Reading aids in low vision rehabilitation of older adults

An integrative literature review

Ville Rissanen

jamk.fi

Description

Author Rissanen, Ville	Type of publication Bachelor's Thesis	Date December 2020
		Language of publication: English
	Number of pages 66	Permission for web publi- cation: x

Title of publication **Reading aids in low vision rehabilitation of older adults** An integrative literature review

Degree programme Rehabilitation Counselling

Supervisors Karapalo, Teppo; Kurunsaari, Merja

Assigned by -

Abstract

The aim of the thesis was to investigate factors related to the use of reading aids in low vi-sion rehabilitation of older adults. The objective of the thesis was to synthesise research data on the topic of reading aids in low vision rehabilitation of older adults and compare the findings in relation to the integrated people-centred eye care model promoted by the World Health Organization.

An integrative review of the literature was chosen as a method in order to gain insight into the outcomes of interventions involving the use of reading aids in low vision rehabilitation of older adults and evaluate the extent to which they were integrated and people-centred in their approach. The research was conducted unaffiliated in an independent manner.

The research data were retrieved from three electronic databases (Cochrane Reviews, ProQuest Central and Scopus). The data were comprised of eight primary studies, the ori-gins of which were in six countries. The quality of data was assessed with critical appraisal tools from the Joanna Briggs Institute. The quantitative data were tabulated, analysed and described using narrative integration, after which findings were compared with the strate-gic approaches of the integrated people-centred eye care model in a categorical manner.

The thesis presented a synthesis on how reading aids are included in low vision rehabilita-tion of older adults and which factors make it integrated and people-centred. It appeared that strategic integrated and people-centred approaches featured to a certain extent in data, but the results may not be generalisable for their differences in study methods and main focus on only one eye disease. Implications for future research included more robust and comparable study methods to be implemented. As for practice implications, there were elaborated methods of low vision assessment to be utilised.

Keywords/tags (subjects) Low vision, rehabilitation, older adults, reading aids, people-centredness

Miscellaneous (Confidential information)

jamk.fi

Kuvailulehti

Tekijä(t) Rissanen, Ville	Julkaisun laji Opinnäytetyö, AMK	Päivämäärä Joulukuu 2020
	Sivumäärä 66	Julkaisun kieli Englanti
		Verkkojulkaisulupa myönnetty: x

Työn nimi **Lukemisen apuvälineet heikkonäköisten ikääntyneiden kuntoutuksessa** Integroiva kirjallisuuskatsaus
Tutkinto-ohjelma Kuntoutuksen ohjaaja (AMK)
Työn ohjaajat Karapalo, Teppo; Kurunsaari, Merja
Toimeksiantaja(t) -

Tiivistelmä

Opinnäytetyön tarkoituksena oli selvittää, mitkä tekijät vaikuttavat heikkonäköisten ikääntyneiden lukemisen apuvälineiden avulla tapahtuvaan kuntoutukseen. Opinnäytetyön tavoitteena oli löytää tietoa lukemisen apuvälineiden käyttöön liittyvistä tekijöistä suhteessa Maailman terveysjärjestö WHO:n integroituun, ihmiskeskeiseen silmätautien hoitomalliin.

Opinnäytetyössä etsittiin integroivan kirjallisuuskatsauksen kautta tietoa heikkonäköisten ikääntyneiden lukemisen apuvälineprosesseista ja siitä, kuinka integroituja ja ihmiskeskeisiä ne ovat toteutustavoiltaan. Opinnäytetyö toteutettiin itsenäisesti ilman toimeksiantajaa.

Katsauksen aineisto haettiin järjestelmällisesti kolmesta sähköisestä tietokannasta (Cochrane Reviews, ProQuest Central ja Scopus). Aineisto koostui kahdeksasta julkaisusta, joiden tutkimukset sijoittuivat kuuteen eri maahan. Alkuperäistutkimusten laatua arvioitiin hyödyntäen Joanna Briggs -instituutin kriittisen arvioinnin tarkistuslistoja. Määrällinen aineisto taulukoitiin, analysoitiin ja kuvattiin narratiivisen integraation kautta, jonka jälkeen tuloksia verrattiin suhteessa silmätautien hoitomallin strategian mukaisiin luokkiin.

Kirjalllisuuskatsaus antoi kuvan siitä, miten lukemisen apuvälineet ovat osa heikkonäköisten ikääntyneiden kuntoutusta, ja niistä tekijöistä, jotka tekevät siitä WHO:n silmätautien hoitomallin mukaista. Katsauksen perusteella vaikutti siltä, että malli esiintyy aineistossa osittain, mutta tulosten yleistettävyyttä heikensivät erot tutkimusmenetelmissä sekä aineiston yksipuolisuus silmätautien suhteen. Oli pääteltävissä, että alan tutkimus hyötyisi vahvemmista ja vertailukelpoisemmista tutkimusmenetelmistä. Tutkimustuloksista saatiin tarkennuksia tapoihin toteuttaa heikkonäköisten apuvälinesovituksia.

Avainsanat (asiasanat) Heikkonäköisyys, kuntoutus, ikääntyneet, lukemisen apuvälineet, ihmiskeskeisyys
Muut tiedot (salassa pidettävät liitteet)

Contents

Figures

Tables

1   Introduction

It is a truth universally acknowledged that, irrespective of their fortunes, people irrevocably age. Bearing in mind this notion, it becomes increasingly clear that one of the inevitabilities of life for everybody will include being deeply entrenched in the process of aging, sooner or later. Yet nobody is an island in the grand scheme of things. Living in a seemingly ever-aging society as Finland, there seems to be a growing challenge waiting to be solved in terms of making the social and health care system cope with a potential influx of older people into service provision in the future. According to the latest official Finnish forecast, the projection for older adults aged 65+ and their share of the population is estimated to steadily rise in the next decades from the current level of around 22% (OSF 2019, 3).

The World Health Organization (WHO) offers some sobering facts in relation to health and aging. It is not only that populations are aging worldwide, but there is also evidence of them having functionally limiting conditions as continually as before. Most of these conditions are noncommunicable, and in high-income countries they tend to cause more harm especially among older people. However, there is no typical older adult when it comes to health issues; rather, the intertwining of biological and chronological age and its impact on life is highly individual. Yet it seems there is nothing random about the effects of aging, as they derive from many biological, social and economical factors. (WHO 2017.)

Unfortunately, age-related eye diseases become more prevalent as people grow old. They may ultimately result in vision impairments, which are known to reduce quality of life, cause depressive symptoms and affect personal independence (Goldstein, Massof, Deremeik, Braudway, Jackson, Kehler, Primo & Sunness 2012, 1028). However, there are means for alleviating the repercussions associated with conditions that cause low vision. For example, the use of optical reading aids as part of rehabilitation in near-vision related tasks has been found to be effective common practice (Virgili, Acosta, Bentley, Giacomelli, Allcock & Evans 2018, 14). Overall, the aim of low vision services is to respond and fulfil the needs of their clients with appropriate and measured professional efforts (Lueck 2004, 5).

The author of the present study has a fairly extensive background in the field of vision impairment and blindness, having previously worked in special education for children with vision impairments and lately in tertiary level hospital-based rehabilitation services for adults with vision impairments. The role of a low vision therapist assessing for individual needs in reading aids, among many other things, at an outpatient eye clinic ultimately became so intriguing that the topic for the thesis was quite easy to outline. Essentially, it seems as though there is an inherent need to incorporate more evidence-based methods into service provision, since the field of low vision rehabilitation has to a certain extent been known for its shortcomings in terms of both conducting effective research and applying its findings into practice (Binns, Bunce, Dickinson, Harper, Tudor-Edwards, Woodhouse, Linck, Suttie, Jackson, Lindsay, Wolffsohn, Hughes & Margrain 2012, 36-37).

Therefore, the present study aims to investigage the use of reading aids in low vision rehabilitation of older adults. The perspective chosen for this task is people-centred and integrated, as there is strong evidence in favour of catering for individual healthcare needs of people and their families in a wider context than is currently being utilised (WHO 2015, 12). It is to be hoped that, in addition to older adults with low vision themselves, personnel working with the use of reading aids in low vision rehabilitation services would also benefit from the findings that are unearthed as a result of the study.

2   Vision impairment

It is estimated that globally there are over 2.2 billion people who are visually impaired. Over half of them are deemed to have an undiagnosed eye condition or one that could have been preventable. Two of the most common causes for vision impairment and blindness worldwide are cataracts and uncorrected refractive errors. (WHO 2019c.) In Finland and other high-income industrialised societies, however, the most frequent causes for vision impairments primarily stem from the result of aging. Eye conditions such as age-related macular degeneration (AMD), glaucoma and diabetic retinopathy tend to become more prevalent as people age. (Ojamo 2019, 33;

WHO 2019c.) In 2018, AMD counted for 64.3% and glaucoma for 12.5% in all re-
ported new vision impairment cases across all ages in Finland (Ojamo 2019, 33).

