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RESEARCH ARTICLE

Barriers and facilitators to implement e-mental health for depression and anxiety in patients with macular oedema: a qualitative interview study among stakeholders

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ABSTRACT

Purpose: Mental health problems are common in patients with macular oedema, who receive repeated intravitreal injections with anti-vascular endothelial growth factor. A guided internet-based self-help intervention, called E-PsEYE, was developed to reduce these problems. Patients were referred by their ophthalmologist to follow E-PsEYE individually at home, guided by a social worker from low vision services. Since e-mental health is new in this setting and professionals were collaborating in a novel way, barriers and facilitators during implementation and for future scale-up were evaluated.

Methods: Semi-structured interviews were performed with patients (n=8), ophthalmologists (n=4), heads of ophthalmology departments (n=2), doctor's assistants (n=3), social workers (n=6) and managers from low vision services (n=2), and representatives from a health insurer (n=2). Data were analyzed using a thematic approach.

Results: Both patients and professionals were satisfied with the potential efficiency and added value of the intervention. They indicated that sufficient digital skills in patients and social workers, information technology (IT) support and adding personalized face-to-face contacts, could facilitate implementation. However, a high workload within the different settings (i.e., hospital and low vision services) and the reluctance of both patients and professionals in focusing on mental health problems could hinder implementation. Moreover, evidence on cost-effectiveness and incorporation in current guidelines were expected to be important for reimbursement and scale-up.

Conclusions: Both on the individual level and in the interaction between stakeholders and their context, different important barriers and facilitators were expressed. To facilitate the use of E-PsEYE in practice, strategies that focus on these aspects could be implemented, e.g. healthcare providers could discuss and normalize mental health complaints and their digital skills could be supported.

Introduction

Due to a growing and ageing population globally, it is estimated that the prevalence of moderate to severe visual impairment will increase by almost half to 535 million people by the year 2050, of whom 61 million people will be legally blind.[1] While visual impairment can occur at any age, it is estimated that people aged 50 years or older (i.e., 24% of the global population) account for approximately 70% of the visually impaired population[1]

Retinal exudative diseases, or macular oedema, are a common cause of visual impairment in people aged 50 years and older.[2,3] It refers to conditions where fluid infiltrates the centre of the retina, which may have an inflammatory, degenerative or vascular origin. Common causes are neovascular macular degeneration, diabetic macular oedema and retinal vein occlusion. Research has shown that elevated levels of vascular endothelial growth factor (VEGF) are important in the pathogenesis of these diseases.[4] VEGF is produced by various cells in the retina and is an important factor for homeostasis in the eye.[4,5] Exudative retinal diseases are characterized by macular leakage leading to cystoid macular oedema, and ultimately to loss of visual acuity.[5]

Current treatment for exudative retinal diseases are anti-VEGF injections.[5-8] These (monthly) intravitreal injections inhibit vessel growth and prevent leakage of blood vessels in the eye.[7,8] Multiple studies have shown that anti-VEGF injections are in many cases effective in halting disease progression.[7,8] However, mental health problems are expressed among various patients.[9]

Studies have shown that about one in three patients who receive anti-VEGF treatment [10-12] or even up to half of the patients [9,13] experience at least mild symptoms of depression and/or anxiety. This can be caused by concerns about treatment effectiveness, fear of going blind, experienced limitations in daily life activities due to vision loss and experienced loneliness.[9,13,14]

Depression is a major cause of disability, regardless of the degree of vision loss or medical problems due to the eye disease.[15] Mild symptoms of depression and anxiety could already lead to health decline, further disablement, reduced quality of life and increased mortality.[16,17] Also, they create an economic burden due to increased healthcare utilization and productivity losses.[18,19] Approximately 13% of excess costs associated with vision loss are caused by depression.[20]

Research has shown that e-mental health (i.e., using the internet and other technologies to deliver mental health treatment) can be a cost-effective way to reduce depression and anxiety.[21,22] E-mental health is considered essential for reducing the demand for healthcare and its economic burden.[23] While younger people have more experience and show more interest in using e-health,[24] it also has major potential for older adults who make up the majority of visually impaired people and increasingly show interest in using technology.[25] In addition, the visual disability puts a particular challenge on the usability and feasibility of receiving e-mental health. Therefore, good accessibility (e.g. basic/intuitive navigation options, audio support, magnification options) and proper guidance during the intervention are of the utmost importance.[9]

An e-mental health intervention that was designed for older adults (≥ 50 years) who receive anti-VEGF injections is 'E-PsEYE'.[26] This cognitive behavioural therapy (CBT)-based

intervention was based on a guided self-help intervention for patients from low vision service organizations, and found effective as part of a stepped-care program.[27] It was modified for patients who receive anti-VEGF treatment and implemented as a guided e-mental health intervention, with specific adjustments to increase usability and feasibility.[9]

Since e-mental health is completely new in this setting, this study aims to evaluate barriers and facilitators for the implementation and future scale-up of E-PsEYE from various stakeholders' perspectives. A thorough understanding of the barriers and facilitators at individual, healthcare and system levels could contribute to the refinement of E-PsEYE and stimulate its implementation in daily practice.

