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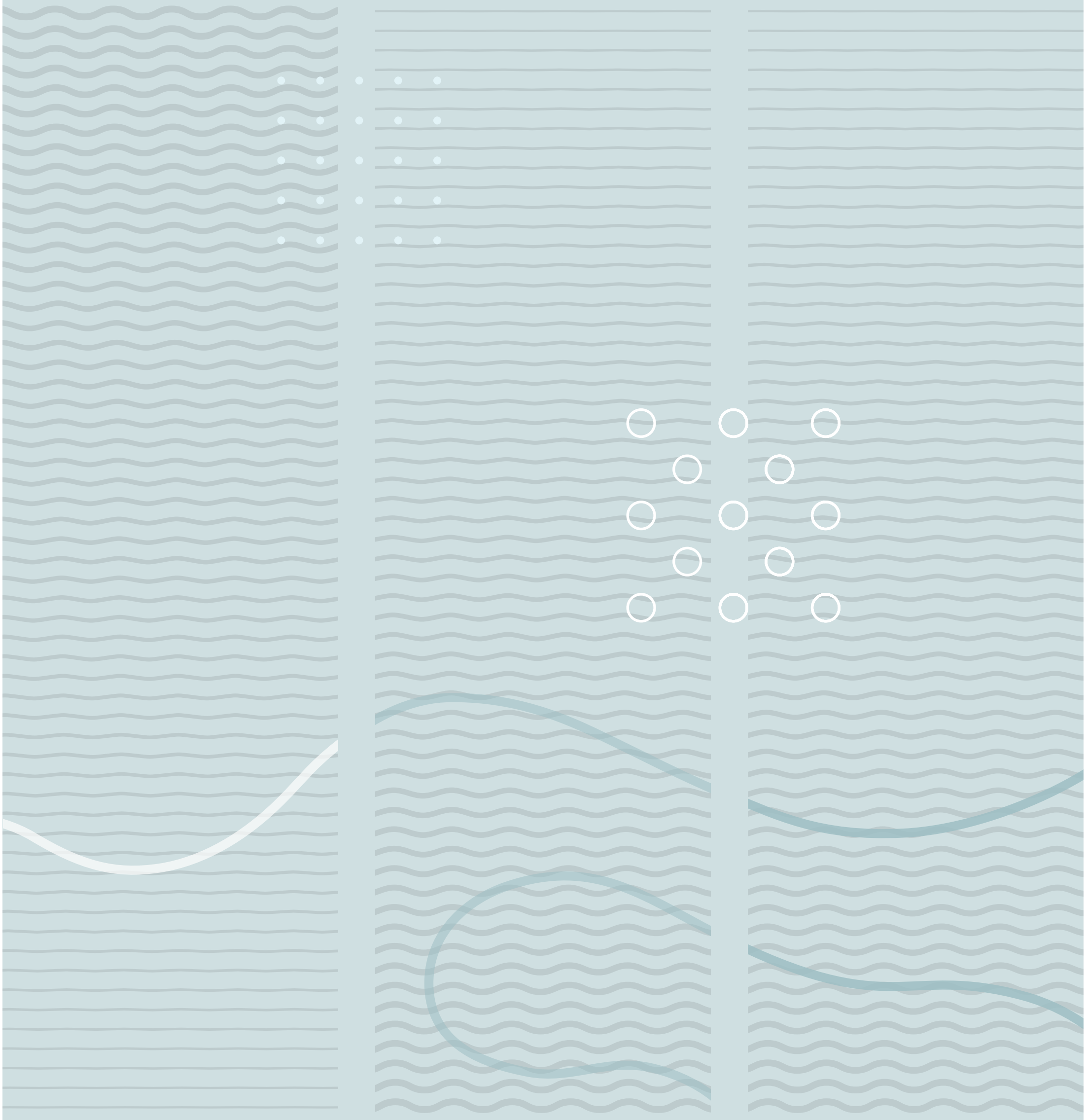
Implementing structured vision assessment in stroke care services: The KROSS knowledge translation project



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Implementing structured vision assessment in stroke care services: The KROSS knowledge translation project

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This project and its result would not have happened without the collaboration and kind response to the project by the health care personnel and service managers in Kongsberg municipality. Thank you for taking the time and efforts in your busy days to participate in the project and the studies. A motivation for working with this topic for such a long time is related to my many years working as a stroke nurse. Many times, have I met stroke survivors with post-stroke visual impairments and struggled to provide them with proper information and advice for follow up. I hope this project can contribute to reduce such experiences for other health care personnel in stroke care. Thanks to all the stroke survivors I have learned to know before and during this project, and your willingness to share your experiences and contributions to the project.

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Abstract

Background

Stroke is a leading cause of death and disability in Norway and internationally. Many functions can be affected by stroke and vision is one of them. Visual impairments (VIs) affect 60% of all stroke survivors, and includes reduced visual acuity, eye movement disorders, visual field defects and perceptual deficits. Post-stroke VIs can lead to a number of negative consequences. It reduces the effect of general rehabilitation, cause immobilisation and reduced participation in activities, and reduced quality of life. Vision rehabilitation and individually adapted information for the stroke survivor and their caregivers can reduce the negative effects of post-stroke VIs. Post-stroke VIs are often overlooked by the stroke survivors and healthcare professionals. To identify post-stroke VIs, the visual function needs to be assessed. Even so, visual assessment is not an integral part stroke care. This represents a gap between knowledge about post-stroke VIs and the current practise in Norway.

Aim

The main aim of this project was to improve stroke care by implementing structured vision assessment in Kongsberg municipality using an adapted version of the KROSS (a Norwegian acronym standing for Competence and Rehabilitation of Sight after Stroke) vision assessment tool. Another aim was to increase the competence and awareness post-stroke VIs among health care personnel. The aims of the three sub-studies are based on different parts of the implementation process. Sub-study 1 explores stroke survivors' experiences of vision care in within stroke health services. The second study assess barriers and facilitators to the implementation of a structured vision assessment in the municipal health care service. In the third study, the implementation outcomes are evaluated.

Methods

We used the Knowledge To Action (KTA) model to plan and organise the implementation project. The KTA model describe the different components in the implementation

process, and consists of a ‘Knowledge Creation’ part and an ‘Action Cycle’ part. We applied a collaborative approach to the implementation and the three sub-studies and included relevant stakeholders in all parts of the implementation. All three sub-studies are qualitative studies. Sub-study 1 is a qualitative interview study with in-depth interviews of 10 stroke survivors with post-stroke VIs. Study 1 and 2 were analysed using inductive content analysis. Sub-study 2 include individual interviews with 11 health professionals and managers. In addition, we included data from two workshop discussions with a total of 26 participants. The results from sub-study 1 and 2 were used in planning and organising the implementation. Sub-study 3 consisted of four focus group interviews. The study had a deductive-inductive approach, and we used a framework for implementation outcomes.

Results

‘Invisible’ vision problems – was the main theme in sub-study 1. The theme represents how the participants experienced post-stroke VIs as an unknown and difficult symptom of stroke. The participants experienced a lack of attention to, and follow-up of their VIs in the health services. VIs was highlighted as a main hinder returning to living the life they had before the stroke. In sub-study 2, individual and contextual barriers and facilitators were identified. The individual barriers were related to the participants' experiences of having low competence of visual function and assessment. They considered themselves as generalists, not stroke experts. Some participants were reluctant due to previous experiences with unsuccessful implementation projects. Individual facilitators were the belief that including vision assessment would improve their services for stroke survivors. If the tool was perceived as useful and evidence based, it would be easier to implement. Contextual barriers were experiences of unclear responsibility for vision care, lack of structured interdisciplinary collaboration and lack of formal stroke routines. Time constraints and practical difficulties related to include the vision tool in the medical records were other contextual barriers. Contextual facilitators were leader support and acknowledgement, in addition to having a flexible work schedule. In sub-study 3, the participants expressed that the structured visual assessment with the KROSS tool was acceptable in their clinical practice. They were motivated to use the new routine because they acknowledged that the visual function influenced other functions, such as mobility and activities of daily living. Most of the participants reported having adopted KROSS, except for the home care service which experienced that they saw few stroke survivors in their service. They all reported increased attention and awareness to post-stroke VIs. The KROSS assessment was considered to be most appropriate in the rehabilitation services where they already perform many function assessments. Although vision assessment was new to all participants, they felt they became more confident in performing the assessment when they used the tool frequently. The good user manual and supervision in their own practice, they experienced the vision assessment as feasible. That the vision assessment was included in the existing routines and systems was important to promote a sustainable implementation.

Conclusion

This knowledge translation project and the three sub-studies have generated new and important insight about the implementation of structured vision assessment after stroke. The three studies provided insight to the gap between knowledge and action from the perspectives of the stroke survivors, but also from the health care personnel who described that they lacked knowledge and skills about visual function and assessment. Stroke survivors from several organizations participated throughout the project and contributed with their experiences and acted as demo patients in the workshops. This was emphasized by the health care personnel as especially motivating. We developed many different strategies to implement the KROSS tool, especially important was the workshops to promote knowledge and skills in assessing vision. In addition arrangements made to supervise the participants practising the KROSS tool were also valuable. The KROSS tool has been adopted in the rehabilitation unit and home rehabilitation in Kongsberg municipality, a stroke unit and the rehabilitation hospital. Using the KTA model to plan and complete the implementation was important for the outcome of the project, because it provided an overview of important elements of the implementation process. The collaborative approach was important for involving and create enthusiasm from health care managers and practitioners in the implementation, promoting a sustainable routine for vision assessment in the municipality

Keywords: Stroke, vision impairments, rehabilitation, implementation, knowledge translation, knowledge to action, qualitative research

List of papers

Paper 1

Falkenberg, H. K., Mathisen, T. S., Ormstad, H., & Eilertsen, G. (2020). “Invisible” visual impairments. A qualitative study of stroke survivors` experience of vision symptoms, health services and impact of visual impairments. *BMC Health Serv Res, 20*(1), 302. doi:10.1186/s12913-020-05176-8

(Falkenberg et al., 2020)

Paper 2

Mathisen, T. S., Eilertsen, G., Ormstad, H., & Falkenberg, H. K. (2021). Barriers and facilitators to the implementation of a structured visual assessment after stroke in municipal health care services. *BMC Health Serv Res, 21*(1), 497. doi:10.1186/s12913-021-06467-4

(Mathisen et al., 2021)

Paper 3

Mathisen, T. S., Eilertsen, G., Ormstad, H. K., & Falkenberg, H. K. (2022). ‘If we don’t assess the patient’s vision, we risk starting at the wrong end’: a qualitative evaluation of a stroke service knowledge translation project. *BMC Health Serv Res, 22,* 351. https://doi.org/10.1186/s12913-022-07732-w

(Mathisen et al., 2022)

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Abbreviations

ADL Activities of daily living

CT Computer Tomography

CFIR Consolidated Framework for Implementation Research

FAST Face Arm Speech Time

GP General Practitioner

ICD 11 International Classification of Diseases

IKT Integrated Knowledge Translation

KROSS Competence, Rehabilitation of Sight after Stroke

KT Knowledge translation

KTA Knowledge to action

MRI Magnetic Resonance Imaging

NIHSS National Institute of Health Stroke Scale

NSD Norwegian Centre for Research Data

PARIHS Promoting Action on Research Implementation in Health Services

RURU Research Unit for Research Utilization

TDF Theoretical Domains Framework

TIA transient Ischemic Attack

VIs Visual impairments

VISA Vision impairment screening assessment

WHO World Health Organisation

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1 Introduction

Stroke is a major cause of death and disability worldwide, and Norway is no exception with 12 000 stroke incidents every year (Ellekjaer & Selmer, 2007; Feigin et al., 2021; Johnson et al., 2019). Vision is one of the functions that can be affected by stroke, either exclusively or, more commonly, in combination with other impairments. Visual impairments (VIs) affect approximately 60% of all stroke survivors (Hepworth et al., 2015; Rowe, Hepworth, Howard, et al., 2019). Post-stroke VIs include reduced visual acuity, visual field defects, eye movement disorders and perceptual problems such as neglect and agnosia (Hepworth et al., 2015). Post-stroke VIs are associated with reduced participation in activities, reduced quality of life, social isolation and reduced effect from general rehabilitation (Hepworth & Rowe, 2016; Sand et al., 2016; Tharaldsen et al., 2020). Early rehabilitation, information, education and the proper use of vision aids can help reduce the negative effects of VIs (Rowe, 2011). A failure to identify a possible visual problem may result in stroke survivors having to live with consequences of VIs that could have been avoided. It can be difficult for stroke survivors and health care personnel to identify the symptoms of post-stroke VIs as visual problems (Berthold-Lindstedt et al., 2017; Berthold‐Lindstedt et al., 2021; Hanna et al., 2017a). In order to address these issues adequately, a patient’s visual function must be assessed by health care personnel and properly followed up.

Both research and current national clinical guidelines for post-stroke treatment and rehabilitation recommend that all stroke survivors should be assessed for VIs, and that patients with VIs should be referred for further follow-up (Berthold-Lindstedt et al., 2017; Hanna et al., 2017b; Hepworth et al., 2021; Rowe, Hepworth, Howard, et al., 2019; Rowe, Hepworth, Howard, Hanna, et al., 2020; The Norwegian Directorate of Health, 2017). Even so, formal visual assessment is not a standard procedure in Norwegian stroke care services (Huseby et al., 2017; Lofthus & Olsvik, 2012a; Sand et al., 2012; The Norwegian Directorate of Health, 2016). This represents a gap between research and knowledge of post-stroke VIs and the practise in stroke care. To reduce this knowledge-action gap, structured vision assessment should be implemented in stroke care. This thesis is an implementation project where a structured vision assessment is implemented in stroke care using the Knowledge To Action (KTA) model for knowledge translation (KT) developed by Graham et al. (2006). It includes three studies of different elements in the KTA process. KT is a dynamic and iterative approach to the implementation of knowledge in health care services (Harrison & Graham, 2021). The project follows up an earlier project on the implementation of a standardised visual assessment tool in acute stroke care (Falkenberg et al., 2016). As part of this work, an assessment tool called KROSS (a Norwegian acronym standing for Competence and Rehabilitation of Sight after Stroke) was developed by the University of South-Eastern Norway in collaboration with the Vestre Viken Hospital Trust and stroke survivor organisations for use in hospitals. In Norway, the main responsibility for post-stroke rehabilitation and follow-up lies with the municipal health services. A new implementation project was planned together with Kongsberg municipality which represents a new context for the implementation of the KROSS tool. The most common post-stroke services in the municipal health care services involve in-patient rehabilitation, home rehabilitation and home care services, and these constitute the baseline setting for this implementation project.

The aim of this project was to improve stroke care by implementing a structured post-stroke visual assessment as part of municipal stroke care services and to increase competence and attention towards VIs after stroke among health care personnel as a means of achieving better post-stroke follow-up.

2 Background

Vision is an important sense. It enables us to perceive our surroundings, and some even claim that it is *the* most important sense (Hutmacher, 2019). Vision represents a dominant sensory input. It is important for learning, memory, mobility and how we interpret the world (Zihl, 2010). Vision is more than just a pair of eyes. It is a complex sensory function involving fine-tuned interaction between the eyes and their muscles, the optical pathway, and the processing of visual information in several parts of the brain cortex and deep structures, such as the cerebellum, brain stem and cranial nerves (Prasad & Galetta, 2011; Watson et al., 2010). In fact, we see with our brain. As a result, any damage to the brain, such as a stroke, can cause a variety of visual problems.

In this chapter, the background for the thesis and the implementation project is presented. First a definition and description of stroke and stroke care, then follows a presentation of visual impairments following stroke. Finally, I argue for the need of implementing a structured vision assessment in stroke care.

2.1 Stroke

More than 12 million people worldwide suffer from stroke each year (Feigin et al., 2021). In Norway, it is estimated that 12,000 strokes occur annually (The Norwegian Directorate of Health, 2022). Even though stroke is the third most common cause of death in Norway, many people survive due to improved medical treatment and acute stroke care (Feigin et al., 2021). The prevalence of stroke in Norway has been reported to be 55,000 and is expected to increase due to an aging population (Wyller et al., 1994). This number represents persons living with a variety of consequences of stroke, many of whom are dependent on short- or long-term health care and rehabilitation services (Langhorne et al., 2011).

Stroke is defined by the World Health Organisation (WHO) as “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin” (Aho et al., 1980, p. 114). If these symptoms pass within 24 hours, the condition is defined as a transient ischemic attack (TIA) (Aho et al., 1980). This definition is based on clinical symptoms related to focal or global functions. Examples of focal symptoms include unilateral paresis, face palsy, aphasia, diplopia and visual field defects (Jung & Mattle, 2019). Global symptoms include reduced consciousness, including coma. There are also other, less specific, symptoms that include a variety of vision disturbances, dizziness, headache and others (Jung & Mattle, 2019). The symptoms and subsequent consequences of a stroke will vary in type and severity depending on the size and location of the stroke. Motor and cognitive impairments, communication problems, visual problems and sensory loss are the most common post-stroke impairments. Many stroke survivors will also suffer from post-stroke depression, anxiety and fatigue (Langhorne et al., 2011).

Stroke is the common name of cerebral infarction, intracranial haemorrhage or subarachnoid haemorrhage (Aho et al., 1980). Cerebral infarction is caused by a blocked artery that results in insufficient blood supply to an area of the brain, whereas haemorrhage is caused by a ruptured artery. A subarachnoid haemorrhage occurs when there is bleeding to the subarachnoid space. Recent developments in medicine and diagnostic imaging, such as computer tomography (CT) and magnetic resonance imaging (MRI), have promoted discussion about the need for an updated definition of stroke that incorporates the occurrence of positive findings on brain images without persisting symptoms (Sacco et al., 2013). Such a definition is expected to be included in the next International Classification of Diseases (ICD 11) published by the WHO (Coupland et al., 2017).

2.2 Stroke services

Stroke is an acute condition in which the time from symptom onset to hospital admission and treatment is crucial the outcomes (Wardlaw et al., 2012). In the case of cerebral infarction, 1.9 million brain cells will die every minute (Saver, 2006). A blocked artery can be re-opened using intravenous thrombolysis, or mechanically by means of a thrombectomy, although the therapeutic window from symptom onset to treatment is short. The benefit of revascularization treatment reduces with time and is recommended for only up to 4.5 hours for thrombolysis and 6 hours for thrombectomy, although up to 24 hours may be effective for certain patients (Frønsdal et al., 2016; Wardlaw et al., 2012).

It is important that the public understand the implications of the short treatment window, and act quickly in response to stroke symptoms. Many campaigns have been initiated, both in Norway and internationally, to increase knowledge and awareness about stroke symptoms with the aim of reducing the time between symptom onset and hospital admission. Most of the campaigns focus on the 'FAST' acronym that combines face-, arm- and speech-related symptoms and the importance of the time factor (Wall et al., 2008). The FAST symptoms include face palsy, resulting in an asymmetric smile, problems with arm movement and an inability to speak coherently. Campaigns focus on the need to act quickly. The most recent campaign run in Norway is called 'Talk, Smile and Lift'. People encountering problems in completing one or more of these functions are advised to call the medical emergency number (Fjærtoft et al., 2018). More than 70% of all stroke patients admitted to hospital in recent years have experienced one or more of the FAST symptoms (Hild Fjærtoft et al., 2021). Visual symptoms are not included in the FAST campaign and may remain undetected because the public are not aware that sudden visual symptoms may indicate that stroke has occurred.

The most important intervention for optimal outcomes is for most stroke patients to be treated in a dedicated stroke unit (Langhorne, Audebert, et al., 2020; Langhorne, Ramachandra, et al., 2020). A stroke unit is a geographically-defined area or ward in a medical, neurological or geriatric department staffed by an interdisciplinary team including a stroke nurse (with coordinating responsibility), together with designated doctors, physiotherapists, occupational and speech therapists who specialise in stroke treatment (Indredavik et al., 1991). In comparison with treatment in a general ward, treatment in stroke units reduces mortality and subsequent dependence on assistance (Langhorne, Ramachandra, et al., 2020). A stroke unit combines structured clinical observation, physical monitoring to prevent complications, acute rehabilitation and medical investigation (The Norwegian Directorate of Health, 2017).

Post-stroke rehabilitation usually starts in the stroke unit within the first 24 to 48 hours provided that the patient is medically stable (Langhorne, Audebert, et al., 2020). After initial stroke treatment, the need for rehabilitation will be assessed. The Norwegian health care system is comprised of specialist and primary health care services, both of which are publicly funded (Saunes, 2020). In Norway, post-stroke rehabilitation is organized under both specialist health care and primary health care services (Saunes, 2020). The specialist health care services are provided by the state via the Regional Health Authorities, and include hospitals, outpatient specialist services, and specialist rehabilitation. Primary health care is provided by the municipalities and consists of general rehabilitation, long-term care, nursing and preventive care provision (Saunes, 2020). Norway is made up of 356 municipalities of various sizes. Specialist health care rehabilitation is provided by the public hospital trusts or by private institutions that offer stroke rehabilitation on behalf of the hospitals. Rehabilitation as part of primary care is provided by the municipalities.

According to the Norwegian National Stroke Register treatment in acute care is normally short, with a median duration of five days (Hild Fjærtoft et al., 2021). 35.1% of patients are discharged to their own homes with no need of further rehabilitation or assistance. A total of 23.7% of patients are referred to a rehabilitation centre, of which the municipal health services cater for 61.7%, while 38.3% receive rehabilitation from the specialist health care services (Hild Fjærtoft et al., 2021). Municipal rehabilitation consists of inpatient, home and outpatient rehabilitation, as well as a combination of home and outpatient rehabilitation.

Although the teams in stroke units and rehabilitation are interdisciplinary and consists of many different professions, currently there are no tradition for including vision experts such as optometrists, orthoptists or ophthalmologists to such teams (Roberts et al., 2016; The Norwegian Directorate of Health, 2016). Patients are normally referred to a thorough vision assessment only if a VI is suspected (Lofthus & Olsvik, 2012a; Rowe et al., 2016; Rowe et al., 2015).

2.3 Visual impairments following stroke

The various visual impairments that may occur following stroke are defined by Hepworth et al. (2015) as "a deficit of visual function and includes abnormalities of peripheral vision, central vision, eye movements and a variety of perception problems" (Hepworth et al., 2015, p. 2). This definition will be applied in this thesis.

VIs are common after stroke. A retrospective register study of 11,900 stroke survivors using vision items provided by the National Institute of Health Stroke Scale (NIHSS), horizontal eye movement and visual field tests, found that 60.5% experienced post-stroke VIs (Ali et al., 2013). A review of 61 studies found that the overall prevalence of post-stroke VIs was 65%, exhibiting a variation among the studies from 7% to 92% (Hepworth et al., 2015). Many of these were prevalence studies and may include VIs that were already present prior to the stroke. In 2019, Rowe, Hepworth, Howard, et al. (2019) published a prospective study involving 1,033 stroke survivors. The survivors' visual function was assessed at a median three days after admission to a stroke unit. Their visual status prior to the stroke was obtained from medical records and compared with their post-stroke visual function. Sixty percent were identified with VIs acquired after their stroke, while 73% had VIs that involved both pre-existing and new problems (Rowe, Hepworth, Howard, et al., 2019). These numbers are now accepted as the probable incidence and prevalence of post-stroke VIs.

It is common to observe a combination of two or more of the different VI categories following stroke. Rowe, Hepworth, Howard, et al. (2019) found that while 18% of stroke survivors had problems with just one of the four VIs, 54.8% had combination of different visual impairments. Impairment combinations serves to complicate the presentation of post-stroke VI symptoms and are known to affect high-level visual tasks such as reading.

Reduced visual acuity

Visual acuity describes our ability to resolve details in an image. Visual acuity is important for many visual tasks, seeing details in shapes, contrasts and colour not least for reading. It is related to the optics of the eye (including refractive error, clarity of ocular media, pupil size) and the ability of the retina and visual pathway to process light to form a sharp image on the retinal fovea. It is commonly assessed by testing a patient’s ability to identify small and highly contrasted letters as a logMAR chart (Westheimer, 1965). In addition to the function of the optical structures in the eye, visual acuity also depends on contrast sensitivity, eye movements, fixation and perception (Kerkhoff, 2000).

Hepworth et al. (2015) reported that reduced visual acuity and central vision deficits affect up to 70% of stroke survivors, with a mean value of 53% as part of a systematic review. They also reported that the patients’ glasses were either missing, dirty or had the wrong prescription (Hepworth et al., 2015). Rowe, Hepworth, Howard, et al. (2019), found that 56% of those studied exhibited reduced central visual acuity.

Visual acuity reduces with age and the most common cause of reduced visual acuity is normal aging, caused by changes to the intraocular lens and pupil size (Cedrone et al., 2009; Van der Pols et al., 2000). Stroke patients typically occupy an age demographic characterised by a high frequency of medical conditions that may impair visual acuity, such as cataracts and macular degeneration (Sand et al., 2013). Optimal correction, combined with advice on lighting, offers important interventions for stroke survivors with reduced visual acuity. Low vision aids may be necessary for some patients (Hanna et al., 2017b).

Visual field defects

Our visual field describes the area of our surroundings from which we perceive light during steady fixation. Normally our visual field reaches more than 90 degrees temporal, 60 degrees nasal, 60 degrees up and 70 degrees down (Wang et al., 2019). Our total horizontal visual field varies from 140 to 180 degrees (Figure 1). Most of our visual field is covered by both eyes (binocular visual field, approx. 120 degrees), with the exception of the most distal temporal part of the visual field, which is covered by one eye only. Visual field defects arise when parts of our normal visual field are missing (Hepworth et al., 2015). They vary in size and may be located centrally or peripherally.

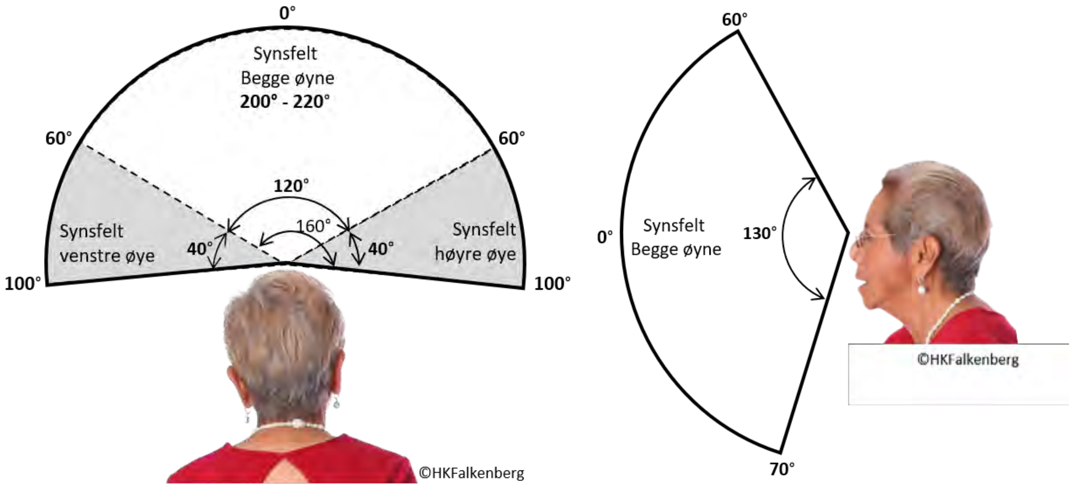


Figure 1. Illustration of normal visual field.

The optic nerve (*nervus opticus*) emerges from each eye and the optic nerve fibres meet in the optic chiasma (Zihl, 2010). From the chiasma, the fibres divide in two separate nerves (optic tracts), one on each side of the brain. Information from the left side of the retina (right side of the visual field) from both eyes is merged on the left side, and information from the right side of the retina (left side of the visual field) is merged on the right side (Schiefer & Hart, 2007). A stroke that occurs in the visual pathway before the chiasma may result in a visual field defect in one eye. A stroke located after the chiasma can cause hemianopia, which is a loss of vision on one side of the visual field, affecting both eyes. Quadrantanopia is the loss of the upper or lower part of a patient's visual field on one side in both eyes.

The incidence of visual field defects after stroke varies in studies from 5.5% to 57% (Hepworth et al., 2015). This variation is related to the time between the incidence of the stroke and the study itself, and to whether the defects were self-reported or objectively assessed. Rowe, Hepworth, Howard, et al. (2019) identified visual field loss in 28%. Many people with visual field defects are unaware of their impairment and report experiencing a complete visual field (Townend et al., 2007), leading them to question the results of visual field assessments (Hazelton et al., 2019).

Eye movement disorders

In order to provide a clear and stable gaze, both of our eyes require accurate and coordinated motor control. This is key to binocular vision, by which two eyes can focus on a single object from slightly different angles and thus resolve a single image in the brain (Ygge, 2011). Eye movement disorders can lead to a variety of problems such as double vision, reduced acuity, and oscilliopsia (Kommerell, 2007). Important functions that depend on well-functioning eye movements include fixation (the ability of the eyes to maintain a steady focus on a specific object), conjugate movements (by which the eyes move in the same direction while maintaining focus on a moving object) and pursuit movements (the ability to follow a moving object with smooth movements). Also important are saccadic movements, which involve rapid shifts between different areas of focus (fixations) and are especially important during reading. Vergence or disconjugate eye movements occur when the two eyes move in opposite directions, as is the case when watching an object that is moving towards you.

Eye movement disorders encompass a wide variety of different conditions, such as strabismus, diplopia, eye movement palsy, nystagmus and reduced convergence, and it is reported that between 22 and 54 percent of stroke patients suffer from eye movement problems, with a mean of 33% (Hepworth et al., 2015).

Visual perception deficits

Visual perception is the process of creating a meaningful concept from visual input (Colwell et al., 2021). Visual perception deficits include visual inattention/neglect, hallucinations, agnosia (loss of the ability to recognise and interpret objects or faces), problems with colour detection and depth perception, visual memory impairments and visuospatial disturbances (Hepworth et al., 2015; Zihl, 2010). Visual inattention or neglect are related to difficulties in perceiving visual stimuli on one side of space, and are the most common post-stroke perceptual disorders, affecting 32% of stroke survivors (Hepworth et al., 2015). In the hierarchal view of visual function, visual perception is referred to as being a higher level visual function, closely linked to the lower visual functions (Chang et al., 2017).

Consequences of post-stroke VIs

Stroke is a life-changing event for stroke survivors, many of whom have to make adaptations to their lives in response to post-stroke impairments (Eilertsen et al., 2010; Kirkevold, 2010). Post-stroke visual impairments generally affect survivors' lives negatively. They are associated with reduced quality of life (Hepworth & Rowe, 2016; Sand et al., 2016; Tharaldsen et al., 2020), fatigue (Berthold Lindstedt et al., 2019) and reduced participation in work and leisure activities (Hazelton et al., 2019; Rowe, 2017; Smith et al., 2018) and activities of daily living (ADL) (de Haan et al., 2015; Wolter & Preda, 2006). General stroke rehabilitation is commonly based on functional training in daily activities and focuses on the integration of visual sensory information with motor function in order to promote a natural and functional motion. Post-stroke visual impairments may reduce the effects of rehabilitation (Jones & Shinton, 2006) and are also associated with increased mortality (McCarty et al., 2001; Sand et al., 2018). In order to reduce these negative effects, it is important that the VIs are identified and properly followed up.

Post-stroke vision rehabilitation

The various rehabilitative approaches to VIs following stroke and other acquired brain injuries (ABI) are often described as compensation, substitution or restitution (Hanna et al., 2017b; Kerkhoff, 2000; Zihl, 2010). In compensative rehabilitation, the aim is to use remaining intact visual function to compensate for the impaired function as a means of improving overall visual input (Kerkhoff, 2000; Khan et al., 2008). Substitutive rehabilitation interventions refer to the use of optic and low vision devices combined with environmental adaptation, while restitution refers to efforts to restore the impaired function based on new knowledge about the brain's plasticity (Kerkhoff, 2000).

A challenge is the lack of high quality studies that demonstrate the effect of rehabilitation on visual field defects (Pollock et al., 2019), spatial neglect (Longley et al., 2021) and eye movement disorders (Pollock et al., 2011). However, two recommendations have been included in the Norwegian clinical guidelines for rehabilitation and treatment of stroke. The first addresses compensative training for visual field defects, and the second training in visual search techniques to address visual neglect (The Norwegian Directorate of Health, 2017). Even with limited amounts of high-quality evidence, there is an understanding that a thorough assessment of visual function, combined with person-centred information and education provided to patients and their caregivers, and supported by an awareness of VIs among health care personnel, may help to reduce the negative effects of VIs (Hazelton et al., 2019; Rowe et al., 2016; Rowe, 2011, 2017; Rowe et al., 2015).

Symptoms of VIs after stroke

Patients report a number of symptoms following stroke, such as blurred, altered or reduced vision, visual field loss, diplopia, reading difficulties, visual hallucinations, watery, dry or gritty eyes, photophobia, image movement problems, oscillopsia, difficulties in identifying people or finding objects among clutter, visual disorientation, increased glare from surfaces, changes in depth and distance, visual illusions, colour and face recognition problems, eye strain, migraine with aura, after-images, inattention, polyopia, static images that appear to move, difficulties with object recognition and getting lost (Hepworth et al., 2021).

The most frequently reported symptoms of post-stroke VIs include visual field loss, blurred vision, reading difficulties and diplopia. Less common symptoms include oscilopsia, hallucinations, depth impairment, photophobia, colour disturbance and trouble in finding things (Hepworth et al., 2021; Rowe, 2013). Some visual symptoms, such as visual field loss, visual field loss and diplopia for ocular motility problems, are directly linked to the vision impairment. Other symptoms may be less specific and caused by a variety of vision problems. Problems with reading or trouble finding things may be related to visual field defects, visual inattention, agnosia or other conditions (Rowe, 2013).

Not all stroke survivors with VIs either experience or report symptoms related to their visual impairment. Neglect and other perceptual deficits are common impairments but are frequently not reported by stroke survivors. Visual field loss and strabismus are also underreported. (Berthold-Lindstedt et al., 2017; Berthold - Lindstedt et al., 2021;

Hepworth et al., 2021; Rowe, 2013). A study of 1,500 stroke admissions revealed that 703 persons were identified with new or partially new VIs after their stroke. Only 47.1% reported visual symptoms, while 38.4% reported no symptoms at all and 14.5 % were unable to report any symptoms (Hepworth et al., 2021). Younger patients with less severe strokes are more likely to report visual symptoms (Hepworth et al., 2021). A study using the Vision Interview approach found that patients with acquired brain injury, including stroke, when asked if they experienced any visual problems, consistently underreported visual symptoms or tended to link them to other impairments (Berthold-Lindstedt et al., 2017).

2.3.1 Post-stroke vision assessment

In the light of the aforementioned underreporting, it is important to establish a system in health care services that ensures that the 60% or more of stroke survivors that have a VI are identified. A literature review of screening methods for post-stroke visual impairments carried out by Hanna et al. (2017a) showed that although there exist instruments for the assessment of post-stroke visual function impairment, there is no single tool that can identify all such impairments. It is particularly difficult to assess patients with communication problems and cognitive impairments. The authors highlighted the need for an assessment tool that can also be used by non-vision experts to examine stroke survivors for vision impairments (Hanna et al., 2017a). Rowe, Hepworth and Kirkham (2019) developed a set of core outcomes for post-stroke vision screening as part of a consensus study that included the following; previous ocular history and use of glasses, case history open questions, observations, visual acuity, ocular alignment and eye movements, visual inattention, visual fields, reading ability and functional vision. In a study of patients with acquired brain injury, including stroke, Berthold-Lindstedt et al. (2021) found that VIs are best identified by using a combination of symptom reporting and clinical investigation.

In recent years, vision assessment tools have been developed and tested with the aim of detecting possible VIs to identify patients that require a proper visual examination by a vision expert. The vision screening assessment tool (VISA) have improved the detection of post-stroke VIs for stroke experts without vision expertise (Rowe, Hepworth, Howard, Bruce, et al., 2020). Compared to a pre-defined gold standard, the StrokeVision app has also been shown to be effective in assessing vision in stroke care (Quinn et al., 2018). An Australian study found that using an assessment tool increased VI identification rates among non-orthoptic health care personnel (Jolly et al., 2013).

The KROSS tool

In Norway, Falkenberg and colleagues have developed and piloted the KROSS vison assessment tool (Falkenberg et al., 2016; Falkenberg et al., 2013; Falkenberg et al., 2018), named for the Norwegian acronym for 'Competence, Rehabilitation of Sight after Stroke'. The tool was designed as part of a KT project to assist multidisciplinary health care personnel in stroke units to assess vision after stroke. KROSS was developed and tested by the University of South-Eastern Norway in collaboration with the Vestre Viken Hospital Trust and stroke survivor organisations, and resulted from a consensus following discussions addressing both feasibility and clinical accuracy of the tool in specialist health services. A training programme was also developed during the piloting process.