2.1 International Classification of Diseases: Vision impairment

According to the International Classification of Diseases (ICD) 10 classification cur-
rently in use, visual impairment is defined in terms of distance visual acuity deficien-
cies and/or visual field deficits (See Table 1). Thus, if distance visual acuity with best
possible correction irreversibly falls below 0.3 in the better seeing eye when using
the decimal notation, the individual in question will be classified as having moderate
visual impairment. Furthermore, if distance visual acuity is below 0.05, the individual
will be classified as being blind. As for central visual field restrictions, there is a crite-
rion for blindness in case of central visual field being less than 10° in radius in the
better seeing eye (category 3), whereas for low vision no such definition has been
described. (WHO 2016a.)

Table 1 Visual impairment including blindness ICD-10

Category	Presenting distance visual acuity	
	Worse than:	Equal to or better than:
0 Mild or no visual im-pairment		6/18 3/10 (0.3) 20/70
1 Moderate visual im-pairment	6/18 3/10 (0.3) 20/70	6/60 1/10 (0.1) 20/200
2 Severe visual impair-ment	6/60 1/10 (0.1) 20/200	3/60 1/20 (0.05) 20/400
3 Blindness	3/60 1/20 (0.05) 20/400	1/60* 1/50 (0.02) 5/300 (20/1200)
4 Blindness	1/60* 1/50 (0.02) 5/300 (20/1200)	light perception
5 Blindness	No light perception	
9	Undetermined or unspecified	
	* or counts fingers (CF) at 1 metre	

Note. Data retrieved from Visual impairment including blindness ICD-10 (WHO 2016a).

In the present study visual impairment excluding blindness will be interchangeably
referred to as *low vision*, as is common in the field. However, it must be noted that

there exists no thoroughly acknowledged single definition for low vision (Virgili et al. 2018, 14), owing to the fact that visual impairment terminology has chiefly evolved in the course of time from definitions concerning blindness (Corn & Lusk 2010, 5). A fitting example of this is the above-mentioned lack of definition for central visual field losses in relation to visual impairments excluding blindness.

The aforementioned way of defining visual impairment has been more or less similar since the 1970s. However, changes are forthcoming. According to the ICD-11 classification (see Table 2), due to come into effect in January 2022, vision impairment ought to be categorised in two groups, which represent distance and near vision correspondingly. (WHO 2019a.) In this manner, when visual acuity falls below certain parameters, distance vision impairment will be classified as follows:

- mild   <0.5
- moderate   <0.3
- severe   <0.1
- blindness   <0.05.

As for near vision impairment, near visual acuity that is worse than N6 or M8 when assessed at 40 cm with an existing correction will be classified as mild vision impairment. When using the decimal notation in reading charts, the equivalent for values N6 or M 0.8 translates to 0.5 (n.b. in this connection N refers to a letter size, M is a metric unit, and both are used in near-vision test charts). In addition, a central visual field less than 10° in radius in the better eye is set to continue to fit the criteria for blindness (category 4). (WHO 2019a.)

Furthermore, the ICD-11 is expected to include definitions for impairments of functional vision in the following areas: contrast vision, colour vision and light sensitivity (WHO 2019a.) Only colour vision has previously been included in the ICD-10. However, at this point of time there is no clear indication yet of how these functions are to be exactly assessed in a clinical setting, that is, what kinds of tests and parameters should be utilised.

Table 2 Vision impairment including blindness ICD-11

Category	Presenting distance visual acuity	
	Worse than:	Equal to or better than:
0 No vision impairment		6/12 5/10 (0.5) 20/40
1 Mild vision impairment	6/12 5/10 (0.5) 20/40	6/18 3/10 (0.3) 20/70
2 Moderate vision impairment	6/18 3/10 (0.3) 20/70	6/60 1/10 (0.1) 20/200
3 Severe vision impairment	6/60 1/10 (0.1) 20/200	3/60 1/20 (0.05) 20/400
4 Blindness	3/60 1/20 (0.05) 20/400	1/60* 1/50 (0.02) 5/300 (20/1200) or counts fingers (CF) at 1 metre
5 Blindness	1/60* 1/50 (0.02) 5/300 (20/1200)	Light perception
6 Blindness	No light perception	
9	Undetermined or unspecified	
Category	Presenting near visual acuity	
	Worse than N6 or M 0.8 with existing correction	

Note. Data retrieved from Vision impairment including blindness ICD-11 (WHO 2019a).

Clearly, there has been no specific mention of near vision deficits or above-mentioned functional impairments in the ICD-10. The introduction of such categories in the ICD-11 will probably have a considerable effect on low vision rehabilitation of older adults, since there is evidence of near visual acuities being lower than distance readings particularly in macular diseases which reduce central vision (Wilkinson 2010, 262). Similarly, reduced contrast sensitivity is known to seriously affect reading ability in many eye conditions, among other things (Flom 2004, 44).

Moreover, it seems the new category of mild vision impairment will be a crucial one here, as it can be expected to introduce growing numbers of older people into service provision. The mild segment has previously not been classified as being visually impaired. Semantically, there seems to be slight changes due as well: ICD-11 uses *vision* impairment instead *visual* impairment, to be precise. Overall, it seems as though the future will present new scenarios for low vision rehabilitation because of these

changes in the ICD classification. The present study will make use of the ICD-11 as a manner of defining vision impairment and blindness for research purposes as well as accommodating to future professional requirements.

2.2   Vision loss

According to the International Classification of Functioning, Disability and Health (ICF) by WHO, vision loss can be differentiated in at least four different ways. First of all, there are organ-level ocular changes that can be either anatomical or structural (e.g. diseases, disorders). Secondly, functional changes may occur at the organ level. These may be referred to as visual functions, the defects of which are called impairments. The two remaining aspects have got more to do with the individual, however. Out of these, functional vision is a term used to describe the abilities that an individual has in performing independent living skills. And lastly, one may be disabled, not being able to participate as freely as possible because of one's vision loss. In this respect, these defects may lead into various social and economic repercussions for the affected individual. (Visual Standards 2002, 2.) To elaborate, vision loss as described here is often viewed as referring to adventitious vision impairments, that is, previously normal-sighted people experiencing them (Corn & Lusk 2010, 10).

Vision itself can be defined by three different ranges: normal vision, low vision (or vision impairments) and blindness, as defined by international disease classifications. Visual functions such as visual acuity and visual field can be put to quantitative assessment, typically one eye at a time. Visual abilities, however, refer to the individual. Some of the aspects related to the lack of abilities caused by visual loss can be measured, such as reading speed, whereas others, such as reading enjoyment, in the lesser degree. (Visual Standards 2002, 4-5.) It is worth noting that low vision or blindness are visual limitations that in principle cannot be corrected by eyeglasses or surgical procedures, as they are irreversible in that sense (Fraser 1997, 80). The present study will primarily concentrate on low vision reading aids as its main focus, the use of which is dependent on remaining eyesight, but low vision rehabilitation is inclusive of clients with blindness as well. However, the use of terms in the field of vision

impairments can be slightly contentious, with different disciplines choosing to utilise terms in deviating manners for their own service provision (Corn & Lusk 2010, 12).

Since the present study is interested in older adults as a target population, it is relevant to reflect on the intertwined specifics of aging and vision loss. First and foremost, age-related changes in vision are typical for advancing years. This is chiefly due to the fact that eye structures age anatomically, resulting in poorer visual acuity that is typically evidenced by a loss of refraction. Additionally, the amount of light that reaches the retina gradually wanes over the years. Older people are affected by the decreased visual acuity especially in conditions characteristic of dim lighting and low contrasts. Other age-related issues that hamper vision are often found in the following areas, typically worsening over time: accommodation (focusing at various distances); contrast sensitivity (ability to see objects from their background); visual field (peripheral in particular); colour discrimination (especially between darker colours); and adaptation (adjustability to differences in lighting conditions). (Watson & Echt 2010, 871-876.)

It is evident that vision loss can have a tremendous effect on the lives of older people. Griffin-Shirley and Bozeman (2016, 4-6) have inferred that, because of vision loss, older adults can become more susceptible to falls, more likely to be socially isolated and skipping communal activities, and more inclined to feeling depressed and losing confidence, which can all result in mental health problems. The fear of blindness in particular can be a major theme for many during the onset of vision impairment. It is these physical and psychosocial repercussions that are of considerable concern in low vision rehabilitation, and the aim is to lessen the overall impact of vision loss on people's quality of life (Watson & Echt 2010, 880).