Methods

Study design

Semi-structured interviews were conducted based on purposive sampling among a diverse group of stakeholders, including patients, professionals and representatives of a large health insurance company, to increase data triangulation while determining barriers and facilitators for implementing E-PsEYE in daily practice. The study protocol was approved by the Medical Ethics committee of Amsterdam University Medical Centres – location VU University Medical Centre (registration number: 2016.515) and conducted according to the Declaration of Helsinki and its later amendments. All participants provided written informed consent.

Intervention

E-PsEYE is a guided internet-based intervention for patients 50 years or older, who receive anti-VEGF treatment for retinal exudative diseases, who have at least mild symptoms of depression and/or anxiety (i.e., a score of five or higher on the Patient Health Questionnaire (PHQ)-9,[28] and/or a score of three or higher on the Hospital Anxiety and Depression Scale – Anxiety (HADS-A)).[29] A stepped-care model with three steps is used to offer the intervention: (1) providing information and psychoeducation; (2) when depression and/or anxiety symptoms persist, guided CBT is offered supported by social workers from low vision service organizations; and (3) when symptoms still persist, patients are referred to their general practitioner. The intervention is offered via the internet on a platform called 'MindDistrict' (Dutch platform for e-mental health www.minddistrict.com). The intervention contains nine modules. The first module is a welcome module in which patients receive information about retinal diseases, the effects of anti-VEGF injections and psychoeducation. If symptoms of depression and/or anxiety persist after this first module, eight follow-up modules are provided, aimed at: (1) dealing with uncertainty surrounding anti-VEGF injections; (2) dealing with depression and anxiety; (3) dealing with fatigue and stress; (4) participating in pleasurable activities; (5) replacing self- defeating thoughts with healthier thoughts; (6) identifying and replacing negative thought patterns; (7) identifying and replacing negative communication styles; and (8) setting goals for the future. E-PsEYE contains several exercises for patients to perform, e.g. in the second and third module patients keep a diary on mood and stress. The duration of the intervention differs between patients, but takes a maximum of three months. If necessary, an information technology-trainer from a low vision service organization provides computer training for

participants prior to the intervention. Guidance during the intervention is provided by trained social workers from a low vision service organization. When participants finish a module, social workers receive a notification by e-mail. Within a week, participants receive feedback from the social worker on the exercises they performed. Feedback is provided digitally or by telephone, depending on the preference of the patient. The intensity of guidance depends on patients' needs, but has a maximum of 2.5 hours in total. Social workers are trained in delivering guidance (6 hours in total), consisting of a workshop on providing the online intervention and the role as coach (2 hours), and practicing in two patients while being supervised (4 hours). Also, peer support sessions are organized.[26] Ophthalmologists and doctor's assistants from Dutch hospitals' are expected to inform patients about the opportunity to follow E-PsEYE and refer them to low vision services when patients express an interest.

Recruitment of participants

A purposive sampling technique was used. A diverse group of patients were recruited to participate in the interviews via the ongoing randomized controlled study on the cost-effectiveness of E-PsEYE.[26] After patients provided written informed consent, they were contacted by telephone by the research team to determine eligibility and an interview was scheduled. Patients were eligible if they received anti-VEGF injections, were 50 years or older and had experience with mental health issues (at present or in the past). In addition, a diverse group of other stakeholders were recruited by the research team from three large Dutch hospitals, two nationally operating low vision service organizations and a health insurer. Professionals were eligible to participate if they were currently operating in the field of anti-VEGF treatment and/or treatment and care related to that. At the beginning of each interview, participants were asked for their relevant demographic data, after which an introduction to E-PsEYE was provided.

Data collection

The theoretical framework of Fleuren et al. was used, which represents the main stages in innovation processes and related categories of determinants, and is based on several other theories and models [30]. The guiding principle of the framework is that there are four main stages in innovation processes: (1) dissemination; (2) adoption; (3) implementation; and (4) continuation. Each of these phases can be seen as points at which the desired change may (not) occur. The transition from one stage to another can be affected by several determinants which are categorized into: (1) characteristics of the innovation; (2) characteristics of the (future) adopting persons/users (i.e., care providers); (3) characteristics of the organization; and (4) characteristics of the socio-political context. Based on these determinants, we created our topic list (Appendix 1) to determine experienced barriers and facilitators for the implementation of E-PsEYE in daily practice. The topic list was tailored to each type of stakeholder.

Data analysis

Interviews were recorded, transcribed verbatim and anonymized. The framework method was used for the thematic analysis, which is a systematic method of categorizing and organizing data. A combined approach of

deductive and inductive reasoning was used. The analysis took place in four phases. Firstly, transcripts were read. Secondly, codes were identified and organized based on a subset of the data in a codebook (Appendix 2), categorized according to the Fleuren et al. framework.[30] Thirdly, all data was coded using the codebook. Lastly, codes were organized into themes. Atlas.ti software was used for the data analysis.