As with other assessment tools, and in line with the core outcomes for post-stroke vision screening, the KROSS tool includes assessments of visual acuity, visual field, eye movements and visual attention. It also addresses the clinical observation of ADL, history of previous eye health and the presence of vision symptoms. The KROSS tool with its user manual can be seen in appendix 1 in the version adapted to the local context of this KT project.

2.4 Vision assessment and follow up needs to be implemented in stroke care

In order to improve follow-up and rehabilitation of post-stroke VIs, potential visual problems must be identified. Given the high numbers of stroke survivors with VIs, it might be expected that vision assessment would be an integrated part of stroke care services. During recent decades, Norway has improved its stroke care services and has experienced significant reductions in mortality and morbidity, making it one of the best performing countries in the world (OECD, 2019). However, the assessment of visual functions, followed by a well-defined pathway for follow-up and post-stroke vision rehabilitation, is yet to be established as a routine component of Norwegian stroke care. In their study of patients admitted with cerebral infarction or symptoms of visual field defects, Sand et al. (2012) found that only 9.6% were referred to perimetry, and only 2.3% to visual rehabilitation. In another study, they found that a patient is less likely to receive thrombolysis in a stroke a stroke related to posterior circulation (Sand et al., 2017). Although the Norwegian clinical guidelines for stroke rehabilitation and treatment recommend that vision should be assessed, and that patients with visual problems should be referred to a vision specialist, they do not specify the functions that should be included in such assessments or the specialists that should be responsible for follow-up (The Norwegian Directorate of Health, 2017). Current procedures for vision assessments are unclear and fragmented acute stroke units perform some assessments of the visual function as part of a neurological examination, (Lofthus & Olsvik, 2012a; The Norwegian Directorate of Health, 2016). Norwegian patient organisations have repeatedly launched initiatives to improve post-stroke vision care (blindeforbundet.no, 2021; Solli, 2021). A few international qualitative studies of stroke survivors report that post-stroke VIs receive little attention, either during acute stroke care or rehabilitation. Many stroke survivors make their own compensatory adaptations to their VIs and feel left to themselves to deal with their problems (Hazelton et al., 2019; Rowe, 2017; Smith et al., 2018). This illustrates a gap between what is recognised as proper care for post-stroke VIs and the current practise in Norwegian stroke care and calls for implementation of a structured vision assessment. In this project we followed up the previous implementation of the KROSS tool in stroke units (Falkenberg et al., 2016) with an implementation in municipal stroke care. In Norway, most stroke patients are treated in designated stroke units and are subsequently followed up by the municipal healthcare services. The implementation project employed the KTA model developed by Graham et al. (2006). This approach provides an overview of the implementation phases and has been widely used in the implementation of knowledge, tools and routines in health care services, including in stroke care and rehabilitation (Esmail et al., 2020; Field et al., 2014; Janzen et al., 2016; Moore et al., 2021). Figure 2. shows the model which consists of a ‘Knowledge Creation’ part and an ‘Action Cycle’ part. The KTA model is described in details in Chapter 4.2. Based on the knowledge presented in the foregoing, the aims of this implementation project are defined as follows; i. all stroke survivors should be assessed for VI’s using an assessment tool. ii. Increase competence and attention on post-stroke VIs among health care personnel. The KTA model was used as a guide throughout the planning and execution of the implementation and the previously described KROSS assessment tool was implemented in three municipal health care settings; (a) a rehabilitation unit, (b) home care services, and (c) home rehabilitation services. During the initial implementation phase, we included participants from both a specialist rehabilitation hospital and the stroke unit of a local hospital

3 Aims and research question

The overall aim with this KT project was to improve municipal stroke services for persons with post-stroke VIs by implementing vision assessment for stroke survivors using an assessment tool. An additional aim was to increase competence and attention on post-stroke VIs among health care personnel. The KTA model guided the process which included a participatory approach to KT and included all relevant stakeholders. In the methods section the whole KT process is described in details, while the sub studies address three different KTA elements. Table 1 provides an overview of the research questions linked to the three sub-studies based on the elements of the KTA model they address.

Table 1 *Overview of the subs-studies research questions related to the KTA elements*

KTA element	Sub-study	Research questions
Identify the problem (gap between knowledge and practice)	"Invisible" visual impairments. A qualitative study of stroke survivors' experiences of vision symptoms, health services and impact of visual impairments.	How do stroke survivors experience the way specialist and municipal health care services address and attend to VIs in stroke care? How does VIs affect everyday life in the first months post-stroke?
Assess barriers to knowledge use	Barriers and facilitators to the implementation of a structured visual assessment after stroke in municipal health care services	What are the barriers and facilitators to the implementation of structured visual assessment in municipal health care services?
Evaluate outcomes	'If we don't assess the patient's vision, we risk starting at the wrong end': a qualitative evaluation of a stroke service knowledge translation project	What are the implementation outcomes after the implementation of KROSS in health care services?

4 Methodology

In this chapter I first present the theory used in the implementation project and the sub-studies, then follows a description of how we applied the KTA model in this project. The qualitative approach used in the sub-studies is presented in the end of this chapter.

4.1 Implementation science

The approach to this project and the aims of the sub-studies were guided by the elements of the KTA model. This chapter describes how the three sub-studies are positioned within the KTA model, as well as all the other work related to the implementation. A summary of each sub-study is presented in Chapter 5. I will firstly provide a description of implementation science and practice and of where the KTA model is situated within this discipline. Secondly, I will explain how the KTA model was applied in practice in this project.

The science of implementation often focus on building theory and studying different aspects of practise change such as determinants of knowledge use, effective implementation strategies and outcome evaluation (Harrison & Graham, 2021). The following definition from 'Implementation Science' will be used in this thesis. This definition incorporates not only the implementation of guidelines and knowledge-based practice, but also the application of minor, practical changes to improve health care services. "Implementation research is the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services and care." (Eccles & Mittman, 2006, p. 1).

As a distinct discipline, implementation science is a relatively recent development, but it already constitutes a rapidly-growing field (Nilsen & Birken, 2020). The focus on active implementation started to grow in parallel with the development of the evidence-based medicine movement in the 1990s. There is a challenge in health care services that only 60% of current practise is in line with evidence-based or consensus guidelines, thirty percent of practice is considered to be of low value, and 10% of the practise is harmful (Braithwaite et al., 2020). Active implementation represents a move away from the straightforward dissemination of research results, under the expectation that health care personnel would adopt these as part of their practice, and towards a more systematic process for the active implementation of new knowledge. The volume of published research is too overwhelming for health care personnel to navigate in, and there is a need to develop methods of assessing and selecting the knowledge that needs to be implemented, while at the same time removing ineffective practice (Graham et al., 2006).

Theories, models and frameworks in implementation science

There are many benefits to basing implementation practice and research on theory, although there is some discussion as to whether or not the implementation of theory actually improves implementation outcomes (Damschroder, 2019). Theories, models and frameworks are conceptual tools to provide help in planning, implementing, evaluating and sustaining change (Harrison & Graham, 2021; Lynch et al., 2018). Basing implementation on sound theory, tested in practice, can promote the accumulation of knowledge. Theoretical assumptions can thus be applied, tested and further developed. The use of theory may prevent implementers from repeating others mistakes (Damschroder, 2019; Nilsen, 2020).

Different theories, models and frameworks have been developed and used in various implementation contexts and projects. Lynch et al. (2018) provides the following definitions of the frameworks, models and theories in implementation: “A framework lists the basic structure and components underlying a system or concept. A model is a simplified representation of a system or concept with specified assumptions. A theory may be explanatory or predictive, and underpins hypotheses and assumptions about how implementation activities should occur”.

As part of a narrative review, Nilsen (2015) provides an overview of implementation theories, models and frameworks and categorises them on the basis of their origins, development and applications (Nilsen, 2015). Process models are those that specify and describe the phases involved in translating research into practice. Such models are practical, in that they contain step-by-step descriptions of implementation processes (Nilsen, 2020). The processes are active in the sense that they rely on deliberate actions in order to change practice (Graham & Tetroe, 2013). Determinant frameworks aim to describe constructs or concepts that influence the outcomes of implementation (Nilsen, 2020). Such constructs are influenced by barriers and facilitators that are either expected to make an impact on an implementation, or which have been documented so to do (Damschroder, 2019). Determinant frameworks imply a relationship between the object of an implementation, potential strategies that promote implementation and the implementation outcomes. Classic theories refer to theories of change. They typically have their origins in other fields, such as sociology, psychology and organisational theory. Classic theories are often passive, in the sense that they do not promote change, but rather investigate the causes of change (Nilsen, 2020). Implementation theories are either developed specifically for, or adapted to, implementation. These theories seek to understand or explain specific aspects of implementation. Evaluation frameworks are those designed with the aim of evaluating implementation. They address themselves to aspects that are considered essential to implementation success (Proctor, 2020).

During this project we have looked into many of the theories, models and frameworks in implementation. We were inspired by determinant frameworks like the Theoretical Domains Framework (TDF) when assessing barriers and facilitators (Michie et al., 2005). In the evaluation of the implementation we used an evaluation framework developed by Proctor et al. (2011). Although the main theoretical foundation in this project was the KTA model, a process model, that we used throughout the project.

4.2 Knowledge translation and the Knowledge to Action model

The practise of bringing research into practice has been given many names and definitions, such as dissemination, research uptake, research use, and so on (Graham et al., 2006). However, the term ‘implementation’ has become the common term in European contexts. Initially in Canada, and then later in the US and by the WHO, the term Knowledge Translation (KT) has become more widely used to describe the process of closing the gap between knowledge and practice (Straus et al., 2013). KT is defined as:

“the dynamic and iterative process that includes synthesis, dissemination, exchange, and ethically-sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system.” (Canadian Institutes of Health Research, 2016). KT includes assessment of the knowledge, making the knowledge user aware of the knowledge and improving the health care services and systems by facilitating knowledge use (Harrison & Graham, 2021).

Graham et al. (2006) have developed the KTA model as a model for practising KT. As part of their work to develop the KTA model, the authors reviewed over 30 so-called ‘planned action theories’ in an attempt to identify the elements and phases that are important for implementing knowledge in health care contexts. They identified activities that were commonly used in planned changes of practice and placed these within a cycle of actions that subsequently developed into the Action Cycle illustrated in the model in Figure 1. The action cycle consists of the following seven phases that should be considered in implementation contexts; (a) identify the problem (the existing gap between knowledge and practice), (b) identify, review and select relevant knowledge, (c) adapt knowledge to local context, (d) assess barriers to knowledge use, (e) select, tailor and implement interventions, (f) monitor knowledge use and (g) evaluate outcomes and sustain knowledge use. Although the phases are presented in a logical order, the process is dynamic and the phases can take place simultaneously and interact with each other (Graham et al., 2006; Harrison & Graham, 2021).

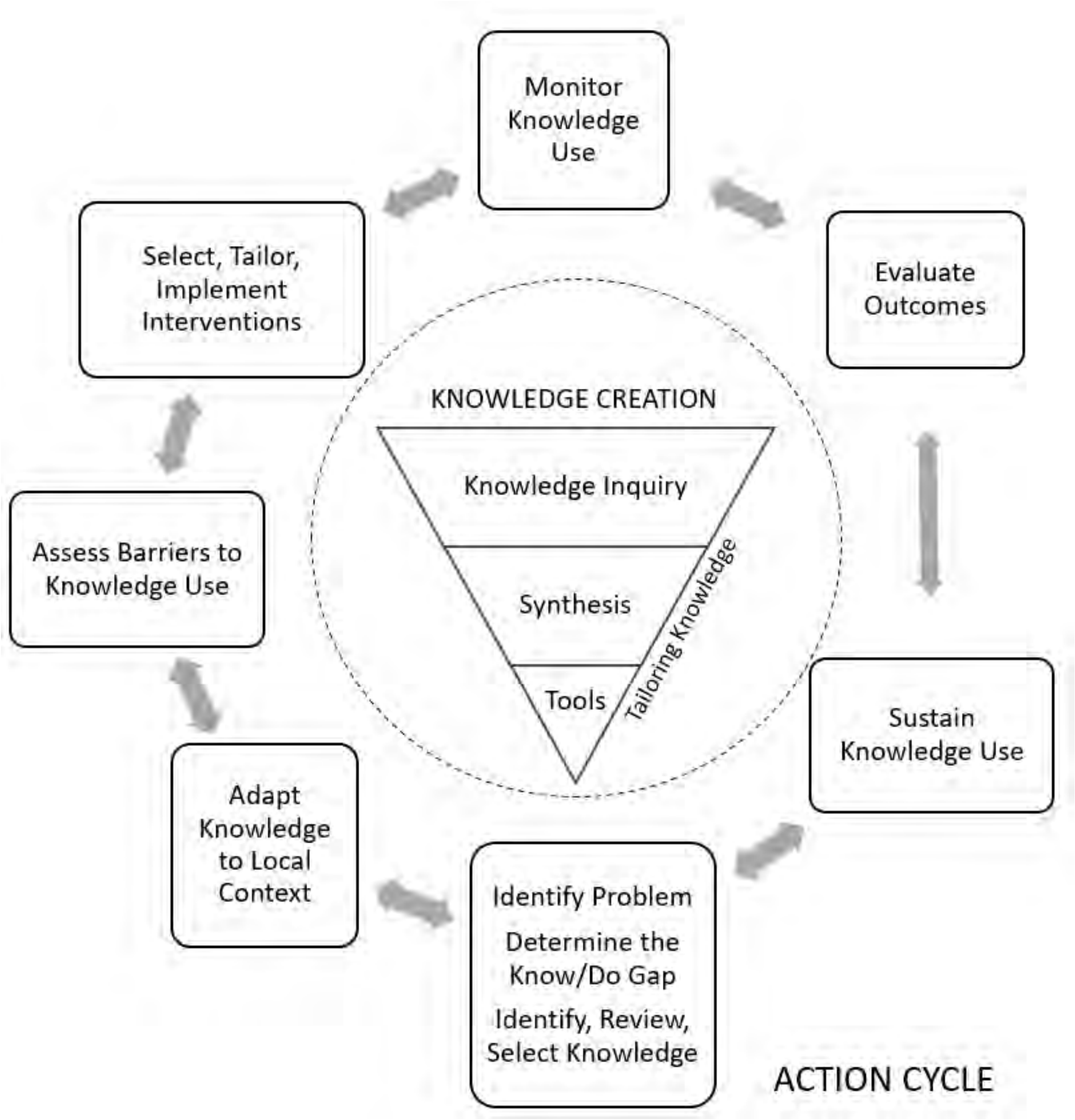


Figure 2. The knowledge to action cycle. Adapted with permission from: Lost in knowledge translation: time for a map? Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., & Robinson, N. (2006). *J Contin Educ Health Prof, 26*(1), 13-24. https://doi.org/10.1002/chp.47

In addition to the planned action components, Graham et al. (2006) added a knowledge creation element to the model. Knowledge creation is the process of identifying single studies, literature syntheses, guidelines and tools that relate to a specific practice. The knowledge creation phase may differ between projects depending on the level of available evidence obtained from publications relating to the knowledge to be implemented. In some cases, published reviews and guidelines may already exist, while in others knowledge has to be created or synthesised. Knowledge in this context is defined as more than simply research findings, and may include key elements such as local data, organisational culture and context, professional experience and patient preferences (Straus et al., 2013).

According to Nilsen's taxonomy of implementation theories, models and frameworks, the KTA model is categorised as a process model (Nilsen, 2015). We chose the KTA model for this present project because it seemed to be suitably representative of the relevant phases, and thus provided a practical overview of the implementation process. The KTA model has previously been used in implementation projects in a variety of settings, including rehabilitation (Esmail et al., 2020; Field et al., 2014; Moore et al., 2021). It is also clear and easy to understand for the users of the model (Lynch et al., 2018). The present project is both a KT practice project and a KT research project, using the KTA model to implement post-stroke structured vision assessment. To plan and prepare the KT project we performed three sub-studies. In the first study we examined the knowledge to action (know-do) gap. In the second, we studied the barriers to, and facilitators of, implementing knowledge, and in the third study we evaluated the implementation outcomes.

4.2.1 A participatory approach to Knowledge Translation

An approach to participatory research in which knowledge users and other stakeholders work together with researchers during the various stages of knowledge production is Integrated knowledge translation (IKT) (Bowen & Graham, 2013; Jull et al., 2017). In this project, we have applied a participatory approach inspired by IKT, involving municipal managers, administrators, service unit leaders, practitioners and representatives from user organisations in its planning and execution. This approach also serves to promote engagement among the project participants rather than a passive transfer of knowledge (Keefe et al., 2020).

There are different approaches to KT. So-called ‘end-of-grant’ KT describes the process of implementing knowledge at the conclusion of a study (Graham et al., 2013). Typically, the researcher will provide a description of how the results of the study will be disseminated to practice or, in a clinical context, when a clinical guideline, procedure or tool, designed for use in practice, has been developed and should be implemented (Graham et al., 2013). It is common in the biomedical paradigm to assess the observed gap between knowledge and action as a dissemination problem (Bowen & Graham, 2013). Evidence-based practice (EBP) constitutes part of this paradigm and is focused on transforming evidence into practice using clinical guidelines and tools as aids in decision-making. EBP focuses on teaching practitioners how to access, read and apply evidence in their own clinical settings (Bowen & Graham, 2013). In recent years, Norway has initiated a number of programmes designed to promote quality in health care, typically prepared by high-level managers, bureaucratic administrators or politicians eager to deliver solutions to perceived problems afflicting the health care services. Unfortunately, many of these programmes exhibit a one-size fits-all design approach that fails to consider clinical practice in local contexts (Catchpole & Russ, 2015; Martin et al., 2015).

A pitfall that may arise when researchers or health service managers introduce new knowledge and tools to clinical practice is that knowledge users may not recognize the need for the specific knowledge. There is a need in such cases for other methods that actively involve the knowledge users in the development of research questions and the creation of knowledge (Bowen & Graham, 2013). In this way, the uptake and sustainability of knowledge is promoted because the knowledge itself directly addresses questions relevant to clinical practice.

Our participatory approach harmonizes well with the principles of person-centred research and practice. This is an approach to practise that include mutual respect and understanding between all involved persons and is enabled by cultures of empowerment (McCormack & McCance, 2017a). The values and principles of person-centred practice have also been applied in person-centred research (Dewing et al., 2021; Sandvik & McCormack, 2018). In this project, we have worked to create and foster healthful relationships between all stakeholders by involving health care managers, service unit leaders and personnel, as well as stroke survivors representing user organisations that have participated as partners in the project. Detailed descriptions of all the steps in the process, together with the participants, are given in Chapter 4.3. Person-centred research should be with persons, not about persons. And, it should create the conditions for empowerment by means of inclusion, participation and collaboration (Dewing et al., 2021). The IKT approach will also apply to implementation practise. It may help in co-creating the local adaptation making the knowledge fit better to the specific context (Harrison & Graham, 2021)

4.3 Application of the KTA model

In the following chapter I will describe how the project was planned and completed by applying the KTA model using a participative approach.

4.3.1 Knowledge creation

Initially, implementation of a structured vision assessment using the KROSS tool in a municipal stroke care context was discussed between the University of South-Eastern Norway and Kongsberg municipality. As presented in Chapter 2 of this thesis (Background), research related to the importance of post-stroke vision assessment, including qualitative and quantitative single studies, reviews, debate articles, clinical guidelines suggested that all stroke survivors should be assessed for VIs using an assessment tool that includes assessments of visual acuity, visual field, eye movements and visual perception. Stroke survivors with VIs should be properly followed up and referred to vision specialists if a problem is identified and there is a need to increase the general awareness of VIs in stroke care contexts. On the basis of previous development, implementation and evaluation of the KROSS tool in two stroke units (Falkenberg et al., 2016; Falkenberg et al., 2013; Falkenberg et al., 2018), the University and the municipality agreed to engage in a KT project addressing post-stroke VIs using the KROSS tool and educational workshops.

Establishing a research and practice partnership

The supervisor of this PhD project and the municipal partners worked together with user organisations to prepare an application for research funding for the project. Kitson and Straus (2013) suggests to engage the end users and all stakeholders when choosing which topic of knowledge that should be assessed. The research group had worked with implementing assessment of post-stroke VIs in other contexts. The municipality showed interest in the previous implementation project and expressed that assessment and follow-up of post-stroke VIs was important to patients in municipal health care and that such research would represent potential improvements to their services. The knowledge-action gap was also discussed during the collaborative meetings with the municipal managers and health care personnel, who confirmed that VIs were not assigned specific focus as part of municipal health care services. Visual function was seldom discussed among municipal health service managers or health care personnel.

Together with the Norwegian Association for the Blind and Partially Sighted, the Norwegian Stroke Association and the Heart and Lung Association (*LHL Hjerneslag*), Kongsberg municipality and the University of South-Eastern Norway it was applied for funding from the Norwegian Dam Foundation. Funding for a PhD project involving a person-centred research programme was subsequently granted under project number 2017/FO147431.

Once funding was granted and the PhD candidate was in place, a project partnership was established between the research and the practice groups. The PhD fellow (Project Manager) and the supervisor formed a partnership with the head of the coordinating unit, the rehabilitation coordinator and the quality advisor at the municipal health care services. This group constituted the research and practices partnership group and met frequently during the project to discuss and plan the KTA process. The group consulted participants from the user organisation throughout the project.

The role of the Project Manager was to plan, initiate and facilitate the implementation together with the partners, as well as design and perform the studies in collaboration with the supervisors. Key elements of this work included coordination, the planning and arranging of meetings, the writing of minutes, the collation of project-related information and communication with all of the stakeholders.

Collaborative meetings

The established research and practice partnership enabled us to obtain access to municipal health service management groups, which we met on several occasions. We attended several formal meetings with these groups, as well as with the head of municipal health services and other service managers. The meetings included the provision of information on our part about the project and the reasons for selecting the topic, followed by dialogue about the managers' understanding of current practice and potential barriers to implementation. We prepared short reports from these meetings and used them in subsequent planning.

The project group was also invited to attend meetings of the municipality's continuing education programme, where the KROSS KT project was presented to, and discussed with, health care personnel working for the different municipal services. The research and practice partnership group also attended meetings with user representatives from the patient organisation and other municipal health care personnel. Disseminating information repeatedly was a strategic choice to promote engagement about the project in the municipality.

Expanding the group

As part of the process to recruit participants from the municipal health care services, we disseminated information about the proposed project workshops (the workshops are described under the heading; Select, tailor and implement interventions) that launched the implementation. One of the user organisations erroneously shared this information on its Facebook page, but before the post was removed we were contacted by several health care services asking to participate in the project. Possible expansion was discussed during the collaborative meetings and we decided to invite representatives from a rehabilitation hospital to the first of the two workshops, and a participant from the local hospital's stroke unit to the second. We sent these invitations because both participants were close collaborators with the municipal health care services and had expressed an interest in implementing the KROSS tool. This expansion enabled us to reach out to several services and patients and also to study a larger component of the stroke care pathway. Although these new participant services were not involved in the KT programme prior to their participation in the KROSS workshops, they did in fact independently complete some of the phases of the action cycle. They had contacted us after recognising their own experience of the gap between knowledge and practice, and saw participation in the project as a means of reducing this gap, they also adapted the knowledge into their local contexts. A number of requests for participation from other services were rejected due to limited capasity at the workshops, although some of these groups have since been invited to participate in a subsequent nationwide network (NorVIS, 2022).

4.3.2 Action cycle

We approached several of the phases of the Action Cycle (Figure 1) and initiated a number of activities simultaneously. Table 2 presents the different phases of the Action Cycle as separate entities, although the work itself was highly iterative between the various phases. The list in Table 2 provides an overview of the main project activities and results, and in the following I will describe the various activities that made up the project, and how the results from these activities related to the phases of the Action Cycle.

Table 2 *Overview of the KTA phases, sources of information and the results from the activities.*

KTA Phase	Sources of information	Results
Identify gap between knowledge and practice	Interviews with stroke survivors suffering from VIs	Stroke survivors' experiences: VIs as unexpected after stroke, difficulties in understanding VIs as stroke-related; lack of focus on, and care of, post-stroke VIs; lack of acknowledgement, information and rehabilitation. There is no formal or structured assessment by the municipal services of the visual function of stroke survivors.
	Collaborative meetings	Municipal practitioners regard their post-stroke VI expertise as low. Vision assessment using the KROSS tool should be carried out for all stroke survivors.
Identify, review, select knowledge	Interviews with health care personnel and managers	
Adapt knowledge to local context	Interviews with health care personnel and managers Collaborative meetings Discussions during the KROSS workshops Communication and feedback during implementation	Adaptation of the KROSS tool. Changes to the user manual. Adaptation of the KROSS workshops.
Assess barriers and facilitators to knowledge use	Interviews with health care personnel and managers Collaborative meetings Discussions during the KROSS workshops	Organisational and individual barriers and facilitators.
Select, tailor and implement interventions	Collaborative meetings Interviews with health care personnel and managers Workshop discussions	Multicomponent interventions (see Table 3).

Monitor knowledge use	Patients assessed using the KROSS tool were referred to the university's eye clinic for supplementary assessment Continued communication with knowledge users	All services, except home care, regularly referred patients and reported use of the knowledge.
Evaluate outcomes	Focus group interviews with the participating services	Adoption of knowledge by all services except home care. All services: increased expertise and focus on post-stroke VIs.
Sustain knowledge use	Building knowledge and awareness Inclusion in existing routines Continued partnership	Organisational integration. A wish for formal vision-related expertise. Continued partnership as part of a nationwide implementation project

Identify the gap between knowledge and practice

Both research and reports from the Norwegian Directory of Health have shown that structured post-stroke vision assessment is lacking both in Norway and international stroke care (Hanna & Rowe, 2017; Huseby et al., 2017; Lofthus & Olsvik, 2012a; Rowe et al., 2016; Rowe, 2017; Sand et al., 2012; Smith et al., 2018; The Norwegian Directorate of Health, 2016, 2022). And, our aim was to identify specific gaps between the knowledge and practice exhibited by Kongsberg municipal health care services.

As part of this project, we employed a combination of qualitative studies (Study 1 and 2) and collaborative meetings to explore the gap between knowledge and action. We explored patient experiences of the focus and follow-up of post-stroke VIs provided by the health care services, and ten stroke survivors with VIs participated in individual qualitative in-depth interviews (Study 1). The participants in this study were not exclusively from Kongsberg municipality, but also included participants from neighbouring municipalities with comparable health care service provision. In the results of these interviews, we identified themes that were relevant to our assessment of the 'know-do' gap. From this study, we identified an experience of lack of attention to and care of VIs in stroke care. We also planned and conducted individual interviews (Study 2) with municipal health care personnel and their managers. In these interviews they reported a lack of expertise in, and awareness of, visual function in general, and of vision assessment after stroke in particular. Details about these studies are presented in Chapter 6

Another way of identifying the knowledge action gap could have been done using other methods, such as the development of quality indicators or the use of chart audits (Kitson & Straus, 2013). However, legislation preventing access to medical records served as a barrier to using chart audits. As researchers from outside the municipal organisation, we were not permitted to review medical records for the purposes of chart audits without the patients' written consent. The municipal participants could have done this as part of a quality improvement project, but did not have the resources. Another barrier to chart auditing was the lack of patient diagnosis records in medical journals, making it difficult to identify those who had received a stroke diagnosis. We identified the qualitative and collaborative approach as more appropriate. The knowledge to be implemented in this project was new to the municipal services. They acknowledged, that they did not currently provide vision assessment. And that this was something they wanted to change. It is possible that practices such as the assessment of nutritional status would have to be assessed differently because all health care personnel should be aware of the required procedures. However, vision assessment was new to all the participants and our aim was to adopt a more detailed and explorative approach to the participants' experience of vision and vision assessment as part of their practice.

Select knowledge for implementation

Based on knowledge obtained from the 'knowledge creation' phase of the Action Cycle, combined with the gap identified between knowledge and practice, the partners agreed to implement a structured vision assessment as part of stroke care services using the KROSS assessment tool. In order to perform a useful vision assessment with the KROSS tool and provide adequate follow-up of any findings, health care personnel require knowledge about the following:

1. Normal visual function
2. How a stroke may cause VIs
3. How visual function is assessed in order to identify post-stroke VIs
4. Information needs among patients and caregivers about post-stroke VIs
5. Follow-up alternatives in cases of post-stroke VIs
6. How post-stroke VIs affect survivors' everyday lives

Adapt knowledge to local context

Kongsberg municipality represents a medium-sized municipality with 26,000 inhabitants. The KROSS tool was originally developed for use in hospital stroke units (Falkenberg et al., 2016), and some adaptations were necessary to make it suitable for application in a municipal context. Adaptations to the KROSS tool were discussed and reviewed during the collaborative meetings, the KROSS workshops and in the individual interviews. As a result, the tool's assessments of visual acuity, visual field, eye movements and visual attention remained. However, adaptations were made to the response options, wording of some items, and the guidelines for the follow-up and referral of patients with positive findings were modified to fit a municipal setting. The original version of the KROSS tool included results from an NIHSS neurological assessment that was not used by the municipal health services, and was thus removed from the assessment. The user manual was revised several times during the implementation in response to feedback from the participants based on their experiences with using the tool (See appendix 1 for KROSS tool and user manual). Combining the research evidence with knowledge about the local context, skills, knowledge and experience is crucial to adapt the knowledge to the specific practise settings (Harrison & Graham, 2021).

In Kongsberg, stroke survivors access health care from a variety of different municipal services. During discussions with the partners, the project selected three specific services that provided care for stroke survivors after discharge from the stroke unit. These comprised a rehabilitation unit, a home care rehabilitation unit and home care services, all of which had stroke survivors referred to them directly from the stroke unit. In addition to the municipal services, personnel from a rehabilitation hospital and the local stroke unit participated in the implementation, using the same tool but with specific adaptations that facilitated their internal follow-up work.

When adapting to the municipal context, the research practice group identified early that the general practitioners (GP)s would be a sensible project partner. We had discussions with the community general practitioner, who was positive and supported the project, however, it was decided that it would not be possible for the GPs to participate in the project as active partners due to their high workload. The GPs were subsequently informed about the project and that municipal health care personnel would be conducting vision assessments.

Assess barriers and facilitators of knowledge use

Barriers and facilitators were discussed during the collaborative meetings. One of the barriers addressed the recruitment of health care personnel to the KROSS workshops and how to promote further engagement by the front-line personnel. We met health care practitioners in various occasions to inform about and discuss possible participation in the implementation.

The main aim of the interviews with health care personnel and their managers (Study 2) was to identify and assess the barriers to, and facilitators of, knowledge use. These interviews enabled us to identify several barriers and facilitators linked to individual health care personnel, in addition to contextual factors (Figure 3).

As the project progressed, the KROSS workshop discussions became important to address the identified barriers and suggest solutions to overcome them. The discussions were semi-structured exercises, carried out after the participants had been informed about the background of the project and had received some education about stroke, vision and post-stroke VIs. They had also practised the KROSS tool on those stroke survivors with VIs who were participating at the workshops. We presented the barriers and facilitators identified in the interviews and the offered participants an opportunity to supplement these and to discuss them in a practical way in the light of their experiences with the

KROSS tool. A more comprehensive description of this process and the results are presented in study 2 (Mathisen et al., 2021).

Select, tailor and implement interventions

Figure 3 provides an overview of the four phases of the KT implementation conducted during this project, and is published in the second article. Phases I and II are described in this chapter. Phase III, represented by the blue boxes, constitutes the focus of the second study, which describes how the interviews and workshops were used to assess barriers and facilitators, while Phase IV is the topic of the third study. The strategies described in Figure 3 are four-fold; (a) strategies tailored to increase expertise and motivation, (b) strategies intended to stimulate attendance at the workshops, (c) strategies that offer follow-up, and the enhancement and implementation of knowledge use and (d) strategies developed with the help of workshops participants to facilitate and implement knowledge use.

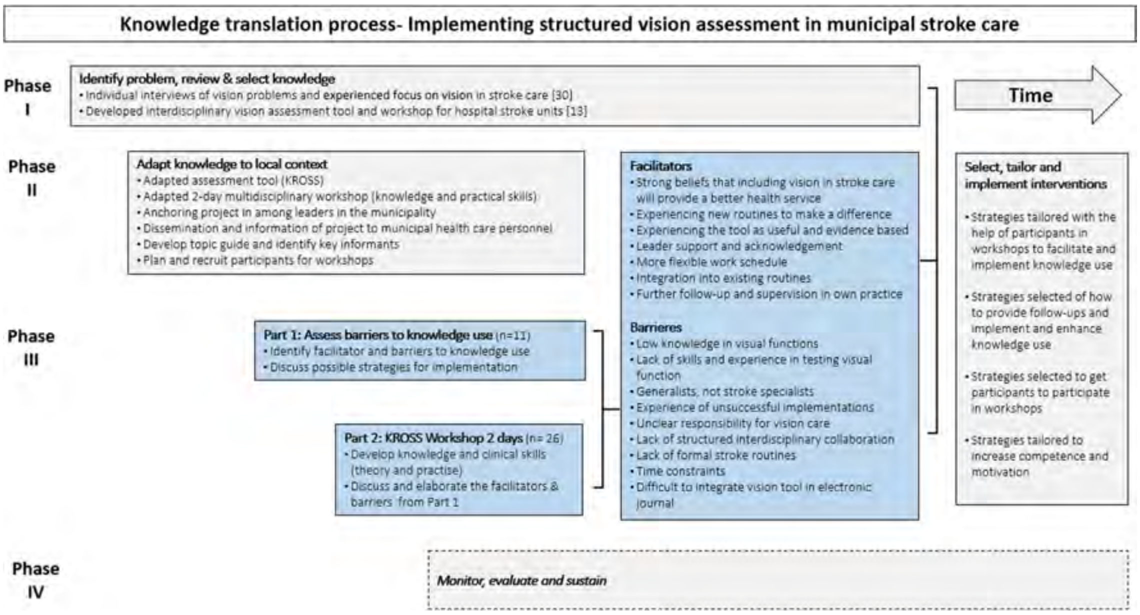


Figure 3. An overview of the KT process and the three sub-studies (Mathisen et al., 2021)

In implementation, the interventions should address the identified barriers and facilitators in order to promote knowledge use. Wensing and colleagues expressed this as follows; “The choice of KT interventions remains an ‘art’ informed by science, meaning that practice-based experience and creativity are important in the selecting of KT interventions.” (Wensing et al., 2013, p. 159). The terms ‘KT interventions’ and ‘implementation strategies’ are used interchangeably in this thesis and refer to the various activities carried out to promote knowledge use.

Among the theory-based approaches applied in this context are determinant frameworks that are designed to illustrate the relationships between identified barriers, the strategies intended to overcome such barriers, and eventual outcomes. Examples of such determinant frameworks include the Theoretical Domains Framework (TDF), Promoting Action on Research Implementation in Health Services (PARIHS), and the Consolidated Framework for Implementation Research (CFIR) (Nilsen, 2020; Wensing et al., 2013). There is limited evidence to support one approach in favour of the others (Colquhoun et al., 2013). We investigated several of these theories as part of our strategy development and became inspired by the TDF approach because many of the domains included in the framework were reflected in our interviews in the second study. The TDF which was initially developed to identify factors influencing the behaviour of health care personnel in relation to the implementation of evidence-based practice (Atkins et al., 2017). In its revised form, the TDF has come to encompass 14 domains that include knowledge, skills, social/professional role and identity, beliefs about capabilities, optimism, beliefs about consequences, reinforcement, intentions, goals, memory/attention and decision-making processes, environmental context and resources, social influences and emotion and behavioural regulation (Atkins et al., 2017; Cane et al., 2012; Michie et al., 2005). Although our analysis of the material in the second article is inductive, aspects of the TDF domains were also discussed in an attempt to view the results of our study in relation to alternative descriptions of barriers and facilitators.

Another approach to selecting strategies is the so-called ‘common sense’ approach (Colquhoun et al., 2013). This is perhaps were the ‘art’ in choosing strategies belong. Based on the collaborative meetings, interviews and discussions we developed strategies that made sense to the involved stakeholders. The final implementation strategies were chosen on the basis of identified barriers and facilitators as described in the second study, combined with the various partners’ application of practice-based experience and knowledge related to local context. We employed the RURU (Research Unit for Research Utilization) taxonomy Walter et al. (2003) as a means of providing a more detailed overview of our strategies, including their target groups, objectives and the stages during the KT process when they were put into action (Table 3).