3   Low vision rehabilitation

Low vision rehabilitation is a collective term used for low vision services provided by multidisciplinary teams seeking to aid people with vision impairments through various evidence-based means. It is a discipline that emphasises visual functions, particularly the ways in which they are assessed and trained, in order to aid people in

effective ways so that they can continue to use their functional vision to the best of their abilities. (Wolffe 2010, 731.) On the whole, there is a lot of diversity in the field, and the present study can only try to make a limited presentation on the topic. It should be noted, therefore, that this study refers to common low vision rehabilitation strategies currently in use among older adults in high-income societies (as can perhaps be derived from the citations chosen), which can be quite specialised in their healthcare-based settings. This is also the framework within which the author of the study has operated whilst working as a low vision therapist.

According to Lueck (2004, 4), low vision services aim to offer function restoring options in care and rehabilitation, compensatory strategies in vision loss as well as multiprofessional support and access to other networks suitable for their clients. Most often, low vision rehabilitation is performed within a framework that focusses on teamwork. There is a coordinated plan in use behind the efforts of different professionals responding to the needs of their clients. These integrated practices should therefore include both clinical and instructional elements in order to attest to those needs on a comprehensive scale. As the term itself suggests, low vision *re*habilitation is focussed on maintaining or relearning skills that may have been reduced or lost after acquiring low vision. The rehabilitation process as such can utilise various means, including low vision devices. (Corn & Lusk 2010, 21.)

For a discipline that avoids easy definitions, there are challenges to be found in its background. For example, the lack of qualified professionals working in the field, compounded by the fact that there are not enough institutional study programmes for them in the first place, is a major concern in many places. In particular, the lack of university-level study programmes in low vision rehabilitation has been named as one of the barriers to advancing the development of the field all the while that there has been a growing influx of new clients mostly due to people aging. Moreover, there have been constant issues in securing proper funding for the services, especially in insurance and third party-based models. (Goodrich & Huebner 2010, 51-52.)

It is vital to realise that low vision rehabilitation practices vary a great deal in different parts of the world, starting with provision. Lim, Vukicevic, Koklanis and Boyle

(2014, 311-312) have defined three basic models of service provision. First, delivery is dependent on the level of service, the range of which covers primary, secondary and tertiary levels. In this definition primary means community-based practices, whereas secondary and tertiary levels are more specialised in nature, with low vision care and rehabilitation performed by ophthalmologists and other eyecare specialists. Secondary model is, in essence, based on eyecare centres into which patients have to travel, whereas the primary model takes place in communities, as in outreaches, for example. Moreover, the tertiary model can be seen as a multidisciplinary evolution of the second one; its objective is broader, and its workforce includes rehabilitation workers in addition to eyecare professionals.

There is more to low vision rehabilitation than the aforementioned levels of model, of course. Differences are rife in terms of institutional provision in the first place. Services are provided by a vast array of governmental to nongovernmental organisations, which in turn makes it difficult to compare services globally between developed and developing countries, sometimes even within nations. According to Lim and others (2014, 314), barriers to low vision rehabilitation can be found in the following areas: healthcare systems, persons and societies.

Firstly, with regard to healthcare systems, it has been systematically found that low vision rehabilitation can be scarce in places where it is mainly offered by nongovernmental organisations. In direct conjunction to this, private healthcare sector does not necessarily offer or support low vision practices to a great extent, thus potentially creating a systemic dearth. Other barriers to consider are the lack of referrals (direct ones in particular) to low vision providers from the eye care sector; limited service awareness or access to it by other healthcare professionals; and simply non-existent cooperation between eye care professionals and other agencies, which can result in potentially available services not being used to a great degree. (Lim et al. 2014, 314-315.)

Secondly, there are barriers that are part of the person. Namely, in some cases persons with vision impairment can manage their functional deficiencies independently enough so that they feel no need for accessing low vision services. It can also happen

that, initially, some patients are to some extent denying that there is something wrong with their vision and, therefore, they abstain from the services recommended to them. There may be other reasons, too, such as those rooted in cultural and social aspects. In developed countries older people live alone more frequently than in developing ones, where other family members may take care of them and, simultaneously, choose not to utilise low vision services. One must not forget the social stigma associated with visual impairment, either, as a hindrance. Persons eligible for low vision services may simply not want to consider applying for them for the fear of losing independence, among other things. (Lim et al. 2014, 316-318.)

Thirdly, barriers occur within the society as well. Due to prejudice and other forms of discrimination, many people with vision impairments may not want to come forward with their status at all. Many of them are fearful of being classified as dumb or incompetent because of vision impairment. Other people may also well-meaningly treat them in a far too protective and condescending manner, resulting in them being constantly reminded of their vision loss. (Lim et al. 2014, 318-319.) There can also be misconceptions in reference to vision impairments being unavoidable direct results of old age rather than actually being related to aging (Sacks 2010, 80).

3.1   Low vision intervention strategies

There are different strategies available to tackle the issue of vision loss. To begin with, there is often a possibility that uncorrected refractive errors can be dealt with glasses. Cataract surgeries performed at appropriate times can also be of help in mending vision. (WHO 2019c.) Furthermore, there are different kinds of treatment and medication available for eye conditions such as glaucoma or diabetic retinopathy. The neovascular type of AMD can be treated to some extent with intraocular injections. These kinds of interventions are organ-based and, as such, part of medical and surgical care (Visual Standards 2002, 5). Even with options like these available, it is possible that an individual's vision can deteriorate to the level of permanent impairment. At that point the individual may become eligible for low vision rehabilitation services and, consequently, low vision aids. According to Fraser (1997, 80), low vision services at their most basic always include the assessment of an individual's

functional vision into the following areas: the prescription of eyeglasses if useful; the prescription of optical and non-optical devices in order to make better use of visual functioning; and education how to use these various devices.

As an intervention strategy, low vision rehabilitation is aimed to improve the abilities to perform common independent living skills. In terms of ability ranges, for example, near-normal reading ability can often be reached with reading aids in cases of moderate visual impairment, whereas in severe visual impairment the reading ability can be restricted and slow with the use of reading aids. Moreover, in profound visual impairment and cases of blindness, this ability is either limited or not possible with visual reading aids. In consequence of this, vision substitution skills and blind techniques may be more suitable as rehabilitative means in everyday tasks. (Visual Standards 2002, 10.) However, due to reading abilities in particular often being studied in a clinical setting at the expense of authentic situations, it may not be feasible to draw far-reaching conclusions from them (Binns et al. 2012, 50).

3.2   Low vision assessment

As such, low vision assessment can consist of various forms and stages but, for the focus of the present study, the following overview mostly refers to near vision-related tasks that would require the use of reading aids in particular. As a first step, current visual functioning and ocular health of the client have to be duly noted, after which a rehabilitation plan can be formed on the basis of the findings and client's own needs. Next, a low vision therapist or other specialist suited to the task will go through with the client and find suitable optical, electro-optical and non-optical devices and options in order to enhance functional vision. It is recommendable to perform a comprehensive assessment that considers limitations of vision together with specific individual needs for the formulation of a rehabilitation plan. In addition, the client's physical and cognitive aspects along with social issues should similarly be contemplated, together with their ocular and visual functioning history. (Fraser 1997, 86.)

In terms of low vision assessment for older people specifically, Watson and Echt (2010, 881-883) have proposed the following plan of action. After visual acuity, visual fields and constrast sensitivity have been examined, it is paramount to refer the client to a low vision eyecare specialist and/or low vision rehabilitation professional for further assessment of needs for different types of aids, assistance and counseling that could be beneficial to them. The assistance should begin from preparing the client for what lies ahead in low vision rehabilitation, from simple strategies of coping with vision loss to provision of information and resources available to them. In addition, the family and community of the client should be included in the rehabilitation process from the beginning.

All things considered, the overall goal in low vision aid assessment is to find ways of improving visual acuity for near, intermediate and/or distance activities. For example, magnification is useful in accomplishing an enlarged retinal image, which in turn makes objects seen with more comfort. Magnification can be relative-distance (e.g. watching television at a closer distance), relative-size (e.g. large-print books), angular (e.g. magnifiers make objects appear bigger) or electronic (e.g. camera systems). (Fraser 1997, 96.) The importance of good, glare-free illumination cannot be underestimated in conjuction with any of the options provided by magnification (Dister & Greer 2004, 84).

For near activities, the main goal is often reading. This is best accomplished by having actual continuous texts as test material, on which the apt near magnification is then tried and found, if applicable. There are several options available for testing, such as strong reading glasses, hand-held magnifiers, stand magnifiers and electro-optical devices, to name but a few. (Fraser 1997, 97-100.) Video magnifiers in the form of closed-circuit televisions (CCTV) and portable systems may be of considerable use in appropriate cases because of their versatility in comparison to basic magnifiers. Computers, in their hardware and software options available, also offer a considerable array of accessibility means to users, most often in options such as screen magnification and screen readers. (Zimmerman, Zebehazy & Moon 2010, 224-226.)