Results

Participant characteristics

A total of 28 interviews were conducted between June 2018 and April 2019 with patients (n=8), managers/directors (n=2) and social workers (n=6) who worked for a low vision service organization, ophthalmologists (n=4), doctor's assistants (n=4) who worked in a hospital with patients who received anti-VEGF injections, department heads from the Ophthalmology department (n=2) and representatives of a large health insurance company (n=2, Table 1). Both patients from the intervention group (n=4) of the E-PsEYE randomized controlled trial (RCT) and patients from the control group (n=4) were included. The two employers from a health insurance company were interviewed in a duo interview. *The interviews took on average 30 minutes (range 21 to 54) for patients and on average 34 minutes (range 20 to 62) for professionals.* The interviews were conducted face-to-face and took place at the workplace of the professionals and employees of the health insurance company. The interviews with patients took place at the outpatient Ophthalmology department and were conducted by three experienced researchers (*HA, FN and WS).*

Table 1: Participant characteristics (N=28)

Characteristics patients (N=8)	
Gender	
Male	3
Female	5
Age (years)	
50-60	3
60-70	2
70-80	2
>90	1
Eye disease*	
Neovascular macular degeneration	3
Diabetic macular oedema	3
Macular oedema due to retinal vein occlusion	3
Current living status	
Living together with partner	5
Living alone	3
Characteristics professionals (N=20)	**N**
Gender	
Male	6
Female	14

Occupation	
Manager/director	2
Social worker	6
Ophthalmologist	4
Doctor's assistant	4
Department head	2
Health insurance company representative	2
Years active in current role	
0-5	10
5-10	7
>10	3

* multiple diseases possible

Barriers and facilitators

Six main themes were identified: (1) suitability of the intervention for the target population; (2) suitability of the intervention within the hospital; (3) suitability of the intervention within low vision services; (4) support for the intervention; (5) scientific evidence of the intervention; and (6) suitability of the intervention for other target populations. These six themes and accompanying subthemes are shown in Table 2.

Table 2. Overview of experienced barriers and facilitators

Themes	Subthemes
1. Suitability of the intervention for the target population	Accessibility (+,-) Perceived burden (-) Content (+,-)
2. Suitability of the intervention within the hospital	Workload (-) Role and task ophthalmologist (+,-) Role and task doctor's assistant (+,-) Incorporation in Dutch Ophthalmology Guidelines
3. Suitability of the intervention within low vision services	Workload (-) Role and task social worker (+,-) Organizational goals (+)
4. Support for the intervention	Support among patients (+,-) Support among ophthalmologists (+,-) Support among doctor's assistants (+,-) Support among social workers (+,-)
5. Scientific evidence of the intervention (+,-)	
6. Suitability of the intervention for other target populations (+,-)	

(-): barrier; (+): facilitator

Theme 1: Suitability of the intervention for the target population

A common view among respondents was that the suitability of E-PsEYE for patients was either a facilitator or barrier for successful implementation, on the basis of the following three subthemes: (1) accessibility; (2) perceived burden; and (3) content.

Overall, both patients and professionals described E-PsEYE as accessible. Especially since the intervention could be used at home and at any moment in time. No travelling was required, which is especially useful for visually impaired older adults who have difficulty traveling and also saved them money and time. Still, concerns were expressed about some patients having no access to a computer. And even if they had access, lack of digital skills was often reported to be a barrier. Nevertheless, almost all patients who used the E-PsEYE intervention in the RCT, found the program easy and pleasant to use. IT support was necessary for some patients. A social worker mentioned that the amount of people with digital acquaintance is increasing, which makes E-PsEYE suitable for use in future. Also, an ophthalmologist and multiple doctor's assistants reported that many older adults use computers, making e-health accessible to them.

In addition, several patients and professionals indicated that it is important to consider the specific needs of the individual patient while offering support during E-PsEYE. Some patients preferred face-to-face contact over digital communication with a social worker. They indicated that internet-based treatment for psychological complaints can be experienced impersonal or distant. A patient noted the lack of face-to-face contact could lead to untruthful answers and less involvement from patients. Face-to-face interactions allow for the exchange of non-verbal cues such as facial expressions, body language, and gestures. These cues play a crucial role in conveying emotions, intentions, and nuances that may be lost in digital communication. Social workers confirmed the importance of face-to-face contact with patients to build a confidential relationship and discuss mental health.

The perceived burden for patients to follow the intervention was sometimes high. Some patients mentioned that filling out the diary every day and answering questions, related to the exercises during each module, can be challenging and, therefore, burdensome. It could withhold people from completing the intervention. However, most patients agreed that the intervention overall was not very demanding.

> *'I don't think that it's a burden, since people are able to choose when to work on it. … I think that as long as people have the freedom to be able to decide, it shouldn't be very burdensome.'* (patient)

The content of E-PsEYE was considered to be suitable and advantageous by most patients. Patients mentioned the added value of useful advice on how to deal with complaints related to the injections, inducing feelings of support and reassurance. They gained insight into the anti-VEGF treatment and the possible effects of the treatment. Several patients indicated the exercises taught them how to convert their negative mindset to a positive mindset. Some patients could not fully identify with the examples that were given, while others thought they were very helpful.

'It's indeed very informative, if you learn about what other people have been through. Then you might think: 'I've had the same experience. Or I haven't had the same experience.' (patient)

Some patients expected more information about the eye condition, anti-VEGF injections and their effects. They would have liked to receive more information about for instance the medications used for the injections and how to deal with vision loss (e.g. keeping a driver's license). Other patients stated the information was too theoretical and was too generally focused on mental health.