Table 3. *Overview of strategies employing the RURU taxonomy (Walter et al., 2003)*

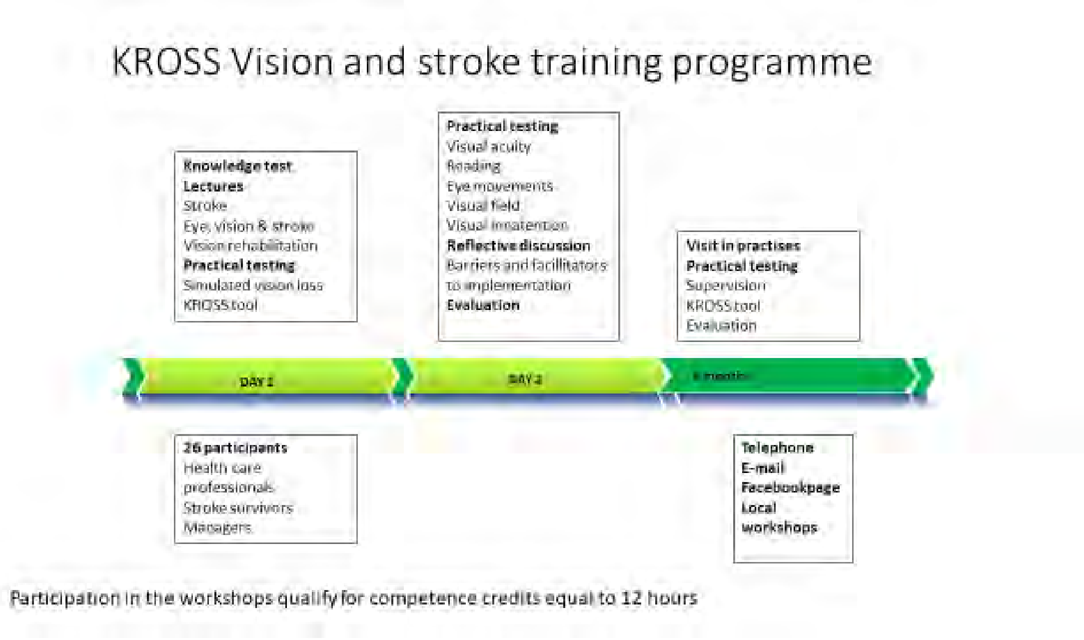
Taxonomy (RURU)	Strategy	Target	Aim	Timing
Dissemination	Information and discussion with different management levels	Managers	To generate enthusiasm about the project	Before implementation
	Verbal information given at a seminar for health care professionals	Knowledge users	To develop knowledge about the project	Before implementation
	Information (e-mail) from municipal health care administrators	Knowledge users	To recruit personnel to take part in interviews	Before implementation
Education	Post-stroke vision knowledge test	Knowledge users and other stakeholders	To create awareness about own knowledge	During the KROSS workshops
	Theoretical education about strokes, vision, VIs and post-stroke VIs.	Knowledge users and other stakeholders	To improve knowledge	During the KROSS workshops
	Practical training in vision assessment using the KROSS tool	Knowledge users and other stakeholders	To improve skills	During the KROSS workshops
	Sharing of personal experiences by stroke survivors	Knowledge users and other stakeholders	To understand the significance of post-stroke VIs	During the KROSS workshops

Social influence	Use of informal implementation facilitators	Local implementation facilitators	To promote local knowledge use	During the implementation phase
Collaboration	Research project planning	The university, municipal managers, stroke survivor organisations	To apply for research funding	Before implementation
	Involvement of administrative and health service managers	Managers	To promote participation and knowledge use	Before implementation
	Formation of a project group comprising knowledge users and stroke survivors	Managers, health care personnel, the university and stroke survivors	To promote participation and knowledge use	Before implementation
	Gathering reflections on the workshops	Knowledge users and other stakeholders	To assess barriers and facilitators; discuss strategies	During the KROSS workshops
	Adaptation of the KROSS tool to local context	All participants, the university, managers and stroke survivors	To apply knowledge and the tool in the relevant context	Throughout the project
Incentives	Approval of the KROSS workshop as a valid component of formal continuing education (equivalent to 14 hours)	Knowledge users	To recruit knowledge users	Before implementation
	Financial compensation to the health services for releasing staff to attend the workshops	Managers	To recruit knowledge users	Before implementation
Reinforcement	Feedback to the health services regarding knowledge use	Knowledge users and managers	To promote knowledge use	During the implementation phase

	Meetings with health service managers of units where knowledge use is low	Managers	To promote knowledge use	During the implementation phase
	Reminder notifications; in meetings, by e-mail and on Facebook	All knowledge users and managers	To promote knowledge use	During the implementation phase
Facilitation	Supervision in practice	Knowledge users	To improve knowledge and skills	During the implementation phase
	Supervision by phone and e-mail	Knowledge users	To improve knowledge and skills	During the implementation phase
Multifaceted initiatives	Use of a combination of multiple implementation strategies during the KROSS KT project			Throughout the project

The KROSS workshops

A major strategy of this project was to address the lack of knowledge and skills expressed by many participants. The KROSS workshops were arranged following the interviews with individual personnel, and drew on the knowledge accumulated during the previous phases. The workshops also worked as the launching of the implementation even though some of the strategies were developed and refined during the workshop discussions. This illustrate the iterative and dynamic KTA process were several activities occur simultaneously. We adapted a programme that had initially been developed for implementation of the KROSS tool in stroke units. The adaptation was based on input from the collaborative meetings and interviews. A difference between stroke units and municipal health care services was that the municipal participants considered them as generalists and not stroke specialists. This implied having a more basic education about stroke care and VIs after stroke in a municipal setting. The workshops were arranged over two days, with a one-week interval, and were later repeated. Figure 4 illustrates the content and organisation of the KROSS workshops.



KROSS Vision and stroke training programme

Knowledge test
Lectures
Stroke
Eye, vision & stroke
Vision rehabilitation
Practical testing
Simulated vision loss
KROSS tool

Practical testing
Visual acuity
Reading
Eye movements
Visual field
Visual inattention
Reflective discussion
Barriers and facilitators to implementation
Evaluation

Visit in practises
Practical testing
Supervision
KROSS tool
Evaluation

DAY 1
DAY 2
6 months

26 participants
Health care professionals
Stroke survivors
Managers

Telephone
E-mail
Facebookpage
Local workshops

Participation in the workshops qualify for competence credits equal to 12 hours

Figure 4. The content and organisation of the KROSS workshops

Monitor knowledge use

It was a strategic plan engage in continuous communication with knowledge users during the implementation by means of e-mail and phone calls, combined with visits to the municipal service units and the local hospital. Both the health care services and the local hospital referred patients they had assessed to University clinic for inclusion in a study that was designed to validate the KROSS tool, and this enabled us to register referred patients. During the implementation we had regular dialogue with all the participating services, with the exception of the home care services unit, with which we struggled to maintain contact. We attempted to engage the unit in a number of ways, including meetings with service managers. They stated that they intended to use the knowledge generated by the project, but we did not succeed in fully including the unit as we had planned.

In general, however, our experience was that we obtained insight in knowledge use by employing this approach, and frequent contact with many of the participants was helped by the fact that the university is located close to the municipal services' offices.

Evaluate outcomes

Evaluation (phase IV in Figure 3) was carried out both as a continuous process throughout the project, and also at the end of the implementation phase. We evaluated the KROSS workshops with all participants, and during the monitoring phase we adjusted our facilitation and follow-up to each practise. The evaluation of outcomes at the end of the implementation was carried out using an evaluation framework developed by Proctor et al. (2011). This framework distinguishes between what the authors define as implementation outcomes, services outcomes and client outcomes. Implementation outcomes represent the "effects of deliberate and purposive actions to implement new treatments, practices, and services" (Proctor et al., 2011). Service outcomes represent the extent to which services are safe, effective, patient-centred, timely, efficient, and equitable. Client outcomes relate to satisfaction, function and symptomatology (Proctor et al., 2011). Our evaluation explored the implementation outcomes' acceptability, adoption, appropriateness, feasibility, fidelity, implementation costs, penetration and sustainability defined by Proctor et al. (2011). We used focus group interviews to evaluate the outcomes qualitatively. The focus groups were representative of the various health services involved in the project. The results of these evaluations are presented in study 3.

The evaluation of an implementation can be performed in different ways, and applied approaches commonly involve both quantitative and qualitative methods designed to investigate implementation success. We chose to qualitatively evaluate the implementation outcomes as they are defined by Proctor et al. (2011). Their definitions are based on terms derived from implementation research and theory. When gathering experiences of the effects and implications of an implementation, respondent stakeholders may report experiences and use terms in connection with outcomes that differ from those defined in discussions of theoretical concepts (Proctor, 2020). For this reason, a qualitative investigation should be open and explorative and be able to capture outcomes that may be overlooked when using a questionnaire or during the counting of vision assessments available in medical records. In our focus group interviews, topics related to the implementation based on the implementation outcomes without explicitly using theoretical terms. This allowed the participants to share their experiences of knowledge use and the implementation in their own ways.

Sustain knowledge use

It is pertinent to ask whether the health care services involved in this project will continue to perform structured vision assessments using the KROSS tool once this project is completed. Will new staff be instructed about the KROSS procedure by those who participated in the project? Will the KROSS procedure be integrated into health care services in the same way as other established routines? Will this practice be expanded for use by other services? Such questions are related to the sustainability of the project. Proctor et al. (2011) define sustainability as *'the extent to which a newly implemented treatment is maintained or institutionalized within a service setting's ongoing, stable operations'.* Sustainability as an outcome is presented in study 3, which concludes by indicating that vision assessment using the KROSS tool is being maintained and institutionalised to a certain extent.

Lennox (2020) describes both a linear and a dynamic perspective on sustainability. The linear view refers to the achievement of a target outcome or state, whereas the dynamic perspective views sustainability as an ongoing process. Davies and Edwards (2013) suggest that in a KTA perspective, promoting sustainability involves continuing the KTA cycle by assessing the determinants for sustainability, and then select tailor and implement sustainability interventions, and thus promoting renewal of the cycle.

In our case, one approach to promoting sustainability would be to engage the organisation in question in further work to promote better post-stroke vision care. The partnership and implementation with Kongsberg municipality has resulted in continued collaboration in connection with post-stroke VIs. The Norwegian Vision in Stroke Network (NorVIS) is a nationwide partnership, also including international partners, between researchers, health care practitioners and a variety of user groups. It consists of 40 partners from over 30 organisations and is funded by the Research Council of Norway (NorVIS, 2022). Kongsberg municipality, the stroke unit at Kongsberg Hospital, and the specialist rehabilitation hospital are active partners in NorVIS. The aim of the network is to implement better vision care and post-stroke rehabilitation in the Norwegian health care system. Experience and results from the KROSS KT implementation project constitute a natural part of this work.

4.4 Qualitative approach to study the implementation of the KROSS tool

Qualitative methods were applied to the three sub-studies that make up this thesis. Qualitative research has been used in implementation science for many different purposes, especially in situations where knowledge concerning the phenomena of interest is limited. Since only limited research has been conducted into the implementation of vision assessment in stroke care, our research questions were deliberately open and explorative. A qualitative approach can also contribute towards the involvement and empowerment of project participants by actively engaging them in the studies (Creswell & Cheryl, 2018). Qualitative interview research involves the creation of knowledge during the interaction between the researcher and participants during interviews (Brinkmann & Kvale, 2015). In our project, we developed a basis for collaboration and the co-creation of knowledge by means of formal and informal meetings, individual interviews, workshops and focus groups. Quantitative research is also used widely in implementation research to measure the impact of the strategy to outcome process and determinants for change (Smith & Hasan, 2020). However, a qualitative approach is appropriate when there is a need to understand complex and detailed phenomena (Creswell & Cheryl, 2018), as is the case in this project. It can provide useful insights into the ‘how and why’ related to implementation issues (Hamilton & Finley, 2019). In complex implementations such as the present project, involving multiple strategies and parallel processes, it can be difficult to isolate the most important issues that are suited to quantitative investigation. Our qualitative approach focused on the entire process of implementation as applied in our specific context (Creswell & Cheryl, 2018).

4.4.1 Data material

There are many approaches to qualitative research. In this project we employed individual interviews in Studies 1 and 2, and focus group interviews in Study 3.

Individual interviews

In the first study, we interviewed ten stroke survivors with VIs. The aim of these interviews was to explore how stroke survivors experience the ways in which the specialist and municipal health care services addressed and focused on the issue of VIs as part of stroke care, and how VIs affected the everyday lives of survivors during the first months after their strokes. In the second study, we interviewed eleven municipal health care personnel and managers. Here, the aim was to identify and explore the barriers to, and facilitators of, the implementation of structured visual assessment as part of health care services. Sampling procedures and data collection are outlined in detail in the two articles that describe the respective sub-studies.

There were similarities and differences between the individual interview studies. A semi-structured interview guide was used in both studies, which focused on the participants' experiences in relation to the topic of interest. Although the topics of the two studies were different in nature, the interview situation and the way in which the interviews were conducted were quite similar. The first study, involving the stroke survivors, was highly personal in nature in that participants were asked about their personal experiences of stroke and VIs, the health care services, and the impact of VIs on their everyday lives. In the second study, the focus was on the role of the health care personnel. These differences had an effect on the ways in which the interviews were conducted, and interviews in the second study closely resembled what are termed 'topical interviews' by (Rubin & Rubin, 2011). The second study interviews involved asking the participants about their practice, post-stroke VI procedures, and their views on the barriers and facilitators that influence the implementation of a new routine.

Focus group interviews

The aim of the third study was to evaluate the implementation outcomes following implementation of the KROSS tool, and we chose to achieve this by means of focus group interviews. Focus group interviews aim to stimulate discussions between participants and bring out different views on the issues in question (Brinkmann & Kvale, 2015). Focus group interviews usually employ a moderator to initiate discussions on predefined topics. The key role of the moderator in focus group settings is to ensure that all aspects of the topics are explored, and that all the participants are fully involved. The aim is not to reach consensus, but to bring out a wide variety of opinions (Brinkmann & Kvale, 2015).

Our aim was to explore how health care personnel experienced the implementation of the KROSS tool and the implementation outcomes. A topic guide was prepared prior to the interviews, inspired by the implementation outcomes described by Proctor et al. (2011), although we employed a different, more common language, terminology that was more appropriate to the setting. One important consideration during selection of the focus groups was the information that we had obtained during the 'monitoring knowledge' phase of the implementation. For example, while the majority of services had actively used the knowledge, we were aware that the home care unit probably had not. We wanted to explore why some practitioners had adopted the knowledge, and why others had not. At the same time, we did not want the participants to feel that they had failed.

We wanted to create focus groups based on participants' workplaces, because workplace differences generate considerable contextual differences that have an influence on barriers and facilitators. As a result, while one of the groups consisted of nine participants, another had only two. One group comprised a mix of personnel from a variety of different services. The strength of this focus group design approach is that it encouraged the participants to be open about both the positive and negative aspects of their experiences of the implementation, and about how contextual determinants influenced these experiences.

The focus group interviews enabled us to obtain insights into the perceptions of the participants and their views on the various implementation outcomes. Discussion among the participants is the major strength of this method. One participant might make a statement and others may agree or disagree. In this way we obtain a variety of additional reflections and nuances. Focus groups provided participants with an opportunity to reflect on their experiences of the implementation outcomes, which may be perceived differently once they have started to apply their new knowledge.

4.4.2 Content analysis

As part of the studies, we determined that content analysis was the most appropriate approach to data analysis. Qualitative content analysis has frequently been used in qualitative nursing research and is a method suitable for many types of qualitative material (Graneheim & Lundman, 2004). Content analysis aims to describe the condensed and broad meaning of the data while preserving its content and contextual conditions (Elo & Kyngäs, 2008). It serves to provide an overview of a complex and extensive data set, which can be distilled into categories, a theory or a conceptual map (Elo & Kyngäs, 2008).

The epistemological and ontological assumptions behind content analysis are open in the sense that such analysis has its roots in both quantitative and qualitative paradigms (Elo & Kyngäs, 2008; Graneheim et al., 2017). A researcher’s own ontological views on content analysis serve to guide how he or she approaches the analytical process, whether the aim is to identify an objective truth in the data, or to interpret a text to reveal meanings (Graneheim et al., 2017). The epistemological standpoint of a quantitative researcher using content analysis will be to identify the truth in the data by counting similar statements or the frequencies of predefined content without interpretation. In qualitative content analysis the epistemological standpoint in relation to interviews is co-created by the researcher and the participant, while the analysis is a co-creation of the researcher and the text. Any given text may represent several possible meanings, depending on its interpretation (Graneheim et al., 2017).

We employed a qualitative approach to content analysis in all three studies, although the approach varied depending on the study. Graneheim and Lundman (2004) describe two important concepts in content analysis; manifest content and latent content. Manifest content deals with what the text actually says, describing what is visible and obvious. Latent content deals less with what the text actually says, but rather with the underlying meaning of the text. The identification of latent content involves an interpretation process.

In the first study, in which we conducted interviews to explore survivors' personal experiences of post-stroke VIs, the interviews were open and our analysis addressed both manifest and latent content. The material provided opportunities for a high level of interpretation and abstraction of the text. In the second study, the interviews were more concrete and related to a topic of investigation. Our analysis was thus restricted to was kept on a manifest level. Content analysis as described by Graneheim and Lundman (2004) was appropriate to both studies and provided us with a clear approach to the commencement of our analytical work. The two first studies were data-driven and conducted inductively, starting with the identification of meaning units that were condensed and given codes which were later sorted into categories or subthemes. We refer to the articles for detailed descriptions of the procedures used. Both studies and their analyses were comprehensive, and the selected categories, subcategories and themes were discussed repeatedly until the authors achieved consensus.

In the third study, we employed the implementation outcomes as defined by Proctor et al. (2011) as a framework for a deductive-inductive content analysis as described by (Elo & Kyngäs, 2008). We used the defined implementation outcomes to construct a categorization matrix. The focus group interviews were subsequently analysed and the meaning units coded to one of the implementation outcomes. After coding the meaning units into the implementation outcome categories, the content of each implementation outcome was sorted into new categories based on the principles from governing inductive content analysis. Further details of this process are described in the article addressing the third study.

4.4.3 My role as a researcher, PhD student and implementation facilitator

In qualitative interview research, knowledge is produced initially in the meeting between the researcher and the project participants. During the analysis, knowledge is generated at the interface between the researcher and material (Brinkmann & Kvale, 2015; Graneheim et al., 2017). This perception of knowledge, combined with the researcher's background and prerequisites, will then influence the way in which the research process is practiced, analysed and presented (Brinkmann & Kvale, 2015; Corbin & Strauss, 2014; Creswell & Cheryl, 2018).

My professional background is in nursing, and I have experience from working both in home care contexts and in an acute stroke unit. In the stroke unit, I observed several stroke survivors with VIs and found that it was difficult to help patients with this particular post-stroke condition. Neither I nor my colleagues had much expertise in vision, the result being that we struggled to provide satisfactory answers to our patients' requests for VI-related advice and rehabilitation. While I was in the stroke unit, I participated in a project where the KROSS vision assessment tool was implemented (Falkenberg et al., 2016; Falkenberg et al., 2018), and this provided me with more insight into the topic.

In the years before I started my PhD, I worked as a health care advisor at *LHL Hjerneslag,* which is a Norwegian organization for stroke survivors and their caregivers. This work enabled me to get to know many stroke survivors and to hear their stories. Given my experience, I felt confident in my role as a nurse and health care provider, but this confidence did not extend to my role as a researcher, despite having taken a master's degree and participated as a student in research projects. The concept of implementation research was new to me, although as a nurse I had been defined as a 'knowledge user' in previous implementation projects. My experience of the implementation of quality improvement procedures was that as nurses, we were not directly involved in processes that were planned and initiated by bureaucratic administrators who were looking to implement fixed procedures in all hospital wards. Some of the procedures, and the ways in which they were delivered, challenged my professional integrity and caused me to question my role as an autonomous health care worker with valuable clinical experience.

Naturally, my background and experience conditioned me as I assumed the role of a novice researcher and implementation facilitator, and influenced my work with the implementation project and the three sub-studies. I was fully aware of them and made every effort to be as open as possible to the perceptions and experiences of others. My preconditions also affected my attitude towards my role as an implementation facilitator. I wanted to demonstrate appropriate humility when presenting new knowledge to experts in an existing practice and, for this reason, was eager to encourage the active participation of health service personnel. This was also my feeling during my first PhD course – 'Science and the practice of person-centred research'. The core principles behind person-centred practise and my practical experience served as valuable input as I began this project.

The interviews included in the first study were conducted by a research assistant with no in-depth knowledge of strokes or VIs. This influenced the follow-up questions related to the participants' descriptions of their experience of VIs and the health care services. When I read the interviews and began the analysis, I noted the presence of questions in the material that I would not have asked, as well as questions that I missed. The material would have been different if I had had the opportunity to apply my background from stroke care and knowledge about the health care services. Opinions vary as to how much an interviewer should know about the topics being discussed in such interviews (Brinkmann & Kvale, 2015; Creswell & Cheryl, 2018). Experts and non-experts tend to ask different questions and to interpret the responses differently. Experts may not dwell on topics that are familiar to them. On the other hand, prior assumptions about a participant's experience may cause some issues to be taken for granted that might otherwise have been explored in more detail in the hands of a more open, non-expert interviewer.

In the first study, the participants expressed a great deal of uncertainty regarding their visual symptoms. In attempting to explain their symptoms and visual condition to the interviewer, it was clear that some of them did not really understand their problems. In one case, while attempting to describe her hemianopia, a participant ended up agreeing with the interviewer that she was blind in one eye. An interviewer with any knowledge of post-stroke VIs may have clarified the situation at an earlier stage and we may have missed the level of uncertainty expressed by the participant.

A research interview is never power-neutral (Kvale, 2006). In spite of attempts to create an atmosphere of equality between the researcher and the participant, there will always be a power imbalance. The researcher is often an expert on the topic of discussion and sits with a predefined agenda for the interview and prior knowledge of the questions. I conducted the interviews that formed the bases of the second and third studies, and my experience in specialist stroke care probably influenced the power relationship during the interviews. On the other hand, I am also reliant on the interviewee's participation in the project. They are also experts on their own workplaces. The participants willingly shared information about a practice that they wanted to improve, and trusted me to use the information they provided in an ethical way. During both the individual and focus group interviews, and in other collaborative situations with the participants, I tried to facilitate reciprocity and create mutual respect for our respective backgrounds. This is an important principle in person-centred research (Dewing et al., 2021).

Trustworthiness

The trustworthiness of a qualitative study cannot be measured by a single component. It must emerge from the totality of the entire research process; the selection of the topic, the planning process, participant recruitment, the conduct of the interviews, as well as analysis and reporting (Brinkmann & Kvale, 2015; Creswell & Cheryl, 2018; Elo & Kyngäs, 2008; Graneheim et al., 2017). We have described the research process in the three sub-studies in order to promote transparency. Readers can make up their own minds about the trustworthiness of the studies. I have given an account of my own background, which undoubtedly influenced my approach to the analysis of the material. However, my supervisors and co-authors also participated in the analytical work, during which we engaged in many discussions about the meanings in the data. The contrasting professional backgrounds among the members of the research team were key during the creation of the categories and themes that are presented in the results.

4.4.4 Ethical considerations

The KT definition express that the application of knowledge should be ethically sound (Canadian Institutes of Health Research, 2016). All phases of an implementation study can generate ethical considerations and consequent needs for clarification and discussion (Allen & Flamenbaum, 2013). Implementation research that involves material obtained from individual persons, including interviews and responses to questionnaires, should be reviewed ethically with the aim of ensuring the secure and sensitive handling of personal information (Eccles et al., 2011). However, an ethical approach encompasses more than simply ensuring secure procedures for the handling of personal data (Allen & Flamenbaum, 2013). As I see it, the ethical considerations linked to this implementation project are three-fold; first, considerations linked to the knowledge to be implemented, secondly, considerations related to the implementation methods, and thirdly, considerations related to the methods used in the three sub-studies.

First, we have found that, based on clinical guidelines and an increasing amount of literature on post-stroke vision assessment, there was sufficient high-quality evidence to justify the implementation of a structured post-stroke vision assessment (Berthold-Lindstedt et al., 2017; Berthold‐Lindstedt et al., 2021; Hanna et al., 2017a; Hepworth et al., 2021; Rowe, Hepworth, Howard, Bruce, et al., 2020; Rowe, Hepworth, Howard, et al., 2019; The Norwegian Directorate of Health, 2017). Graham et al. (2006) assert that if research demonstrates that a certain clinical intervention, service or treatment is effective and useful, it is unethical not to integrate it in practice. There are many examples of effective treatments that were never applied to patients, or which were applied later than was necessary (Braithwaite et al., 2020). This was a starting point of this project, we knew of the importance of vision assessment after stroke, although little about how to implement it. On the other hand, not all research with a positive outcome can be directly implemented in practise, such as those from single studies involving a limited number of patients, or treatments that entail major consequences for financial issues, prioritisation or equality in health care services (Grimshaw et al., 2006; Harrison & Graham, 2021). The results from our first study confirmed that stroke survivors in an Norwegian context need better vision care. Moreover, health personnel expressed a wish to implement post-stroke vision assessments, and wanted more knowledge about them. At the same time, health care services are under constant pressure in relation to their time and resources, and such implementations may be very time-consuming. They may have to choose between the implementation of vision assessments and other important work. Such considerations were discussed with the participants during both the planning and evaluation of the project. Ethical considerations relating to knowledge implementation must address the knowledge itself and any potential consequences for the services in which it is implemented (Graham et al., 2006).

Secondly, we have continued to argue for stakeholder participation and have adopted a collaborative approach throughout this implementation project. Not all participants in the project were identified from the start – some joined in as the project evolved. The collaborative nature of this type of research can make it difficult to plan an ethical protocol because it is not always possible to obtain a complete overview of all the participants involved (Goodyear-Smith et al., 2015; Gopichandran et al., 2016). For the most part we have used written minutes to document the many meetings we have had with stakeholders which will not need an informed written consent, except in the three sub-studies were the participants were recruited separately and signed a consent form.

One aspect of conducting a knowledge-action gap assessment is the identification of practice that does not adhere to an established ‘gold standard’. When health care personnel are interviewed about their practice, they may not always be comfortable about expressing negative opinions concerning their workplace. This issue was addressed early during the collaborative meetings, and discussed by municipal health care managers, service managers, health care personnel and researchers in order to promote a common understanding of the project. This common understanding helped to pave the way for safe and open dialogue during the collaborative meetings and an awareness that all stakeholders shared the same view on practice development.

Thirdly, a collaborative approach requires recognition of the power relationships inherent within the group. What are the participants’ interests, and what are their motives? (Allen & Flamenbaum, 2013). As an implementation facilitator and researcher, I experienced a personal dilemma related to some of the implementation strategies linked to the recruitment of participants and the promotion of knowledge use. I recognised that some of these strategies might potentially be in conflict with the principle that all participation in research should be voluntary, and that anyone could withdraw their participation at any time (Eccles et al., 2011). In practice, we succeeded in keeping ethical research principles at the forefront of our minds during the promotion of knowledge use.

According to national regulations in Norway, research projects, such as this, studying aspects of health care organisation are regarded as projects assessing the quality of clinical practice, and not considered as medical and health research even though we interview Human Participants (Act 2008-06-20 no. 44). This have consequences for which ethical authority the research project apply and report to (Lovdata, 2009). Our institution have no institutional review board, and use the independent agency the Norwegian Centre for Research Data (NSD) as a resource to assess research projects and secure that it follows the current ethical standards for collecting and storing personal information, in line with other Norwegian universities. NSD also assess and approve ethical issues related to how oral and written information is provided and collected. Although the entirety of the implementation project was not reviewed by an ethical committee, all three studies were approved individually by the Norwegian Centre for Research Data (NSD). All participants in the three studies have submitted their written and informed consent to participate in the studies. The specific ethical considerations related to the individual studies are described in the relevant articles. NSD have assessed and approved our study protocols, methods, interview guides and written consent forms. Reference 56278

5 Substudies

The three sub-studies will be presented shortly in this chapter. The tables which presented the results in the articles are included. Parts of the studies are already described in Chapter 4 since we used the results from the study in the implementation work. Each study can be found in full text as an attachment in the thesis.

Study 1

Title: ‘Invisible’ visual impairments. A qualitative study of stroke survivors’ experiences of vision symptoms, health services and impact of visual impairments.

In this first study, the aim was to explore stroke survivors’ experiences of how the health care services focused on and attended to post-stroke VIs. We also wanted to explore how VIs affect the everyday lives of survivors during the first months following a stroke. The participants in this study comprised ten stroke survivors with post-stroke VIs, and were interviewed three months after their strokes using a semi-structured interview guide. The material was analysed using inductive content analysis as described by Graneheim and Lundman (2004).

The main theme of the study – ‘Invisible’ visual impairments – was identified in the material and represents the participants’ experiences of having post-stroke VIs that were difficult to understand and cope with, and inadequately followed up. The ‘invisibility’ of the impairments refers to the failure of health care personnel to identify and adequately follow up the impairments, which compounded the survivors’ difficulties in understanding the nature and impact of their impairment. The main theme consists of three subthemes and seven categories. These are presented in Table 4.

Table 4. *Presentations of categories, subthemes and the main theme published in Falkenberg et al. (2020)*

Categories	**Subthemes**	**Theme**
• Experience of sudden vision problems – distressful but not alarming • Difficulties relating vision problems as a symptom of stroke	Vision problems are experienced as a difficult unknown symptom of stroke	"Invisible" visual impairments
• "They primarily do not have it in their checklist" - an experienced lack of focus on vision in the stroke units • No offer of to visual rehabilitation in health services - a worry	Experiences of inadequate visual care in health services	
• Difficult and exhausting to adapt to changes in everyday activities • Life moves on, without driving • Being told that nothing could be done for the vision impairment - accepted, but not convinced…	Visual impairments—big impact now and in the future	

The first subtheme, termed 'Vision problems are experienced as a difficult unknown symptom of stroke', relates to the start of a patient's experience of visual symptoms related to stroke. Some became aware of their symptoms immediately, while others failed to recognise their VIs until they became apparent either by coincidence or as a result of a vision assessment. The experience of sudden vision problems was experienced as distressful, but not alarming. Participants who experienced visual symptoms as the primary presenting symptom of their stroke described it as uncomfortable, but also as something that would pass. They were determined to try to wait the symptoms out. When the symptoms persisted, they called their doctors and were admitted to hospital, although they were too late to receive hyperacute medical treatment. Both patients and health care personnel encountered difficulties in recognising these vision problems as symptoms of stroke, and frequently misidentified them as indicators of ocular problems, leading to consequent delays in hospital admission.

The second subtheme, termed 'Experiences of inadequate visual care in health services', describes participants' experiences related to the focus on, and follow-up of, VIs in the stroke unit, rehabilitation unit, and during subsequent follow-up. They highlighted differences in the follow-up of VIs compared with other, more ‘common’, stroke-related impairments, such as paresis and aphasia, which were routinely the subject of greater focus and better follow-up. Some participants discovered their VIs accidentally while in the stroke unit, and pointed out that vision did not seem to constitute an item on the stroke teams’ checklists. Another worry, was the lack of planning in relation to VI follow-up after discharge from the stroke unit. Plans were prepared for the rehabilitation of other functions, but not for vision.

The third subtheme, termed ‘Visual impairments – big impact now and in the future’ addressed the impact of VIs on the participants’ daily lives. Their attempts to adapt to, and learn to live with, VIs presented them with major and multifaceted challenges. An inability to use the online bank or visit their GP without help from relatives represented a major obstacle to their wishes to live independent lives. Many emphasised that their VIs constituted the main barrier to returning to life as it was before their strokes. For some of the participants, having to stop driving became a symbol of the big change occurring in their lives. Some experienced improvements in their visual function over time, even though they had been told not to expect any improvements. This conflict between a patient’s experience of improvements and the information he or she had received made them question the quality of the information. Some had found literature describing post-stroke visual rehabilitation and had even participated in such rehabilitation.

Study 2

Title: Barriers and facilitators to the implementation of a structured visual assessment after stroke in municipal health care services

The aim of this study was to assess the barriers to, and facilitators of, the implementation of structured post-stroke visual assessment as part of municipal health care services. The study was based on qualitative interviews with eleven managers and municipal health care personnel, and included two workshop discussions with 26 participants. The workshops formed part of the implementation strategy, and included both theoretical and practical education in post-stroke vision assessment using the KROSS tool. The participants were made up of health care personnel and user representatives. The material was analysed using inductive content analysis as described by Graneheim and Lundman (2004).

Table 5. *The participants' experiences of individual and contextual barriers and facilitators, previously published in Mathisen et al. (2021)*

Participants' experiences of individual and contextual facilitators and barriers	
Individual	Contextual
Barriers i. Low knowledge about visual functions ii. Lack of skills and experience in testing visual function iii. Generalists, not stroke specialists iv. Experience of unsuccessful implementations	Barriers i. Unclear responsibility for vision care ii. Lack of structured interdisciplinary collaboration iii. Lack of formal stroke routines iv. Time constraints v. Difficult to integrate vision tool in the medical record
Facilitators i. Strong beliefs that including vision in stroke care would provide a better health service ii. Experiencing new routines to make a difference iii. Experiencing the tool as useful and evidence based	Facilitators i. Leader support and acknowledgement ii. More flexible work schedule iii. Integration into existing routines iv. Further follow-up and supervision in own practice

During the analysis, we identified both individual and contextual barriers and facilitators. They are presented in Table 5. Individual barriers were related to a lack of knowledge of the visual function in general, and post-stroke VIs in particular. Participants had very little experience in vision assessment and lacked the proper procedures and tools to perform such assessments. In contrast to the specialist health services, municipal health services are generalists who work with patients presenting with a variety of conditions. Although they considered themselves competent in the field of general rehabilitation, they were not experts all the different diagnosis's such as stroke. An additional individual barrier concerned participants’ experiences from other implementation and quality improvement projects. Many reported that they had gained nothing useful from such exercises, and some expressed concern that the present project would be of only short-term interest, and soon forgotten.

Individual facilitators included a belief that the inclusion of vision assessment as part of stroke care would provide better health care services. Some participants made it clear that the information they had received about the background to the project, including the incidence and prevalence of post-stroke VIs and the potential consequences for their patients, was sufficient motivation in itself to change their practice. They emphasised that any new procedure had to be beneficial to their patients. The scientific evidence behind the KROSS tool was important for some participants, while others stated that an experience of usefulness was more important.

Contextual barriers were related to the organisation of stroke care and a variety of other organisational issues. The participants experienced that vision care was outside their ordinary field of responsibility. Patients were assigned their own optometrists or ophthalmologists who attended to their patients’ vision-related needs, and there was no form of structured interdisciplinary collaboration between vision experts and the participants. Moreover, the municipality operated without any form of formal written stroke care procedures, although generic routines for a variety of rehabilitative assessments were in place. All participants described of a lack of adequate time to perform their work, and home care services in particular believed that it would be difficult to introduce new procedures to what was already an excessive workload. A further barrier to implementation was the complexity linked to integrating the assessment tool into medical records.

A further contextual facilitator was the high level of commitment expressed by service managers towards the implementation. All participants felt that both their immediate managers and organisations wanted them to participate in the project and start using the KROSS assessment. Participants who experienced that they had the opportunity to plan and organise their working day were optimistic about the implementation. Although they worked to tight schedules, they felt it would be possible to assign priority to tasks that would result in key benefits for their patients. Existing routines should be used to integrate the KROSS assessment into the services, and this would contribute towards user awareness about the new procedure. Examples of such procedures included white board meetings and the assessment protocol for new patients. Participants said that feeling confident in performing the procedure is important when learning new assessment procedures, and any opportunity to receive supervision during the assessments could be helpful during the initial phase of the implementation.

Study 3

Title: 'If we don’t assess the patient’s vision, we risk starting at the wrong end': a qualitative evaluation of a stroke service knowledge translation project.

The aim of the third study was to evaluate the implementation of a structured post-stroke vision assessment. We employed a qualitative approach to describe implementation outcomes, in accordance with the evaluation framework described by Proctor et al. (2011). Participants from the health care services who were involved in the implementation were invited to participate in focus group interviews. Four focus group interviews were conducted, involving different health care service units; (a) home care (n2), (b) the municipal rehabilitation unit (n5), (c) the specialist rehabilitation hospital (n9) and (d) a combination of case handlers and participants from the home-based rehabilitation unit and a local hospital (n4). The interviews were analysed using deductive-inductive content analysis as described by Elo and Kyngäs (2008), and based on the implementation outcomes described by Proctor et al. (2011) as a framework.