For distance activities, moving closer to objects is often the best way of achieving satisfying results, as in the example of watching television. However, if this is not possible, using a monocular or binocular telescope of various types can be of use for trying, especially in target finding (spotting), environmental surveillance (scanning), following moving targets (tracking) or adapting to different focal distances (focusing). (Fraser 1997, 100.)

The aforementioned options are suitable for an individual whose central vision is still relatively intact. Visual field losses may make use of those options difficult, however. In central field losses, eccentric viewing techniques may be helpful; in doing so, parts of peripheral retina instead of central area are being used for reading, if possible. As for peripheral visual field defects, these are often realised in the difficulty of independent travelling, but also in slowing down reading rates. In some cases prism lenses may be of use, for example, but more often than not it is simply wiser to teach peripheral awareness when travelling, and introduce a long cane if needed as an aid at some point. (Fraser 1997, 101-102.)

Furthermore, technological advances in the near past have brought about new systems into low vision services at a rapid rate. For example, electronic book readers and text-to-speech software offer wide-ranging options for those in need of reading aids, as do smartphones and tablets in both hardware and software applications (Natarajan 2013, 191-192). In addition, artificial vision aids which use optical character recognition (OCR) technology to speak aloud both texts and surrounding environment have lately become under considerable interest for their seeming feasibility in many vision-related tasks. It has already tentatively been found that such a device can help users with low vision due to glaucoma gain more independence and achieve improved quality of life. (Waisbourd, Ahmed, Newman, Sahu, Robinson, Siam, Reamer, Zhan, Goldstein, Kurtz, Moster, Hark & Katz 2019, 339.) However, to what extent some of the newest devices will eventually assimilate into low vision services remains to be seen. For assessment alone, they seem to present challenges for both practitioners and users because of the intricacies involved in becoming fully acquainted with them if compared to more basic low vision technology of old.

4 People-centred integrated healthcare

4.1 People-centred integrated healthcare services

Lately, there has been a subtle shift in paradigm proposed by some scholars as to how to better describe the involvement of individuals in their own healthcare, in particular how their needs are taken into account. A more considerable shift had already taken place in the past from *patient* to *person* as the focus on care orientation had gradually changed and widened from concentrating on treatments of diseases only. As for now, though, there seems to be a growing demand for *people-centred* care – the concept of which refers to the person in question as a whole within a more comprehensive context that includes family and community alike. (De Maeseneer, Weel, Daeren, Leyens, Decat, Boeckxstaens, Avonts & Willems 2012, 602.) Moreover, the ways in which people can influence and develop health services and policies are thought to be of equal importance. The new paradigm is closely intertwined with integrated health services where patients receive coordinated healthcare services according to their own needs in a cross-sectional manner. (WHO 2016b, 2.)

The latest paradigm shift is epitomised in the people-centred integrated healthcare services, which is a global strategy proclaimed by WHO since 2016. The primary goal of the strategy focuses on the need to reconsider the funding, management and delivery of healthcare services. There are many reasons for this, most of them compounded by the fact that populations are aging worldwide, chronic conditions that are expensive to treat having had put a strain on current services and preventable illnesses proliferating, among other things. Therefore, WHO is advocating a more comprehensive approach that would put people into the centre of receiving evidence-based care according to their own needs in a coordinated manner throughout their lives that would be essentially humane, yet also producing better quality and cost-effectiveness at the same time (see Figure 1 for the conceptual framework). (WHO 2015, 7, 9.)
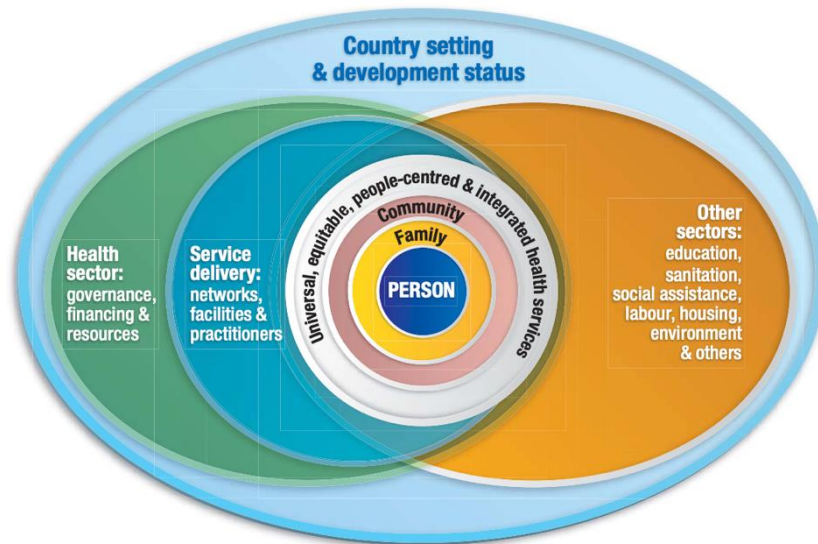
Figure 1 Framework for people-centred integrated healthcare services
Note. Retrieved from WHO 2015, 13.

Essentially, people-centred care and, in effect, rehabilitation measures are collective by nature, as De Maeseneer and others (2012, 604) indicate, the pluralism of the approach demanding merging of communal health operations with singular treatments of diseases. In other words, the demand is for integrated healthcare services in this respect. In parts of China, for example, people-centred integrated healthcare has been adopted in order to move away from a healthcare system in which the overriding focus has previously been on treatments in hospitals. In terms of funds distribution and cost reduction in the context of care delivery, this kind of approach may be advantageous as well, in particular through its core emphasis on people's needs in lieu of structural, systemic demands. (Wang, Sun, Birch, Gong, Valentijn, Chen, Zhang, Huang & Yang 2018, 850.)

Naturally, paradigm shifts require varying modes of action and time before they are accomplished. In the case of advancing people-centredness in healthcare, it has been demonstrated that there is a principal need to improve collaboration between different levels of the system, to emphasise the use of community health services instead of hospitals when needs arise in the first instance, and to be aware that overall costs may initially rise before long-term effectiveness can be realised (Wang et al. 2018, 847-9).

4.2 Integrated people-centred eye care model

The present study will frame its theoretical basis on the WHO's integrated people-centred eye care model (IPEC), which in turn is derived from the WHO framework on integrated people-centred healthcare services. As an approach, IPEC is intended to provide universal healthcare in the domain of eye care (WHO 2019b, 147). By definition, IPEC is

> *services that are managed and delivered so that people receive a continuum of health interventions covering promotion, prevention, treatment and rehabilitation, to address the full spectrum of eye conditions according to their needs, coordinated across the different levels and sites of care within and beyond the health sector, and that recognizes people as participants and beneficiaries of these services, throughtout their life course.* (WHO 2019b, 117.)

In order to achieve IPEC to good effect, certain areas need to be closely taken into consideration. According to WHO (WHO 2019b, 117), the implementation of IPEC is based on four interdependent strategies, the approaches of which are listed below.

1. *Empowering and engaging people and communities*
2. *Reorienting the model of care*
3. *Coordinating services within and across sectors*
4. *Creating an enabling environment.*

With regard to strategic approaches relative to low vision rehabilitation, the first category that deals with empowerment and engagement refers to issues such as shared clinical decisions, self-management and peer support, among others. The second approach of care reorientation includes concentrating on local health issues, age-related services and assessments for health technology, to name but a few. As for coordinating services in a transsectional manner, the focus is on, for example, referral systems, case management and partnerships. Lastly, an enabling environment ideally consists of assuring strong quality, maintaining leadership and aligning regulations if possible, amongst other things. (WHO 2016b, 5-9.) Table 3 lists the strategic approaches of IPEC, whereas Appendix 1. lists the interventions and policy options related to the strategic approaches in full detail.

Table 3 Integrated people-centred eye care model

Empowering and engaging people and communities	Reorienting the model of care	Coordinating services within and across sectors	Creating an enabling environment
Empowering and engaging individuals and families	Defining service priorities based on life course needs	Coordinating care for individuals	Strengthening leadership and management for change
Empowering and engaging communities	Revaluing promotion, prevention and public health	Coordinating health programmes and providers	Strengthening informations systems and knowledge management
Empowering and engaging informal carers	Building strong primary care-based systems	Coordinating across sectors	Striving for quality improvement and safety
Reaching the underserved and marginalised	Shifting towards more outpatient and ambulatory care		Reorienting the health workforce
	Innovating and incorporating new technologies		Aligning regulatory frameworks
			Improving funding and reforming payment systems

Note. Data retrieved and adapted from Framework on integrated, people-centred health services (WHO 2016b, 5-9).

Moreover, the implementation of IPEC needs to be aware of the following guidelines: There should be a country-led agenda that is centred on fairness and participation. The aim is to strengthen eye healthcare systems, especially in terms of service delivery and management. Decisions that are taken need to be all evidence-based with a focus on results, but they have to be ethically sound so that they contribute to future-oriented, sustainable forms of the people-centred, integrated eye care and rehabilitation services. (WHO 2016b, 10.)