'The focus lies too much on the theory of a person who has never had injections. ... I'd like to know, that man or woman who has had an injection, has he or she felt sad? And if so, why did they feel sad?' (patient)

Theme 2: Suitability of the intervention within the hospital

Several barriers and facilitators on the suitability of E-PsEYE within the hospital setting were mentioned: (1) workload; (2) role and task of the ophthalmologist; (3) role and task of the doctor's assistant; and (4) incorporation in Dutch Ophthalmology guidelines.

Workload was reported to be of great importance when implementing E-PsEYE. Generally, the workload of ophthalmologists and doctor's assistants was said to be too high, due to various causes. Almost all respondents indicated that the ophthalmologist lacks time to refer patients to low vision service organizations, which could become a barrier when implementing E-PsEYE. Some doctor's assistants pointed out they already had many tasks and the intervention is supplementary, increasing the likelihood of being omitted, once implemented in daily practice. Both patients and professionals pointed out that a flyer could be helpful.

'The workload is sometimes really high … yes, this might be a complication, I'll be honest. Because obviously those are things that you decide to leave out then. We're just thinking: come on, quickly on to the next patient.' (doctor's assistant)

Most ophthalmologists believe it is part of their role and task to focus on patients' mental health. However, for many it is not a priority. Some pointed out they paid little to no attention to patients' psyche, as did other colleagues in the field. According to some, experience and age may influence this.

'It requires a certain maturity as a doctor. Because in the first couple of years, your work is very technical, and you're looking at the medical aspects in particular. And then at the end of your training, you start to wonder about how it might affect the patient personally.' (ophthalmologist)

Half of the ophthalmologists indicated a strong doctor-patient relationship was of importance for patients to be able to talk about their mental health and be willing to follow up on a referral. However, they indicated that this is not always the case. In addition, some professionals from low vision services stated that, in spite of many efforts in the past, ophthalmologists are still not inclined to refer patients to low vision services, which may also play a role for E-PsEYE.

'For ophthalmologists referring patients is still an issue. … Often, we have patients of whom I think: this is really bad, why wasn't this patient referred to us earlier on?' (social worker)

Almost all doctor's assistants agreed that patients would more likely follow up on a referral when it came from an ophthalmologist compared to them. However, many doctor's assistants still thought they could play a role in informing patients about E-PsEYE, since they see patients more regularly and already ask how they are doing.

> *'We see patients very often. Almost more often than the ophthalmologist him/herself. Every four to six weeks. So at a certain point, you do create a better relationship.'* (doctor's assistant)

Incorporation in Dutch Ophthalmology guidelines was said to be important for the implementation of E-PsEYE. A department head indicated that a lot of professionals and patients read the Dutch Ophthalmology guidelines, which may help to create awareness and stimulate implementation of E-PsEYE. An ophthalmologist noted that the old guidelines delineate that exclusively patients with a Snellen visual acuity of 0.3 and lower are acknowledged for a referral to low vision services.[31] However, this interviewee believed that vision should not be a criterion for a referral.

> *'Relative vision loss or the concern about vision loss is much more comprehensive than an absolute number.'* (ophthalmologist)

Still, this interviewee described that for many ophthalmologists this may be a barrier for implementing E-PsEYE in patients who receive anti-VEGF injections, who often have better visual acuity.

Theme 3: Suitability of the intervention within low vision services

The suitability of E-PsEYE within low vision service organizations was another main theme, which can be divided in three subthemes: (1) workload; (2) role and task of the social worker; (3) organizational goals.

All social workers from low vision service organizations indicated a high workload causing stress, which could negatively influence the implementation of E-PsEYE. One social worker explained that the extra burden of E-PsEYE could cause her to not read the answers of patients thoroughly and respond too quickly, which could influence the effectiveness of the intervention. Many anti-VEGF patients currently do not receive low vision service support, so this would be a new patient group for social workers and add to their workload. Several social workers pointed out they already have many tasks, that they have to give priority.

> *'It is the general opinion amongst low vision service providers that it only becomes more and more and more.'* (social worker)

The high workload was said to be a consequence of staff shortage. A manager and social worker indicated that it was difficult to find employees. On the other hand, a social worker indicated that with E-PsEYE more patients could be treated, because the treatment took less time compared to face-to-face interventions, and traveling was not necessary.

When asked if they felt confident about their skills and knowledge to carry out the intervention, almost all of the social workers responded positively. On the other hand, they expected that for some low vision service staff it may be difficult to deviate from the old guidelines, stating that exclusively patients with a Snellen visual acuity of 0.3 and lower should be given access to low vision services (similar to the believes of some ophthalmologists). Several social workers indicated that e-health should

become a routine part of their work in order for E-PsEYE (and other e-health interventions) to work. A social worker pointed out that the intervention shows similarities with usual tasks in daily practice. However, it is still considered a major change which is expected to be hard for some social workers. A manager indicated that knowledge and experience with internet-based care is often lacking within low vision services. Age was distinguished by multiple social workers to be coherent with digital skills. It was said that older employees tend to experience more difficulty with using a computer. Education and support were mentioned to be of great importance in helping employees work with the online system.