Table 6. *Implementation outcomes and categories. The categories from the analysis are presented in the right column and implementation outcomes with its definitions in the left. The table is presented in Mathisen et al. (2022).*

Implementation outcome and definitions from Proctor et al. (2011).	Categories
Acceptability *The perception among implementation stakeholders that a given treatment, service, practice or innovation is agreeable, palatable or satisfactory.*	• A motivating and useful KROSS workshop • Acceptance of prioritising a vision assessment in the hectic workday • Vision assessments create a positive change for the patients
Adoption *The intention, initial decision or action to try or employ an innovation or evidence-based practice.*	• Differences in the extent of knowledge use • Increased awareness of visual impairments in clinical practise
Appropriateness *The perceived fit, relevance or compatibility of the innovation or evidence-based practice for a given practice setting, provider or consumer and/or perceived fit of the innovation to address a particular issue or problem.*	• Assessing vision is a first step to better vision care • More appropriate in a rehabilitation setting
Feasibility *The extent to which a new treatment or an innovation can be successfully used or carried out within a given agency or setting.*	• Practise makes perfect • Helpful instructions and supervision • Integration of the KROSS tool into the medical records ease documentation • Limited time available
Fidelity *The degree to which an intervention was implemented as prescribed in the original protocol or as intended by the programme developers.*	• Followed the KROSS protocol but did not test all patients
Penetration *The integration of a practice within a service setting and its subsystems.*	• Vision assessment now included in service allocation office case handling • Visual function assessment integrated into the clinical gaze • More structured interdisciplinary collaboration with vision experts
Sustainability *The extent to which a newly implemented treatment is maintained or institutionalised within a service setting's ongoing, stable operations.*	• Integration into existing routines • Desire for formal vision competence

The results are presented in Table 6. The focus group participants found the implementation of a structured vision assessment acceptable in their practice. They agreed that it was important to assign priority in their busy schedules to vision assessment because knowledge about their patients' vision is important in their work. Moreover, the KROSS workshops was experienced as motivational and useful to their practice. Most of the participants had adopted the KROSS tool and were actively using the new knowledge of post-stroke VIs in their practice. The rehabilitation hospital, the home-based rehabilitation unit and the municipal rehabilitation unit were all using the KROSS tool on most of their stroke patients. However, the home care unit never started using the tool in spite of their initial positive intentions. Although some participants found it difficult to identify a problem that they were not trained to rehabilitate, they still experienced the KROSS tool as appropriate to their services. The tool enabled them to detect a problem, and the patient could later be referred to other practitioners with expertise in vision rehabilitation. Participants from the home care unit believed that the assessment should be integrated into rehabilitation services in situations where there is an explicit focus on functional assessments.

Participants reported that it was easy to become familiar with the KROSS tool after conducting the first few assessments. Frequent use made the participants more confident in their assessments and less dependent on the instructions, although these, in combination with internal supervision, proved to be important during the initial part of the implementation. It was important to the participants to have a procedure for documenting their assessments. The most practical way of achieving this was to integrate the assessment form into the medical record. However, participants from the services were they were unable to do this felt challenged by their lack of ability to describe visual functions and prepare assessments in their own words. Lack of time was reported as a reason for not performing assessments on all patients.

The assessment protocol was used by participants carrying out the KROSS assessments, and all parts of the assessment were covered in a predefined order. Some only tested patients who they suspected had VIs and not all stroke survivors. This was due to the limited resources available to perform the assessments. Municipal case handlers started reminding service providers to perform the KROSS assessments by specifying this in their services decisions. The service providers were also more aware of vision issues when observing their patients in activities and then began to consider vision in their clinical judgements. Others reported that they referred more patients to vision rehabilitation than previously. Moreover, the rehabilitation hospital integrated vision specialists into its practice.

In order to promote the sustainability of knowledge use, the vision procedure was integrated into already existing routines. One example was the use of whiteboard meetings in the municipal rehabilitation unit. This involved listing all the assessments and tasks on the whiteboard used in interdisciplinary meetings. Inclusion of the KROSS assessment served as a reminder to practitioners to carry it out on patients. Many participants expressed an interest in more formal education about post-stroke VIs. More vision competence in stroke rehabilitation can help to sustain a focus on post-stroke vision issues within the health care services.

6 Discussion

This KT project and the three sub-studies have provided new important insights into the implementation of structured vision assessments as part of stroke care. Structured vision assessment using the KROSS tool have been implemented in municipal rehabilitation and home rehabilitation, a rehabilitation hospital and a stroke unit, while home service never got started using the tool in practise. The participants in the evaluation study, including home care, expressed an increased competence and attention of post-stroke VIs. Three factors especially contributed to knowledge use; a) improving the participants knowledge and skills in vision assessment through the workshops, b) engaging all stakeholders with a participative approach and c) integrating the KROSS routine in local routines and procedures.

The knowledge-action gap

We used the KTA model to guide the implementation and explored the gap between current knowledge and the practice of post-stroke vision assessment (Graham et al., 2006). In the first study, we obtained insights into the experiences of stroke survivors with VIs. Their experience was that their VIs received little attention in the stroke unit, and that the care they received and subsequent follow-up was inadequate. This is in line with the results of other studies carried out in Norway and internationally (Rowe, 2017; Sand et al., 2012; Smith et al., 2018). A new perspective from this study was the experience of VIs being an invisible impairment throughout the stroke care continuum from the first visual symptom to how their VIs was addressed in later rehabilitation. The experiences of patients do not necessarily tell the whole objective truth about practitioners' focus on or assessment of vision issues as part of stroke care. There are many factors influencing a person's perception of a phenomena (Creswell & Cheryl, 2018) However, they do offer understandings into the patients' experiences of the care they received. Even though health care personnel may have assessed, informed and followed up their patient's vision to some degree, the patients in our study experienced a lack of information. This is problematic since stroke is a serious and potentially life-threatening diagnosis and the acute phase is commonly experienced as chaotic and confusing by many stroke survivors, who have a legitimate need for information (De Simoni et al., 2016; Eames et al., 2010; Eilertsen et al., 2010; Kirkevold, 2010). The short time during which patients stay in the stroke units makes it important that health care personnel in rehabilitation and follow-up are able to continue to provide sufficient information to patients and their caregivers. Survivors’ experiences, as expressed in the first study, harmonised well with accounts of the lack of knowledge and skills in vision issues and vision assessments as expressed by health care personnel in the second study and previous published reports and studies (Lofthus & Olsvik, 2012b; Sand et al., 2012; The Norwegian Directorate of Health, 2016). Health care personnel in the second study reported that they lacked basic competencies in vision issues and that they had experienced too little focus on vision as part of their education and previous work. Findings from study one and two describe the knowledge practise gap from the perspectives of stroke survivors and health care personnel. Both the stroke survivors and the health care personal expressed that post-stroke VIs are difficult to understand. That stroke survivors and their carers commonly encounter difficulties in understanding post-stroke VIs is also described in other studies internationally (Hazelton et al., 2019; Rowe, 2017).This gap was also confirmed in the discussions with the municipal service managers and organisational leaders.

Promoting enthusiasm for change

The participative approach, involving municipal participants as partners in the implementation project, proved to be somewhat time-consuming, especially at the start during meetings with a variety of management groups and practitioners. This experience has also been reported in connection with other studies that have employed IKT (Harrison & Graham, 2021; Lawrence et al., 2019). Although the process is time-consuming, the collaborative approach was a key factor for the positive outcomes of the project. It helped to promote recruitment for the interviews and enthuse the participants prior to the workshops. IKT can be seen as an approach to research, and not a method in itself (Nguyen et al., 2020). This implies that there are many ways of applying the IKT approach, and we found it a valuable approach for use in the present implementation process, and in general in terms of the research project and its outcomes.

Much of the practical work linked to the collaboration involved face-to-face meetings to plan and discuss the project, attend presentations, take part in interviews, participate in the workshops, as well as in connection with subsequent follow-up activities. Such work is an important part of the implementation facilitators role (Harrison & Graham, 2021; Harvey & Kitson, 2016). Meetings became key arenas for creating a shared understanding of the project, an awareness of why it was is important, and a roadmap of how it should be carried out. This approach conforms well with the principles of person-centred practise and research (Dewing et al., 2021; McCormack & McCance, 2017b), and we strongly believe that this approach promoted an enthusiasm for change that in turn contributed to the success of the implementation. The definition of the term 'knowledge user' is broad, and is formulated to include managers, practitioners and a variety of other stakeholders (Nguyen et al., 2020). Managers at all levels, practitioners and stroke survivors were included at an early stage in the implementation. This gave an acceptance for the project throughout the organisation and the participants reported that they were aware of their managers' approval of their participation.

During this implementation, we employed multifaceted strategies that utilised educational meetings (KROSS workshop) as the central component. This approach is widely used in health care implementations and has been reported as being effective (Cassidy et al., 2021; Jones et al., 2015). Our work demonstrated that the workshops was a crucial part of the implementation, not least because of the lack of competence and skills exhibited by practitioners at the outset represented a barrier for knowledge use. A lack of knowledge and skills is a well-known barrier to implementation (Michie et al., 2005). The workshops was followed up by facilitation and supervision by the project leader. An implementation facilitator has been described as important to promote implementation (Harrison & Graham, 2021). Although, when coming from outside the practise setting it is important to take a supportive approach (Harrison & Graham, 2021), which we tried to maintain throughout the project. Health care personnel highlighted the availability of supervision and follow-up in own practices as being of key importance, are described as important in implementation (Harrison & Graham, 2021). The collaborative approach laid the foundation for the recruitment of health care personnel and the practical aspects of their participation in the workshops. Important strategies related to the present project, as suggested by the participants, involved integration of the assessment into local routines. Each service has its own way of organising its day-to-day work and of identifying the procedure into which the KROSS implementation can best be integrated. Such adaptations require close dialogue with knowledge users.

The use of multiple strategies in the same project can create difficulties in distinguishing effective strategies from those that have no impact. Only a limited number of studies are available in the literature that have evaluated single interventions in which multicomponent strategies have been recommended (Bero et al., 1998; Jones et al., 2015), although multicomponent strategies has not proved to be more effective that single strategies (Harrison & Graham, 2021). We do believe that although the workshops were central for improving knowledge of post-stroke VIs, and the positive outcomes of the implementation. However the totality of the strategies used were important for the outcomes.

Improved vision competence motivates health care personnel

The present implementation project differs from others in which health care personnel are already equipped with the requisite knowledge, but for various reasons fail to apply it. A good example of this involves nutritional assessments in geriatric care (Hickman & Tapsell, 2009). The lack of knowledge about vision is a problem among health care personnel, not least to those working in the municipal services. In our studies the health care personnel described little emphasis on vision in their education and later work. For this reason, it was necessary as a major implementation strategy to build vision competence. Educational workshops are often used in implementations such as ours, and can be designed in different ways (Davis et al., 2013). As described earlier, in our workshops we used a number of approaches involving both formal presentations of knowledge and the use of the KROSS tool as a means of putting the knowledge into practice. We also employed practical training in vision assessment on stroke survivors.

During the workshops we enabled to succeed in achieving a shared understanding of the importance of post-stroke vision assessment. Creating a shared understanding of the practise trough engaging health care personnel represents a key facilitator of practice development and implementation (McCormack et al., 2013; Rycroft-Malone et al., 2018). Another important motivational factor was the expected impact on the stroke survivors. That practitioners anticipate real benefits for their patients is known to motivate them to implement new routines (Michie et al., 2005; Nilsen et al., 2020; Skytt et al., 2016). The health care personnel in this project expressed their motivation and accepted that the knowledge was important to their practice, and that the anticipated positive outcomes for their patients motivated their interest in learning about post-stroke VIs. Such factors are important components of adult learning theory (Hutchinson & Estabrooks, 2013). In the third study we found that motivation was maintained by those who adopted the procedure because they saw that their own vision assessment competencies were beneficial to their patients. Several participants also expressed an interest in developing their knowledge further after participating in the project. Such effects has also been reported in other implementation projects involving partnerships and practise developments (Harrison & Graham, 2021).

Some participants in the third study found it frustrating that there were no services available to which they could refer their patients. Rehabilitation following post-stroke VIs has been less investigated in the literature, and where investigated, the findings have been inconclusive (Pollock et al., 2011; Pollock et al., 2019). The lack of evidence of the restoration of visual field has resulted in clinical guidelines containing weak recommendations (The Norwegian Directorate of Health, 2017). This in turn can result in a lack of opportunities for follow-up of VIs after stroke because the health care services refrain from implementing weak recommendations. For this reason, it is important to remember that the identification of visual problems, the provision to patients and their carers of adequate information, training and advice on compensative strategies, and adaptation to a life with VIs can all be highly beneficial to stroke survivors with VIs (Hanna et al., 2017b; Hazelton et al., 2019; Howard & Rowe, 2018; Pollock et al., 2019; Rowe, 2017; Rowe et al., 2015).

Integrating vision assessment in local routines and procedures

A contextual facilitator identified in the second study was the integration of the KROSS assessment into existing routines. A challenge to do so was some of the contextual barriers which were a lack of formal stroke routines and difficulties to integrate the vision tool in the medical record. If there was a formal stroke routine, the new vision assessment routine could have been included here. When such a routine was missing, we had to look for other solutions. Together with the knowledge users we identified different arenas for integrating the KROSS routine. These where white board meetings were the interdisciplinary team met to organise their days and plan their activities, inclusion in the case handlers' services decisions and plan to include vision assessment as a part of the first visit assessments in home care and home rehabilitation. These solutions, in which several of them were important for adoption, would not have been identified without the partners knowledge about the local context. The integration of such local knowledge is highlighted in several implementation theories, models, frameworks and studies (Dryden-Palmer et al., 2020; Harrison & Graham, 2021; Harvey & Kitson, 2016; Nilsen & Bernhardsson, 2019; Rycroft-Malone et al., 2013). Our broad involvement of health service mangers and service leader also made it possible to find solutions for how to integrate the vision tool in the medical records.

Another contextual barrier was the lack of interdisciplinary collaboration, especially with vision specialists organised outside the stroke care services. Communication with vision specialists consisted of written reports about the visual function. Health care personnel who participated in the second and third studies considered the value of such reports to be low because they did not have the skills to understand the results of the vision assessments or interpret the implications for their patients. The language used by vision specialists was complicated and consisted mostly of numbers and abbreviations that they did not understand. To fully integrate vision in stroke care, there is a need to include vision specialists in the interdisciplinary stroke teams. The rehabilitation hospital started a collaboration with an optometrist who came to their institution and performed vision assessments. This arrangement came as a result of this implementation work. Stroke care and post-stroke rehabilitation are interdisciplinary fields organised in teams (Langhorne et al., 2011). Interdisciplinary treatment is much more effective than care administered by single-field practitioners (Langhorne, Ramachandra, et al., 2020). The strengths of the interdisciplinary approach include planning, skills sharing and general collaboration during the rehabilitation process, based on a common understanding of the expertise inherent in each profession, as well as the preferences and personal aims of the patient (Langhorne et al., 2011; Langhorne, Ramachandra, et al., 2020). Currently there are no tradition for including vision specialist in interdisciplinary stroke care in Norway. Integrating vision specialists in stroke teams, not only for doing vision assessments, but also to share their knowledge in visual function and obtain knowledge about stroke rehabilitation from the stroke team, vision can be integrated in stroke care. Such integration will enable the use of detailed knowledge about a patient's visual function can be translated into how the VIs affect the patients function (functional vision) (Roberts et al., 2016). By integrating these approaches, the stroke team will have a better starting point for the design of their rehabilitation interventions (Roberts et al., 2016).

This study introduced the KROSS screening tool as a means to identify Vis after stroke. The use of a screening tool is an important first step towards improving post-stroke vision care after stroke, and a way to identify the need for including vision specialists in follow-up (Rowe, Hepworth, Howard, Bruce, et al., 2020; Rowe, Hepworth, Howard, Hanna, et al., 2020). Rowe, Hepworth, Howard, Hanna, et al. (2020) have proposed a stroke-vision care pathway that describes how stroke survivors can access appropriate vision care services, depending on where they find themselves in the stroke care continuum. Such a pathway should be considered developed as part of Norwegian stroke care in order to further promote integration of vision care into stroke teams.

Reflections on applying the KTA model

This implementation project was relatively small in relation to participants, however the complexity of the project made it time consuming. The KTA model was chosen early in the planning phase and guided the process from idea to action. Although looking simple at the first glance the model comprises many different processes going on simultaneously. As a novice implementation facilitator/researcher I experienced the KTA model as very intuitive and informative giving an overview of the elements needed to consider in such a project. Since the model does not provide a specific recipe for how each KTA element should be performed, it was challenging to practically design the project. This has also been reported by others using the KTA model (Lynch et al., 2018). To aid the implementation design, I therefore looked towards other relevant framework and models, and took inspiration from them. Altogether, the KTA model was useful to provide an insight to the implementation field and the focus on the participatory approach in the KT literature has been important in this work.

6.1 Implications for future research

In this project we evaluated the implementation outcomes and not the service and client outcomes. Although both the results from this project and previous literature gives us grounds to believe that client outcomes will improve, we suggest that this might be a topic for further research. The KROSS tool employs validated tests and has been designed and developed on the basis of sound theory, research and practical experience. However, it has not been validated in its present form by health care personnel without specialist skills in vision. This matter is currently under investigation. The KROSS tool was developed with aim of identifying VIs caused by a stroke, although there are several brain injuries that can cause vision problems such as traumatic brain injury and brain tumour. Future research may assess how the KROSS tool can include this population.

The KROSS workshops were evaluated qualitatively. A formal assessment for improvement of knowledge and skills are interesting for further development of this implementation strategy. This project represents the implementation in a limited number of stroke care services. Some of the results will be context specific while others may be more general in implementing structured vision assessment in stroke care. Future research should explore such implementation in other contexts.

6.2 Implications for practice

This project supports that all stroke survivors should have their vision assessed. And confirms that interdisciplinary stroke services currently have only limited competence about vision and the assessment of visual function. This project has demonstrated that adequate training and use of the KROSS vision assessment tool are both feasible and acceptable for application in stroke care. Our studies indicate that vision assessment is probably most appropriate in health service units that work with rehabilitation and post-stroke functional assessments. These services have focus on assessing post-stroke outcomes and functions and meet the patients early after their strokes. This project has shown that a collaborative approach to the implementation of vision assessment is beneficial in stroke care, and helps towards achieving a shared understanding of the objectives and methods of implementation in relevant contexts. The integration of the KROSS tool into existing procedures was an important facilitator to promote a sustainable use of knowledge. With local adaptations, the KROSS tool for assessing vision post-stroke, can be implemented in the different stroke services.

In recent years, post-stroke VIs have been the subject of increasing levels of interest in Norway, and internationally. A national vision in stroke network (NorVIS, 2022), has been established in Norway with the aim of promoting better post-stroke vision care, and many stroke care services are showing great interest in the KROSS tool. This project and earlier work with the KROSS tool were the basis for the NorVIS network. A political decision was taken in 2021 to provide guarantees to all stroke survivors that their vision would be assessed. Moreover, all persons diagnosed with post-stroke VIs will be referred to vision rehabilitation. This provides a great opportunity for the further implementation of structured post-stroke vision assessment in Norway.

The national quality register for stroke care are used for registration of quality indicators (Hild Fjærtoft et al., 2021). Currently, the register does not contain any registration of vision assessment to monitor the practise of post-stroke vision care. This project shows that structured post-stroke vision assessment should, and can included, as an indicator of good quality in stroke care.

6.3 Strengths and limitations

A strength of this project is that the qualitative approach has provided new knowledge and in-depth insights to the aims of the sub-studies. Although the sample sizes are relatively small and might not represent the experiences of other than the included participants. Qualitative approach is particularly beneficial when exploring the "how "and "why" of the implementation instead of just the end results (Hamilton & Finley, 2019) which was important for developing this project. These qualitative findings can later be used to design quantitative studies in later implementation of the KROSS tool.

We used multifaceted strategies in the implementation, this might make it difficult to separate the most effective strategies from strategies with less impact. However, in the third study we identified that the KROSS workshops and the collaborative approach was especially important for the positive outcomes. Other strategies that proved to be important was developed in this collaboration with the stakeholders and emerged as a result from this. An example of this is how the KROSS procedure was included in existing routines. This illustrates the importance of using an IKT approach (Jull et al., 2017).

This project was performed in one municipality, and as most municipalities are organised slightly differently the results from this project may not be directly applied to other municipalities. However, Kongsberg municipality is a medium sized municipality comparable to many other Norwegian municipalities and we do believe that many of the determinants for such an implementation will count for them. The project included additional practises during the planning process. This made it somehow different to evaluate the project since the implementation planning were different between the services. Their participation in the project was positive for the project and provided the implementation with additional insight and experience in post-stroke care.

A major strength of the collaborative approach was that several stroke survivors participated in the project. They shared their own experiences with the participants, and they acted as demo-patients when the health care personnel practised the KROSS tool.

This was highlighted by the participants as highly motivating and gave the knowledge to be implemented a high level of acceptance.

7 Conclusion

This KT project and the three sub-studies have provided new important insights into the implementation of structured vision assessments as part of stroke care. Structured vision assessment using the KROSS tool have been adopted in municipal rehabilitation and home rehabilitation, a rehabilitation hospital and a stroke unit, while home service never got started using the tool in practise. The KTA model guided the implementation and was a valuable tool for planning the implementation and the three sub-studies. The results from this project confirms that stroke survivors experience a lack of acknowledgement and follow up of VIs in stroke care. Early detection of a visual problem and referral to a vision specialist for follow up and rehabilitation contribute to better stroke care. The project has also revealed that health care personnel lack sufficient knowledge and skills to perform vision assessment without the access to a tool to guide them in the assessment. As a main strategy to increase knowledge and skills we adapted educational workshops with theoretical education and practical training to promote implementation. With sufficient knowledge and skills and integration in local routines and procedures, the KROSS tool can be successfully implemented in stroke care. A participatory approach which was applied to this project promoted implementation success. It is important to consider contextual barriers and facilitators during the implementation of structured vision procedures in other contexts and at larger scales. Services that already perform other functional assessments as part of their rehabilitation service were perceived as the most appropriate by the participants in the project. Seeing that their new practise and improved knowledge and skills in post-stroke vision assessment made a difference for their patients, was an important experience that enhanced motivation. This resulted in an expressed wish for formal vision competence for several of the participants. To improve post-stroke vision care, a structured vision assessment should be included in a national stroke care pathway description.

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Errata

Page	Line	Original text	Corrected text
11	2	Stroke is a stroke is a	Stroke is a …
19	3	… then follows a description og how we …	… then follows a description of how we …
66	28	Trough the workshops we enabled….	During the workshops we enabled…
69	16	The use of screening tools The use of a screening tool is an important…	The use of a screening tool is an important…
69	28	…the model comprises of many different processes…	..the model comprises many different processes…
70	7	… implementation field ant the focus on the participatory…	… implementation field and the focus on the participatory…
72	13	Other strategies that proved to be important was developed in this collaboration with the	Other strategies that proved to be important was developed in this collaboration with the stakeholders and emerged as a result from this.

		stakeholders and though a result from this.	
73	1	This was highlighted as by the participants as highly motivating	This was highlighted by the participants as highly motivating
22		*Figure 2.* The knowledge to action cycle. Adapted with permission from: *Knowledge translation in health care : moving from evidence to practice* (2nd ed. ed.). John Wiley & Sons. Graham, I. D., Straus, S. E., & Tetroe, J. (Eds.). (2013).	*Figure 2.* The knowledge to action cycle. Adapted with permission from: Lost in knowledge translation: time for a map? Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., & Robinson, N. (2006). *J Contin Educ Health Prof, 26*(1), 13-24. https://doi.org/10.1002/chp.47

Paper 1

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RESEARCH ARTICLE

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"Invisible" visual impairments. A qualitative study of stroke survivors` experience of vision symptoms, health services and impact of visual impairments

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Abstract

Background: Visual impairments (VIs) have a negative impact on life and affect up to 60% of stroke survivors. Despite this, VIs are often overlooked. This paper explores how persons with VIs experience vision care within stroke health services and how VIs impact everyday life the first 3 months post stroke.

Methods: Individual semi-structured interviews were conducted with 10 stroke survivors 3 months post stroke, and analyzed using qualitative content analysis.

Results: The main theme, "Invisible" visual impairments, represents how participants experience VIs as an unknown and difficult symptom of stroke and that the lack of attention and appropriate visual care leads to uncertainty about the future. VIs were highlighted as a main factor hindering the participants living life as before. The lack of acknowledgement, information, and systematic vision rehabilitation leads to feelings of being unsupported in the process of coping with VIs.

Conclusion: VIs are unknown symptoms pre stroke and sequelas after stroke that significantly affect everyday life. VIs and vision rehabilitation needs more attention through all phases of stroke health services. We request a greater awareness of VIs as a presenting symptom of stroke, and that visual symptoms should be included in stroke awareness campaigns. Further, we suggest increased competence and standardized evidence-based clinical pathways for VIs to advance all stroke health services including rehabilitation in order to improve outcomes and adaptation to future life for stroke survivors with VIs.

Keywords: Rehabilitation, Qualitative research, Municipal- and specialist health care services, Health care professionals, Vision

Background

Stroke is the second-leading cause of death [1], disability, and need for long-term rehabilitation and care in industrialized countries [2], and approximately 10.3 million persons suffer from stroke every year [3]. With an estimated increase of 60–80% in stroke events by 2050 [4], this will cause considerable challenges to the health care system, as half of those who survive will experience permanent complications or changes [1]. Impaired vision is one of many complications after stroke and affects up to 60% of stroke survivors [5].

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Visual impairments (VIs) after stroke include visual field loss, eye movement disorders, loss of central vision and perceptual disorders. Symptoms of VIs include sudden loss of vision, double vision, reading difficulties, reduced balance or mobility, clumsiness or inattention of visual information [6, 7]. However, many stroke survivors do not relate these symptoms to impaired vision but attribute them to other problems, such as age, fatigue, and limb weakness [6]. VIs may be permanent and are associated with fatigue, mental distress, increased falls, and reduced rehabilitation outcomes and daily living activities [8–12]. They may lead to driving cessation [13], reading difficulties [14, 15], and increased falling [16]. Failing to identify VIs after stroke can have a severe negative impact on the patient's coping, further recovery, and quality of life [17].

Learning to live with a visual loss is a comprehensive and complex task closely intertwined with existential and social aspects [18–20]. Regardless of severity, much can be done to recover from or improve VIs through vision rehabilitation [21, 22], even if high quality randomized controlled trial (RCT) studies do not show evidence of effective treatment for visual field loss [23]. Several studies have concluded that identifying and give advice on VIs and coping strategies will raise self-awareness [22], and that visual compensatory training is useful for vision outcomes [23, 24], rehabilitation of other consequences of stroke, and the overall rehabilitation process [25]. The Norwegian guidelines for treatment and rehabilitation of stroke [26] state that vision function should be examined after stroke, VI patients should be referred to an eye care specialist, and compensatory training is recommended after vision field loss [26]. In Norway, general stroke treatment and outcomes are successful [27]; the median hospital stay is 5 days, and 44% are discharged straight home [28]. However, in Norway and internationally, vision rehabilitation is not generally included in stroke health services and VIs are commonly overlooked and undertreated as professionals in both specialist and municipal health care services often have little awareness and competence regarding visual problems occurring in stroke survivors [6, 11, 19, 29–32]. That VIs are inadequately documented and lack systematic assessment, treatment, or rehabilitation [31, 33], leads to negative consequences not only for the individual but also for the family and society [19, 34–36].

In order to improve health services and outcomes for stroke survivors with VIs, a deeper understanding is needed of how stroke survivors view the way specialist and municipal health care services address and attend to VIs in stroke care, and further, how VIs affect everyday life in the first months after stroke. Today this knowledge is scarce. Further, this is the first Norwegian study illuminating patient perspectives regarding VIs and stroke health services early after stroke. Key aspects include symptoms, experiences of health services and the impact of VIs following stroke.

Methods

Study design

This qualitative study used a descriptive, interpretative design with in-depth individual participant interviews. Qualitative interviews aim to gain knowledge about the experiences of participants in relation to a particular phenomenon. Here, the phenomenon to be studied was stroke survivors` experiences of vision symptoms, health services and impact of VIs. The study is part of a larger knowledge translation project [37] that aims to implement knowledge and competence of vision care and rehabilitation in Norwegian stroke health services.

Recruitment and participants

Stroke nurses in two acute stroke units recruited patients with VIs after stroke. All patients identified with VIs and who fulfilled the inclusion criteria were invited to participate during an eight-month period. Inclusion criteria were persons with VIs following acute stroke, over 18 years of age, the ability to express their experiences in Norwegian, and the ability to participate in an in-depth interview lasting approximately 60 min. VIs were identified by use of the National Institute of Health Stroke Scale (NIHSS) [38]. NIHSS is a standard test used on all patients with suspected stroke in the two hospitals. It includes a simple clinical assessment of visual field, horizontal eye movements and neglect. In addition, patients that reported double vision were asked for participation.

Five men and five women with a mean age of 73.4 years participated (see Table 1). Six were discharged directly home from the stroke units, while four had extensive rehabilitation due to physical and cognitive consequences following their stroke. All lived in their own homes at the time of the interview. Only one patient had received visual rehabilitation after self-referral. All participants stated that, before the stroke, they could see well and did not experience any problems with their vision. Everyone used reading glasses, most had undergone cataract surgery. The required sample size was assessed during data collection in order to ensure that sufficient data was obtained. The interviews provided rich and varied descriptions, and the sample of ten was considered appropriate.

Data collection—qualitative interviews

Three months after discharge from the acute stroke unit, a qualitative in-depth, semi structured interview was conducted with each of the participants. A research assistant conducted the interviews in the participants'

Table 1 Participants' characteristics

ID	Age	Gender	Days in acute care	Rehabilitation	Self-reported visual impairment
1	70	Female	14	In-patient	Hemianopia
2	59	Male	2	None	Loss of vision one eye
3	76	Female	21	In-patient	Hemianopia
4	75	Male	14	In-patient	Hemianopia/neglect
5	73	Male	14	None	Hemianopia
6	71	Female	7	In-patient	Hemianopia/neglect
7	81	Male	2	None	Hemianopia
8	71	Female	5–9 (unsure)	None	Hemianopia
9	90	Female	5	None	Diplopia
10	68	Male	4	None	Hemianopia

homes. An interview guide was developed focusing on the person's experiences of the initial symptoms of stroke; vision care from the first point of contact, during the stay on the stroke unit, and in rehabilitation or municipal health care services. Further, details of living with VIs from stroke onset and during the following 3 months constituted a particular focus. The participants were encouraged to express themselves freely and elaborate if new topics emerged. All interviews were digitally recorded and transcribed verbatim.

Data analysis

We performed a content analysis as described by Graneheim and Lundman [39, 40] in which both manifest and latent content were identified. Manifest content represents the obvious content—what the text says. Latent content represents the underlying meaning of what the text talks about and contains a higher level of interpretation and abstraction than the manifest content [40]. The analysis started with all authors reading all interviews as a whole text to get familiar with the content. Meaning units were then identified by TSM and HKF and discussed with HO and GE, and could be one word or a whole paragraph that expressed a specific meaning of interest to the research questions. The next step condensed the meaning units while still preserving the original meaning. Further, the condensed meaning units were abstracted and labelled with a code taking the context of the text into consideration [39, 40] (performed by TSM and HKF). All codes were discussed with all authors until consensus. Based upon similarities and differences, we grouped and abstracted the codes into seven categories. Table 2 shows an example of the analysis process from meaning unit (manifest content) to a category (latent content) [39, 40]. Further analysis and interpretation of the seven categories identified three subthemes. Finally, all authors agreed on one main theme after taking the original text, categories and subthemes into consideration, see Table 3.

Results

Through the analysis of interviewing ten stroke survivors of their experience of vision care after stroke and living with VIs the main theme, "Invisible" vision impairments, were derived from three subthemes and seven categories, and will be presented in this order, (see Table 3).

"Invisible" vision impairments

The theme "Invisible" vision impairments covers both how the participants experienced their vision symptom, and that vision symptoms were ignored by health care personnel. They perceived a lack of information, support

Table 2 Examples of the analysis from manifest to latent content

Meaning unit (MU) Manifest content	Condensed MU Manifest content	Code Manifest content	Category Latent content
"I rubbed my eyes … but I thought it [visual loss] would pass—I did not think it could be something serious! But this was in the evening, so I took my medication, because I got tired, so I took them and went to bed. I fell asleep at once."	Thought the vision loss would pass, and not as something serious.	Waiting for the symptoms to pass	Experience of sudden vision problems – distressful but not alarming
"I also lost balance, you know. It was not only that I did not see-that I saw double, but I was swaying. Just like a drunk man; I was swaying. That was unsettling. Very distressful."	In addition to double vision, lost balance and was swaying. Felt like a drunk man swaying. Felt unsettled and very distressful.	Distressful feeling of sudden vison problem	

Table 3 Presentation of categories, subthemes, and the main theme

Categories	Subthemes	Theme
• Experience of sudden vision problems – distressful but not alarming • Difficulties relating vision problems as a symptom of stroke	Vision problems are experienced as a difficult unknown symptom of stroke	"Invisible" visual impairments
• "They primarily do not have it in their checklist" - an experienced lack of focus on vision in the stroke units • No offer of visual rehabilitation in health services - a worry	Experiences of inadequate visual care in health services	
• Difficult and exhausting to adapt to changes in everyday activities • Life moves on, without driving • Being told that nothing could be done for the vision impairment - accepted, but not convinced …	Visual impairments—big impact now and in the future	

and acknowledgement of the impact and consequences of VIs. In contrast to physical symptoms, the participants experienced that VIs were little known symptoms, signs or sequela after stroke in health care services. VIs are difficult to observe because often they are not visible in the way an arm paresis or face palsy are. In addition, the participants also struggled to become aware, understand and acknowledge their VIs, such as when the brain fills in the missing visual field with something thought to be sensible:

> "There are areas where I don't' see anything, but the brain makes up an image. Initially, I did not understand it, but I understand it better now. "Moving objects appear very suddenly. And, when I sit and look out – I don't see "nothing" –- there is no area that is invisible, because there is an image there. However, if something comes in from the side, *then* I realize there is something wrong [with my visual field]."

A particular concern was that although VIs as a consequence of stroke were unknown to them, the participants also experienced that this was unknown to many health care professionals. They felt they met a lack of knowledge, competence and limited interest in their challenges, and the importance of vision in performing everyday activities. They believed this had affected their treatment from the point when they first experienced a vision symptom, in the hospital, during rehabilitation, and in long-term follow-up in the municipality. They also highlighted the concern of dealing with this alone and felt uncertain of whether the perceived improvement was something they imagined, or if it actually could be measured. Many highlighted VIs as the most important factor hindering a return to their previous life and activities. Some expressed that, if VIs had been a more focused symptom and sequela after stroke, they could probably have received appropriate vision care, which ultimately might have improved their outcomes after stroke.

Vision problems are experienced as a difficult unknown symptom of stroke

Several of the participants experienced a lack of awareness and knowledge, both among themselves and in the health services, of VIs as a symptom of stroke and that VIs are common after stroke. This sub-theme was identified by two categories (Table 3).

Experience of sudden vision problems- distressful but not alarming

Five participants experienced sudden vision problems at the onset of their stroke. These participants expressed that sudden vision problems were confusing and a distressful experience. The symptoms varied greatly from minor feelings of eye irritations to double vision or severe visual field loss. A few experienced a feeling of something irritating their eye, which they tried to rub away.

> "It happened while I was driving, and suddenly I thought I had something in my eye, and I started to rub … . To make it go away. I stopped the car and continued rubbing, but it did not go away."

Another participant said he suddenly discovered that he could only read the right-hand side of the signs in a food market. He recalled that he had felt something slightly wrong with his vision the previous few hours but gave it no further attention:

> "And.. I drove to Oslo … Did not feel any problems driving either. However when I got into the food market and was going to read the posters –then I got a surprise –I could not see the whole words! I could only see half the words!"

Even though he reported the experience as serious and distressful, he drove a hundred kilometers back home. Another participant explained:

> "And I fell asleep [watching television]. When I woke up, half the screen was missing. There was a

> line up and down, and I could not see to the right. It was grey, so I called my husband and told him there was something wrong with the television. Then, I started to look around, and I noticed I could see half of everything. I rubbed my eyes … but I thought it [visual loss] would pass—I did not think it could be something serious! But this was in the evening, so I took my medication, because I got tired, so I took them and went to bed.

Another, with acute double vision experienced an overwhelming feeling of dizziness and sickness, to the point where she felt that all she could do was close her eyes and go to bed. She did not call for medical help until the next day as the symptoms persisted:

> "I also lost balance, you know. It was not only that I did not see-that I saw double, but I was swaying. Just like a drunk man; I was swaying. That was unsettling. Very distressful. So, I went to bed. My son asked if we should call the doctor, but I said: "No, I will try to get some sleep"

Although the specific symptoms were new and experienced as distressful, they confused them with minor irritations or other symptoms of being unwell and hesitated to contact medical help. None recognized it as a sign of acute stroke in need of urgent medical attention:

Three participants were admitted to the hospital because of physical limb weakness, and two had their stroke as a complication of surgery and were already in hospital at stroke onset. For some, it took a while before they became aware of their VIs, and others first realized their VIs when the visual field was tested. One was unaware of something wrong until it was explained after a while by the hospital personnel that he only ate from one side of the plate:

> "So … you can say, my vision, in fact, I became aware of it when I was going to eat. Then I—well, **I** had not noticed it, but the ones who served the food did: 'Why didn't you finish your food?' I did not see any food on the left side of the plate."