5   Aim, objectives and research questions

The aim of the study is to investigate factors related to the use of reading aids in low vision rehabilitation of older adults.

The objectives of the study are to identify and appraise relevant studies from a pool of data that fit the inclusion criteria for an integrative literature review in order to answer the research questions; and by synthesising subsequent findings through a categorical, thematic analysis to establish whether the current use of reading aids in

low vision rehabilitation of older adults can be deemed people-centred and integrated on evidence and to what extent.

In consequence of the aforementioned aim and objectives, the present study will make use of the following **research questions:**

1. What factors contribute to the outcomes involving the use of reading aids in low vision rehabilitation of older adults with low vision?

2. How do these factors appear in relation to the strategic approaches of the integrated people-centred eye care and rehabilitation model?

6   Implementation of the study

6.1   Integrative literature review as a method

There are different options available for conducting literature reviews in social and healthcare. Scientifically, systematic literature reviews are the most elaborate ones, whereas traditional or narrative reviews are perhaps the least structured. Other alternatives that fall somewhat in between the aforementioned ones are integrative reviews, scoping reviews, concept analyses and realist reviews. All types of reviews tend to share the concept of collecting, assessing and displaying evidence-based data on a given topic, the process and extent of which vary according to the chosen review type. Systematic literature review is often seen as a standard for other reviews in showing how rigorously the whole process should be conducted. As a result, other types of literature review tend to assimilate parts of it into their own research processes. (Coughlan & Cronin 2017, 12-30.)

The method chosen for this literature review is that of an integrative review. According to Coughlan and Cronin (2017, 15), an integrative literature review outlines previous research and establishes conclusions on a certain topic. Having read for years scientific journals such as *Journal of Visual Impairment & Blindness*, the author of the study has been aware of the chosen topic being studied to a certain extent, so this review should be operational. Especially, as the purpose of an integrative review is to

arrive at a broader comprehension as regards the chosen issue, it could be used to gain new perspectives through reframing previous ideas concerning the topic. Often this is achieved by having a theoretical concept as a tool, with which it becomes easier to frame the research question(s) in relation to the topic. (Coughlan & Cronin 2017, 15.) Therefore, as a way of framing, the present study will make use of the IPEC model, in particular its framework of strategic approaches. The aim is to make insight into how older people with low vision could possibly benefit from low vision rehabilitation practices that are more comprehensive by nature than those strictly adhering to specialised healthcare-based strategies. An integrative review of the current field could therefore be possibly able to reveal viewpoints that would otherwise remain hidden.

Whittemore and Knafl (2005, 548-549) have proposed a five-tier framework for use in conducting integrative reviews. First, it is paramount to formulate the problem that is to be studied. Variables such as main concepts and useful background information should be introduced, while questions pertaining to framing the studies (e.g. eligibility criteria) should also be answered at this problem identification stage. Second, an integrative review needs a thorough literature search stage. This can be accomplished by resorting to and combining different search strategies: namely, computerised databases ought to be searched using a set of clearly formulated key words, the results of which can then be judged according to the inclusion and exclusion criteria and processed in a correct manner. Any sampling choices, however, need to be elaborated on their justification. Specifically, in the present study the sampling focus must be clearly on older adults and reading aids in the first instance so as to meet the purpose of the study and its research design.

Third, Whittemore and Knafl (2005, 549-550) have suggested having data evaluation as the next stage. How complex this may end up being varies owing to chosen data samples. Depending on the empirical and theoretical diversity of samples, it may be necessary to elaborate on how authentic, methodological, informational or representative these samples are as primary sources. An option at this stage could be, for instance, to make note of methodological and theoretical rigour as well as data

relevance of each included source. These notes could, in turn, be commented further in the fourth stage, which is data analysis.

As such, data analysis is an important phase of an integrative literature review. The present study will aim to synthesise its data through thematic narrative integration with no intention to utilise statistical analysis. This kind of approach is applicable to data that features methodologically varied studies (Coughlan & Cronin 2017, 89-90.) In addition, tabulations will be used appropriately to highlight the results in an effective manner. Following Whittemore and Knafl's (2005, 550-551) model, data analysis should be done in a thorough and categorical manner. Thus, data will be reduced, displayed, compared, concluded and verified. Studies that are included in the final analysis will be analysed in terms of their purpose, study designs, outcomes and study limitations. In ideal circumstances this review process should not be done by the author alone but together with an outside reviewer so as to increase the strength and plausibility of the research process (Coughlan & Cronin 2017, 88).

The present study will utilise critical appraisal tools offered by the Joanna Briggs Institute in order to accomplish the aforementioned quality assessments that are needed. Furthermore, an inductive data analysis based on the four-tier IPEC eye care and rehabilitation model will be undertaken to divide the findings further into subgroups, with intention to provide new insight into how low vision rehabilitation involving reading aids is related to IPEC. Essentially, data analysis as a whole will concern itself with elements such as common patterns and themes, plausible causes and relationships between different factors in interventions so as to find chains of evidence that do not defy logic (Whittemore & Knafl 2005, 551).

Finally, there is one last issue to consider: namely, presentation. Whittemore and Knafl (2005, 552) have presented the view that diagrams and tables can be of great use when presenting results in integrative reviews. However, serious consideration ought to be paid to the logical rigour in presenting evidence from the data so as to make new insight into the phenomenon that is being studied, without forgetting to mention possible limitations in methodology. Practice and research implications

should similarly be part of a comprehensive integrative review that aims to arrive at new viewpoints regarding the subject matter.

There are several demand areas for an author to cover when contemplating an integrative review. First, there is a need to create a thorough research plan that is dependent on having become acquainted with previous research into the topic and being able to define solid research questions alongside an extensive search strategy. This rather systematic approach is further realised by generating eligibility criteria under which only relevant research can be accepted into the the review and subjected to analysis and synthesis. (Aveyard 2014, 10-11.) After all, it is the methodologically rigorous framework that assists in presenting assorted results in an integrative review to best advantage (Whittemore & Knafl 2005, 552).

6.2   Development of research questions

A crucial part of an integrative review is the formulation of its research design. The research questions of the present study were formulated by using a PICOS framework (Table 4). According to Munn, Stern, Aromataris, Lockwood and Jordan (2018, 2-3), the PICo (population, intervention or phenomena of interest, context) variation of the framework can be useful when studying the relevance of a given phenomenon. It may be helpful for framing research questions when a literature review is interested in finding, for example, how effective interventions are from a certain perspective. In the present study this is outlined by the use of a people-centred, integrated perspective, whereas the context is explained by the fact that aging populations are putting a considerable strain on current eye care and rehabilitation services. In addition, it is useful to include prospective ideas concerning outcomes and study designs to further frame the research questions (Coughlan & Cronin 2017, 35). Therefore, research questions in this study pay attention to finding outcomes of interventions or exposure involving the use of reading aids. As for study designs, it is accepted that this review can include both interventional and observational research as well as systematic reviews and meta-analyses, even if they are not explicitly mentioned in the research questions.

Table 4 PICoS framework

Population	Older adults, aged 65+, with low vision
Intervention or phenomena of interest	Low vision reading aids within low vision rehabilitation practices
	Integrated people-centred eye care model
Context	Aging population and strain on eye care and rehabilitation services
Outcomes	Outcomes involving the use of reading aids in low vision rehabilitation
Study designs	Interventional and observational studies and systematic reviews and/or meta-analyses

The hypothesis is that, with regard to research questions described in Chapter 5, there may be varying levels of people-centred and/or integrated approaches present in the recent outcomes of low vision rehabilitation involving reading aids, specifically whether they have solely taken place in specialised healthcare settings. According to Binns and others (2012, 36), there is evidence of low vision services predominantly taking place in hospital environments and being mainly inclusive of services that are usually provided by low vision therapists or optometrists, unless they are clearly part of multidisciplinary services. In those kinds of integrated surroundings, it may prove possible to witness people-centred elements more akin to IPEC. Further, the origin of studies may have an effect on the results of the present study as well, since evidence exists for a great deal of variation as to how clients may meet low vision rehabilitation professionals of different disciplines at various levels of service provision in high-income countries alone. Even so, assessing for reading aids would be expected to feature among the primary needs in such low vision rehabilitation processes (Owsley, McGwin Jr, Lee, & Wasserman 2009, 686-687.) These above-mentioned premises are also similar to those that the author of the study has found in practice whilst working as a low vision therapist.