According to managers of low vision service centers, affiliation with main goals of the organization is essential for successful implementation. E-PsEYE seems to fit with their goals to provide assistance to all visually impaired people in the Netherlands, the development of arranging patients into target groups and the interest in working together with hospitals. Moreover, managers indicated that the intervention is future-oriented, given the aspect of digitalization. The low vision service organizations have a specific focus on offering more e-health to follow current demands and possibilities and improve efficiency of care.

> *'We are inviting professionals to think about an increase of possible e-health applications in the future.'* (manager)

Theme 4: Support for the intervention

Several barriers and facilitators on support for implementing the intervention were mentioned, which can be divided in four subthemes: (1) support among patients; (2) support among ophthalmologists; (3) support among doctor's assistants; and (4) support among social workers.

Almost all patients supported the use of the intervention in practice, facilitating the implementation of E-PsEYE. However, some patients thought that other patients might not acknowledge the severity of their vision loss, since they are focused on curing their eye disease or keeping it steady. Therefore, they might not associate themselves with being a patient of a low vision rehabilitation organization and may not be inclined to seek assistance there.

> *'People will think: 'I don't have it that bad'. That happens to most, although they are blind and bump into everything. But that's human, to underestimate your own situation, while in reality it might actually be that bad.'* (patient)

On the other hand, patients with very low vision were expected to be more reluctant and less willing to participate in an online intervention, because it may be harder for them to follow it. Moreover, multiple stakeholders addressed the concern that some patients might not recognize or acknowledge their reduced mental health. A social worker described that society expects individuals to exhibit strength and perseverance. Therefore, they might not be inclined to follow the intervention.

All interviewed ophthalmologists showed support for E-PsEYE and were willing to implement the intervention. However, a director and ophthalmologist indicated that in order for them to really do so, it should be very clear to ophthalmologists that mental health problems are prevalent in this patient group and that recognizing these complaints and referring patients to appropriate care is part of their task.

> *'It would be a good thing to bring that to the attention of the ophthalmologist, so*

that they'll be more inclined to say: that makes sense. That also doesn't cost me any effort and not a lot of time. And I do give that extra bit of service, or that extra bit of care.' (ophthalmologist)

Doctor's assistants all supported E-PsEYE and were willing to take part in the referral of patients. One assistant was convinced colleagues would feel confident in offering the intervention, while another assistant predicted resistance, because of a lack of knowledge about mental health and the fear to inquire about this topic

Also, most of the social workers showed support for implementing E-PsEYE. Digital expertise of the social worker was reported to be a prerequisite for support. Regardless of the increased normalization of digital contact in social work, resistance is still expected.

'I'm older and not really handy around computers. I've also felt resistance against computers for years, but eventually all of that can be blamed on fear.' (social worker)

Theme 5: Scientific evidence of the intervention

The scientific evidence for the implementation of E-PsEYE in daily practice was another main theme. Employees of the health insurance company indicated that scientific evidence was needed for them to reimburse the intervention beyond the research setting, in which both effectiveness and cost-effectiveness should be taken into account. Also, the intervention needs to add value for the patient, the ophthalmologist and the insurance company. The benefit for the patients were clear, namely improvement of quality of life and mental health. However, the ophthalmologist has to spend time on the intervention, while his/her benefits are less clear.

'What you're technically saying is that a new intervention is added, that needs financial resources. Things that aren't written down in current guidelines or protocols. What you then need, is a truly good story about why we would reimburse that. Why would you want to have extra costs for the sole purpose of making a patient happier? That is not our job in the Netherlands. Our job is to keep the costs down to make healthcare affordable, so that requires a good story.' (representative of the health insurance company)

A head of department indicated it is useful to prove that E-PsEYE prevents patients from going to a psychologist or psychotherapist later on, which eventually lowers costs. This was also pointed out by a director of a low vision service organization. They added that effectiveness from the trial is very important to motivate both patients and professionals to use E-PsEYE.

Theme 6: Suitability of the intervention for other target populations

The last theme covers the suitability of the intervention for other target populations. Multiple stakeholders indicated that E-PsEYE could be extended to other target populations, when it proves to be cost-effective. For instance, a department head indicated that the intervention could be extended to patients with other eye diseases. A social worker thought that E-PsEYE could also be very valuable to younger patients. Within their low vision services, they notice that many younger patients have a tendency to discontinue treatment. By means of e-health they aim to connect to the needs of this age group. Also, a patient pointed out E-PsEYE could also

be implemented for people with other diseases who deal with insecurities, because it teaches people to cope with negative thoughts.