Participants admitted to the hospital in a hurry due to severe physical symptoms explained that they struggle to recall their first awareness of their visual problems. These were lost among other physical and more known problems.

Difficulties relating vision problems as a symptom of stroke

The five participants who experienced VIs as their presenting symptom of stroke, hesitated to contact medical help, as they thought it would go away. When the symptoms persisted, from hours to days, they all contacted their general practitioner (GP) and not the emergency medical services (EMS), nor were they admitted directly to the hospital but instead were called into the GP's office. After the initial assessment, the GPs all referred the patients to the hospital, but with varying degrees of urgency. Some were admitted to hospital directly from the GPs office by ambulance or taxi, while others were sent home and asked to call the ophthalmology department in the hospital and make an appointment themselves:

> "And then … (one day after) I called the hospital, and then I said, "I feel like I'm going blind!" And the woman that answered said that I should talk to the ophthalmologist. "He is occupied for a moment, but he will call you when he is available." And he called shortly after, and I explained the same for him. "If I am covering the right eye I see like that, and if I am covering the left eye it is just the same." "Then, it is not the eye," he said. "You don't have the same error on both eyes, completely the same. So, it has to be something else, and the first thing that crosses my mind is stroke," he said. "You need to come immediately.""

One participant, who worked as a janitor, was told by a colleague that he needed to check his vision because he seemed to neglect one side of the room (eg, when clearing a room or setting up chairs). The GP checked his visual acuity and concluded everything was fine, missing his visual field loss. However, when his right arm lost its strength a bit later, he was rapidly admitted to a stroke unit.

During their stay in the stroke unit, some participants said they were informed that time was crucial for a successful outcome of medical treatment. These participants emphasized this knowledge contrasted with their actual experiences from the treatment they received. They expressed a feeling of missed opportunities for medical treatment due to time lost in the GPs' or the ophthalmologists' waiting rooms. One participant explains:

> "I was told; "You have lost your vision. You will be blind for the rest of your life." If I had come directly to the hospital they could have saved it [vision], this should have been within 90 minutes, but it took almost three hours before I was there, waiting"

Experiences of inadequate visual care

The second subtheme represents two categories that describe the participants' experiences of visual care, rehabilitation and discharge from the stroke unit.

Although they recount the overall treatment in the stroke unit as good and safe, they had other experiences of the attention, information, care and follow up regarding their VIs.

"They primarily do not have it in their checklist" - an experienced lack of focus on vision in the stroke units

The participants described a lack of focus, awareness, and attention on their VIs in the stroke unit. They described being tested comprehensively, however, they felt focus was on their physical functions. Especially participants for whom VIs were their only or main sequela after stroke reacted to this. They described a health care system lacking competence, assessment, and follow-up of VIs after stroke:

> "Yeah, they—maybe they primarily do not have it in their checklist. Because it should be just as important to check your vision as it is to check if your arm works or not! You know, or if you struggle to empty your bladder. Because they are very concerned about that. The residual urine, they call it. They check that all the time - that you have managed to empty your bladder. But if your eyes work? Not at all! It is not even on their list! That astonishes me because your eyes are pretty important. You cannot replace them with new ones. You can get new teeth, you can actually do a lot with new limbs, but you cannot do anything with your eyes."

One became aware of her VI when her husband brought her the newspaper and she was not able to read it. She reacted very negatively to the fact that she discovered it herself:

> "I asked for my book, but I could not read a word. Nothing! Then, my husband arrived and asked me to try to read the newspaper. He held it up for me and I could not understand a thing. I had to tell the doctor during the ward round that my vision was impaired. "Oh?" That was a big surprise to them."

Another example interpreted by the participants as a lack of focus on VIs was the information regarding driving post stroke. One said he was told he would be given a driving ban for 3 months, but they forgot and he started to drive when he was discharged despite his visual field loss. Another said he was surprised the hospital did not take time to talk to him about driving, but his wife who is a nurse, stopped him from driving.

Several participants used the word "lucky" when they described their VIs after stroke, as they had seen how serious stroke outcomes could be. Others were called "lucky" by the hospital staff who compared them to others who sat in wheelchairs or had aphasia. The participants emphasized this as particularly negative and condescending, as it made them feel that their impairment was insignificant compared to others. One said:

> "'After all, you have been lucky,' they told me. 'It could have been much worse.' I tried to tell them that 'lucky' was the wrong word. I *have* been unlucky. Of course, I see that others are very unfortunate and need help with everything. But no, I have *not* been lucky."

No offer of visual rehabilitation in health services - a worry

Five of the participants reported an early discharge from the hospital: apart from their VIs, they were cognitively and physically functioning well, and were told the hospital had no more to offer them. They felt worried and disappointed about the lack of information, support, and plans for visual rehabilitation when being discharged. One participant with homonymous hemianopia as his only impairment said:

> "The hospital stay was probably ok, but you get discharged home. At the hospital, I asked and I asked, "What is happening with me now [with vision rehabilitation]?" "No, we do not have any to offer you," they replied. Everyone at the hospital, the neurologist, and everyone. So there, they had nothing to offer."

After the participant arrived at home he made an appointment with his GP. He continued:

> "He [the GP] was a bit surprised. "So, you were just sent home from the hospital?" he said. "Yes," I answered. "They told me it was the municipality's responsibility to follow me up now." The hospital had control over the medication and so on, but visual rehabilitation—nothing to offer."

The participants' were concerned of the lack of information and rehabilitation of VIs compared to physical problems after stroke. One participant expressed:

> "And, if the result of my stroke had been a problem with my arm or my leg or something like that, then I would be offered rehabilitation. At the hospital. But, for vision impairments, rehabilitation is completely missing!"

Visual impairments—big impact now and in the future

The VIs had a big impact on the participants life's, and told that adapting to a life with VIs was a process that took time and effort. They missed professional guidance and information in this process. A few were still searching options for vision rehabilitation. One participant finally found a rehabilitation service he thought helped him, while others said they had accepted that nothing could be done for them. Many felt their vision had improved, even though they had been told there were small chances of improvements. Many participants therefore wondered if their visual recovery could have improved further with visual rehabilitation. Three categories describe their experiences and views of life 3 months post stroke and for the future.

Difficult and exhausting to adapt to changes in everyday activities

Reading was something the participants emphasized as an important and essential part of daily living. Therefore, not being able to read was very difficult for them. They became aware of how important reading was, not only recreational reading but also to access information in newspapers, read letters, and use the internet, particularly online banking, independently. Many lost interest in watching television, as the subtexts changed too fast and the focus and energy needed to read made them tired and fatigued. Several felt their reading gradually improved, and they used different approaches to improve their reading, such as using a pen to mark the start of the sentence or reading material written in high contrast or columns, like newspaper texts. Others said they had cancelled their newspapers and stopped watching TV:

> "I am going to end my newspaper subscription, because I really struggle to … .Before, I could see both sides in the paper but now I have to sit like this [moves his finger through the text] Exhausting! Very exhausting, actually. To sit and watch TV is very exhausting.

The participants said that things they normally would have managed to do right away were delayed because of their reading problems. The visual problems was a threat to independent living; and the problems caused stress like in the following utterance:

> "..sometimes when things turn bad, I really just want to take a pill and be done with it. Not having to struggle with everything … for example, paying the bills. It feels hopeless. I have tried for a longer period, but I can't get the numbers right, and I now have an online bank and I need to find it and get my son to help me."

The participants now needed more help from their family and friends. They said it was easier to accept and ask for help with practical issues, but admitted it was much more difficult with intimate or personal issues, such as needing their children to come when visiting their GP or administering their finances. They felt this was intruding on their privacy and independence, and several expressed they did not want their children to know their concerns, have access to their health or finances.

Several of the participants noticed that they were more tired and fatigued than they were before the stroke. They wondered if the VIs made them tired because they needed to concentrate and pay much more attention when doing activities. In addition, some said that, when tired, they could not compensate as well for their VIs and their symptoms got worse.

Life moves on, without driving

In many ways, the participants were satisfied with their lives. They had started to adjust to their "new life," and many emphasized things they were still able to do. However, not being able to drive was something they all agreed limited their life after stroke. All except one had to cease driving temporarily due to their VIs and, at the time of the interview, were waiting for fitness-to-drive assessments. Being told they were banned from driving was dramatic, and they really hoped this would not be a permanent situation. At the same time, some reflected that they would never drive again:

> "Yeah, no. I think I will be fine. I hope that I can be so good that I can pick up driving again, but at the same time, I might have to realize that I need to manage without a driver's license too."

The one participant who received visual rehabilitation emphasized the hope of improving his vision enough to drive was the main motivation for training. He said he hoped the effort would pay off at the fitness-to-drive assessment. Many felt that their vision had improved enough for driving safely, but they were informed after the initial perimetry that they probably would not be allowed to drive again. All experienced the driving regulations for visual function as strict:

> "I feel that I could have been driving. Because if I move my head a bit I see … yeah..almost everything. But,, with this test [perimetri], when you do it, you have your chin on the chinrest and one eye patched. The tester apparently can see my pupil. If I move my head a bit she says: "Keep fixating straight ahead!""

Several said that ceasing to drive was the most significant loss after their stroke. The driving ban was especially problematic for those who did not have a driving partner or spouse. Public transportation was not something they were very familiar with, and they had to become familiar with schedules and ticket procedures, which were new to them and on digital platforms.

Being told that nothing could be done for the vision impairment - accepted, but not convinced …

All participants experienced, to varying degrees, poor information and a lack of awareness and knowledge of their VIs from health care personnel. When the VIs were detected, they were told that the chance of recovery was small:

> "The first he said to me when I came to him [ophthalmologist] was "You have had a blood clot. You will be blind [in one eye] as long as you live," he said. "So, I can never be able to have my vision back?" I said. "Only if you believe in miracles," he said. "Then, you may have your vision back." It had to be a miracle if I was going to get my vision back, but he said that that would never happened."

Some frequently repeated that they had been told that nothing could be done for their vision and accepted this. Even when some vison rehabilitation later had been suggested, the participants repeated that they initially had been informed that their vision could not be treated. One participant said:

> "I already got the answer to my question. Don't have anything to ask about. I am told that I am going to stay blind, so what can I ask about then?"

All participants experienced that their visual function had improved since the acute phase. However, it was unclear for them if this was a result of an actual improvement or if they had simply been adapting to their new situation and were now able to compensate for their VIs. One said:

> "So I don't think it has changed much. Other than that I … I guess I use my eyes in a different way. To … see»

The participants reported that their GPs knowledge and competence of VIs after stroke were poor. The feeling of getting better contrasted markedly with the information they received in the hospital, where they were told that nothing could be done. It made them concerned. They described several self-adapted compensation strategies that helped them feel improvement in everyday life and questioned whether the care services should have offered structured rehabilitation to promote further and more efficient improvement. For example, scanning the room for objects that might be in their missing visual field, seating themselves with the missing field toward the background, or inventing strategies to avoid knocking over objects, such as a cup of coffee, when grasping.

The participants missed visual rehabilitation and support to alleviate their visual loss. They experienced a lack of understanding and inappropriate solutions among municipal health care professionals, who only focused on what they felt was irrelevant low-vision aids, such as magnifying glasses or audiobooks. They felt it was their individual responsibility to identify and organize their visual care. One spent a great amount of time with his caregivers searching for visual rehabilitation services. When he finally learned that he could have been referred directly from the hospital, he was very disappointed that this had not been done:

> "I was a bit resigned at first, when I felt that … I did not get help anywhere. I did not get any response. Because, I read online and found out that it was really important to get going as soon as possible when you have (vision) problems like I do, with some sort of rehabilitation. But I felt I was banging my head against the door."

Discussion

This study describe stroke survivors` experience of vision symptoms, health care services, and for the first time, impact of visual impairments in the first 3 months post stroke. In this study, the participants expressed that VIs after stroke received little attention throughout health care services. This had negative consequences for acute treatment, rehabilitation, and their experiences of living with VIs. The overall theme expressed by the participants in this study is that the nature of VIs post stroke often is invisible. The concept of invisible problems after stroke has traditionally been understood as cognitive or psychological problems [41, 42]. The participants talked about their VIs in the same way that other invisible impairments have been expressed [19]. Invisible problems are, by their nature, particularly challenging due to not being acknowledged and addressed by health care services, caregivers, and the persons themselves [41, 43]. Other studies have also found that VIs after stroke are a "hidden disability" which makes it harder for stroke survivors to comprehend the nature and extent of their vision loss and its ramifications [20]. A more "visible" handicap would be easier to identify and address by health care professionals [19]. Regarding vision, this is a problem because there is a lack of knowledge, competence, structured assessments, and attention among health care personnel [33, 44]. This leads to VIs not being detected and adequately cared for, leaving the individual with feelings of uncertainty and having to deal with this alone.

Visual problems as a presenting symptom of stroke

Many participants reported that hospitalization was delayed because their presenting symptom of stroke was visual and they did not relate it to stroke. This is similar to experiences described by stroke survivors in the UK [19]. Visual symptoms have been reported as the least known symptom of acute stroke [45, 46]. Time from symptom to hospital treatment is crucial for stroke outcomes [47]. The most important factor of pre-hospital delay in acute stroke care is that patients hesitate to contact EMS [48]. To raise awareness in the general public, many campaigns have been initiated to inform about common symptoms of stroke [49, 50]. Most of these campaigns exclude visual symptoms of stroke and emphasize face palsy, limb weakness, and aphasia, with the mnemonic FAST (Face, Arm, Speech, Time) [49]. In Norway, the present campaign is Talk, Smile, and Lift [50]. The current mnemonics that focus on limb weakness, face palsy, and aphasia ignore vision symptoms as a sign of stroke. When a person presents symptoms of stroke to any health care professional, the proper intervention is admission to the hospital for acute treatment [26]. Results from this study indicate this is not the case, because many experienced they were first called in to their GPs office for and only later admitted to hospital. In the hospital, they learned that time from stroke onset to treatment is crucial, and the visual outcome might have been better if they were treated earlier. Our study supports that there is a need for non-acute medical services (such as GPs and their staff) to gain knowledge that VIs can be a symptom of stroke and to improve their competence and routines for securing an adequate response when being confronted with stroke symptoms. The five participants that had VIs as their presenting symptoms of stroke all called their GPs, which delayed their treatment and potential outcome. This is similar to a study showing that 60.7% of stroke patients who contacted their GPs were first examined in the GPs' clinics, while of those who contacted EMS 93.7% were directly admitted to hospital for acute assessment and treatment [51]. Another study found that thrombolysis treatment rates were lower for patients with posterior circulation infarction compared to those with anterior circulation infarction, and propose this may be due to posterior circulation symptoms, such as VIs, being less stroke specific and causing delayed hospital admission [52].

Failing to identify their VIs as symptoms of stroke may have caused a delay in hospital admission, and some participants believed they might have missed the opportunity for acute treatment to recanalize (remove blood cloth) their cerebral circulation. Therefore, there is a need for acute VI to be highlighted as an acute condition, and EMS should be contacted immediately [53]. Adding visual symptoms and balance (balance and eyes, BE-FAST) to the stroke awareness campaigns may detect a greater amount of strokes from posterior circulations [53].

Need for greater awareness of visual impairments in stroke care

The participants experienced that their VIs received little attention by the hospital staff. This is not very surprising and has been supported by other studies. A Norwegian study of persons with hemianopia after cerebral infarction found that only 9.6% were referred to visual field testing (perimetry) and only 2.3% to visual rehabilitation [31]. A lack of awareness and structure of visual assessment after stroke is also described in studies from the United Kingdom and United States [34, 54].

In this study, several of the participants asked the stroke unit staff about rehabilitation, information, and follow-up of their VIs. They felt that this was not granted. What they felt to be sparse and poor information was frustrating, and while some accepted it, some searched for information and rehabilitation elsewhere. The Norwegian guidelines for treatment and rehabilitation of stroke do not include a specific care pathway for identification and follow-up of patients with VIs but are general in their recommendations [26]. Such care pathways should be designed to secure predictable and equal visual care after stroke [54].

Some participants were told that nothing could be done to help improve their vision. This statement is true in the sense that there is no sufficient evidence to support that visual field defects can be restored with rehabilitation [24]. However, appropriate glasses, vision rehabilitation, and personalized information and guidance can improve visual function and adaption to VIs [22, 24, 34]. Valuable tools and advice on strategies to help adapt to and cope with their VIs were unavailable for participants, and they had the impression that nothing could help them. Acute stroke units, ophthalmology departments, and rehabilitation services treating stroke survivors need to gain knowledge in these processes and offer good visual assessment, provide information about the nature of the impairment, and offer proper rehabilitation.

Reducing the impact of visual impairment on everyday life

VIs, with their limitations on daily activities, such as reading, watching television, and mobilization, were highlighted as being the most important factor limiting patients from regaining normal life after stroke. VIs after stroke are associated with reduced quality of life, decreased participation in everyday and meaningful activities, and increased depression [17, 55]. VIs also increase the risk of falls, loss of independence, and social isolation [14, 56, 57]. In addition to optimizing vision and providing sound vision advice, an assessment of the stroke survivors' housing and mobility training may help reduce this [58, 59]. These are important aspects to consider when planning health care services.

The participants in this study reported that driving cessation was the one activity that had negatively affected their lives the most after stroke. VIs are the major reason the majority of pre-stroke drivers cease driving after stroke [60, 61]. Being banned from driving or being unable to drive is associated with reduced community integration and affects leisure activities, personal freedom, identity, and personal roles [62]. For many, it is the most important loss after their stroke [13]. These concerns should be taken seriously, and interventions to increase inside and outside mobility should be considered [13, 58].

Sudden VIs are a shock in life and leave the person with uncertainty and many questions about their future [18]. The participants in this study were uncertain of the prognosis of their Vis and whether there was anything they could have done or should do to improve their situation. They had learned that other impairments benefit from early and frequent training and wondered if that also is the case with VIs. Contact with peers through user organizations, information to caregivers or learning and coping centers, and visual rehabilitation may help these stroke survivors adapt to and cope with the situation [19, 34]. In this study, the participants felt they received poor information about their VIs and services that could possibly help them. That specific information of individual's VIs is significant to promote understanding of their impairment has also been raised by others [19, 20]. This stresses the importance of providing the individual with specific information, even if there is limited expectation of improved measurable function. In addition to giving new insights into the needs and experiences from the participants themselves on the acute treatment, rehabilitation and living with VIs in the early months post stroke, our results elucidates findings from other studies [19, 31, 34]. The transition from specialist health care to community services and home represents a vulnerable period that needs attention to promote better outcomes after stroke [63]. Although our participants described their experiences with the Norwegian health service, similar descriptions internationally [19, 20, 34], suggests that these challenges are common among stroke survivors. Further, the results are recognisable and transferable to other countries and need to be addressed internationally.

Health care services for stroke survivors should provide personalized information and a clinical pathway for rehabilitation and follow-up of VIs [54]. The perspectives of the participants in this study contribute to new knowledge that is included in a multidisciplinary knowledge translation project to illuminate and include the experiences of stroke survivors in designing a vision-in-stroke competence-building course for community and specialist health care services in Norway.

Limitations

The content for this research was the lived experiences of a small number of Norwegian stroke survivors with VIs living at home, and caution must be taken to generalize to all stroke survivors. Although Norwegian health care services may differ in many ways from other countries, similarities with studies outside Norway suggests that the results are transferable internationally. Most participants in this study had visual field loss, which may be due to identifying participants with the NIHSS. One limitation of NIHSS is that it does not identify central vision loss, vertical eye movement defects or perceptual problems other than neglect, which are frequent VIs after stroke [5]. This was the only tool assessing vision used in the stroke units at the time of the study, and it may be that the descriptions do not fully represent experiences with other types of VIs. We only had access to the participants own experience of VIs and other than fulfilling the inclusion criteria for participation, we do not any objective assessments of VIs performed in the health services. Although interesting, it would not add significant insight to the participants own experiences of the attention to VIs in the health services, and how VIs affect everyday life. The participants experiences of care and follow up in health services are their own, and what the health care services actually provided can differ from their experiences. However, stroke survivors are in a situation were repeated information at different times may be necessary, something our results supports. Our findings support and elucidate other qualitative and quantitative studies, and confirm public reports and statements from user organizations about the attention of VIs and possibilities of follow up after stroke.

Conclusion

VIs are experienced as dramatic and have a significant effect on everyday life after stroke, and there is a lack of competence in and attention to VIs in acute stroke care and rehabilitation. To contribute to better acute treatment, greater awareness of VIs as a presenting symptom of stroke is needed among all health care personnel, including nonacute health care services, along with education for the general public. Our study supports that adding visual symptoms to stroke awareness campaigns is important. Furthermore, it is necessary to include structured assessments and follow-up of VIs in stroke care. The participants expressed feelings of struggling alone with an unclear vision of their future. To improve self-efficacy, acceptance, and adapting to a life with VIs, knowledge is important. This stresses the importance of providing personalized information about individual VIs, what this entails for everyday activities now and in the future, and the options for vision rehabilitation. With information and attention from competent personnel together with standardized evidence-based clinical pathways, stroke survivors with VIs can be helped in their process of adapting to their life with VIs.

Abbreviations

VIs: Visual impairments; RCT: Randomized controlled trial; NIHSS: National Institute of Health Stroke Scale; GP: General practitioner; EMS: Emergency medical services; FAST: FACE Arm Speech Time

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Authors’ contributions

HKF was the principal investigator and designed the overall study with GE and HO. TSM analysed and interpreted the data, drafted and critically revised the manuscript with HKF. GE and HO contributed to data analyses, interpretations and subsequent revision of the manuscript for intellectual content. All authors read and approved the final manuscript.

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Availability of data and materials

Due to individual privacy law, data sharing is not possible and are not publicly available. An anonymised version of the data is available upon reasonable request from the corresponding author.

Ethics approval and consent to participate

The study was approved by the Norwegian Centre for Research Data, reference 34930. Written and oral information about the study was provided, and all subjects participated with written informed consent. The study was conducted in line with the Declaration of Helsinki [64]. During transcription of the interviews, all names, places, and institutions that could identify persons were removed.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Barriers and facilitators to the implementation of a structured visual assessment after stroke in municipal health care services

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Abstract

Background: Stroke is a leading cause of disability worldwide. Visual impairments (VIs) affect 60% of stroke survivors, and have negative consequences for rehabilitation and post-stroke life. VIs after stroke are often overlooked and undertreated due to lack of structured routines for visual care after stroke. This study aims to identify and assess barriers and facilitators to the implementation of structured visual assessment after stroke in municipal health care services. The study is part of a larger knowledge translation project.

Methods: Eleven leaders and municipal interdisciplinary health care professionals participated in qualitative interviews. During two workshops, results from the interviews were discussed with 26 participants from municipal health care services and user representatives. Data from interviews and workshops were collected before the intervention was implemented and analyzed using content analysis.

Results: The analysis identified individual and contextual barriers and facilitators. The individual barriers were related to the participants' experiences of having low competence of visual functions and vision assessment skills. They considered themselves as generalists, not stroke experts, and some were reluctant of change because of previous experiences of unsuccessful implementation projects. Individual facilitators were strong beliefs that including vision in stroke care would improve health care services. If experienced as useful and evidence based, the new vision routine would implement easier. Contextual barriers were experiences of unclear responsibility for vision care, lack of structured interdisciplinary collaboration and lack of formal stroke routines. Time constraints and practical difficulties with including the vision tool in current medical records were also expressed barriers. Contextual facilitators were leader support and acknowledgement, in addition to having a flexible work schedule.

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Conclusions: This study shows that improving competence about VIs after stroke and skills in assessing visual functions are particularly important to consider when planning implementation of new vision routines in municipal health care services. Increased knowledge about the consequences of living with VIs after stroke, and the motivation to provide best possible care, were individual facilitators for changing clinical practice. Involving knowledge users, solutions for integrating new knowledge in existing routines, along with easily accessible supervision in own practise, are essential facilitators for promoting a successful implementation.

Keywords: Stroke, Vision, Visual impairments, Knowledge translation, Implementation, Barriers, Rehabilitation

Background

Knowledge translation (KT) is a systematic process with the aim to bridge the gap between knowledge and practise. KT includes the identification and synthesis of evidence and an active strategy to implement the evidence in a specific practice [1]. The knowledge to action model (KTA) by Graham and colleagues [2] describes the important phases in the KT process. It is a process model frequently used in clinical health care settings [3] and has two main components: 1) knowledge creation (knowledge inquiry, synthesis and tools/procedures) and 2) action cycle (adapt knowledge to the local context, identify barriers, tailor and implement interventions, monitor, evaluate and sustain knowledge). A crucial element that influence the outcome of the implementation is identifying and addressing barriers and facilitators for knowledge use [1], which is the focus of the current study.

Worldwide, stroke is a leading cause of death and disability [4]. One of many sequelae after stroke is visual impairments (VIs), which can affect over 60% of all stroke survivors [5]. VIs after stroke include visual field defects, eye movement disorders, reduced visual acuity and perceptual disorders [5, 6]. VIs after stroke are associated with an increase in depression, falling, decreased participation in activities and a reduced effect of general rehabilitation, among others [7–9].

The symptoms of VIs before and after stroke can be difficult to identify and be misinterpreted as other problems [10–15]. Vision-related symptoms such as dizziness, reading problems, headache, balance problems, and fatigue are not always experienced as a visual problem by the stroke survivor [10, 11]. For example, people with visual field defects after stroke may lack a conscious awareness that large parts of their visual field are missing or that the brain is filling in the empty space with something sensible [12, 13]. This can complicate their understanding of their visual problem [16] and may lead to underreporting symptoms of VIs from the stroke survivors themselves. Unless the visual function is properly examined, many visual symptoms are difficult to identify by health care professionals (HCP) and may be overlooked or perceived as a symptom of other impairments [14]. To secure proper care and rehabilitation, it is crucial that visual function is assessed in health services.

In Norway and internationally, there are lack of national care pathways for VIs after stroke in health care services [15–18], which has led to a variation in the quality of assessment and follow-up of VIs in stroke care [19]. In stroke services, there is a gap between research evidence on how to assess and follow up on VIs after stroke and clinical practice [11, 20]. Stroke survivors experience little or no follow-up and rehabilitation of VIs after discharge from acute stroke care [13, 21, 22]. Therefore, a strengthening of vision competence in stroke care to identify VIs and initiate early rehabilitation is needed [23, 24]. In Norway, the hospital stay in stroke units is short (median 5 days) [25], and municipal health care services are the main providers of primary care, including rehabilitation and follow-up after the initial treatment [25–27]. A recent article from our group confirmed that Norwegian stroke survivors experienced a lack of attention and follow-up of VIs after stroke and that HCP in both specialist and municipal health care services had their focus and competence on the other consequences of stroke [13]. This necessitates the need for vision competence and attention in municipal stroke services because of municipal health care services important role in stroke care and rehabilitation.

In stroke services, several functional assessment tools are implemented, but there is no standard tool that includes a full vision assessment [28]. The Vision Impairment Screening Assessment (VISA) tool has been validated in the UK; with this tool, clinicians who are not specialists in vision problems can identify VIs and refer patients with VIs to vison experts [29]. A similar assessment tool, Competence, Rehabilitation of Sight after Stroke (KROSS), was developed and implemented in two Norwegian stroke units [30]. Both tools assess visual acuity, eye alignment and movements, visual field and visual inattention [29, 30]. In addition, the patients are asked about symptoms, and clinical observations are described. It was designed to provide a non-vision expert HCP with an easy-to-use tool to help identify VIs after stroke during treatment in the stroke unit. KROSS was introduced to two stroke units during a two-day vision-after-stroke workshop with theoretical and practical education, and it has been a useful tool in these settings [30]. The current study aimed to identify the barriers and facilitators of importance to implement the KROSS visual assessment tool after stroke in municipal health care services.

Methods

This qualitative study describes phase III of a larger KT project, where the overall aim is to implement structured vision assessment and follow-up of VIs in municipal health care services after stroke (see Fig. 1). A qualitative approach was chosen because there is limited knowledge of the determinants of implementing knowledge of VIs after stroke in municipal health care services [31]. We considered it important to secure in-depth and broad descriptions of potential barriers and facilitators. The material consists of qualitative individual interviews with 11 HCP and group discussions with 26 HCP participants from two different KROSS workshops.

Setting and partner involvement

This study took place in a medium-sized Norwegian municipality. In Norway, the health care services are mainly publicly funded [27], and the municipals are responsible for providing primary health care services including general practitioner, prevention, treatment, rehabilitation and palliative care [27]. The most commonly used municipal health services for stroke survivors are the in-patient rehabilitation unit, home-based rehabilitation and home care [25] which are the three services involved in this KT project. Figure 1 describes details of the KT phases I-IV in this implementation project, including that the phases start at different times but overlap. This study focuses on assessing barriers and facilitators to implementing vision assessment after stroke (Phase III, Fig. 1).

The municipality, the Norwegian Association of the Blind and Partially Sighted, the Norwegian Association for Stroke Survivors and the Norwegian Heart and Lung Foundation (LHL Hjerneslag) were active partners in the planning and execution of this project to secure a participative approach. The research group had several meetings with municipal leader groups to inform, adapt, anchor, and engage leaders and service managers in the project's implementation. Initially, with the head of municipal health care services and service leaders, subsequently with managers in the in-patient rehabilitation, home rehabilitation, home care and the service allocation office (Phase II, Fig. 1). In these meetings, the background for the project and the possible barriers to implementation of visual assessment after stroke were discussed. Together, suggestions on practical

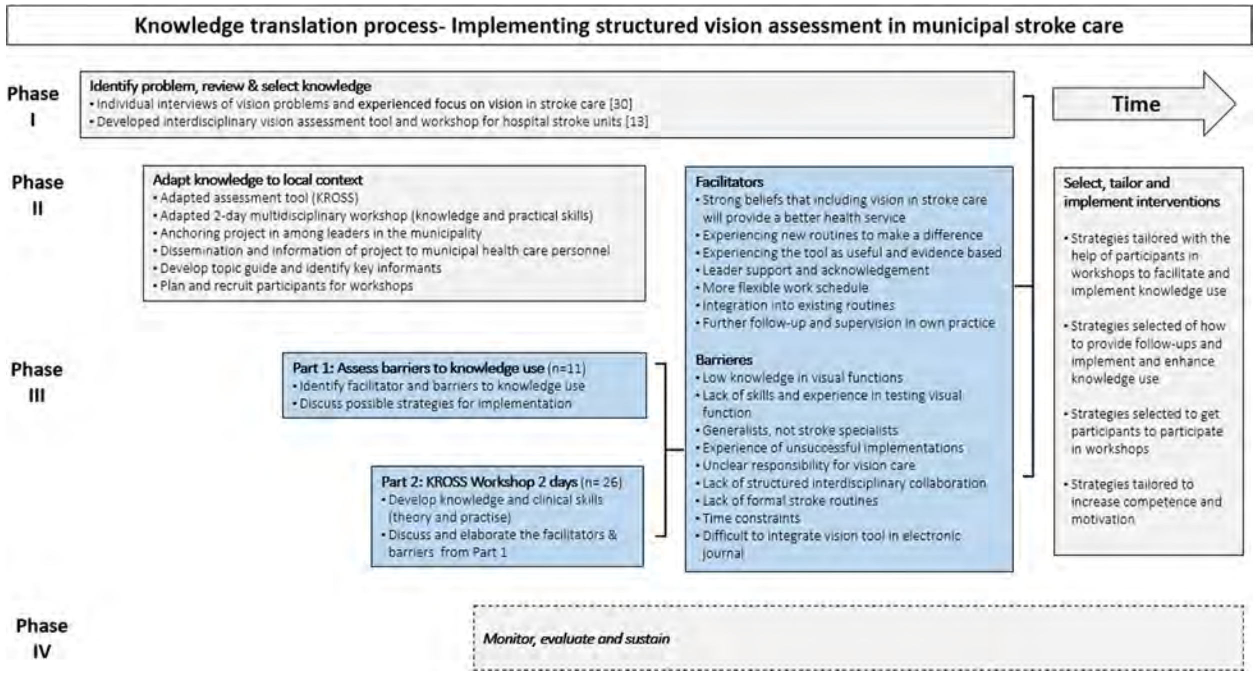

Fig. 1 An overview of the four KT phases in this implementation project. Phase III (blue boxes) is the focus of the current study and describes how the interviews and workshops were used to assess barriers and facilitators. Phase I has been described elsewhere [13, 30]. Phase II describes the process of how knowledge was adapted to the local context in preparation for phase III. Phase IV will be the content of a later publication

considerations and key persons to involve from the different services were provided. Both leaders and service managers confirmed there was a lack of procedures and attention toward VIs after stroke in municipal health care services, and they recognised the value and need for improvement. To enhance the relevance and promote success of this implementation, knowledge users (municipal nurses, nurses assistants, physiotherapists, and occupational therapists) were also active partners, in line with integrated knowledge translation (IKT) [4, 5]. Knowledge users and stroke survivors were involved during the planning and preparation of the interviews, implementation and workshops [32, 33]. This active partner involvement gave common understanding of the project's aim and the importance of improving services for stroke survivors with VIs (Phase II, Fig. 1.)

Data collection

Participants and recruitment

The participants were purposefully recruited for the individual interviews to secure representation of relevant health care professions in the three municipal health services. Service managers informed and invited HCP they believed had valuable insights to share with the research group. All HCP consenting to participate were included in the study. The final sample comprised 11 health care professionals: six nurses, four physiotherapists and one occupational therapist. Invitations to the KROSS workshops were sent out from the head of municipal health care services to all employees in the rehabilitation unit, the home rehabilitation service and home care services. The service managers facilitated and encouraged their staff to participate. Twenty-two interdisciplinary health care professionals participated, representing the three municipal services, service managers and staff from the service allocation office. In addition, three participants from a specialist rehabilitation hospital and one from an acute stroke unit participated in the workshops on their own requests after learning about the project from one of the user groups. The 26 participants were nurses, physiotherapists, occupational therapists and assistant nurses. Three participants from the workshop also participated in the individual interviews. Four stroke survivors with VIs participated in both the theoretical and practical parts of the workshops. All had visual field loss, in combination with at least one other VIs, including reduced visual acuity and/or ocular motility problems. Their experiences living with VIs ranged from 3 months to several years. Two represented the patient organisations and were actively involved in planning the project, and two were recruited from the municipal services.

Interviews

The interviews were semi-structured using a topic guide to ensure key areas were covered. The topics were based on input from all partners, patient experiences [13] and determinants frequently reported in the literature [34–38]. In addition to specific questions about their knowledge of, attention to and practice on VIs, we also asked general questions about experiences related to the implementation of new assessment tools, leader involvement and how they viewed the climate for competence improvement. The topic guide is available as a supplementary material S1. The interviews took place at the university, or in a neutral location chosen by the participants. The participants were encouraged to freely describe their views and experiences on the assessment and follow-up of VIs after stroke.

Because of practical reasons, three participants working in home care were interviewed as a group. All interviews were completed before the workshop, and preliminary results were used to adapt the workshop to the local context [2]. The interviews lasted from 30 to 75 min. Except for one individual interview, in which notes were taken during the interview because of the participant's preferences, the interviews were recorded and transcribed verbatim.

KROSS workshop

The KROSS workshop was part of the implementation strategy in this KT project. The KROSS workshop was designed earlier as part of developing the KROSS tool for use in two hospital stroke units [30]. The workshop was adapted to the local municipal setting in collaboration with all partners and preliminary results from the individual interviews (Phase II, Fig. 1). The KROSS workshops were provided by the two first authors (a nurse and an optometrist) in the university's clinic over 2 days one week apart (Supplementary material S2). The workshop was repeated twice. The content of the workshop consisted of theoretical education on vision and stroke, assessment of VIs, and practical training using the KROSS tool. The stroke survivors contributed with their experiences of living with VIs after stroke, participated in the discussions and acted as demonstration patients during practical training. The workshop included a reflection discussion of barriers and facilitators identified in the interviews to enable a wider group of HCP to elucidate and provide practical insights on how to promote a successful implementation, now that they had more knowledge of VIs and stroke, and had practiced using the KROSS tool. Notes were taken during these discussions.

Data analysis

The interviews and notes from the workshop reflections were analysed using an inductive content analysis as described by Graneheim and Lundmann [39, 40]. NVivo 12 was used to manage the data during the analysis. The entire interview text and notes from the workshops were read as a whole several times by TSM and HKF. TSM started to identify the meaning units by marking a part of the text that represented an expressed meaning related to the area of interest. Meaning units were condensed to a shorter form while still preserving its content before being grouped together with other meaning units with similar content into subcategories. TSM and HKF discussed the subcategories and their connection to each other, and all authors discussed and agreed on the subcategories and categories. The levels of interpretation of the subcategories and categories were kept close to the text (manifest content), in line with Graneheim and Lundmann [39]. Through the analysis it became clear that the different barriers and facilitators were related to the individual professional or their professional context.

Results

The analysis showed individual and contextual barriers and facilitators of importance when it comes to implementing a structured visual assessment after stroke in municipal health care service (see Table 1). Tables 2, 3, 4, 5 describe each barrier and facilitator with quotes.