6.3   Search strategy

The present study will be executed using a search methodology that is explained in this subchapter. An undefined number of studies will be chosen according to the following inclusion criteria (see Table 5 in detail): 1) research subjects are adults over 65

(mean age) as a target population; 2) subjects are diagnosed with low vision; 3) low vision rehabilitation interventions have to include the use of reading aids; 4) all interventions are non-invasive in nature; 5) publication between January 1, 2010 and September 30, 2020; 3) English language; 4) peer-reviewed primary studies and research literature in scholarly journals and reviews; 5) freely available and fully accessible through Jyväskylä University library's electronic databases; 6) categorised search terms referring to low vision and low vision rehabilitation respectively have to be found in titles, abstracts and keywords being sought; 7) studies found in the Cochrane Systematic Reviews, ProQuest Central and Scopus databases; 8) experimental, interventional and observational study designs, as well as systematic literature reviews and meta-analyses; and 9) the number of subjects participating must be 10 or more.

Table 5 Eligibility criteria

Inclusion criteria	Exclusion criteria
Subjects: adults, mean age 65 or older	Adults, mean age less than 65
Subjects with low vision according to ICD-11 classification (BCVA: <0.5), incl. those with blindness if part of study design	Subjects not diagnosed with vision impairments or studies consisting of only subjects with blindness
Low vision rehabilitation dealing with optical and non-optical reading aids, incl. large print, eccentric viewing	Low vision rehabilitation dealing with artificial vision devices or mobility devices or means used in other than vision-related tasks
Non-invasive eye care and rehabilitation services	Invasive eye care, incl. use of contact lenses
Studies published between Jan 1, 2010 – the present	Studies published before Jan 1, 2010
Language: English	Any other language than English
Primary studies and research literature in scholarly journals and reviews	Secondary studies (excl. systematic reviews and meta-analyses) or policy literature
Peer-reviewed	Missing peer reviews
Freely, fully available studies	Studies behind paywalls
Entire studies available in electronic form through JYU library	Studies only partly available in electronic form through JYU library
Search terms based on categories found in titles, abstracts, keywords	Search terms not found categorically in titles, abstracts, keywords
Cochrane, ProQuest Central or Scopus databases	Any other database
Interventional and observational studies, systematic literature reviews and meta-analyses	Other types of research, e.g. feasibility studies, pilot studies
Number of participants: 10 or more	Less than 10 participants in a study

Studies open to the present study will be original empirical research or primary research and, as such, they can range from quantitative to qualitative to mixed methods research (Aveyard 2014, 48). Ideally, studies ought to be interventional studies such as randomised controlled trials, but observational studies can also be accepted. An integrative review does fundamentally accept different research designs, even if these differing methodological considerations may prove arduous to compare. (Coughlan & Cronin 2017, 15.) Systematic reviews or meta-analyses will likewise be accepted if suitable because of their inherent methodological robustness (Aveyard 2014, 48).

At any stage, however, neither practice or policy literature will be included in the review, nor will any secondary sources (apart from systematic reviews or meta-analyses). Furthermore, as the aim of the study is to gain insight into the use of reading aids by older adults, the review will focus on studies involving people whose mean age is 65 or more. Publication time span will be limited to slightly over 10 years from the present (September 30, 2020 or thereabouts) to January 1, 2010, in order to obtain both newer and older insight on research with the aim of arriving at a wider general view.

The choice of electronic databases for searches is instrumental in being able to present a comprehensive pool of applicable results from which to answer the research questions (Coughlan & Cronin 2017, 56). It seems as though an extensive enough search can be accomplished by using the following databases: 1) Cochrane Database of Systematic Reviews, specifically its review database; 2) ProQuest Central, inclusive of its health and medicine, science and technology, and social sciences databases; 3) Scopus, the entire database.

Understandably, there were other databases worth considering prior to undertaking the searches. For example, databases offered by CINAHL (Ebsco) were a strong contender for measures, but ProQuest Central was able to offer similar search results during tentative searches in late September 2020, probably for the reason that

Medline was included in both of them, as well as in Scopus. Similarly, PubMed was initially experimented as a possible search tool, but it seemed to overlap with Scopus quite significantly yet appeared to amass fewer results in comparison. At that stage it had also started to appear as if data extraction could have resulted in a multitude of findings had numerous databases been chosen. These tentative searches were also being used for sampling apposite search terms.

Search strategy of the present study will make use of a set of search terms that have been divided into two categories. The first one refers to the target population in question: people with *low vision*, *partially sighted* and similar ones. This category will not include the term *blind* or its variants, as the focus is on low vision. The second one references the interventions that are being studied, ranging from strategies (e.g. *low vision assessment*) to devices (e.g. *magnifiers*). This category will not include any trademarks. All the terms are either derived from Medical Subject Headings (MeSH) (e.g. eye diseases) or adopted from previous systematic literature reviews concerning low vision (e.g. those in reference to low vision and reading aids). The search terms will be detailed in their entirety in Chapter 6.4.

Both categories will be searched using Boolean Operators (OR) as conjunctions within each category, combined with Boolean Operators (AND) between the categories. As a result, all studies must match at least one search term represent in each category in order to gain access to final analysis. Special attention must be paid to differences between databases in the use of truncated words and other special forms (Coughlan & Cronin 2017, 64). All of the searches will take place within the online domain of Jyväskylä University library, to which the author of the present study has access.

As for reading aids, the present study opts to concentrate on low vision reading aids in a manner reminiscent of both Corn and Lusk (2010, 5) and Zimmerman and others (2010, 193) in their definition to include optical, nonoptical and electronic devices in them. Therefore, spectacles, magnifiers, portable electronic devices and closed-circuit televisions will be included in the review, as will large print and eccentric viewing techniques. There is scientific evidence for their effectiveness in advancing visual

functioning (Virgili et al. 2018, 14) to the extent that their inclusion as a main focus of the study is justifiable. This outline is also conversely based on the limited evidence available as of yet on the efficacy of brand-new technology that uses text-to-speech or similar means, even if it seems to show a great deal of promise. The studies available so far involving newest apparatuses seem to be tentative and, as such, may not yet offer enough scientific weight to a review. Moreover, computer-based technology will not be included in the review either.

Furthermore, as the present study concerns itself with integrated services, it is accepted that low vision rehabilitation involving reading aids may and can be part of study designs that measure outcome variables such as the quality of life or effect of depression or performance of everyday tasks in conjuction with the provision and use of low vision aids (Binns et al. 2012, 37). Common interventions in low vision aid rehabilitation are demostrably varied, including training methods related to them (Virgili et al. 2018, 14). In summation, then, the aforementioned reading aids have to be an inherent part of the study design, but not necessarily the sole component of what is being studied.

6.4   Implementation of the search strategy

All of the subsequent results shown in this subchapter were achieved by the sole author of the present study, no other person was involved in the process. The search terms that were applied in different databases were similar each time, the main difference being the use of curly brackets instead of quotation marks in ProQuest Central to find phrases including variants. Medline was intentionally excluded from ProQuest, as it was also included in Scopus, and the non-selection was easier to execute in ProQuest. Search terms were divided into two categories, out of which at least one term had to be found in each of them for any study to become eligible for inclusion; this was achieved by using Boolean OR-conjunctions between terms within a category and AND-conjunctions between categories. The search terms (in their base forms, including truncations and double quotation marks) can be seen in Table 6.

Table 6 Data search fields and terms

	Search fields	Search terms
Category 1:	**Title Abstract Keyword**	"low vision "OR "vis* impair*" OR "sight impair* OR "partial* sight*" OR "visual disability" OR "visual loss" OR "functional vision" OR "age-related macular degeneration" OR AMD OR glaucoma OR "diabetic retinopathy" OR "retinal dystroph*"
	Boolean Connector	AND
Category 2:	**Title Abstract Keyword**	"low vision assessment" OR LVA OR "low vision aid*" OR "low vision service*" OR "vision rehabilitation" OR "assistive technolog*" OR "reading aid*" OR "optical device*" OR magnifier* OR spectacle* OR "electronic device*" OR "portable device*" OR CCTV* OR "eccentric viewing" OR "large print"

The search for ProQuest Central took place October 7, 2020. It took place anywhere except in full texts (noft); in other words, it included article titles, abstracts and key words. The databases consisted of health and medicine (excluding Medline), science and technology, and social sciences. The search ran into scholarly journals. Linkage to full, peer-reviewed texts was set as a requirement, as was English language. Publication period ran between January 1, 2010 to September 30, 2020. All duplicates within ProQuest were automatically removed. The end result was 590 documents.

The search for Scopus took place October 7, 2020. Search fields included article titles, abstracts and keywords. Other limitations in use were English language only and document type (article or review). Only peer-reviewed and full texts at disposition were accepted. Publication period ran from January 1, 2010 to October 7, 2020, because September 30, 2020 as a limitation could not be utilised. No duplicates were included in the search result. The end result was 546 documents.

The search for the Cochrane Database of Systematic Reviews took place on October 7, 2020. Search fields included titles, abstracts and keywords. The following search limits were in use: Cochrane Reviews was used as a content type. Cochrane Library publication date was between January 1, 2010 and September 30, 2020. 'Search word variations' option was activated. Quotation marks were used for phrases. As it

happened, no duplicates emerged. The end result was 9 systematic literature reviews.