> *'Of course I would recommend it, I would recommend it to everyone. Insecurities don't necessarily have to do with eye diseases. ... For example when people have heart diseases and have to rehabilitate. The intervention can help with that too. I mean, the intervention helps people cope with negative thoughts.'* (patient)

Discussion

This study identified several important barriers and facilitators that need to be taken into account when implementing e-mental health for patients (50 years and older) with macular oedema who receive anti-VEGF injections. Overall, the E-PsEYE intervention, that was specifically developed to reduce depression and anxiety in this target population, was expected to be suitable for the different settings (i.e., hospital and low vision service organizations) and all stakeholders showed support for its implementation. Several stakeholders even saw possibilities to use a similar intervention for other target populations, i.e., patients with other eye diseases or disabilities and younger patients. However, sufficient evidence on the cost-effectiveness of the intervention and the gains for patients, professionals and health insurers for embedment within current reimbursement, are crucial to facilitate implementation. Also, e-health may not be suitable for all patients and a high workload of ophthalmic and low vision service personnel could hinder implementation.

Both patients and professionals praised the efficiency of e-health (e.g. flexibility in usage, no travel time or expenses) and the added value of increased collaborations between professionals, which has been reported by others in different settings.[32] However, the digital skills of both patients and professionals need to be taken into account. While these skills seem to be increasing,[25] e-mental health might not be suitable for all patients. It is important to consider factors related to their technology adoption, such as age (i.e. older patients tend to have more difficulty using e-health), interest in acquiring new knowledge, motivation to use technology, need for social interaction and communication preferences.[25] Wentzel et al. argue that to benefit from this type of care and optimize cost-effectiveness, treatment modalities (e.g. digital vs. face-to-face contacts, number and intensity of contacts) should be personalized to fit a patient's abilities, needs, and preferences.[33] In addition, IT support seems to be crucial [32] and face-to-face contacts at the beginning or during the intervention may have added benefits. Such contacts may improve the involvement of both patients and social workers and may help them to build a confidential relationship. Moreover, social workers may need training and supervision to be able to have the proper skills and confidence to offer this type of blended support,[32] which is very new in this field. Currently, there seems to be a discrepancy between managers setting e-health as a priority within their organization and the reluctance of several healthcare providers in offering this type of support.

The workload of both ophthalmic and low vision service personnel is high, which could hinder the implementation of E-PsEYE. On the other hand, E-PsEYE could have a preventive effect and reduce healthcare costs in the long

run, lowering the burden on ophthalmic care. Therefore, sufficient evidence on its cost-effectiveness is crucial to facilitate implementation. Also, many ophthalmologists are not trained and expected to be reluctant in giving attention to a patient's psyche. Previous studies have shown that two in three eye care practitioners do not aim to detect symptoms of depression in their patients.[34,35] Especially, those who think depression is harmless and untreatable, feel less confident and perceive more barriers, are less likely to attempt to detect depression.[34,35] This may be improved by integrating this subject into their training and improving awareness on the work floor.[36] Depression and anxiety have a considerable negative impact on a person's health[37] and, therefore, should get the appropriate attention of specialists working with an inherently vulnerable population.

The tendency of patients to not acknowledge their mental health problems and their reluctance to identify themselves with patients who need low vision services is also an important finding. Patients describe a burden in addressing their mental health and receiving assistance. Studies in adults with visual impairment confirm experienced difficulties in being open about mental health complaints [38] and sometimes even find that patients tend to deny psychological distress.[39,40] Patients with macular oedema are confronted with uncertainty about anti-VEGF treatment effectiveness and can experience recurrent loss experiences.[13] They need to adapt to and acknowledge their disability repeatedly during the treatment period that can go on for years. Problems tend to increase when patients gradually adjust to their reduced vision and, therefore, do not translate their disability into a need for intervention.[41] Healthcare providers should be aware of this, discuss and normalize mental health complaints and offer or refer patients to low intensity treatment options, such as E-PsEYE, to help them overcome difficulties in acknowledging mental health problems and receiving support. Both ophthalmic and low vision service personnel could be supported in this on the work floor and during training.[36] They could use motivational interviewing techniques to motivate patients to receive support.[42] Also, it might be worth considering offering mental health support directly at the ophthalmology department within the hospital setting.

Strengths and limitations

This study took multiple relevant stakeholders perspectives into consideration (i.e., patients, eye care practitioners, low vision service personnel and employees from a health insurance company) important for the success and uptake of the E-PsEYE intervention. The exploratory, qualitative design allowed for in-depth insights, contributing to the richness of the data. The framework from Fleuren et al. was used in coding the interviews and identifying facilitators and barriers for implementation.[30] Still, the results must be interpreted with caution since the sample might not reflect the whole target population. Those who participated in the interviews were possibly more likely to be interested in the potential of e-mental health and may have provided socially desirable answers.

Conclusion

Overall, there was support amongst stakeholders for the implementation of E-PsEYE within the different settings (i.e., hospital and low vision

services). They were satisfied with the efficiency (e.g. flexibility in usage, no travel time or expenses) and the added value of the intervention and collaborations between professionals. Evidence on the cost-effectiveness, sufficient digital skills in both patients and social workers, IT support, and adding a possibility for personalized face-to-face contacts, were mentioned as being essential. Moreover, the reluctance of both patients and professionals in focusing on mental health problems could receive proper attention in education and care. E-PsEYE may help bridge the current gap between mental and ophthalmic care. Future cost-effectiveness evaluation of E-PsEYE is needed, as well as a tailored implementation plan addressing identified barriers.