Individual barriers

Several individual barriers were expressed by the participants; these barriers were related to competence in different ways: their individual knowledge and skills about visual function and impairments, how they worked with patients with a variety of medical conditions and needs and their previous experiences of other implementation efforts (see Table 2).

Table 1 The results presented as the participants' experiences of individual and contextual barriers and facilitators

Participants' experiences of individual and contextual facilitators and barriers	
Individual	**Contextual**
Barriers i. Low knowledge about visual functions ii. Lack of skills and experience in testing visual function iii. Generalists, not stroke specialists iv. Experience of unsuccessful implementationsi.	**Barriers** i. Unclear responsibility for vision care ii. Lack of structured interdisciplinary collaboration iii. Lack of formal stroke routines iv. Time constraints v. Difficult to integrate vision tool in the medical record
Facilitators i. Strong beliefs that including vision in stroke care would provide a better health service ii. Experiencing new routines to make a difference iii. Experiencing the tool as useful and evidence based	**Facilitators** i. Leader support and acknowledgement ii. More flexible work schedule iii. Integration into existing routines iv. Further follow-up and supervision in own practice

The participants expressed that they had a *low competence about visual functions*. This was related to both normal visual function and visual problems in general, particularly VIs after stroke. Regardless of their professional background, they said that vision and visual functions had both had little focus in their education and in later professional work. Several participants reflected that while working with stroke survivors, they wished they possessed better competence in assessing vision to be able to identify whether a problem was related to vision, cognition, communication or physical problems; they expressed this as particularly important when planning rehabilitation for their patients.

Although the participants said they lacked knowledge of visual functions and VIs, some described performing crude assessments of visual function, and others described that they identified vision loss during other practical observations. For example, some physiotherapists observed vision during physical training, and some nurses and assistant nurses observed visual function during meals and activities of daily living (ADL). However, if they suspected VIs, they expressed little confidence in their own observations or test results, and they lacked the language to describe them precisely in the patient's medical record. The most commonly reported assessment was the waving test (confrontation test) to assess the peripheral visual field. However, this was 'self-taught', and they explained they did not fully understand or trust the results because they had a *lack of skills and experience in testing visual functions.*

The participants described themselves as *generalists, not stroke specialists*; this is in contrast to stroke units in hospitals where HCPs can fully admit to stroke care. As HCPs in municipal health care services, they had to have general knowledge of many conditions rather than specialist knowledge in one specific field. They expressed a general concern related to their ability to stay professionally updated and provide good enough care because their patients represent a variety of diagnoses with different needs for rehabilitation. They felt a need for more competence in many areas, including stroke, because their patients are discharged from the hospital earlier and are in need of more complex and comprehensive care than just a couple of years ago.

Many participants had some *experience of unsuccessful implementation* projects, and this made them cautious about new implementations. Even in cases where there was an expressed consensus between service leaders and clinicians and where the HCP had signed off that they had read and understood a new routine, it was difficult to maintain sustainable changes. The HCP believed a change of practice was more time-consuming in

Table 2 Individual barriers illustrated with quotes

Individual barriers	Quotes
Low competence about visual functions	*Several of us have now discussed that we really have not been thinking much about it [VIs after stroke], other than neglect of course. I can't really remember that I really learned much more about it in school either (P10).*
Lack of skills and experience in testing visual function	*I try to test eye movements. If they can see in all directions, eh and visual field defects but I don't feel confident and qualified that I am doing it right. However, I do get an impression if you know what I mean, but I am not sure if it is exactly right. But I get an impression if it may be something with the vision (P5).*
Generalists, not stroke specialists	*We have so many groups of patients, from functional decline, hip fractures, COPD and a lot of Parkinson lately. So, it varies how many stroke patients we have (P6).*
Experience of unsuccessful implementation	*It [implementation of new routines] often works fine the first week, and suddenly it is put a side. I don't think it is bad* ***will****, because everyone agrees. It is easy to fall back to old habits, and suddenly it seems like it is forgotten in a way. Yes, it takes time to make a change. We keep going back to the old routines (P8).*

municipal health care services compared with hospital services and that municipal health care services do not have the same focus on updating their practice. They suggested several explanations, including a lack of formal health education among many staff members, many HCP working part time and a culture resistant to change.

Individual facilitators

Through a presentation of the project and its aim in meetings and written information about the current study, the participants had been provided with new knowledge about VIs after stroke. When the participants learned about the importance and significance of vision for everyday activities and the consequence and prevalence of VIs after stroke, many highlighted this as a strong motivation for changing their practice. They now said they considered it important to include vision assessment in their practice (see Table 3).

The participants expressed *strong beliefs that including vision in stroke care will provide a better health service* for their patients. When they learned about the significance of VIs after stroke, they expressed it should be an obligation for HCP to change their practice and include a vision assessment in their routines. They also thought that a visual assessment should be done as soon as possible after the stroke because of the implication vision has on other functions, such as mobility, balance and ability to read. All the participants highlighted that knowledge about visual function in and of itself is important when assessing other functions such as balance, language and cognition and when assisting in ADL activities. The participants thought most patients would be positive to have their vision assessed and followed up on because they often wished to return to the life they knew before the stroke and are motivated to do the work required to achieve this. The participants also expressed the importance of including time to build trust between HCP and the patient before performing a vision assessment because many patients are vulnerable after stroke, and they should not be exposed to unnecessary assessments and observations.

One facilitator considered by the participants to be important was if the new vision routine led to positive changes for the patients and further follow-up. *Experiencing new routines to make a difference* must be considered so that the implementation will be worth the invested time and energy to maintain a sustainable routine.

The participants described a need for *experiencing the tool as useful and evidence based.* Some expressed that a new tool and procedure should be based on evidence and were concerned about using a tool not validated for this specific context. Others said it was just as important

Table 3 Individual facilitators illustrated with quotes from the participants

Individual facilitators	Quotes
Strong beliefs that including vision in stroke care will provide a better health service	*It needs to be implemented because it is important for the patients. When you know the large number of stroke survivors with VIs and when many do not discover it themselves its reason enough for us to be systematic in the assessment of it. It's about contributing to better lives (P8).* *I experience stroke patients as very motivated, in a way, to get better. Because of the acute changes to their functional level, it triggers something in many, and they want to get back to where they were. Therefore, it is important to be prepared and be able to receive them and provide a good assessment (P6).*
Experiencing new routines to make a difference	*I believe it is important that we experience it [vision routine] as useful. That we can use it immediately. In rehabilitation, and of course, for further recommendations and referrals (P2).*
Experiencing the tool as useful and evidence based	*It is important for me when I am going to use the test results to show something or to show a change, that it [vision assessment tool] is standardised and validated (P9).* *I think it should be relevant. That it serves a purpose, that it's not just a formality but is useful and has a meaning. The other things are not that important to me, I am not a stickler (P2).*

Table 4 Contextual barriers illustrated with quotes from the participants

Contextual barriers	Quotes
Lack of formal stroke routines	*In our municipality there is no formal procedure for a stroke pathway when the patient is transferred from the hospital to municipal health care service … (),.. our assessments are not systematic; they are random and depend on each professional (P1).*
Unclear responsibility for vision care	*The responsibility for follow-up of vision is fragmented. Like in the rehabilitation ward, everyone should be aware of VIs, but maybe some should be specialists in assessing it (P1).*
Lack of structured interdisciplinary collaboration	*You do not need to be a physiotherapist to perform or explain different tests. But, often it becomes the physiotherapist's job to perform it in practice because we have time to get involved with the patients. So, eh it often ends up to be a task for the physiotherapists alone (P7).*
Time constraints	*It is important that it does not take a long time to perform. And that it's not too complicated, while still giving us information if something is wrong and we need to refer for follow-up (P5).*
Difficult to integrate vision tool in the medical record	*We have I pads with us, but assessments tools can't be used directly on the I pads. That is something we want, so we can register in the results while we perform the test in the patients home. (P3).*

that the tool felt useful. If experiencing that the patients could benefit from the assessment and results, this would be enough for continuing to use it. Getting access to a visual assessment tool with standardised tests was something the participant's emphasised as positive, even if the tool was not validated fully. The participants looked forward to performing a more structured and standardised visual assessment than the tests and observations they had previously performed; they said it would improve their knowledge of vision functions and competence of their assessments, bringing confidence to their own observations and assessments. They also commented that a result from a standard test tool would also be easier to communicate to other health care professionals because it could provide a language with known terms to describe vision functions and VIs that they previously did not have.

Contextual barriers

The contextual barriers represent diverse challenges for implementation that are related to settings outside the individual. The barriers included unclear responsibility of vision care, a need for better interdisciplinary collaboration and formal routines, time constraints and difficulties with the medical record. The analysis showed that the barriers were perceived with different strengths between the three different municipal health care services (see Table 4).

The participants expressed that there was an *unclear responsibility for vision care* and that it was random whether visual function or VIs were being described in hospital transfer records. If vision was mentioned at all, it was often limited to whether the patient needed glasses or not, or when the patient had large visual field defects or neglect. Vision and the assessment of visual function was something the participants initially (before learning about this project) considered to be someone else's responsibility, for example, the responsibility of the patient's ophthalmologist or optometrist. Now, they recognised vision as a responsibility for all involved services and professions. Their opinion was also that the hospital stroke units should be responsible for the first vision assessment after stroke. However, they acknowledged that for some, the initial assessment needed to be postponed and performed by the municipal health care service because not all patients are suitable for visual

Table 5 Contextual facilitators illustrated with quotes from the participants

Contextual facilitators	Quotes
Leader support and acknowledgement	*After working for some years, I think the need for leader involvement varies from person to person. I see that some need more follow-up from their leader than others, and I believe we all can need reminders. People are put together in different ways in how we like to get involved in new things that is a bit outside our primary work. For me, it is not very important to have a leader that pats me on the shoulder and makes sure I am doing it (P5).*
More flexible work schedule	*During my workday I am the one to prioritise my time, based on professional considerations of course, and waiting lists and the amount of work. Sometimes, you have the opportunity to perform more detailed assessments in one patient, but most times you can only manage to perform the standard procedure (P10).*
Integration into existing routines	*We have whiteboard meetings twice a week where we go through what we have done and what remains to do (functional assessments, among others). I think that KROSS and vision should be included as an additional whiteboard item …. If we see it here, and the assessment is allocated, yes. I believe this can work. And much will be done if vision and KROSS is put it into the routine (P11).*
Further follow-up and supervision in own practice	*It is always challenging to start doing something new. For all of us. And, often that is about feeling confident, at least for me......As such, you need time to practice, and access to resource persons you can contact to supervise and answer questions (P1).*

assessments during their hospital stay. They considered this to be a problem because there was currently *a lack of formal stroke routines* in the municipalities. Some stated they had tests and assessments they usually performed and considered important after stroke, but there was no formal stroke patient pathway or guidelines. The participants also experienced that visual function, VIs or recommendations regarding vision rehabilitation were hardly ever described in the patients' medical record. The participants suggested that along with a formal routine and guideline after stroke, identification and a follow-up of VIs should be included.

Another contextual barrier was the concern that the implementation of visual assessment routines would end up as a task and responsibility for one specific profession and would *lack structured interdisciplinary collaboration*. They considered interdisciplinary collaboration as essential to implement and for securing a visual assessment for all patients because being dependent on one profession could hinder all patients from being assessed. Further, many highlighted the importance of vision assessment being an interdisciplinary matter to raise the awareness, attention and competence of VIs after stroke in the municipality. The participants pointed out the lack of vision specialists within the municipal interdisciplinary team, expressing a need for formal collaboration with vision experts, such as optometrists, vision rehabilitation specialists and ophthalmologists.

All the participants experienced time pressure in their daily routines when it came to caring for an increasing number of patients with complex needs; the fact that the resources in the municipality were scarce only amplified this problem. The participants described different experiences of *time constraints* in their work and their opportunity to add new routines to their practice. For example, nurses and physiotherapists are organised differently in the municipality health care services. The nurses worked shifts every third weekend, while physiotherapists worked regular hours on weekdays. It was also apparent that there was a difference between home care and rehabilitation services. Home care HCP reported having little influence over their own workload and ability to prioritise their tasks. They explained that additional time had to be allocated by their leader if new tasks should be introduced. The time used for an assessment is a factor all the participants agreed had an impact on implementation success, and it should not be too time-consuming. However, what the participants described as an acceptable use of time varied from 15 to 30 min. The ideal time was as short as possible without compromising the quality of the assessment.

A practical barrier was that it was *difficult to integrate the vision tool in the medical record* they used. Results from the KROSS vision assessment should be filled out directly in the form while assessing the patient at the bedside or at home. HCP working in home care already used a tablet to document their work in the patient's own home; however, it was not possible to include extra assessment forms directly on the tablet. The assessment form would have to be on paper, which they would need to scan or fill in manually to the medical record using the office computer when they got back from the home visit. They considered this a major barrier because it would lead to double work and take away valuable time; more importantly, paper records might be misplaced or lost. In addition, scanned documents are harder to find later when reading the patients' medical record because of poor digital search abilities in the current municipal medical record system.

Contextual facilitators

Contextual facilitators were described as different ways of leader support and how some experienced a flexible and autonomous workday. In addition, they suggested integrating the new routine into other routines, such as white board meetings and local competence initiatives (see Table 5). Within these categories there were contextual differences between the services.

The participants expressed good *leader support and acknowledgement* as a facilitator when implementing new routines, but the need for leader involvement differed. Some claimed that an active leader who followed up on the implementation and ensured that everyone adhered to the new routines was crucial. Others emphasised that it was important for them to have the support, trust and understanding from their leader in how they prioritised and spent their time at work, without more detailed follow-up or their leader checking their professional work and decisions; they described this as being allowed to work freely and autonomously.

Although the participants from rehabilitation services all described very busy days, they still had a *flexible work schedule* to prioritise their work. They considered this to be important for implementing a new task, and this would make it possible to include vision assessment and follow-ups into their work routine. In contrast, home care HCP described a more fixed workday with less flexibility to schedule their activities and the content of tasks. This led to a prioritisation of routine tasks and visits, and they expressed reservations in implementing more tasks because this would just add to their already busy days.

When learning specifically about VIs after stroke and new vision assessment routines to be implemented, during the interviews and workshops, the participants discussed how this could be *integrated into existing routines*. Rehabilitation services had, and home care planned to, implement white board meetings where the multidisciplinary team would meet to plan and coordinate their work. The participants suggested that a vision assessment should be included in this meeting. The participants from home care also worked with a standardisation of a first meeting with new patients and suggested integrating a vision assessment in this for new stroke survivors.

All agreed on the importance of feeling confident when performing the assessment; they agreed that *further follow-up and supervision in their own practice* was important in addition to theoretical knowledge and a good user manual to use while testing. They said that feeling insecure in the testing situation may lead to a postponed assessment or them choosing not to do it. Several suggestions on how to secure a follow-up were discussed, including individual supervision in their own practice, plural vision meetings during lunch and easy access to ask the project resource individuals. They also believed that it is important to have more than one person from a workplace to take part in the training; their experience was that if only one person had learned something new, it was difficult to later involve other colleagues.

As presented here and illustrated in Fig. 1, several barriers and facilitators were identified through the interviews and workshops (Phase III). In addition, some strategies to overcome barriers were suggested by the participants, some strategies were identified through the literature, and some were suggested by managers and leaders during Phase II.

Discussion

Assessing barriers and facilitators is an important part of the implementation process and should be considered when choosing implementation strategies [1]. In the current study, we have identified individual and contextual barriers and facilitators to the implementation of structured visual assessment and follow-up in municipal health care. Some barriers and facilitators seem to influence each other, and combined, these can be important for behaviour change [37].

Capability and motivation

The participants experienced that they had low knowledge about visual function, lacked the skills needed in vision testing and assessment and acknowledged that they had paid little attention to vision. A review has also documented that vision is given little attention in municipal health care services and that vision specialists are not an integrated part of rehabilitation services [41]. Competence and care for VIs in rehabilitation is described as being less integrated and conceptualised than other outcomes after stroke, such as motor function, language and cognitive impairments [24]. The experience of not being competent and confident when performing a procedure is described as an important barrier for knowledge use [36, 42, 43]. Capability has been described as the individual's capacity to engage in and perform the behaviour, here performing and including visual assessment and follow-up in their practice [34]. Capability is one part of the COM-B model for behaviour change, with opportunity and motivation as other important parts [44]. Capability includes having the necessary knowledge and skills [34], which the participants in the current study expressed they did not have before the workshop. This may have caused vision routines to be more difficult to implement compared with routines related to clinical areas that HCP are more familiar with.

When the participants learned about the prevalence and consequence of VIs after stroke, they expressed a strong motivation for building their capability and a commitment to provide good quality care and that better routines for VIs should be implemented. Beliefs about consequences is a domain from the theoretical domains framework linked to motivation in COM-B [44]. The experience of vision assessment and the later follow-up being of great significance to the patients' function and everyday life was an important facilitator expressed by the participants. In the initial rehabilitation process, stroke survivors have been reported as having a strong motivation to return to life as it was before the stroke [45]. This was also something that influenced the participants' motivation to learn and include new procedures in their work. They also felt that vision health was outside their core task and something optometrists and ophthalmologists had the responsibility for. However, now, they had learned that vision was a prerequisite for other rehabilitation efforts, and they stated that it should be a part of municipal rehabilitation and care. One major barrier described by the participants was the unfamiliarity with the vision terminology and lack of language to describe their observations related to VIs. This reduces both the opportunity to change behaviour [44], potentially hindering collaboration and efficient vision rehabilitation. The participants acknowledged that the KROSS tool could be a useful tool, improving their capability to describe their assessment of visual function and VIs.

Evidence considered strong by knowledge users has been shown to be more easily adopted than practice with weak evidence [46]. However, as others have described, evidence from research is not sufficient alone, clinical competence and experiencing that the evidence is useful in practise is important [47]. Our study shows that the participants weighted the experience of usefulness higher than strong evidence as a motivator for implementation. On the other hand, if the new routine is not seen as making a difference and is experienced only as a formality, it will not be considered useful and instead just another "tick off" task [46]. This is new knowledge that elucidates evidence as a motivator for adopting new clinical routines, particularly when strong evidence is lacking.

Our findings suggest a lack of focus and competence regarding vision and VIs in health care services and education. Considering that the visual sense is of such importance for function, quality of life and wellbeing, vision deserves more attention from HCP and educational institutions [7, 8, 13–15, 21, 47].

Contextual differences within municipal health care services

The HCP in the present project represent three different contexts within the municipal health care organisation: the in-patient rehabilitation unit, home-based rehabilitation and home care. In our findings, the same barriers and facilitators are present and central in all three contexts, but in particular, some contextual barriers and facilitators were more distinct for one context than others. This is important to consider when developing implementation strategies in municipal health care settings.

As in the present project, practical organisational barriers are frequently reported [42, 48–50]. A concrete problem in the current project was including the KROSS tool as a digital file in the medical record. Alternatives to storing the file were discussed with leaders and practitioners, and a procedure was agreed upon during the workshops. However, it became apparent that this procedure would not work for home care because they use a tablet for all documentation during home visits, and currently, there were no technical solutions to add the recording of the vision tool to the tablet. The solution for home care was that they would have to use a paper copy during home care visits and manually add this to the medical record when they came back to their office. In home care, this may be an additional barrier. Failing to integrate the assessment in the medical record makes it hard to find the information again and may hinder the active use of the results from the assessment.

Limited time and resources are well-known contextual barriers for implementation [44]. The participants expressed different opportunities and abilities to prioritise their own time and workday. Especially the participants working in home care reported that their lists were so full that new things were difficult to include. The participants in the rehabilitation service described time constraints differently. Because they were more autonomous in their ability to organise their daily work schedule, they were more flexible in how they could organise their day, although they also experienced time constraints. The experience of limited time and high levels of stress in home care is also documented in other studies [51, 52]. The participants suggested that 15–30 min could be appropriate for a structured vision assessment.

Leader support

Leader involvement was something the participants viewed as essential for change of practice although they had different opinions on how the leader should be involved. There are many ways a leader could be involved in an implementation project [53]. In Norwegian municipal health care services, managers often have a health care education themselves; however, because their role as leaders is more about organising their department, they tend to delegate responsibility for competence improvement and quality of care to the other HCP in their department [54]. Some participants expressed that it was important to have a leader who was closely involved in their daily work, and they described this as reassuring, particularly during the implementation of new routines. However, others expressed that they preferred to work professionally autonomously with the trust of their leader, rather than having a leader who checked the details of their work. Regarding being involved in implementing the new vision assessment routines in the project, all the participants agreed it was important for them that their leader supported and facilitated their participation in this implementation project. A recent Norwegian study also highlights that an empowering leader is a facilitator for implementation in municipal health care services [55].

Importance of actively integrate partners to facilitate implementation

In this implementation project all partners were actively involved in all phases of the implementation, in line with the KT process [33]. This provided valuable insight and elucidation of barriers and facilitators that might have been missed without this partnership. Involving HCP allowed us to come up with practical solutions to promote facilitators and overcome barriers. One example was to include the KROSS vision assessment as a fixed point during the daily white board meetings. During the white board meetings, the interdisciplinary staff discuss patients and plan their activities as written on the white board (https://pasientsikkerhetsprogrammet.no/forbedringskunnskap/Tavlemoter). The rehabilitation services had already started to use white board meetings successfully, and the home care services were about to start. Another example was that lunch discussions and local workshop would enhance the knowledge use. This active partnership including HCP are more likely to promote a sustainable change to clinical practise [33, 56].

This implementation has an ambitious and important goal [13, 57] with several aspects. At a very early stage, we established contact and cooperation with different partners, including leaders and practitioners in the municipality and user groups. The involvement of partners provided early and continued dissemination throughout the project of its aim, which allowed the participants to reflect on their practise towards VIs after stroke. In preparation for the current study this provided partner involvement in planning and performing the interviews and workshops. These activities secured that the project was anchored in the organisation in order to promote a successful implementation.

Strengths and limitations

The current study has a relatively small sample size, and the barriers and facilitators described in the present study are based on the participants' descriptions of their practice, competence and experience. Their experiences might not be representative of the municipal service as a whole; however, the participants were purposefully recruited, aiming for a broad description of practice and potential barriers and facilitators. The interviews were rich and detailed and represented the different contexts and organisational levels in the municipal health care services. The results confirmed previously known determinants and elucidated others: knowledge and competence of vision and the implications of living with vision impairments after stroke were a strong motivator and facilitator. The results from the interviews were presented and discussed at the workshops, where there was a wider representation of municipal HCP and where the determinants and implementation strategies were recognised and elaborated on. One challenge is that the described determinants may differ from the actual determinants that will come up during the implementation (Fig. 1, Stage IV, paper in preparation). Even though Stage IV may find a difference between the expected and actual determinants, identifying the determinants and designing strategies to remove or reduce barriers and to strengthen facilitators is an important part of successful implementation in health care services [42]. The current study was done in a medium-sized municipal in Norway, and other municipalities and health care organisations may have different contextual challenges. Still, there are reasons to believe that many health care services outside of Norway may have similar challenges because other studies support that vision and visual function are not prioritised in municipal health care [13, 58, 59]. Further, providing a plan for increased competence and an assessment tool can improve vision care from non-vision experts [60]. A strength of this study is the strong and active partner integration with extensive cooperation with different partners within the municipality and stroke survivors. Strong partner involvement is important to consider if the results should be used to implementation projects in other municipalities.

Conclusion

The current study shows that low knowledge about VIs after stroke and competence in testing visual function are potential barriers to implementing new vision routines in municipal health care services. Increased knowledge about VIs' significance for stroke survivors, and a strong motivation to provide best possible care and rehabilitation were important individual facilitators. Contextual barriers can be practical and related to limited time and resources. Supportive management and utilising existing systems to include new routines may facilitate knowledge use. Knowledge from this study will be used in the KT process, to help select, tailor and implement structured vision assessment with the KROSS tool. Strong collaboration with partners in all the KT phases were vital to gain insights into relevant barriers and facilitators, and needs to be considered when planning to implement structured visual assessment after stroke in municipal or primary health care services.

Abbreviations

HCP: Health care professional; IKT: Integrated knowledge translation; KROSS: Competence, Rehabilitation of Sight after Stroke; KT: Knowledge translation; KTA: Knowledge to action; VIs: Visual impairments; VISA: Vision impairment screening assessment

Supplementary Information

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Additional file 1.
Additional file 2.

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Authors' contributions

The study was conceived by TSM and HKF. TSM performed the interviews, lead the workshop discussions with HKF, and transcribed the interviews. TSM and HKF analysed and interpreted the data, drafted and critically revised the manuscript. GE and HO made significant contributions to data analyses, interpretations and subsequent revision of the manuscript for intellectual content. All authors read and approved the final manuscript.

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Availability of data and materials
The transcripts and notes used and analysed during the current study are not publicly available due to protection of the anonymity of the participants, and the content may threaten confidentiality. An anonymised version of the data can be made available from the corresponding author on reasonable request.

Declarations

Consent for publications
Not applicable

Ethics approval and consent to participate
This study was given ethical approval by the Norwegian Centre for Research Data (NSD), reference 56278. The study followed the ethics guidelines of the revised Declaration of Helsinki [61]. The participants received both oral and written information about the study, and gave written informed consent before they participated. During transcription of the interviews and presentation of data, all names, places, and institutions that could identify persons were removed to ensure the anonymity of all participants.

Competing interests
The authors declare that they have no competing interests.

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RESEARCH

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'If we don't assess the patient's vision, we risk starting at the wrong end': a qualitative evaluation of a stroke service knowledge translation project

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Abstract

Background: Visual impairments (VIs) affect 60% of stroke survivors and have negative consequences for rehabilitation and quality of life poststroke. Symptoms of VIs post stroke are difficult to identify for stroke survivors and health care professionals without using a structured vision assessment. In this study, we qualitatively evaluate the implementation outcomes after implementing a structured visual assessment with the Competence, Rehabilitation of Sight after Stroke Vision (KROSS) assessment tool in stroke care services.

Methods: This is a qualitative study comprising four focus group interviews. The health care personnel (HCP) involved in the implementation or with experience using the KROSS assessment tool in practice were invited to participate. We used Proctor et al.'s definitions of implementation outcomes as a framework, which informed the interview guide and analysis. We used a deductive - inductive content analysis, as described by Elo and Kyngäs.

Results: The participants found the structured vision assessment with the KROSS tool as being acceptable; they expressed a motivation and intention to use the new routine in practice. They believed it was important to assess their patient's visual function because it influenced other rehabilitation activities and activities of daily living. Most of the participants reported having adopted the vision assessment in their practice, except for those participants from the home care services who experienced that they have few stroke survivors to follow up on. The assessment was believed to be more appropriate to perform within the rehabilitation services where there is more of a focus on functional assessments. Although vision assessment was new to all the participants, they felt that they improved their vision assessment skills by regularly using the assessment tool. Together with sufficient instructions and supervision, they believed that vison assessment was feasible for their practise. Including the vison assessment in the existing routines and systems was important to promote sustainable implementation.

Conclusion: Implementing a structured vision assessment with the KROSS tool in health care services was experienced as acceptable and feasible. The new routine led to increased attention towards poststroke VIs and increased collaboration with vision experts. Tailoring the routine to each practice and how they organise their work can support

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the integration of a vision assessment in their routines. To promote better vision care poststroke vision assessment and follow up should be included in the stroke care pathways.

Keywords: Stroke, Vision assessment, Visual impairments, Knowledge translation, Implementation, Rehabilitation, Outcomes

Background

Vision impairments (VIs) are common poststroke and affect approximately 60% of all stroke survivors [1]. VIs poststroke include visual field defects, eye movement disorders, reduced visual acuity and different visual perceptual disorders [2, 3]. Poststroke VIs have negative consequences for quality of life, mobilisation and rehabilitation outcomes and are associated with depression and reduced activity [4–8]. Despite this, there is a lack of attention given to assessing visual functions in stroke care and within clinical guidelines [9–12]. Stroke survivors experience that their VIs are overlooked by health care professionals in contrast to other consequences after stroke, such as limb palsy or aphasia, and are offered limited support and follow-up [8, 10, 13]. Frequent vision problems after stroke are blurred, altered and reduced vision, visual field loss, diplopia and a variety of perceptual problems [14, 15]. These problems may cause difficulties with reading, trouble finding things, walking into objects and more [10, 15, 16]. Although some will immediately become aware of their impaired vision, almost 40% of stroke survivors with stroke-related VIs do not report visual symptoms in the acute stroke unit [14]. Hence, a present visual impairment may remain undetected and unnecessarily negatively influence rehabilitation and quality of life after stroke [9, 16, 17]. To identify VIs after stroke, visual functions need to be properly assessed [16, 18]. Currently, no tools that include the assessment of vision and common visual functions affected by stroke are systematically used in Norwegian stroke care. In the UK, the Vision Impairments Screening Assessment (VISA) tool was developed to screen stroke survivors for VIs. With the VISA tool, health care personnel (HCP) in the stroke unit without formal competence in vision and eye care can identify VIs and appropriately refer patients to further vision assessments [19]. In Norway, a similar tool, the Competence, Rehabilitation of Sight after Stroke (KROSS) assessment tool, has been developed and tested in two stroke units and used by multidisciplinary HCP to assess vision poststroke and promote a follow-up for VIs [20, 21]. The KROSS vision assessment tool consists of objective assessments of visual acuity, eye movements, visual field, visual attention and reading, questions for identifying subjective symptoms, and observations in activities of daily living (ADL). The symptom questions are both general, asking for experiences of changes in the patient's vision, and more specific related to the visual functions. The tool has 17 items, scored as yes/no there is an identified problem, and 4 items related to information to the patient. All persons identified with a problem are referred for further assessment.

The current study is an evaluation of the KROSS Knowledge Translation project (KROSS KT), a project to implement a structured vision assessment and follow-up of VIs poststroke among municipal health care services [10, 20, 22]. In collaboration with a Norwegian municipality and patient organisations, we adapted the KROSS tool and competence workshop to a municipal context [20] and implemented it in three municipal health services frequently used by stroke survivors [23]: the inpatient rehabilitation unit, home rehabilitation and home care. As the KROSS KT project progressed, other health care services wanted to be a part of the implementation, attend the workshop and use the KROSS tool. Hence, a specialist rehabilitation hospital and stroke unit located in the municipality were included. We used the knowledge to action (KTA) model as the framework for the implementation [24]. The implementation strategies used in the KROSS KT project were chosen as a result of assessments of barriers and facilitators to implementing a structured vision assessment in municipal health care services, which have been described in an earlier study [20]. We used multicomponent initiatives that combined dissemination, education, collaboration with researchers and knowledge users, incentives and facilitation [25]. More details about the KROSS KT project are described in an earlier publication about the barriers and facilitators to the implementation of a structured vision assessment in the municipality [20].

There are many ways to evaluate implementation. In the present study, we have used the implementation outcomes described by Proctor et al. [26] in qualitative focus group interviews. To facilitate a common language for evaluating implementation, Proctor et al. review the literature on evaluation and describe and define the implementation outcomes [26]; they define implementation outcomes as 'the effects of deliberate and purposive actions to implement new treatments, practises and services' [26]. The implementation outcomes were used as guidance and structure in the current study's interviews and analyses when evaluating the implementation of a structured vision assessment using the KROSS tool. The outcomes are *acceptability, adoption, appropriateness, feasibility, penetration, sustainability, fidelity* and *costs* [26].

The current study's aim is to evaluate the implementation as experienced by the HCPs involved in the KROSS KT project, here as anchored in Proctor et al.' implementation outcomes.

Methods

Design

In the present qualitative study, we used focus group interviews for the data collection. We used the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist to promote transparent reporting [27].

Participant selection

HCP with experience of being in the KROSS KT project were contacted and invited to participate in the focus group interviews. Recently, we described the expected barriers and facilitators to the implementation of KROSS in municipal health care services, identifying the contextual differences between the municipal services. The participants experiences of having a flexible work schedule or not, degree of time constraints and competence especially affected their views on the likelihood of successful implementation [20]. When monitoring knowledge use during implementation, all services reported differences in their use of the KROSS tool and new vision routines in their practise. Therefore, we chose to create focus groups based on the participants' affiliations to the services they worked in. We also considered that this way of organising the groups would contribute to a more free expression of experiences that would be independent of the 'successfulness' of the implementation. The participants who responded to our invitation and consented to participate in the study were allocated into four focus groups. Group 1 included home care services nurses ($n = 2$). Group 2 included municipal rehabilitation unit nurses and physiotherapists ($n = 5$). Group 3 included specialist rehabilitation hospital occupational therapists, sports pedagogues, physiotherapists and neuropsychologists ($n = 9$). Group 4 was a mix including one nurse from home-based rehabilitation, two case handlers (nurses) and one physiotherapist from the local hospitals stroke unit ($n = 4$).

Setting

The focus group interviews took place on the services' premises (special rehabilitation hospital and municipal rehabilitation unit) or at the university (home care and mixed group), here based on the participant's preferences. The first author, who is the project manager, acted as the moderator during the interviews. Most of the participants and the moderator were acquainted with each other because of having worked before this on the earlier parts of the KROSS KT project. It was made clear that the purpose of the study was not to evaluate the participants themselves but instead to discuss their experiences with the implementation and structured vision assessment. Each group was interviewed once 16–18 months after the implementation started.

Data collection

The interviews lasted from 40 to 70 min and were digitally recorded and transcribed verbatim by the first author. We developed an interview guide to cover Proctor et al.'s implementation outcomes [26]. In addition, topics that arose during the implementation phase were addressed, such as the participants' experiences of performing the tests or interpretations of the KROSS manual. The participants were also encouraged to speak freely about their experiences of participating in the project and using the KROSS tool in their services (the interview guide is available as supplementary file 1).

Analysis

We analysed the data using a content analysis with a deductive - inductive approach, as described by Elo and Kyngäs [28]. They described an analysis process containing a preparation phase, an organising phase and a phase reporting the process and results. The transcripts were analysed by two researchers (TSM and HKF, a nurse and an optometrist, respectively). We used NVivo 12 to manage the data [29]. In the preparation phase, the material was thoroughly read by both researchers to become familiar with the data. In the organising phase, we used a matrix based on Proctor et al.'s eight implementation outcomes [26], where TSM and HKF individually reviewed and categorised the data according to the implementation outcomes. During the analysis, the researchers met frequently to discuss the data and which implementation outcome the data fit into. Differences were discussed until consensus was reached. Once all meaning units were assigned to an implementation outcome, the principles of inductive content analysis were used to develop categories within the bounds of each implementation outcome. This Elo and Kyngäs [28] described as unconstrained analysis. (See Table 1 for an overview of the analysis).

The data within each implementation outcome were analysed and grouped into sub-categories and categories. The final categories were discussed and agreed upon by all the authors. The outcomes and included categories are presented in Table 2. The implementation outcome—costs—was not a specific focus in the current study,

Table 1 An example of the analysis process from deductive to inductive content analyses

	Step 1 **Deductive content analysis**	**Step 2** **Inductive content analysis**	**Step 3** **Inductive content analysis**
Proctor et al.'s eight implementation outcomes [26]	Data reviewed for content and coded for correspondence with or exemplification of the implementation outcomes	Create sub-categories	Conceptualizing and abstracting into categories
I. Acceptability Definition: The perception among implementation stakeholders that a given treatment, service, practice or innovation is agreeable, palatable or satisfactory	*It is easier to perform visual assessments now, as we learned something concrete to use for the assessment. This makes it easier to have an opinion about visual function.* (G3) *It was very useful to listen to and engage with the stroke survivors, who shared and explained how their vision loss affected their everyday life. I think this was great.* (G2)	Access to the KROSS tool was considered important to perform vison assessment Real stories from stroke survivors promotes motivation	A motivating and useful KROSS workshop

Table 2 The categories from the analysis are presented in the right column and implementation outcomes with its definitions in the left [26]

Implementation outcome and definition	**Categories**
Acceptability *The perception among implementation stakeholders that a given treatment, service, practice or innovation is agreeable, palatable or satisfactory.*	• A motivating and useful KROSS workshop • Acceptance of prioritising a vision assessment in the hectic workday • Vision assessments create a positive change for the patients
Adoption *The intention, initial decision or action to try or employ an innovation or evidence-based practice.*	• Differences in the extent of knowledge use • Increased awareness of visual impairments in clinical practise
Appropriateness *The perceived fit, relevance or compatibility of the innovation or evidence-based practice for a given practice setting, provider or consumer and/or perceived fit of the innovation to address a particular issue or problem.*	• Assessing vision is a first step to better vision care • More appropriate in a rehabilitation setting
Feasibility *The extent to which a new treatment or an innovation can be successfully used or carried out within a given agency or setting.*	• Practise makes perfect • Helpful instructions and supervision • Integration of the KROSS tool into the medical records ease documentation • Limited time available
Fidelity *The degree to which an intervention was implemented as prescribed in the original protocol or as intended by the programme developers.*	• Followed the KROSS protocol but did not test all patients
Penetration *The integration of a practice within a service setting and its subsystems.*	• Vision assessment now included in service allocation office case handling • Visual function assessment integrated into the clinical awareness • More structured interdisciplinary collaboration with vision experts
Sustainability *The extent to which a newly implemented treatment is maintained or institutionalised within a service setting's ongoing, stable operations.*	• Integration into existing routines • Desire for formal vision competence

although aspects about the use of resources are discussed in some of the other implementation outcomes.