6.5 Stages of data extraction

As can be seen in Figure 2 below, there was a high number of documents to be separated in the early phases of extracting. Duplicates between sought databases (Cochrane, ProQuest and Scopus) were removed after initial data extraction by transferring the results (citations, abstracts, indexing) from databases to RefWorks for deduplication. The process had to be verified manually, since RefWorks did not deduplicate three documents for one reason or another, the use of diacritics possibly confusing the process between documents, at least certainly in one case. As it happened, the number of duplicates between ProQuest and Scopus was 104. Cochrane Reviews had no duplicates with the other two databases. Eventually, the overall, deduplicated number of documents included after data extraction was 1041.

Next, the remaining studies were examined for their titles. After this exploration, the number of studies left was 122. It could be noted on the grounds of titles alone that many studies involving children were discardable at this stage, whereas different segments of adult population were not so easily discernible solely by titles. Similarly, documents probing into invasive treatments of eye conditions were somewhat easily disposable. The author took a stance of approving studies here with an open-minded yet thorough mindset so as not to exclude any potential research at least on titles. A more painstaking step took place when the abstracts of remaining studies had to be read in their full. This resulted in reducing the number of eligible studies to 14, all of which were then perused in their entirety. For final inclusion the number of chosen studies fell to eight. Overall, the complete process of going through the documents took roughly a week to accomplish.
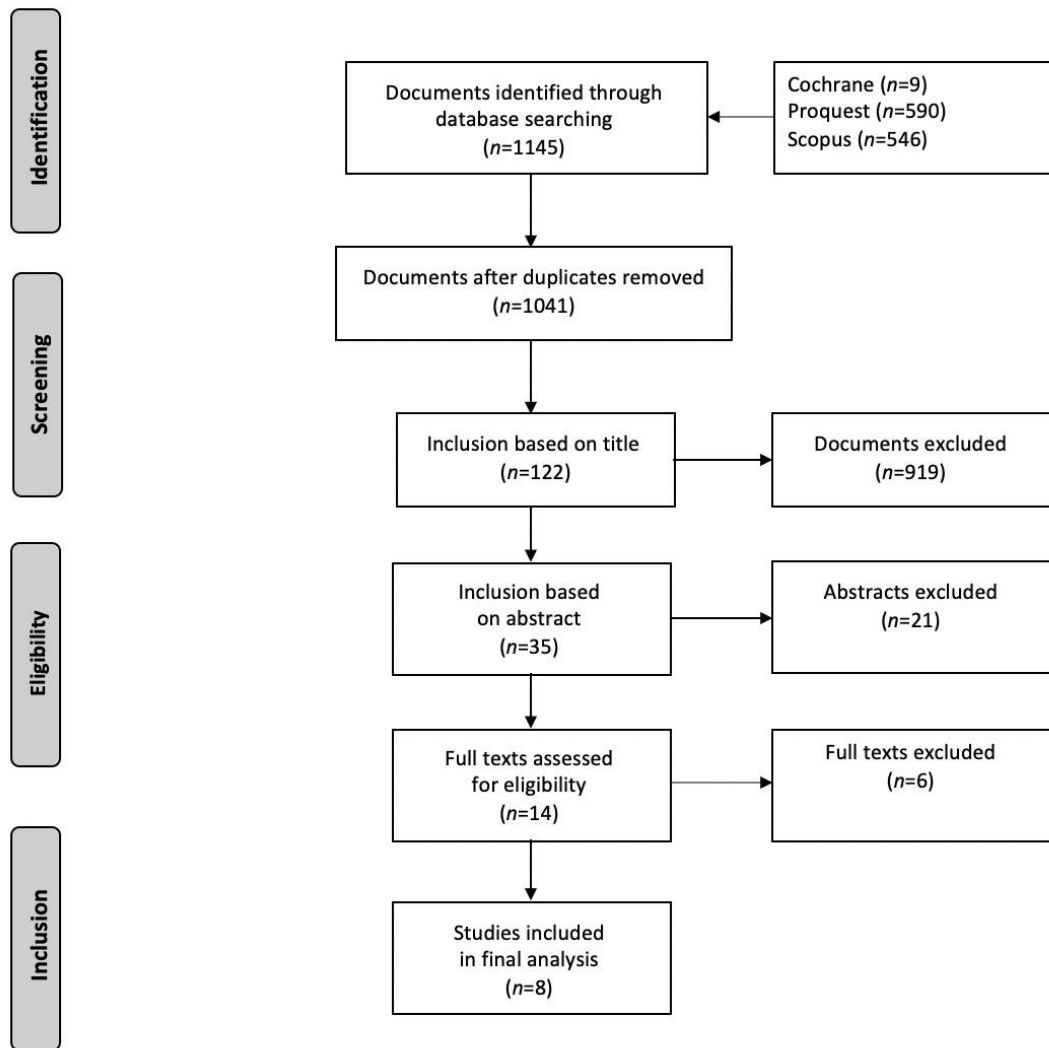
Figure 2 Phases of data extraction

The main reason for exclusion throughout the process appeared to stem from the pre-set age limit of studies having to focus on older adults. Several studies involving older adults seemed to feature subjects over 50 or 55 years of age as their target population. This had already become evident while developing the search strategy, which had resulted in the mean age of 65 years or more being adopted for the age limit, in accordance with the style of reporting ages that is used in research results. Another frequent cause for discarding was studies that concentrated on treatments of eye conditions, which was probably due to search terms including the four most common eye conditions that cause low vision among older adults. As for full texts that were discarded before the final analysis, reasons seemed to vary. Subjects were not either completely visually impaired (two studies) or their mean age was below 65

years (three studies). Further, there was one experimental study that would have otherwise fulfilled the eligibility criteria if not for the extensive use of computer technology in its main intervention.

6.6 Appraisal of data quality

When conducting an integrative review, there is a need to evaluate the quality of data so as to form a clear view of its integrity and suitability for research purposes. Doing this is vital for being able to draw credible conclusions from the data. According to Coughlan and Cronin (2017, 78-79), this process takes place after finding studies that have met the full eligibility criteria. It is paramount to identify studies that are methodologically robust and feature outcomes on which a synthesis can be presented. Moreover, it is wise to utilise quality appraisal tools that give explicit guidance to examining the strengths and limitations of research data (Coughlan & Cronin 2017, 82).

The present study had extensive eligibility criteria but no pre-set limitations on a number of studies to be included. Neither were there criteria for the quality of data. After perusing full texts, there were eight studies left that fulfilled the eligibility criteria. However, they were peer-reviewed, which already added to their integrity. All of these studies were quantitative in terms of their study designs, although with differing ones. There were descriptive (randomised controlled studies and a cohort study) and analytic (case series studies) designs within them. Following Aveyard's (2014, 65-66) guidance on the hierarchy of evidence, they could be sequenced in the following manner: 1) four randomised controlled trials, 2) one cohort study, 3) one prospective case series and 4) two retrospective reviews or case series. As regards case series studies, a prospective design is usually superior to a retrospective one, since the latter is more of a backwards sounding chart review based on existing records (Hess 2004, 1171).

To further assess the quality of these quantitative studies, the present study used three different critical appraisal tools by the Joanna Briggs Institute, which can be used for research purposes only. Each tool featured 'yes/no/unclear' options for

answering questions regarding the study design. When applied to this study, a cumulative sum was calculated based on the 'yes' answers to indicate the robustness of the study design in question. First, studies featuring RCTs were appraised using a 13-item Randomised Controlled Studies checklist (Joanna Briggs Institute 2020c). Second, the sole cohort study was appraised using an 11-item Cohort Studies checklist (Joanna Briggs Institute 2020b). Third, different case series studies were appraised on a 10-item Case Series checklist (Joanna Briggs Institute 2020a). The calculated sums and brief explanatory notes for reasons of flaws are below.

- Girdler et al. **10/13**. The RCT study did not explicitly state whether those who delivered treatment were masked to treatment assignment. Neither did it state if people assessing outcomes were masked to treatment assignment. (Elsewhere, Rees et al. alluded to researcher bias in Girdler et al.) There was a potential self-selection bias before randomisation.

- Rees et al. **11/13**. The RCT study had disparately sized treatment groups (n=93/60) due to recruiting issues before random allocation. There was a lack of recorded sessions. Neither was the accuracy of the programme profoundly assessed.

- Deemer et al. **11/13**. The RCT study did not explicitly reveal whether those who delivered treatment were masked to treatment assignment. Similarly, it was left unclear if those who assessed outcomes were masked to treatment assignment.

- Leat et al. **8/13.** The RCT study did not clearly state whether the allocation to treatment groups was concealed. Similarly, there was no mention of either masking of those delivering treatment or of those assessing outcomes to treatment. Due to problems in recruiting, the study design was a slightly different to the one initially intended. In addition, the overall sample size was very small (n=10).