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Appendix 1: Topic guide interviews with patients

1. Determinants related to the innovation

1.1 Is enough information about the intervention known/described?

1.2 Does the current way of working need to be changed to implement the intervention?

1.3 Should/can the intervention be adapted to better suit the local situation?

1.4 What are possible benefits for the healthcare provider (e.g. time savings, cost savings)?

1.5 What is the extent to which research has shown that the intervention has added value for the patient?

1.6 What is the extent to which the risk of not offering the intervention plays a role (e.g. increased mental health complaints, increased healthcare use)?

1.7 How many patients per year may benefit from the intervention? Is it worth it?

2. Determinants related to the adopting health professional (cure/care)

2.1 What kind of support does the care provider experience from colleagues from the same professional group to implement the intervention?

2.2 What kind of support does the care provider experience from colleagues from other professional groups to implement the intervention (e.g. ophthalmologists, optometrists, nurses, low vision service personell)?

2.3 What kind of support receive healthcare professionals from senior management with regard to the implementation of the interention?

2.4 To what extent has the care provider the skills/knowledge needed to carry out the intervention (e.g. offering digital support)?

2.5 To what extent does the intervention fit with the care provider's conception of his/her work? Are there conflicting goals between different professional groups?

2.6 To what extent does the care provider expect the patient to cooperate/want to participate in the intervention? It is not about actual cooperation, but about the expectation of the care provider.

2.7 To what extent does the care provider expect the patient to be satisfied with the innovation? It is not about actual satisfaction, but about the expectation of the care provider.

3. Determinants related to the organization

3.1 Who decides to introduce the innovation: centrally (top management) or decentrally (professionals)?

3.2 What is the decision-making process like for these kinds of innovations?

3.3 Is there a formal endorsement of the innovation by management (e.g. by including innovation in policy)?

3.4 How is the collaboration between departments/institutions that are involved in the innovation(e.g. low vision service centres and ophthalmology departments)?

3.5 How high is the employee turnover rate and occupancy rate, and what are the consequences?

3.6 What is the existing expertise at departmental level with regard to the innovation?

3.7 What are the logistical procedures surrounding the renewal (e.g. patient route or waiting times)?

3.8 How many people will work with the innovation?

3.9 How much money is available to perform the renewal/ how will costs be covered?

3.10 Are (material) facilities and administrative support present for the implementation of the renewal (e.g. equipment, digital platforms)?

3.11 How much time available (in addition to current work)?

3.12 Is there a clear point of contact (also for implementation)?

4. Determinants related to the socio-political context

4.1 What is the willingness of the patient to cooperate in the implementation of the innovation?

4.2 What is the extent to which the patient is aware of the (health) benefits for himself as a result of the innovation?

4.3 Whate are the patient's doubts about the care provider's expertise with regard to the implementation of the innovation?

4.4 What are extra costs that the patient must incur when working with the innovation?

4.5 Does the patient experience extra mental or physical strain when working with the innovation.

4.6 What does the patient see as possible disadvantages of the treatment?

Appendix 2: Codebook

1. Determinants related to the innovation	
1.1 Intervention mode (+)	• Independent of place and time • From home, no traveling time and expenses • Independently from others (stimulates independence) • More anonymous than face-to-face treatment • Patient can quit at any time and work on it later on • Constant contact between social worker and patient • Quick response from the social worker
1.2 Intervention mode (-)	• Patients have to wait a couple of days to receive feedback • Patients experience following the intervention as a burden • The referring ophthalmologists needs to be aware of the intervention
1.3 Lack of face-to- face contact (-)	• Absence/lack of non-verbal communication • Lack of personal contact • The social worker overlooks signals of the patient • The social worker cannot go into depth with patients • The social worker cannot provide suitable answers • The social worker can be more confronting one on one

1.4 Content fits the target population (+)	• The content fits the target population • The content does not patronize • The content is clear • Independence is stimulated • Self-reflection is stimulated • Converting a negative mindset to a positive one is stimulated • Information can be used in daily life
1.5 Content fits the target population (-)	• Underestimation of the intensity of E-PsEYE • Exercises may provoke resistance • Not all themes fit the target population
1.6 E-health suitable for the target population (+)	• The intervention suits current society and time
1.7 E-health suitable for the target population (-)	• Patients have different preferences • Patients have to identify themselves with someone who needs this type of care • Patients do not want to write their story down on paper • Patients have to know how to use the computer
1.8 Symptoms suitable for prevention (+)	• Helps with dealing with anxiety and depression in an early stage
1.9 Symptoms suitable for prevention (-)	• Symptoms of depression and anxiety have to be present, but in moderation • Irrelevant for patients without depression • Patients in the early stage of eye diseases are often not inclined to receive mental healthcare • Treatment with E-PsEYE needs to be defined to certain eye conditions
1.10 Suitibility (+)	• Suitable to other target populations • Suitable to younger patients
1.11 Evidence (+)	• E-PSEYE improves quality of life of patients • Value for the ophthalmologists • Value for health insurance company
1.12 Evidence (-)	• The required evidence depends on the goal of the intervention • Medical evidence is needed for investment • Takes years to prove medical effectiveness • Healthcare processes have to be created • The intervention adds extra costs in the beginning • Evidence that the intervention eventually lowers healthcare costs • Outcome measures need to be in line with the interests of the different stakeholders