Results

A total of 17 categories were identified during the analysis, and for each of the implementation outcomes, there was a variation between two and four categories (see Table 1).

Acceptability

There were three categories in the data related to the participants' perceptions of acceptability in the KROSS KT project.

A motivating and useful KROSS workshop

The participants expressed that overall, they were happy to be part of the implementation project. The workshop provided new knowledge about VIs after stroke that they could start to use in their clinical practice immediately. Learning about the extent of VIs following a stroke and its significant impact on life poststroke gave the participants motivation and understanding that it was useful to implement vision assessments into their practise.

> *I think that vision after stroke is very neglected, so it is good to start with this now. I reckon that it is true that to see is important; to avoid falling over and hurt yourself or break something. And we can't see it, if they have poor vision, if they can see or not. And the patients do not say anything about it either. (G1)*

The combination of theory and practical training together with the personal experiences expressed by the stroke survivors gave the workshop credibility and acceptance for the implementation.

> *It was very useful to listen to and engage with the stroke survivors, who shared and explained how their vision loss affected their everyday life. I think this was great. (G2)*

Practicing the assessment tool on stroke survivors under supervision during the workshop made them confident that they would be able to use it in their practise.

> *It is easier to perform visual assessments now, as we learned something concrete to use for the assessment. This makes it easier to have an opinion about visual function. (G3)*

Acceptance of prioritising a vision assessment in the hectic workday

All the participants expressed that they had already experienced a high workload in their current practise. Adding the KROSS tool as a new routine had been a trade-off with other work, which some experienced as a dilemma when having to choose between equally important tasks. An important factor for choosing to use the KROSS tool was that they experienced how knowledge of the patient's visual function was beneficial in, for example, ADL and mobilisation.

> *Well, we need to think about how we can defend the extra use of time. I feel that sometimes, the patient either gets physical training, or they get their vision assessed. And what is most important? In some cases, perhaps both are equally important. To facilitate physical training better, however, the vision must have been assessed. (G2)*

The participants reported that using the KROSS tool regularly reduced the assessment time. Some said that the assessment took around 20 min if it had been a long time since they performed their last vision assessment. The participants had different opinions on what they considered an acceptable use of time; most considered 15 to 20 min as being acceptable.

> *Usually, we schedule one hour per home visit because we have many things to assess. This (KROSS) took 20 minutes last time I did it; I don't think that's too much. (G4)*

> *I think I am using about 20 minutes, which might be because I am going through the papers during the assessment and need too… it's the same with other assessments too. The more you do them, the easier they get. And you notice things easier and such. (G2)*

Vision assessments create a positive change for the patients

The participants experienced that all the patients they had tested so far appreciated the added vision assessment. In some cases, if there was a complex outcome and the patient was exposed to comprehensive assessments after the stroke, the vision assessment was postponed to reduce the strain on the patient.

> *Patients are very interested [to be tested with KROSS]. They are often very positive about the additional assessment. Most people are concerned about their own health. (G4)*

> *Before this project, I knew some patients who had been in despair because they had vision problems they could not make head or tail of. And where nobody would follow this up. So I do think it is important to identify vision problems. And this [KROSS tool] is great to use. Yes, it is. (G3)*

Adoption

Two categories represent adoption. The services reported differences in their extent of using the KROSS routine. Some had integrated it into their regular routines, some when they expected a visual problem, and a few did not use it at all. Despite their differences in using the KROSS tool, all groups expressed that their overall attention to VIs had improved both for themselves and among colleagues and overall in the health care services involved in the KROSS KT project.

Differences in the extent of knowledge use

All the participants stated that they intended to start assessing vision among stroke survivors using the KROSS tool after the workshop. However, not all the participants had managed to implement the vision assessment, and the adoption differed between the services. In the municipal rehabilitation unit and home rehabilitation, they now assessed nearly all stroke patients in their service, whereas HCP working in the home care services said they had not been able to use the KROSS assessment tool because they had not yet been seeing any stroke survivors in their services.

> *Ehh... but sadly, we've not been able to use it afterwards [the workshop]. Because… but we have some more focus on it and think about it occasionally. However, we have not seen any stroke patients yet. (G1)*

In the specialist rehabilitation hospital, they assessed all their stroke patients with the KROSS tool, and in the local hospital, they used the KROSS tool if they suspected that the patient might have a vision problem because either the patient reported a visual problem or the HCP made clinical observations that indicated a visual problem, like walking into things or neglecting one side.

> *Yes, I have assessed most stroke patients. Of course, it has happened that I have forgotten some and suddenly think about it when the patient no longer receives our services. But I try to assess all stroke patients. (G3)*

Of the participants who regularly performed the test, most had attended the workshop. The other HCP had been trained to use the KROSS tool by their colleagues who had participated in the KROSS workshop. The participants were encouraged to carry out peer training to allow more patients to be assessed. Peer training was especially common in the specialist rehabilitation hospital, but also in home-based rehabilitation.

> *A colleague, in addition to me, now performs the KROSS assessments. It took some time to feel confident to do the assessment, but we did it together the first time. So now there are more than just me. I think that is smart. (G3)*

Increased awareness of visual impairments

All the participants emphasised that taking part in this implementation project had increased the attention of VIs poststroke in their services, including home care services.

> *Even though I have not had any stroke patients yet, I have been thinking about it a lot since the workshop. That we need to be aware of possible vision problems. (G1)*

It was not only the workshop attendees themselves who reported an increased awareness to VIs, but they also said their colleagues were now asking for a vision assessment of their patients.

> *Participant 1: Often, my colleagues on the team remind me. 'Should we do the KROSS test on this patient?'*
>
> *Participant 2: It is like that for us too, the others remember because they are more with the patients. (G4)*

The KROSS project provided them with a tool and knowledge to help identify vision problems and separate them from other problems. Some symptoms of VIs they described earlier could be misinterpreted as a symptom of cognitive difficulties or related to communication problems they now considered if such symptoms could be related to changes in visual function. Knowledge of the patients' visual function made them more confident in some clinical judgements compared with before implementation.

> *And when it comes to cognitive function, if we don't assess the patient's vision, we risk starting at the wrong end. Vision should be assessed on day one, actually. (G3)*

Appropriateness

Two categories represent the participants' expressions of appropriateness. Their experiences of appropriateness were connected to how they believed that assessing vision could contribute to an improvement of vision care after stroke and their amount of engagement with stroke survivors in their daily work.

Assessing vision is a first step to better vision care

During implementation, there was a clear referral pathway for patients identified with VIs. This was something the participants highlighted as important. Although they wished they could include vision rehabilitation in their services or quickly refer their patients to such rehabilitation, they all recognised the importance of the initial assessment to identify a potential problem. Many had missed such standard pathways for patients with VIs before implementation.

> *I'm now thinking of how to follow up vision after a stroke. One thing is proper correction with glasses and other, more basic things. However, there are some problems beyond that. If there are problems with eye-movement control or perceptions. We have experienced that there are no follow-up to refer to…. (G3)*

The participants felt that it was satisfying to be able to identify vision problems using the KROSS tool. However, some experienced that it was a problem that their services did not offer vision rehabilitation while working with the patients because none of the services included any eye care specialists. Those patients identified with VIs were referred to an external ophthalmologist or optometrist. However, they wanted to be able to start vision rehabilitation while the patient was in their care to promote visual function and rehabilitation.

> *We want to be able to do something with what we find. We want to start training that can be continued in later stages. Because now we can refer to an ophthalmologist if needed, but what do we do to rehabilitate? (G4)*

Most of the participants emphasised that even though their competence for vision assessment was not on an expert level, doing a basic assessment was much better than doing no assessment.

> *Participant 1: 'You can't do anything wrong by doing the assessment; you will identify large vision problems.'*
>
> *Participant 2: 'That's right, I agree. It is much better that someone actually does a vision assessment.' (G3)*

More appropriate in a rehabilitation setting

Although the participants from home care said that they intended to use the KROSS tool, they had a few new stroke patient in their services. They agreed that assessing vision after stroke was important but reflected that the assessment was more appropriate to be performed in other municipal services, such as the rehabilitation unit and home rehabilitation where they have a more explicit focus on functional assessment of their patients.

> *That's when I'm thinking about the rehabilitation unit, right? I am thinking that this [KROSS assessment] is a very good thing when patients are in inpatient care. You know, there are many assessments and tasks that you should do, but they can't be all done in an hour. You have to do it at different times and when you find it appropriate. We [home care] are just in and out, but in the rehabilitation unit, they have the patients all 24 hours (G1).*

Feasibility

Four categories represent the participants' experience of the feasibility of implementing the KROSS tool in their setting. Being new to vision assessment, the participants discovered that they needed time to get familiar with performing, interpreting and documenting their assessment. They thought the available instructions were good, especially when combined with supervision, which was helpful when starting to use the KROSS tool.

Practise makes perfect

Because many of the different tests in the KROSS tool were new to the participants, they needed time to familiarise themselves with the tests to perform them properly with different patients. In periods where they could do the assessment regularly, they experienced the tests as easier to perform and felt more skilled and confident in performing the assessments.

> *Initially, I made many mistakes. I had to do some tests several times. Forgot to ask them to cover one of the eyes and such. (G4)*
>
> *It's like, if you have done it one week, and the next, several times in a row, you feel more confident. Then again, if it's a month since the last time, you get unsure again. (G2)*

Helpful instructions and supervision

Most of the participants thought the instruction manual for the assessment was easy to use and understand. All used the manual during the assessment, and some read the manual before to prepare themselves and thought that doing so improved their performance. The opportunity to ask questions or get supervision in their practice during the implementation was helpful, especially in the initial implementation.

> *It's reassuring to get help if there is a challenging assessment. That we can send an email to the project group so they can do an additional assessment (together with us). That is a reassuring for us and the patients. (G3)*

Integration of the KROSS tool into the medical records ease documentation

In the municipality, they had integrated the KROSS tool into the medical record. The KROSS results were stored in the patients' medical records. This made it easy for other HCP in the municipality to find the test and read the results of the vision assessment.

> *The best way is to plot the results right into the electronic form. Just tick it off. (G3)*

The specialist services had not integrated the KROSS tool into their medical records and struggled to describe the result from the assessment in words. This was because of a lack of knowledge about the terms and expressions used to describe visual function. Some suggested producing a standard text that they could adapt to each patient.

> *I think that it can be difficult to get it in the medical record in a sensible way. Because it ends up with long dissertations because I don't know the right name on the different test, and it's hard to write it in an easy way. (G4)*

Limited time available

For those who did not perform the KROSS tool as intended, a lack of time was one important explanation. This was particularly true for home care. Although some of the services assessed most patients, sometimes the personnel with KROSS assessment training were not available or had to prioritise other tasks, which meant that some patients were not assessed.

> *I guess it is a thing that I, at least in* ***my*** *workday, can find the time (to test vision with the KROSS tool). I just have to rearrange my schedule. (G2)*

Fidelity

Although there was no formal evaluation of the participants' assessments to measure fidelity and accuracy in the present study, it was an aim that all stroke patients should be assessed with the KROSS tool. Most of the participants expressed that they used the KROSS tool and followed the instructions as intended; however, some said they did not test all the patients.

Followed the KROSS protocol but did not test all patients

Even though some items in the KROSS tool, for example, assessing the visual field, were experienced as complex, especially in the beginning, the participants said they always completed the whole test with all the items included. The aim was to test all patients who were diagnosed with a stroke, but some participants only tested patients when they suspected a visual problem. This was discussed between the participants as problematic because there may not be any obvious signs of VIs.

> *Participant 1: But testing all? We do not do that. But I think it has been really good to use when we suspect a visual problem. Earlier, we did not have a tool to test vision with, and we just tried to separate VIs from other impairments.*
>
> *Participant 2: But will you identify all patients with VIs if you don't test all, or? (G4)*

Penetration

Three categories from the data were related to penetration. The KROSS vision assessments were also requested by HCP who not had been a part of the KROSS workshops; here, vision became a part of the observations of their patients, and it improved the planned follow-up of VIs after stroke in the health care services.

Vision assessment included in service allocation office case handling

All the participants had become more aware of the importance of vision assessment after a stroke. Usually, handling cases in this municipality mostly specified the right service level rather than details about the content of the services. Participating in the KROSS project had resulted in the case handlers who were working in the service allocation office now beginning to ask the service providers to perform the KROSS assessment when the municipal received new stroke patients from the hospital. Thus, a vision assessment had become an area in which they specifically instructed service providers to consider.

> *In some cases, the service allocation office has asked us to do a KROSS test while the patient is in rehabilitation. They put it in the order. That is very good. (G2)*
>
> *Now, asking the services specific for vision assessments is something more than we usually do as case handlers. .... Mostly, we just decide on the level of the service and its main content. (G3)*

Visual function assessment integrated into the clinical awareness

All the participants said that they now paid more attention to vision and visual impairments in general. They were considering vision when they observed their patients in different situations, such as ADL and mobilisation. Vision became more integrated in their clinical gaze when caring for their patients. Some found it helpful to use the KROSS tool to assess vision in patients without stroke as well.

> *I have also done the assessment (KROSS) on a patient without stroke who had terrible vision. I became curious and wondered, 'How bad do you see? Or do you struggle with other impairments?' It turned out that he saw just terribly, poorly. Then, we were able to do something about it. (G2)*

More structured interdisciplinary collaboration with vision experts

As a result of participating in the KROSS KT project, awareness and attention to VIs were increased.

The specialist rehabilitation hospital had also started to collaborate with an optometrist who could assess patients at the hospital. The participants considered this a significant improvement compared with previous vision care but would prefer a more permanent solution with a vision expert integrated in their service. The participants also expressed that they had now increased their knowledge about different vision rehabilitation services and referred more patients to vision rehabilitation.

> *We have had optometrists here to assess patients in our hospital. We never had that before this project, and I think we have referred more patients to vision rehabilitation than we did before. (G3)*

Sustainability

In different ways, the KROSS assessment routine was integrated into already existing routines in the services. The participants' became more aware of the need for more competence regarding vision impairments, and to enable further improvement in future vision care, they wanted further formalised vision education.

Integration into existing routines

The rehabilitation unit had included the KROSS vision assessment as a part of its existing whiteboard routines. On the whiteboard, all important activities or assessments for each patient were listed [30]. The whiteboard list was used as a checklist and topic agenda for their multidisciplinary meetings; now, the KROSS assessment was also included on the whiteboard.

> *We now have an item on our whiteboard where it says: KROSS test. This is part of the total assessment package. We mark the task with a red button, so it is how we control that we secure follow-up. (G2)*

Six months after the KROSS KT project started, the municipal rehabilitation unit moved to a new location. With a new office and new whiteboard, the participants said that the KROSS assessment was still included and integrated in their routine service.

Another way that the municipality had promoted sustainability was that the KROSS tool was integrated into their medical record system. Still, some of the participants expressed that the most practical aspect for them was to have a paper version to bring to the bedside or the patients' home and later transfer the results to the medical record. The specialist rehabilitation hospital had included the KROSS vision assessment as part of their formal routine for all stroke survivors as part of their baseline assessments.

Desire for formal vision competence

After having some experience with the KROSS tool, the participants acknowledged that they needed more knowledge and a better understanding of visual function when doing the assessment.

> *Compared with other things we are assessing, we barely have competence in assessing it [vision]. (G3)*

Several wanted more formal vision competence, for example, a continuing education course or even a master's degree. They wished they had learned more in their professional education and wanted vision to have a higher priority when new HCP were educated.

> *Before the KROSS workshop, I did not know anything about VIs after a stroke. I knew it existed, but in my education, we did not learn anything about it. (G4)*

Some wanted to be able to do a more comprehensive assessment but also to have the competence to start vision rehabilitation.

> *After participating in this project, I am thinking about possible rehabilitation options for VIs. Is there a course, education or anything that we can take or something? (G3)*

Discussion

The current study produces important new knowledge about the implementation of structured vision assessment into health care services by HCP without vision expertise. The results show that it is possible to integrate a structured vision assessment with the KROSS tool but that the level of integration depends on how well the implementation is tailored to the local context and accepted by all users and stakeholders [20, 24]. All the participants expressed they found it acceptable to include the KROSS vision assessment in their practice; they were motivated by the experience that knowledge about the patient's visual function was helpful for training ADL and other rehabilitation activities. The KROSS tool was adopted in most of the services, except for those working in home care who had not been able to do so. This also influenced the participants' experiences of how appropriate it was to use the KROSS tool in their services. Integration in the services' existing routines and systems [31], together with a motivation for gaining additional knowledge and better routines for vision after stroke, were the facilitators for a sustainable change of practise [32].

After participating in this implementation project, the participants expressed a high level of acceptance of the KROSS tool and the new structured vision routines. They highlighted that the content of the KROSS workshop was directly useful for their practice and were motivated by knowledge about the potential consequences of VIs after stroke. Experiencing improvements for service users is important for acceptability [33], and the participants stated that assessing vision was now seen as important to include in their practise. The current study indicates that being provided with the KROSS tool, in combination with experience of the benefits of identifying present VIs, influenced the participants' perceptions of acceptability.

Even 16–18 months after the KROSS workshop, the participants still valued the importance of knowing about their patients' visual function, which is considered an important facilitator for sustainable change [26]. Their acceptability was initially related to the expected positive impact for their patients, which was later confirmed for those who adopted the KROSS tool in practise because knowledge about the patient's visual function helped them perform better as HCP. This experience motivated the participants to continue to use the KROSS tool. Several studies have shown that an experienced beneficial change of practice increases the probability of adopting a new routine [20, 34, 35]. Motivation is important for changing practise [36], and the participants in the present study maintained a high level of motivation throughout the project. Proctor et al. described that acceptability can change over time. Something experienced as acceptable when being presented for the first time can be less acceptable after using it in practise [26]. In the current study, however, the participants expressed a high level of acceptability throughout the project.

Different levels of integration of the KROSS tool

Although most of the participants said they had adopted using a vision assessment with the KROSS tool as part of their routines, there were variations between the services. The participants in the rehabilitation services and stroke unit stated that they could start using the KROSS tool immediately after the KROSS workshop and had integrated it into their daily routines. Home care initially intended to use the KROSS tool in practice, but with a lack of patients, they never managed to adopt it. Intention for change, as all reported, is an important precondition for actual change. However, as other studies have found, many do not manage to change their behaviour, even if the initial intention is strong [26, 37]. The current study has found a lack of adoption in home care, even though they thought the implementation was both acceptable and feasible. The reason given by the participants was that they had not seen any stroke patients. When they were not able to use their knowledge and practice their skills right away, this might have reduced their attention towards adopting the implementation. The lack of stroke patients was unexpected because it is reported that 20% of stroke survivors receive help from home care 3 months poststroke [23]. It is possible that several of the stroke survivors had already received rehabilitation before they moved home, either in an institution, in an outpatient rehabilitation or by the home rehabilitation team [1, 6, 23]. This was emphasised by home care HCP as an explanation for why they thought it was more appropriate that vision should be assessed earlier in the stroke care pathway.

Being generalists and not stroke specialists was identified as a barrier to using the KROSS tool before implementation [20]. This means that if one focuses on a specific condition or diagnosis in a service, it will be easier to see the need for improvements and adopt new knowledge in practise [20]. The HCP from the rehabilitation hospital and municipal rehabilitation services consider themselves stroke care and rehabilitation specialists. In a Norwegian context, home care are generalists, traditionally concerned about helping patients with their daily living [20, 38], without a formal responsibility for rehabilitation, leaving this up to other services [39, 40]. This might have influenced their experiences of their capability to perform the assessment properly, which is important for implementation [36]. The HCP accepted that it is important to assess vision in stroke care but felt home care services were not the most appropriate service. This suggests that future implementation needs to consider all stroke services as a continuum of care and find a way to ensure that all stroke survivors have their vision assessed either in the stroke unit or in the rehabilitation services before receiving home care.

Although we had already assessed the barriers and facilitators before the implementation [20], we identified some new barriers in the present study. One barrier was that it was a challenge to stay in touch with home care services after the KROSS workshop. Interestingly, they did not use email on a daily basis, and a second barrier was the large staff turnover. This made it difficult to support the home care participants by sending reminders and information, visiting them in practise for supervision and providing feedback, which were important implementation strategies. We had planned for follow-up and supervision for all services but did not manage to include home care as intended. Home care HCP reported a high level of workload and small opportunities to plan and prioritise their workday. Experiences of limited resources and structural organisational barriers are important contextual determinants for implementation [41]. In the current project, we did not have any additional resources to add to the services, which might have affected adoption.

Keeping it simple while still performing an adequate vision assessment

In the current study, we found that after putting it in practise, the KROSS vision assessment tool was experienced as feasible. With some experience, time use was reduced, and the participants felt more confident with the assessment procedure and less dependent on the user manual; they were also offered supervision in their own practise. This was emphasised as important, especially in the initial phase of the implementation. Indeed, sufficient training and competence for performing an intervention is important for the experience of feasibility [26].

After conducting several assessments in practise, some of the participants wished they had a more comprehensive competence in vision assessment and rehabilitation. Although some expressed concern about a lack of specialised vision competence in their services, all groups agreed that assessing vision is an important first step to improve vision care. This is important because the first step in helping someone with a vision problem is identifying its presence [18, 19, 42, 43].

Vision assessment should be included in the care pathway for all stroke survivors

In terms of fidelity, the current study showed that when testing the patients, the whole KROSS tool was used, not just some parts of the assessment. Although most of the participants had ambitions to test all stroke survivors, others said that they only tested the patients if they suspected VIs. The intention with the routine was to test all patients because of the difficulties in identifying VIs without a formal vision assessment. Assessing vision only on those suspected of VIs may leave some patients with a possible vision problem going undetected [14, 42]. The nature of vision problems requires a formal vision assessment of visual acuity, eye movements, visual attention and visual field [16, 18, 42]. It is necessary to communicate this more clearly to ensure that all patients receive a vision assessment.

In the UK, a stroke–vision pathway has been developed based on a consensus study by Rowe et al. [43]. In this pathway, the authors suggest that a well-defined pathway for vision assessment and rehabilitation, together with support services, should be integrated into stroke services. Depending on when and where the patients present their vision symptoms to HCP, there should be a procedure to provide vision care. In stroke services without immediate access to vision specialists, Rowe et al. recommend the use of vision assessment tools to identify a possible vision impairment to secure a proper referral to vision care [43]. As emphasised in the current study, it is crucial that HCP working with stroke survivors are aware of VIs as a possible symptom or sequela of stroke; in this implementation study, we see that the participants are more aware of VIs and that most of them use the KROSS assessment tool. To promote a multidisciplinary approach for stroke survivors with VIs, a vision specialist should be integrated in the multidisciplinary stroke team [44]. This could add to a better understanding of the stroke survivor's functional vision and how an impairment can affect other functions. HCP without vision competence would learn from HCP with vision competence and vice versa [44].

Integrating the assessment tool into existing routines and systems for sustainable implementation

In municipal health care services, case handlers from the service allocation offices joined the implementation because we believed it was important that they knew about the project. The case handlers requested a vision assessment in their description of the patient's service decision. This was the participants' independent initiative resulting from increased attention to VIs after stroke and is a reminder of the importance of involving a larger part of the organisation than just the HCP working closely with the patients. Other studies have described that involving several parts of the organisation and leaders are possible determinants for the sustainability of an intervention [45].

In the current study, we found that integrating the new procedures into existing routines was effective, such as including the vision assessment with KROSS on the whiteboard and whiteboard meetings. Preparing an infrastructure for new interventions, such as a new tool, was important for sustainable use. Things that are separate from the already established routines and come as an additional new task may need additional attention from HCP, making it easy to forget [46]. In addition, we found that storing the assessment form with the results from the assessment was the preferred way to document their findings. Documenting the results of the vision assessment in their own words was challenging because of the lack of a precise language to describe visual function.

The strategies to increase knowledge and skills about VIs during the implementation increased the participants' capability to perform the vision assessment. Performing the vision assessment and experiencing its importance for their patients influenced their motivation for continuing to improve their capability to provide proper vision care. We believe that the improved capability positively affected the motivation of the participants, and those who used the KROSS tool were further motivated by its significance for their patients. This is supported by other studies showing that motivation and experiencing that the implementation has positive consequences for their patients can facilitate sustainable change [36, 45].

Small investments for better vision after stroke care

Cost was not formally assessed in the current study. There was no need for additional equipment, and the direct costs were related to the need to replace HCP so they could attend the KROSS workshop. One thing related to the use of resources was the time it takes to perform the KROSS assessment in practise. The participants had reported a tight time schedule before the implementation, so they were asked about their experiences of adding the KROSS assessment in their practise. The participants who used the KROSS tool said that they had to prioritise the use of the tool within their own workday at the expense of other important work. However, they found that the benefit of the vision assessment outweighed the cost of time. Changes experienced by the HCP as beneficial for patients are more likely to be successfully implemented [34, 35]. Further specifying of the time it takes for an experienced user to perform the KROSS assessment should be done to prepare other health care organisations for implementing the KROSS tool.

Strengths and limitations

There are many ways to evaluate implementation projects. In this project, we found that a qualitative evaluation of the participants' experiences of using the KROSS tool in their own practise was more appropriate than a quantitative study of knowledge use or feasibility [47]. The results are representations of the participants' experiences, which are expressed in focus group interviews; here, for instance, adoption may be overestimated by the participants. However, we had contact with the HCP during the implementation and supervised them in practical testing. In addition, many patients were referred to the university's clinic for further assessment. The home care group consisted of only two participants, and they had not used the KROSS tool since trying it out in the KROSS workshop. This means that they had little experience with the implementation to share. Therefore, the material represents home care only in some of the implementation outcomes, and this should be considered when interpreting the results.

The KROSS KT project began as an implementation project for municipal health care services. During the start-up process and cooperation with the municipal and user organisations, we were asked for participation from other health care services. We chose to involve the participants from a specialist rehabilitation hospital and acute stroke unit. Although they were offered follow-up, they did not receive the same amount of attention after the KROSS workshop but reported to have integrated the KROSS tool into their routine patient care. Even if the services outside the municipality received less attention in the planning and the follow-up phase, they were eager to participate when they heard about the project. Their participation in the KROSS workshop and this evaluation have contributed to the KROSS KT project with valuable insights; that is, showing that the project has expanded and involved other services than first planned is an example of penetration.

In the implementation, we developed multifaceted strategies to engage the participants and promote knowledge use [25]. This makes it difficult to single out the strategies that worked and those that did. We believe that the combination of strategies was important to recruit, motivate and engage the participants for behaviour change. If the KROSS tool should be used in a different setting or context, the variety of implementation strategies should be addressed to barriers and facilitators specific to the context, as recommended in the KTA model [24]. Engaging the health care organisation, including leaders, case handlers and bedside HCPs, in the implementation was important for the results in the current study.

Conclusion

The participants found the KROSS vision assessment acceptable for use in their practise and were motivated by using it because they experienced it as beneficial for their patients. Although most of the participants had included KROSS in their services, home care had not been able to do so. They considered that rehabilitation services would be most appropriate for structured vision assessment because of the limited number of stroke patients they see and the organisation of their workday. Assessing vision was new to most of the participants, and it appeared important to improve theoretical knowledge and practical skills in vision assessment. The enhanced vision competence led to increased collaboration with vision experts and referrals to vision rehabilitation and, in some cases, a motivation for obtaining more and formalised competence in vision care and rehabilitation. To facilitate better vision care after stroke, vision assessment and follow-up should be included in the care pathway description and be integrated in services that provide stroke care.

Abbreviations

COREQ: Consolidated Criteria for Reporting Qualitative Research; HCP: Health care personnel; KT: Knowledge translation; KROSS: Competence, Rehabilitation of Sight after Stroke; KROSS KT: KROSS knowledge translation; KTA: Knowledge to action; VIs: Visual impairments; VISA: Vision impairment screening assessment.

Supplementary Information

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Additional file 1. Interview guide.

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Authors' contributions

The study was conceived by TSM and HKF. TSM planned the study, recruited participants, moderated the focus group interviews and did the transcriptions. TSM and HKF analysed and interpreted the data, drafted and critically revised the manuscript. GE and HO made significant contributions to data analyses, interpretations and subsequent revision of the manuscript for intellectual content. All authors read and approved the final manuscript.

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Availability of data and materials

The transcripts and notes used and analysed during the current study are not publicly available due to protection of the anonymity of the participants, and the content may threaten confidentiality. An anonymised version of the data can be made available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was given ethical approval by the Norwegian Centre for Research Data, reference 56278. The study followed the ethics guidelines of the revised Declaration of Helsinki [48]. The participants received both oral and written information about the study, and gave written informed consent before they participated. During transcription of the interviews and presentation of data, all names that could identify specific persons were removed to ensure the anonymity of all participants.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Appendices and permissions

KROSS skjema 2017-2019
Synsforstyrrelser og slag

Universitetet i Sørøst-Norge
KONGSBERG KOMMUNE

Navn: **DIAGNOSE:** **Tid brukt på utfylling:**

Personen samtykker til bli testet på nytt for validering av skjema. ☐ Ja ☐ Nei
Dato for hjerneslag:
Dato for synsvurdering:

Lagres i pasientjournal

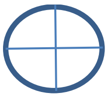
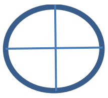
Opplysninger om syn					**Dato/ Sign**
1. Tidligere kjente øyesykdommer	Grønn stær (Glaukom)	Grå stær (Katarakt)	Forkalkning (AMD)	Annet:	
2. Bruker pasienten briller	Avstands-/ kjørebrille	Progressiv/ flerstyrke	Nær-/lesebrille	Ingen brille Har ikke tilgjengelig brille	
Skarpsyn (visus)					
3. Gir uttrykk for nyoppstått redusert syn	Ja	Nei		Ikke undersøkt:	
4. Synsskarphet på 2 m (desimal VA) **Høyre øye** **med / uten brille**	Linje 0,3	Redusert syn	Anbefalt vurdering hos optiker eventuelt fastlege.	Ikke undersøkt:	
	Linje 0,5	Pass på bilkjøring			
	Linje 0,8	Normalt syn			
Synsskarphet på 2 m **Venstre øye** **med / uten brille**	Linje 0,3	Redusert syn	Anbefalt vurdering hos optiker eventuelt fastlege.	Ikke undersøkt:	
	Linje 0,5	Pass på bilkjøring			
	Linje 0,8	Normalt syn			
5.Visus er ulik på venstre og høyre øye	Ja	Nei		Ikke undersøkt:	
6. Problemer med å lese avisskrift med lesebrille	Ja	Nei	Anbefalt vurdering hos optiker eventuelt fastlege.	Ikke undersøkt:	
Synsfelt (synsfelt yttergrenser)			**Kommentar**		
7. Gir uttrykk for at noe mangler i synsfeltet	Ja	Nei			
8. Kommer borti objekter ved mobilitet	Ja	Nei			
9. Tverrfaglig observasjon av orienteringsvansker	Ja	Nei			

Informasjon til bruker: Du har fått kopi av dette skjema og informasjon om egen synsstatus fra helsepersonell. Du bør ta med dette skjema som informasjon i eventuell videre rehabilitering.

KROSS skjema 2017-2019
Synsforstyrrelser og slag

Universitetet i Sørøst-Norge

KONGSBERG KOMMUNE

10. Synsfeltsutfall *Uten briller.* Ved utfall: skraver slik pasienten ser det (ikke slik observatør ser utfallet)	HØ 	VØ 	Normalt:	Henvises optiker/fastlege ved mistanke om utfall	
11. Redusert oppmerksomhet (neglekt) Hjertetest	Ja	Nei	Behov for videre utredning av neglekt?	Tid brukt på testen: ☐ Antall hele hjerter som er markert: ☐	
Samsyn (binokulært syn)					
12. Gir uttrykk for dobbeltsyn	Ja	Nei	Henvises optiker/øyelege	Ikke undersøkt:	
13. Gir uttrykk for problemer med dybdesyn	Ja	Nei	Henvises optiker/fastlege	Ikke undersøkt:	
14. Unormal blikkbevegelse	Ja	Nei	Henvises optiker/fastlege	Ikke undersøkt:	
Annen informasjon					
15. Har førerkort?	Ja	Nei	Personen er informert om sykehusets anbefalinger vedrørende midlertidig kjøreforbud	Ved synsproblemer, informert om ikke å kjøre før synet er vurdert av øyelege	
Informasjon til brukeren					
16. Personen er informert om egen synsfunksjon	Muntlig	Skriftlig	Gitt ut info om pasientforeninger og likemannsarbeid: Kommunens tilbud Norges Blindeforbund: blindeforbundet.no LHL Hjerneslag: lhl-hjerneslag.no Norsk forening for slagrammede: slagrammede.org		
17. Videre oppfølging av synsfunksjon er avtalt	Ja	Nei	Telefon: Tid: Dato:		
18. Personen er informert om hvem som kan kontaktes hvis synsproblemer oppstår/vedvarer etter 3 måneder	Ja	Nei	Fastlege Optiker Øyelege, trenger henvisning fra fastlege eller optiker Nasjonalt senter for optikk, syn og øyehelse Tlf:31008100 Synspedagog, via henvisning fra PPTjeneste eller privatpraktiserende		

Kontakt Torgeir Solberg Mathisen på tom@usn.no 90673529 dersom det samtykkes til videre oppfølging i prosjektet.

Informasjon til bruker: Du har fått kopi av dette skjema og informasjon om egen synsstatus fra helsepersonell. Du bør ta med dette skjema som informasjon i eventuell videre rehabilitering.

Synsforstyrrelser og slag

Beskrivelse for utfylling av skjema for synsforstyrrelser og slag.

Skjema skal fylles ut for alle slagpasienter så godt det lar seg gjøre. I hovedsak er alle «JA» svar relatert til redusert syn og «NEI» svar normalt syn. Dersom noe ikke undersøkes bør grunnen til dette spesifiseres. Skjema legges inn i pasientens journal, og en kopi kan gis til pasienten etter å ha informert om synet. I prosjektperioden skal prosjektgruppen også ha en kopi hos pasienter som samtykker til dette for å gjøre en ny test av pasienten.

1. **Tidligere kjente øyesykdommer** - Spør pasienten/pårørende om tidligere kjente øyesykdommer. Ring rundt ett / flere alternativer. For annet skriv diagnose om den er kjent.

2. **Bruker pasienten briller** - Spør pasienten/pårørende om pasienten bruker briller. Ring rundt ett / flere alternativer. Om pasienten til vanlig bruker briller men ikke har disse tilgjengelig skal det krysses av for ja pasienten bruker briller.

3. **Gir uttrykk for redusert syn** – spør/observer om pasienten opplever at synet er redusert **etter** slaget.

4. **Synsskarphet på 2 meter avstand** – Bruk vedlagte plansje og test på 2 meter med avstands/progressiv brille dersom denne er tilgjengelig. Bruk avstandsmåleren som er vedlagt. Kryss av om testen gjøres med eller uten brille. Høyre og venstre øye testes for seg –dekk til det øyet som ikke testes. Test den øverste, den markerte i midten og nest nederste linjen. For å få godkjent en linje må 3 av 5 bokstaver være korrekte. Få personen til å forsøke, selv om de ikke ser bokstavene med en gang.Start med den øverste linja som er merket 0,3. Ser pasienten minst 3 bokstaver på denne linja, gå videre til neste linje markert 0,5. Ser pasienten minst 3 bokstaver her gå videre til nest nederste linje markert 0,8.

   Ser pasienten mindre enn tre bokstaver på 0,3 linja, ring rundt «redusert syn». Ser pasienten denne, men mindre enn tre bokstaver på 0,5 linja, ring rundt «pass på bilkjøring». Angående kravet til førerkort er det krav om at pasienten ser 0,5 linjen med begge øynene med bruk av oppdatert brille/linse. Ser pasienten 3 bokstaver eller mer på 0,5 linjen gå videre til linje 5 (nest nederst). Greier pasienten minst 3 bokstaver, ring rundt 0,8 «normalt syn».

   Dersom du ringer rundt 0,5 eller 0,3 linjen for ett eller begge øynene, anbefal vurdering hos optiker eventuelt fastlege. I mange tilfeller kan det være behov for ny brille. Vurderes i forhold til tidligere øyesykdommer (spm 1) og bruk av riktig brille (spm 2)

5. **Visus er ULIK på begge øynene** –Er resultatet er ulikt for høyre og venstre øye, ring rundt «JA».