2. Determinants related to the adopting health professional (cure/care)		
2 Clinician factors	Workload social worker(+)	• Family time and work can be combined
2 Clinician factors	Workload social worker (-)	• High workload • Low priority due to large caseload • Lack of time • Social worker will not get all work done
2 Clinician factors	Skills social worker (+)	• Social worker has experience with mental health problems
2 Clinician factors	Skills social worker (-)	• Social worker has to get used to supporting the new target population • Social worker doesn't ask patients enough about given answers
2 Clinician factors	Digital skills social worker (-)	• Difficult to work with a digital intervention; e-health is new, not much experience/knowledge • Mainly the older generation not digitally skilled • Social worker has to get used to the intervention
2 Clinician factors	Digital skills social worker (+)	• Young professionals have IT skills
2 Clinician factors	Role and job description social worker (-)	• Does not fit the job description • E-health can be an addition to tasks, but is not seen as a core task • Low IT skills
2 Clinician factors	Role and job description social worker (+)	• E-health fits the job description
2 Clinician factors	Support in low vision service organizations (+)	• Support from colleagues and manager • Social worker communicates with behavioral scientist • Limited support from colleagues
2 Clinician factors	Role and job description ophthalmologist (+)	• Referral to low vision service organization fits the job description of the ophthalmologist • Involvement of the ophthalmologist is a good thing • Differences between ophthalmologists on focusing on mental health • The ophthalmologist knows patients well because of the long treatment • Patients are inclined to take advice from the ophthalmologist

2 Clinician factors	Role and job description ophthalmologist (-)	• Referral does not fit the job description of the ophthalmologist: high workload, lack of time, quality of life not addressed • Ophthalmologist not able to detect mental problems
2 Clinician factors	Unclear when the ophthalmologist may/needs to refer (-)	• Difficult to refer patients, because patients do not have severe visual impairments (no clear guidelines) • Difficult to close the gap between the medical part and psychological part • Ophthalmologist have to standardize offering E- PsEYE (patient has to know E-PsEYE exists)
2 Clinician factors	Perceived effectiveness (-)	• Effects unknown until later

3. Determinants related to the organization		
3. Organizational factors	Affiliation with core values of the low vision service organization (+)	• E-health is a core value • Minddistrict platform already in use • Adjustment of the organization • Easy to declare
3. Organizational factors	Affiliation with core values of the low vision service organization (-)	• E-health is still in its infancy • There is no contract with Minddistrict
3. Organizational factors	Inflow of patients (+)	• More patients, work and money necessary due to the inflow of patients
3. Organizational factors	Inflow of patients (-)	• Capacity and material shortage due to the inflow of patients
3. Organizational factors	Workforce (-)	• Low workforce • Staff turnover • Reorganization
3. Organizational factors	Differences between organizations (-)	• Different methods and approaches • Operational differences
3. Organizational factors	Differences within organizations (-)	• Differences within different locations of low vision service organizations
3. Organizational factors	Billable hours (-)	• Wish for billable hours

3. Organizational factors	Support for the intervention in the organization (+)	• Support for the intervention among professionals
3. Organizational factors	Support for the intervention in the organization (-)	• Not all professionals support the intervention
3. Organizational factors	Attention for psychological problems (-)	• For social workers, ophthalmologists, patients and managers

4. Determinants related to the socio-political context		
4. Context	Reimbursement E-PsEYE (+)	• From 2020, there will be differentiation within the health insurance company
4. Context	Reimbursement E-PsEYE (-)	• Who will pay? • If the health insurance company will reimburse: patients have an eye condition, but need mental healthcare. From which savings will they reimburse E-PsEYE?
4. Context	Role/support department of social work (+)	• Quality assurance • Engaging the whole department
4. Context	Role/support social work department (-)	• Quality assurance • Engaging the whole department
4. Context	Role/support low vision service	• Quality assurance • Engaging the whole department
4. Context	Role/support low vision service organisation department (-)	• Quality assurance • Engaging the whole department
4 Context	View of the health insurance company on e-health (-)	• Unclear whether the health insurance company will reimburse E-PsEYE
4. Context	Vision health insurance company on the new target group (-)	• Unclear whether the health insurance company will reimburse E-PsEYE

4. Context	Motivation of the patient (+)	• Patients need to be motivated • Patients need to be able to decide whether they want to follow E-PsEYE
4. Context	Stigma attached to complaints (-)	• Addressing psychological complaints is new for older adults/elderly • The intervention should not be called 'rehabilitation'

5. Determinants related to facilities needed to implement the innovation		
5. Facilities	Method book (-)	• Intervention needs to fit and be taken up into the method book/curriculum
5. Facilities	Operational conditions (-)	• Content and form clear: ready to implement • Funding support services • Description knowledge/skills employee
5. Facilities	(-) Project manager/	• There must be a project manager for the implementation
5. Facilities	Affiliation with Dutch Ophthalmology Guidelines (-)	• The intervention needs to affiliate with the new Dutch Ophthalmology Guidelines • Worries about vision loss are more comprehensive than a number (the guideline for referral of 0,3 is not relevant)