6. **Har problemer med å lese avisskrift med lesebrille** – test med en tekst pasienten pleier å lese f eks avis. Bruk lesebrille dersom det er tilgjengelig, avstand ca 40 cm. La pasienten lese høyt. Har pasienten problemer, ring rundt «JA», og anbefal vurdering av lesebrille hos optiker.

7. **Gir uttrykk for at noe mangler i synsfeltet** – spør om pasienten opplever at noe mangler i synsfeltet etter slaget. Ring rundt «JA» dersom dette er tilfelle.

8. **Kommer borti objekter ved mobilitet** – spør om pasienten opplever at det er lett å dulte borti ting mot en av sidene slaget. Ring rundt «JA» dersom dette er tilfelle.

9. **Tverrfaglig observasjon av orienteringsvansker** – er det gjort observasjoner under praktisk bistand, trening eller generell mobilisering hvor pasienten viser vansker med å orientere seg? Her kan det gjøres observasjoner i forbindelse med testingen eller bruke informasjon fra pasientens journal.

10. **Synsfeltsutfall** – Høyre og venstre øye testes for seg –dekk til det øyet som ikke testes. Testes uten brille. Sitt rett ovenfor pasienten. Be pasienten om å se på nesen din under hele undersøkelsen. Test ved hjelp av fingerbevegelse hvor du starter perifert og beveger deg mot midten. Test i fire kvadranter på hvert øye (oppe og nede på hver side, på hvert øye). Avstand ca en armlengde fra pasienten. Normalt synsfelt er 110^o ut mot siden, 60^o inn mot nesa, 60^o opp og 70^o ned. Hvis pasienten IKKE oppdager bevegelsen innenfor det som er normalt, ring rundt hvilket øye og mot hvilken side det gjelder. Om dette ikke er undersøkt og fulgt opp fra tidligere må pasienten henvises til optiker/fastlege/øyelege.

11. **Redusert oppmerksomhet (Neglekt)** – Testes med lesebrille på om den er tilgjengelig. Pasienten bes om å fylle ut alle hele hjerter. Pasienten begynner først med arket med hjerter under hverandre på en rekke for å sikre at de forstår oppgaven. Det er greit at de fyller ut feil, men skal vise at de forstår oppgaven. Deretter fyller de ut arket med alle hjertene. Arket skal være plassert rett foran pasienten med den store pilen i midtlinjen. Testen avbrytes etter tre minutter om pasienten ikke er ferdig. Skriv ned hvor lang tid pasienten brukte. Tell antall avkryssede hele hjerter og skriv det ned. 50 er maksimalt, ned til 42 er normalt. Ved manglende identifisering av hele hjerter til en av sidene kan det indikere romlig neglekt. Om pasienten krysser mange hjerter som har en åpning mot en av sidene kan det indikere objekt neglekt. Ved mistanke om neglekt eller redusert oppmerksomhet mot en side bør pasienten utredes for dette. Det krysses av JA til neglekt dersom det er tydelig sideforskjell.

12. **Gir uttrykk for nyoppstått dobbeltsyn** – spør om pasienten etter slaget opplever å se dobbelt når begge øynene er åpne. Ring rundt «JA» dersom dette er tilfelle, og henvis fastlege/øyelege dersom dette ikke undersøkt og fulgt opp fra tidligere.

13. **Gir uttrykk for problemer med dybdesyn** – spør om pasienten opplever problemer med dybdesynet eller romforståelse. Observer om pasienten har vansker med å beregne avstand til f eks. kaffekoppen eller dørhåndtak. Ring rundt «JA» dersom dette er tilfelle, og henvis til ergoterapeut/fastlege/optiker for videre undersøkelse om persepsjonsvansker.

14. **Unormal blikkbevegelse** –Horisontale øyebevegelser, voluntært eller reflektorisk. Ved unormale funn i ett eller begge øyne, eller ved en fiksert blikkdreining til siden, ring rundt «JA». Henvis til optiker eller øyelege ved mistanke om øyemotoriske problemer.

15. **Førerkort** – spør pasienten om han/hun har førerkort. Spør om pasienten har fått informasjon om midlertidig kjøreforbud. Dersom pasienten har synsfeltsutfall, dobbeltsyn eller nyoppstått redusert syn bør pasienten minnes om at de ikke kan kjøre bil før synet er vurdert. For mer informasjon se: https://helsedirektoratet.no/retningslinjer/forerkortveilederen

16. **Pasienten er informert om egen synsfunksjon** –ring rundt alternativ.

17. **Videre oppfølging av synsfunksjonen er avtalt** –Spesifiser hvem som har ansvar for oppfølging inkludert hva personen selv har ansvar for.
18. **Pasienten er informert om hvem som kan kontaktes hvis synsproblemer oppstår/vedvarer.**

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

NSD

Harald Hårfagres gate 29
N-5007 Bergen
Norway
Tel: +47-55 58 21 17
Fax: +47-55 58 96 50
nsd@nsd.uib.no
www.nsd.uib.no
Org.nr. 985 321 884

Helle Falkenberg
Institutt for optometri og synsvitenskap
Høgskolen i Buskerud
Postboks 251
3603 KONGSBERG

Vår dato: 09.07.2013 Vår ref:34930 / 3 / LT Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 02.07.2013. Meldingen gjelder prosjektet:

34930	*KROSS -Kompetanse, rehabilitering om syn og slag*
Behandlingsansvarlig	*Høgskolen i Buskerud, ved institusjonens øverste leder*
Daglig ansvarlig	*Helle Falkenberg*

Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 31.12.2014, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrin Segal
for Vigdis Namtvedt Kvalheim

Lis Tenold
Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77
Vedlegg: Prosjektvurdering

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 34930

Det gis skriftlig informasjon og innhentes skriftlig samtykke for deltakelse. Personvernombudet finner i utgangspunkt skrivet godt utformet, men forutsetter at følgende endres/tilføyes;
- setningen "Studien utføres i tråd med etiske retningslinjer......" endres til "Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste".

Personvernombudet legger til grunn for sin godkjenning at revidert skriv ettersendes personvernombudet@nsd.uib før det tas kontakt med utvalget (merk eposten med prosjektnummer).

Personvernombudet tar høyde for at det kan bli samlet inn og registrert sensitive personopplysninger om helseforhold, jf. personopplysningsloven § 2 nr. 8 bokstav c.

Prosjektet skal avsluttes 31.12.2014 og innsamlede opplysninger skal da anonymiseres. Anonymisering innebærer at direkte personidentifiserende opplysninger som navn/koblingsnøkkel slettes, og at indirekte personidentifiserende opplysninger (sammenstilling av bakgrunnsopplysninger som f.eks. yrke, alder, kjønn) fjernes eller grovkategoriseres slik at ingen enkeltpersoner kan gjenkjennes i materialet.

Prosjektet gjennomføres i samarbeid med Vestre Viken Helseforetak. Høgskolen i Buskerud er behandlingsansvarlig institusjon. Personvernombudet forutsetter at behandlings-/ansvarsfordelingen formelt er avklart mellom institusjonene. Vi anbefaler at det utarbeides en avtale som omfatter ansvarsfordeling, ansvarsstruktur, hvem som initierer prosjektet, bruk av data og eventuelt eierskap.

Det opplyses at Regional komité for medisinsk og helsefaglig forskning har vurdert prosjektet som ikke fremleggingspliktig jf. helseforskningsloven.

Torgeir Solberg Mathisen

3603 KONGSBERG

Vår dato: 01.11.2017 Vår ref: 56278 / 3 / HIT Deres dato: Deres ref:

Vurdering fra NSD Personvernombudet for forskning § 31

Personvernombudet for forskning viser til meldeskjema mottatt 29.09.2017 for prosjektet:

56278	*KROSS - K Kompetanse innen Rehabilitering om Syn og Slag i kommunen*
Behandlingsansvarlig	*Høgskolen i Sørøst-Norge, ved institusjonens øverste leder*
Daglig ansvarlig	*Torgeir Solberg Mathisen*

Vurdering

Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er meldepliktig og at personopplysningene som blir samlet inn i dette prosjektet er regulert av personopplysningsloven § 31. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling

Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:

- opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
- vår prosjektvurdering, se side 2
- eventuell korrespondanse med oss

Vi forutsetter at du ikke innhenter sensitive personopplysninger.

Meld fra hvis du gjør vesentlige endringer i prosjektet

Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet

Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

Ved prosjektslutt 20.12.2020 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Marianne Høgetveit Myhren

Hildur Thorarensen

Kontaktperson: Hildur Thorarensen tlf: 55 58 26 54 / hildur.thorarensen@nsd.no

Vedlegg: Prosjektvurdering

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 56278

Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivene er godt utformet.

Personvernombudet legger til grunn at forsker etterfølger Høgskolen i Sørøst-Norge sine interne rutiner for datasikkerhet. Dersom personopplysninger skal sendes elektronisk, bør opplysningene krypteres tilstrekkelig.

Questback er databehandler for prosjektet. Høgskolen i Sørøst-Norge skal inngå skriftlig avtale med Questback om hvordan personopplysninger skal behandles, jf. personopplysningsloven § 15. For råd om hva databehandleravtalen bør inneholde, se Datatilsynets veileder: http://www.datatilsynet.no/Sikkerhet-internkontroll/Databehandleravtale/.

Forventet prosjektslutt er 20.12.2020. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)
- slette digitale lydopptak

Vi gjør oppmerksom på at også databehandler (Questback) må slette personopplysninger tilknyttet prosjektet i sine systemer. Dette inkluderer eventuelle logger og koblinger mellom IP-/epostadresser og besvarelser.

Vurdering

Referansenummer

211810

Prosjekttittel

56278 KROSS - K Kompetanse innen Rehabilitering om Syn og Slag i kommunen.

Behandlingsansvarlig institusjon

Universitetet i Sørøst-Norge / Fakultet for helse- og sosialvitenskap / Institutt for optometri, radiografi og lysdesign

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Mathisen Torgeir, torgeir.solberg.mathisen@usn.no, tlf: 90673529

Type prosjekt

Forskerprosjekt

Prosjektperiode

02.09.2019 - 04.09.2020

Vurdering (2)

31.03.2020 - Vurdert

NSD har vurdert endringen registrert 31.03.2020.

Ny dato for prosjektslutt er satt til 04.09.2020.

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 31.03.2020. Behandlingen kan fortsette.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.
Lykke til videre med prosjektet!

Kontaktperson hos NSD: Karin Lillevold
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

12.10.2019 - Vurdert

BAKGRUNN
Prosjektet er tidligere meldt og vurdert av NSD, referansenummer 56278. Ny innmelding gjelder endring av prosjektet. Denne vurderingen erstatter den forrige vurderingen.

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 12.10.19, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD VESENTLIGE ENDRINGER
Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde:

https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html

Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 30.03.2020.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er

avsluttet.

Lykke til med prosjektet!

Kontaktperson hos NSD: Karin Lillevold
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

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TERMS AND CONDITIONS

May 19, 2022

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Quotation

Oxford Cognitive Screen (OCS)	£0.00
Language Selections UK English	£0.00
Support Documents OCS User Manual	£0.00
Total:	£0.00*

* Unless specified in the above list; this price may not include the cost of any additionally requested translations.

Form Responses

Intended Use

DO YOU INTEND TO DEVELOP AN ELECTRONIC VERSION (EPRO) OF THE LICENCED MEASURE? IF YOU ARE TRANSCRIBING PAPER-BASED COMPLETED QUESTIONNAIRE RESULTS TO AN ELECTRONIC RECORDS SYSTEM THEN PLEASE TICK NO. IF THE PATIENT / RESPONDENT / SERVICE USER IS COMPLETING THE QUESTIONNAIRE IN AN ELECTRONIC FORMAT THEN PLEASE TICK YES	No
Please Specify	
PLEASE INDICATE WHICH OF THE FOLLOWING BEST DESCRIBES YOUR ORGANISATION	Academic research - non funded or publicly funded
PLEASE INDICATE THE TYPE OF INTENDED USE OF THE PRO MEASURE	Descriptive study or survey
Please Specify	
PLEASE PROVIDE DETAILS OF THE PROPOSED USE. EXAMPLE: "MULTICENTER, RANDOMIZED,	We are working on a Norwegian project to enhance visual care after stroke in Norway. One of the interventions is to include an assessment of visual function in the stroke care services. We want a short assessment of visual

DOUBLE-BLIND, CONTROLLED PILOT STUDY TO ASSESS EFFICACY AND SAFETY OF [DRUG NAME] AS A THERAPY IN THE TREATMENT OF PATIENTS WITH [DISEASE]" IF YOU ARE REQUESTING THE LICENCE ON BEHALF OF ANOTHER PARTY E.G. A SPONSOR, THEN PLEASE TELL US ABOUT THIS HERE	acuity, visual field, eye movements and visual attention (neglect). We were recommended this test by Inge Wilms, and we believe the broken heart chart seems most appropriate. As we only want to use the heart chart, the Danish version will be suitable, but we are aware that a Norwegian version of OCS is being developed. If this vision test battery is suitable to identify vision problems after stroke, we want to use this in clinical work with patients (public health care) and education of health care personnel (interdisciplinary Master in vision rehabilitation).
STUDY PROTOCOL IDENTIFYING CODES, IF ANY	
START DATE (DD/MM/YYYY)	31/05/2020
IF YOU DON'T HAVE AN END DATE OR HAVE A VERY LONG-TERM STUDY PLEASE TICK THE BOX BELOW. IF NO END DATE IS SELECTED THEN CLINICAL OUTCOMES WILL INITIALLY GRANT A LICENCE FOR 3 YEARS, THAT CAN BE EXTENDED BY FURTHER AGREEMENT	✖
END DATE (DD/MM/YYYY)	30/09/2023
NUMBER OF PATIENTS / SUBJECTS. IF YOU ARE UNABLE TO DEFINE HOW MANY SUBJECTS YOU REQUIRE THE LICENCE FOR, THEN CLINICAL OUTCOMES WILL DEFAULT TO PROVIDING A LICENCE FOR 1000 SUBJECTS	300
I HAVE NO IDEA OF THE NUMBER OF PATIENTS/SUBJECTS	✖
HOW MANY TIMES WILL EACH PATIENT / SUBJECT COMPLETE THE PRO MEASURE	2
IF YOU DO NOT KNOW HOW MANY TIMES EACH PATIENT / SUBJECT WILL COMPLETE THE PRO MEASURE, THEN PLEASE TICK THE FOLLOWING BOX (IT WILL DEFAULT TO 2 USES PER PATIENT / SUBJECT)	✖

Organisation

Organisation Name	University of South-Eastern Norway
Organisation Type	University or other Academic Institution
Please tell us what type or organisation you represent	
VAT number (for organisations registered in the European union)	9908:911770709
How did you hear about us?	From Inge Wilms who has been working on the Danish version of OCS,

	and Nele Demeyere.

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Additional Translations

INTERVIEW GUIDE

We are interested in your experiences of vision care within stroke health services and how vision problems affects your daily activities. Please take all the time necessary for your answers.

Section I: Vision function today

1. How do you experience your vision now? Can you describe whether your vision has changed from what it was before your stroke?

Optional subquestions

I. How has your vision changed?
II. Do you need glasses or any other visual aids that you did not need before the stroke?
III. Have you got any previously diagnosed eye diseases? Please, describe the disease and if you need medication?

Section II: Vision function before the stroke and in the early acute phase

2. I would like you to remember the days near the onset of your stroke. Did you experience any visual symptoms at the time of your stroke?

Optional subquestions

I. What kind of changes in your vision did you perceive?
II. Can you remember specific events/problems when you first noticed?
III. Can you describe how your vision problems affected actions by the health care services related to the early stroke onset?

Section III: Vision care during the stay in the hospital stroke unit

3. If you think back at your stay in the hospital. Can describe your vision problems at the hospital, and whom you had contact with related to identifying your vision problems?

Optional subquestions

  I. Did you have contact with an ophthalmologist or other vision experts during your hospital stay?

4. Can you remember how your vision was tested in the hospital?

Optional subquestions

  I. Can you remember how the results of the vision tests were given to you, and how you experienced the information?
  II. Can you describe information of any follow-up of your vision problems, e.g. were you offered any vision rehabilitation, or advice related to your vision problems?

5. At the discharge from hospital, can you describe how your vision problems were addressed?

Optional subquestions

  I. Were you referred for any vision rehabilitation or other follow-up of your vision problems, if so, were where you referred?
  II. To what extent do you feel you were given sufficient information about your vision problems?
  III. What types of follow-up and outcomes were you given information about?

Section IV: Vision care in rehabilitation or municipal health care services

6. Can you describe how your visual problems has been followed up after your hospital discharge?

Optional subquestions

I. Can you describe what was done in the rehabilitation services?

II. Can you describe what was done in the municipal health care service?

7. Have you experienced any vision problems that were not detected at the hospital?

Optional subquestions

I. When and how did you become aware further vision problems?

II. What kind of vision problems?

8. From your experience since your stroke, to what extent would you have wanted help, information or support in relation to vision rehabilitation after you got home?

I. What help would you wish for?

II. What kind of information or support would have been necessary or helpful?

Section IV: Everyday life now

9. I would like you to tell me about how your vision problems after stroke have changed your life.
10. Overall, how are you today, xx days after your stroke?
11. Can you describe how your vision problems affects your daily activities?

Optional subquestions

I. Have you experienced any limitations caused by your vision problems, and if so, what kind?

II. In what way are you limited, and have you made any adaptations?

III. Do you experience any activities that now requires more time or that you have ceased to do because of your vision problems?

Section V: Information about vision problems

12. In your experience, have you received sufficient information about your vision problems after your stroke?

Optional subquestions

I. Can you describe what information you received about your vision problems and its management?
II. Do you remember any information about improvement, recovery or expected outcomes of your vison problem?
III. Can you describe any information or advice on how to manage and adapt to life with your vision problems, if so what kind?

13. Have you been given information about any user organisations such as the Norwegian Association for the Blind and Partially sighted, the Norwegian Stroke Association" or other?

Optional subquestions

I. If so, can you remember what kind of information did you receive?
II. Can you describe your experiences with the user organisations?
III. Have you received any information of possible vision rehabilitation services provided by for example Hurdal Syn og mestringssenter, Specialist/adult education centres or other rehabilitation centres?

Before we finish, are there any other topics or important aspects you want to add?

Thank you for sharing your experiences with me.

Barriers and facilitators to the implementation of a structured visual assessment after stroke in municipal health care services

Topic guide individual interviews. We are interested in your experiences of vision care within the municipal health services, as a part of the implementation of a structured visual assessment after stroke. Please take all the time necessary for your answers.

Section 1: Your role and tasks in stroke care

How do you experience your role and task in stroke care? Can you describe the stroke care in the municipal health services?

Optional subquestions

- Work place, education and experience
- Which part of municipal health care services do you work in?
- Where in the stroke care pathway do you provide your services to the stroke survivor?
- How are stroke survivors referred to your services?
- Can you describe what kind of health services do you provide to the stroke survivors?
- Are you a part of an interdisciplinary team?
    - If so, what is your responsibility within this team?
    - How is the team organised?
    - Which other professions do you work with?
    - Are you involved with working with the patients' individual rehabilitation plan?

Section 2: Experiences with the present practise of visual assessments and follow up of visual impairments

I would like you to consider todays practice. Can you describe the present practise of visual assessments and follow up of visual impairments? What are your experiences with assessment and follow up of vision impairments after stroke? Who would you consider is, or should be, responsible for vision assessments following stroke?

Optional subquestions

- If you assess vision, is it done systematically, or when you suspect visual impairments?
- Can you reflect on whether you consider visual assessment important?
- Related to the transfer of patients to you, do you have access to information about the visual function of your patients?
- If you do get information, can you describe who provides it (e.g. the hospital, service allocation office, general practitioner)?
- If you perform any visual assessments today, can you describe this in more detail?
- Do you use any vision assessment tools at present, if so please describe?
- If you are part of an interdisciplinary team, is visual function something you assess, or is this done by others (specify)?

Section 3: Experiences with assessment tools

If you use assessment tools, can you describe your experience of using them in your practise today? What tools do you use, and why do you use them?

Optional subquestions

- If you do not have an assessment tool for vision, do you have any suggestions to how an assessment tool for assessing visual function after stroke should be?
- Can you describe how you document results from standardised assessment tool?
- What are your thoughts on including a new vision assessment tool to your practise?
- What may, or may not, contribute to use of the tool? Can you give examples?

Section 4: Experiences with competence improvement and implementation

Thinking back to other competence improvements and implementation projects in your service. Are there things important to consider when implementing new vision routines?

Optional subquestions

- What do you consider important for including vision assessment and follow up for stroke survivors in your practise?
- Can you describe your experiences with earlier competence improvement or implementation projects in your practise?
- Can you tell if anything have influenced negatively on earlier implementation projects?
- What do you believe is important for this vision implementation project to succeed (Number of participants, follow up from project leaders….)?
- How can practitioners train and supervise their co-workers for sustaining the new practise?

Closure: Anything you wish to include that we have not discussed during the interview.

Workshop discussion

After being presented with preliminary results from the interviews the participants were asked for their views in a plenary discussion, with particular focus on strategies and suggestions for a successful implementation.

Implementation outcome: All stroke survivors should have their vision assessed and followed up if needed.

Optional subquestions

- When is the proper timing for the assessment?
- Who should perform the assessment?
- How can we secure proper follow up?
- How can you store the assessment in the electronic journal?
- Potential barriers for implementation
- Potential facilitators for implementation

Interview guide study 3

Short presentation of the study, and what the information collected in this focus group would be used for. Inform of the ethical considerations, that participation is voluntary and that it is possible to withdraw anytime. Information and getting consent to audio record. Ask if any questions before signing of the informed consent form.

Start audio recording

Theme	Question
Role and responsibility in stroke care	Which health care service do you work in? Workplace, profession and experience.
Introduction	Experiences with being involved in the KROSS KT project after the implementation. - How are your experiences of using the KROSS procedure? - How does the patient respond to the vision assessment? - What are the responsibility of your service related to vision care and rehabilitation after stroke - If this project should be repeated elsewhere, do you think your service should be included? - How are your experiences of your leader’s involvement in the KROSS KT project
Experiences with using the KROSS tool	Using the KROSS tool - Have you used the KROSS tool in practise? - If not, elaborate on why? - If yes, elaborate on how you use it? - Who does the vision assessment? (other than you? Profession/How many?) - Experiences of documenting vision assessment - Is it easy to find Previous KROSS assessments in the medical journal? - How do you document the findings? How do you store the assessment tool? Time - Approximately how much time do you use to perform a KROSS assessment? - Do you think the time it takes is acceptable? Complexity - Do you find perform the assessment difficult/easy? - How do you find the user manual? Reflections on adoption/non adoption - Insecurity of the assessment procedure? - Difficult to get in a routine? - Elaborate reasons why/why not
Experiences with the KROSS KT project	For those of you who participated in the KROSS workshop, how did you experience it?

	- Was there sufficient follow up and supervision after the workshop? - Do you think competence about vision is important for your profession and services? - What is important for you to continue/start to assess vision? - All things considered, has participation in the KROSS KT project been worth the effort? - For those not participating in the workshop, how are your experiences with the KROSS KT and how did you get involved in being an active user of the KROSS tool??
Practical organisation	- How do you organise the KROSS assessment, how is it organised in your service? - Do you use a stroke care pathway or written routine for stroke patients? -
External collaboration	- How do you inform other services about the vision assessment? - Have the KROSS KT project had any influence on how you plan further rehabilitation for your patients?
Finally	Are there anything you want to add to this discussion that we have not addressed in this focus group?

Forespørsel om deltakelse i forskningsprosjektet

«Kompetanse om rehabilitering om syn og slag»

Bakgrunn og hensikt

Dette er et spørsmål til deg om å delta i en studie for å undersøke pasienterfaringer knyttet til oppmerksomheten rundt synsforstyrrelser i slagenheten ved sykehuset. Vi ønsker å undersøke hvorvidt det er behov for ytterligere kartlegging og utredning av synsforstyrrelser blant slagrammede. Studiens hensikt er å styrke rehabiliteringstilbudet til slagrammede med synsforstyrrelser ved å gjennomføre et opplæringsprogram for ansatte som styrker synsundersøkelser ved slagenheten samt å videreutvikle systematiske rutiner for utførelse og oppfølging av resultatene.

Vi er opptatt av dine erfaringer relatert til sammenhengen mellom synsforstyrrelser og hjerneslag, og oppmerksomheten og rutiner rundt dette da du var på sykehuset og hvordan synsforstyrrelsene er blitt fulgt opp etter utskriving fra sykehuset. Videre ønsker vi å høre om synsforstyrrelsen påvirker dine muligheter til å utføre ulike dagligdagse aktiviteter.

Hva innebærer studien?

Du vil bli forespurt om å delta i et utdypende intervju. Intervjuet vil være samtalepreget og handle om temaer knyttet til dine erfaringer vedrørende synsforstyrrelser etter hjerneslaget, og oppfølgingen rundt dette på sykehuset og etter du ble skrevet ut. Intervjuene vil vare fra 30 til 45 minutter, og foregå der det er mest praktisk for deg. Det bes om tillatelse til å gjøre lydopptak av intervjuet. Etter at intervjuet er gjennomført vil dette bli skrevet ut. Når dette skrives ut fjernes alle gjenkjennbare opplysninger, slik at det kun er gjenkjennelig for deg og forskeren som samtaler med deg. Alle opplysninger du gir vil bli konfidensielt behandlet.

Mulige fordeler og ulemper

Det er ikke spesielle ubehag ved å delta i studien, men en ulempe kan være tiden selve intervjuet tar. Fordelen ved å delta er at dine erfaringer vedrørende oppfølgingen av dine synsforstyrrelser på sykehuset vil bli benyttet i et opplæringsprogram for ansatte ved slagenhetene med hovedmål å øke kompetansen og styrke rehabiliteringstilbudet til slagrammede med synsforstyrrelser. Dine erfaringer vil også bidra til økt kunnskap om behovet for kartlegging av synsforstyrrelser som en del av den helhetlige rehabiliteringen etter hjerneslag.

Deltakelse i denne studien innebærer å ta del i et kort intervju omtrent 3 måneder etter at du er kommet hjem fra sykehuset. Dersom du kan tenke deg å delta i studien, ber jeg deg om å skrive under på den vedlagte samtykkeerklæringen. Denne legger du i konvolutten som lukkes og leveres til en av personalet på avdelingen. Det ekstra informasjonsskrivet om studien kan du beholde. Du vil bli kontaktet av en av de tre forskerne i prosjektet omtrent 3 måneder etter at du er kommet hjem fra sykehuset for å avtale tid som passer for intervjuet. Våre navn finner du nedenfor. Vi er ansatt på Høgskolen i Buskerud ved Institutt for optometri og synsvitenskap og Institutt for sykepleievitenskap. Studien gjennomføres i samarbeid med sykehuset.

Hva skjer med informasjonen om deg?

Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Alle opplysningene vil bli behandlet uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger.

Forskningsresultatene vil bli publisert i nasjonale og internasjonale fagtidsskrift og på fagkonferanser. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres. Studien er beregnet avsluttet 30.12.2014, og identifiserbare personopplysninger vil da bli slettet.

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelige datatjeneste, og er vurdert av regional komité for medisinsk forskningsetikk, Sør-Norge. Prosjektet er finansiert av Helsedirektoratet og Høgskolen i Buskerud.

Frivillig deltakelse

Det er frivillig å delta i studien. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke til å delta i studien. Dette vil ikke få konsekvenser for din videre behandling. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Om du nå sier ja til å delta, kan du senere trekke tilbake ditt samtykke uten at det påvirker din øvrige behandling. Dersom du senere ønsker å trekke deg eller har spørsmål til studien, kan du kontakte prosjektleder Helle K Falkenberg på mobilnummer 98 49 99 20.

Vennlig hilsen

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Samtykke til deltakelse i forskningsprosjektet

«Kompetanse om rehabilitering om syn og slag»

Jeg er villig til å delta i forskningsprosjektet

(Signert av prosjektdeltaker, dato)

Jeg kan kontaktes på adresse og telefon:

Adresse: ……………………………………………………………………………

Telefon:…………………………………………………………………………..

Jeg bekrefter å ha gitt informasjon om studien

(Signert, rolle i studien, dato)

Høgskolen i Sørøst-Norge
Fakultet for Helse og Sosialvitenskap
Institutt for Optometri, radiografi og lysdesign

Forespørsel om deltakelse i forskningsprosjektet

«Et slag for syn»

Kompetanse innen Rehabilitering om Syn og Slag i Kommunen. KROSS-K

Bakgrunn og formål

Om lag 65 prosent av de som gjennomgår et hjerneslag får endringer i synsfunksjonen. Det kan være utfordrende å identifisere slike synsvansker for både helsepersonell og den slagrammede selv. Derfor er det en risiko for manglende oppfølging og rehabilitering for slagrammede med synsvansker. Noe som kan få konsekvenser for livskvalitet og utkomme av rehabiliteringen. Prosjektet søker å finne svar på om kompetanseheving hos helsepersonell i Kongsberg kommune, og innføring av et verktøy for å kartlegge synsfunksjonen (KROSS-K) etter hjerneslag, kan bidra til bedre oppfølging av synsfunksjonen for de slagrammede.

KROSS-K er et verktøy for å identifisere synsvansker etter hjerneslag utarbeidet ved Høyskolen i Sørøst-Norge. For opplæring i bruk av dette verktøyet er det planlagt et todagers opplæringsprogram og en veiledningsdag i praksis.

Denne studien er en del av et doktorgradsprosjekt finansiert av Extrastiftelsen med Blindeforbundet som søkerorganisasjon. Stipendiaten er ansatt på Institutt for optometri, radiografi og lysdesign ved Høyskolen i Sørøst-Norge. Helse og omsorgsavdelingen i Kongsberg Kommune er en sentral samarbeidspartner i tillegg samarbeides det med pasientorganisasjonene Norsk Forening for Slagrammede og LHL Hjerneslag.

Vi har spurt din leder om deltagere med innsikt i tjenestene og organiseringen rundt slagrammede i Kongsberg Kommune og derfor får du denne henvendelsen.

Hva innebærer deltakelse i studien?

Å delta i denne studien innebærer å bidra i inntil tre intervjuer som varer mellom 30 – 60 minutter. Intervjuet vil gjøres der det passer deg. Det første intervjuet vil foregå i forkant av prosjektperioden, det andre i etterkant av prosjektperioden. Ved behov for videre oppfølging av prosjektet kan det gjennomføres et tredje intervju noe tid etter prosjektperioden for å fange opp eventuelle varige endringer.

Temaet for intervjuene er organisering av tjenestene til pasienter med gjennomgått hjerneslag med spesielt fokus på synsfunksjon. Spørsmålene vil omhandle hva du vurderer som ditt ansvarsområde i oppfølging av synsvansker etter hjerneslag, hvilket ansvar har andre yrkesgrupper, hva fungerer godt i dag og hvilke utfordringer ser du for god oppfølging. Hva kan være eventuelle hindre for at kartleggingsverktøyet skal fungere i kommunen?

Intervjuene tas opp på lydfil og transkriberes (skrives ut til tekst).

Hva skjer med informasjonen om deg?

Alle personopplysninger vil bli behandlet konfidensielt. Innholdet i intervjuene avidentifiseres når de analyseres og publiseres, slik at det ikke er mulig å kjenne igjen hvem som har gitt informasjonen. Informasjonen lagres på en sikret database på høyskolens server. Liste over navn på deltagere i studien lagres i et låst skap på et låst kontor. Kun prosjektleder og veileder vil ha tilgang til datamateriale som kan identifisere deltagerne.

Prosjektet skal etter planen avsluttes 20.12.2020 Da vil datamaterialet anonymiseres helt og lydopptaket slettes. Kun den transkriberte teksten uten personidentifiserende informasjon vil lagres videre for bruk i eventuelle videre publikasjoner.

Frivillig deltakelse

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Dersom du ønsker å delta eller har spørsmål til studien, ta kontakt med Torgeir Solberg Mathisen på tom@usn.no eller på tlf: 90673529
Studien er meldt til Personvernombudet for forskning, NSD - Norsk senter for forskningsdata AS.

Samtykke til deltakelse i studien

Jeg har mottatt informasjon om studien, og er villig til å delta i:

(Signert av prosjektdeltaker, dato)

Med vennlig hilsen

Torgeir Solberg Mathisen Stipendiat	Helle K Falkenberg Hovedveileder	Grethe Eilertsen og Heidi Ormstad Biveiledere

Universitetet i Sørøst-Norge

Forespørsel om deltakelse i forskningsprosjektet

«Et slag for syn»

Kompetanse innen Rehabilitering om Syn og Slag i Kommunen. KROSS-K

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å øke kompetansen om synsproblemer etter hjerneslag i kommunen. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Bakgrunn og formål
Om lag 65 prosent av de som gjennomgår et hjerneslag får endringer i synsfunksjonen. Det kan være utfordrende å identifisere slike synsvansker for både helsepersonell og den slagrammede selv. Derfor er det en risiko for manglende oppfølging og rehabilitering for slagrammede med synsvansker. Noe som kan få konsekvenser for livskvalitet og utkomme av rehabiliteringen. Prosjektet søker å finne svar på om kompetanseheving hos helsepersonell i Kongsberg kommune, og innføring av et verktøy for å kartlegge synsfunksjonen (KROSS-K) etter hjerneslag, kan bidra til bedre oppfølging av synsfunksjonen for de slagrammede.

KROSS-K er et verktøy for å identifisere synsvansker etter hjerneslag utarbeidet ved Universitet i Sørøst-Norge. For opplæring i bruk av dette verktøyet er det planlagt et todagers opplæringsprogram og en veiledningsdag i praksis.

Denne studien er en del av et doktorgradsprosjekt finansiert av Extrastiftelsen med Blindeforbundet som søkerorganisasjon. Stipendiaten er ansatt på Institutt for optometri, radiografi og lysdesign ved Universitetet i Sørøst-Norge. Helse og omsorgsavdelingen i Kongsberg Kommune er en sentral samarbeidspartner i tillegg samarbeides det med pasientorganisasjonene Norsk Forening for Slagrammede og LHL Hjerneslag.

Hvem er ansvarlig for forskningsprosjektet?
Universitetet i Sørøst-Norge er ansvarlig for prosjektet. Prosjektleder Torgeir Solberg Mathisen

Hvorfor får du spørsmål om å delta?
Du har deltatt på KROSS opplæringen, og denne studien er et ledd i evalueringen av denne opplæringen. Derfor får du denne henvendelsen. Kontaktinformasjon har vi fått fra din leder.

Hva innebærer deltakelse i studien?
Dersom du velger å delta i studien vil det innebære å bidra i et fokusgruppeintervju med varighet mellom 30 – 60 minutter. Intervjuet vil gjøres på et avtalt sted. Intervjuet gjøres som et ledd i å evaluere prosjektet «Et slag for syn».

Temaet for intervjuene er organisering av tjenestene til pasienter med gjennomgått hjerneslag med spesielt fokus på synsfunksjon. Mer spesifikt om deltagelse i prosjektet på noen måte har endret din praksis når det gjelder synsproblemer etter hjerneslag. Hva har bidratt til at endringer har blitt gjort eller ikke blitt gjort. Er det behov for ytterligere fokus på synsproblemer etter hjerneslag i praksis og i tilfelle hvordan kan vi oppnå dette?

Intervjuene tas opp på lydfil og transkriberes (skrives ut til tekst).

Det er frivillig å delta
Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Innholdet i intervjuene avidentifiseres (navn og kjennetegn fjernes) når de analyseres og publiseres, slik at det ikke er mulig å kjenne igjen hvem som har gitt informasjonen. Informasjonen lagres på en sikret database på universitetets server. Liste over navn på deltagere i studien lagres i et låst skap på et låst kontor slik at personidentifiserbare data er adskilt fra innholdet i intervjuene.

Kun prosjektleder og veiledere vil ha tilgang til datamateriale som kan identifisere deltagerne. Ingen andre er involvert i behandlingen av dine opplysninger.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes 20.12.2020 Da vil datamaterialet anonymiseres helt og lydopptaket slettes. Kun den transkriberte teksten uten personidentifiserende informasjon vil lagres videre for bruk i eventuelle videre publikasjoner.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra *[sett inn navn på behandlingsansvarlig institusjon]* har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med: Torgeir Solberg Mathisen på tom@usn.no eller på tlf: 90673529

- Universitetet i Sørøst-Norge ved Torgeir Solberg Mathisen tom@usn.no 90673529.
- Vårt personvernombud: Paal Are Solberg epost: personvernombud@usn.no
- NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon: 55 58 21 17.

Med vennlig hilsen

Torgeir Solberg Mathisen Stipendiat	Helle K Falkenberg Hovedveileder	Grethe Eilertsen og Heidi Ormstad Biveiledere

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Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet «Et slag for syn», og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐ å delta i fokusgruppeintervju

(Signert av prosjektdeltaker, dato)

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Implementing structured vision assessment in stroke care services: The KROSS knowledge translation project
Dissertation for the degree of PhD

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Torgeir Solberg Mathisen

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