- Stenmack et al. **10/11**. The Cohort study identified quite well confounding factors such as comorbid diseases or age, among others, but did not fully reveal in its approach how it actually intended to deal with them.

- Coco-Martin et al. **8/10.** The Case Series study did not include clear reporting on the rehabilitation clinic's demographic information. Low vision training consisted of only one session. There was no follow-up research on long-term effect.

- Amore et al. **8/10.** The Case Series study reported the demographics of the participants only on age and sex. There was limited demographical

information on the rehabilitation clinic. There was no follow-up research on long-term effect.

- Tunay et al. **8/10.** The Case Series study did not report on the demographical information of the ophthalmology clinic. There was ambiguity in reporting the results of the effects of using low vision devices after 12 months.

In conclusion, it could be determined following the use of critical appraisal tools by the Joanna Briggs Institute that these studies showed a reasonably wide variety for quantitative data with some discernible flaws. However, as the number of studies was rather low, it was decided by the author of the study to include each eligible study in final analysis, for the sake of being able to analyse as many studies as possible. Had there been more studies to choose from before final inclusion, one or two studies would probably not have been chosen, in particular Leat et al. for its apparent flaws in design. However, as Whittemore and Knafl (2005, 548) have stated, it is possible to include a great diversity of data in an integrative review without risking its own integrity. As things stand, having only quantitative data could perhaps be seen as being representative of current research into the topic – or a result of the eligibility criteria leading into this result, among other things.

7 Results

7.1 Research data

To summarise, there was a variety to the chosen studies as regards many of the factors present in data. First of all, they varied in origin. Two studies were from the United States of America, two from Australia, and one each from Canada, Italy, Spain and Turkey. Likewise, there were differences in study design, sample and data. This was conceivable, though, as the eligibility criteria was set for inclusion of various types of research. However, all studies were quantitative research. Four of the studies were randomised controlled trials, and the remaining four were a cohort study, a prospective case series and two retrospective case series. Outcomes of the studies seemed to vary, yet there were statistically significant results. Study limitations were

also discernible, ranging from small sample sizes to possible flaws in study designs.

Table 7 below presents the summary table for main factors in research data.

Table 7 Main factors in research data

	Reference, year, country	Study design, sample, mean age, mean visual acuity	Study aims and objectives	Outcomes	Study limitations	Quality of data
1.	Girdler et al. 2010. Australia	A randomised controlled trial; n=77, 36/41. Mean age 79.1, SD 6.7; mean BCVA: 0.15.	To combine usual low vision service with a multidisciplinary low vision self-management training in order to assess their effectiveness.	Clinically and statistically better results occur health-wise when self-management is added to low vision rehabilitation	Masking to treatment or outcome assessment not disclosed. Possible self-selection bias. Apparent researcher bias.	10/13
2.	Stelmack et al. 2012. USA	A prospective, randomised cohort study; n=126, 56/44. Mean ages: 78.9 and 79.9 per group; mean BCVA: 0.1.	To assess the effectiveness of low vision rehabilitation in two cohort groups after their inclusion in a low vision rehabilitation trial.	Significant improvement of visual ability in both groups due to Low Vision Intervention Trial treatment effect.	Dealing with confounding factors left unclear.	10/11
3.	Coco-Martín et al. 2013. Spain	A prospective case series, n=41. Mean age 76.1, SD 7.8; mean BCVA: 0.15.	To assess the effectiveness of reading rehabilitation programme (RRP) for patients with AMD; its impact on quality of life; and reading performance improvements between visits.	A well-structured RRP can increase reading speed, duration, ability to read smaller fonts; QoL increased in association with RRP.	No control group. No follow-up on long term effect. Optical device training consisted of only one session.	8/10
4.	Amore et al. 2014. Italy	A retrospective case series, n=95. Mean age 79.7, range 65—92 years; mean BCVA: 0.2	To present a set of multidisciplinary low vision interventions (as performed by psychologist, ophthalmologist, orthopist, O&M specialist).	A customised, multi-professional rehabilitation programme for each patient with AMD may improve their functional vision.	No control group. No follow-up on long term effect.	8/10
5.	Rees et al. 2014. Australia	A randomised controlled trial, n=153, 93 /60. Mean age 80.2, SD 8.1; BCVA: <0.45, with 87% <0.3	To combine usual low vision service with a multidisciplinary low vision self-management training (LVSM) in order to assess their effectiveness.	No statistical effect when self-management added to low vision rehabilitation.	Lack of accuracy checks: no recorded sessions nor assessment of programme accuracy. Disparate group sizes.	11/13
6.	Tunay et al. 2015. Turkey	A retrospective case series, n=139. Mean age 79.7, range 65—101; mean BCVA: 0.12.	To assess the diagnosis allotment together with low vision rehabilitation methods and utilisation among older persons with low vision.	Low vision aids may contribute to a significant improvement in both near and distance visual acuity among older patients with low vision	No control group. No follow-up on long term effect.	8/10

| 7. | Deemer et al. 2017. USA | A single-masked, attention-controlled randomised clinical trial, n=188, 96/92. Mean age 84.0, SD 6.8; mean BCVA: 0.23. | To assess the functional outcomes of patients with AMD when behavioural activation (BA) measures are added to low vision rehabilitation. | Improved functional vision abilities in both groups, but especially in BA at task level. | Masking to treatment or to outcomes assessment not disclosed. | 11/13 |
| 8. | Leat et al. 2017. Canada | A prospective parallel-armed randomised clinical trial; n=10; 4/6. Mean age 82 and 83.5 respectively; BCVA range: 0.125—0.05 | To compare the effectiveness of CCTV and eccentric viewing training for patients with AMD. | Significant improvement in reading speed for 1.3M print in CCTV group; improved near VA in eccentric viewing group when using their own spectacles. | Masking to treatment or to outcomes assessment not disclosed. Small sample size. No follow-up on long term effect. | 8/13 |

Note. Abbreviations: SD = standard deviation, BCVA = best corrected visual acuity, QoL = quality of life, CCTV = closed-circuit television, AMD = age-related macular degeneration, O&M = orientation and mobility. Visual acuities (distance vision) in decimal scale converted from logMAR charts in original studies by the author of the present study.

7.2   Summaries of research articles

Furthermore, main factors and other relevant information in research data will be narratively recapitulated below in order to gain further insight into them.

1. Girdler et al. (2010, 223-228) in *Vision self-management for older adults: a randomised controlled trial* assessed the effectiveness of a low vision rehabilitation model featuring a multidisciplinary self-management programme combined with usual service. The two-armed RCT had 77 subjects, 36 of whom were randomised into an intervention group featuring usual care and self-management, whereas 41 were randomised into having usual care as a control group. Data collection occurred at baseline, after the end of rehabilitation and, as a follow-up, 12 weeks later. Usual care was based on a case management model, where clients were interviewed at home by a service coordinator in order to assess their own needs and formulate a rehabilitation plan. An assessment to provide low vision aids was performed afterwards by optometrists and orthoptists in a clinic. In addition, based on their plan, clients were able to receive referrals to either internal (e.g. occupational therapy, social work, O&M training, low vision technology) or external service providers. The self-management intervention had an eight-week long structured programme consisting of group therapy and home assignments. The therapy sessions included 8—10 participants and were managed by a social worker and an occupational therapist. The

study measured outcome variables in terms of participation, depression, quality of life, adaptation and self-efficacy. The study found statistical significance in health-related outcomes based on the self-assignment model in comparison to usual care. The study did not disclose in detail which types of reading aids were part of the design.

2. Stelmack et al. (2012, 1162-1168) in *The Effectiveness of Low-Vision Rehabilitation in 2 Cohorts Derived From the Veterans Affairs Low-Vision Intervention Trial* assessed the effectiveness of outpatient low vision rehabilitation programme randomly allocated in two groups featuring patients with macular diseases. The prospective cohort study consisted of 44 subjects, who partook in an outpatient rehabilitation model with no additional therapy after the Veterans Affairs Low-Vision Intervention Trial (LOVIT) had ended four months before. The non-treatment control cohort consisted of 56 subjects, who received standard therapy after four months. Almost all subjects were male. The treatment group participants had five weekly two-hour long low vision therapy sessions at a clinic and a home visit by a low vision therapist. In addition, each participant was given five hours of homework per week. Treatment included an assessment by an optometrist for all and, dependent on individual needs, eye disease education, eccentric viewing training, low vision aid instruction, psychological counselling and social work assistance. Reading aids that were used as part of the study included reading glasses, CCTVs, pocket and stand magnifiers, illumination lamps and glare-reducing filters. Treatment effects were measured between and within groups. Visual abilities such as reading and visual motor skills, among others, were measured as outcomes variables. The study found statistical significance in all visual ability domains at four months in the treatment group. At one year, differences between the groups were smaller, but overall visual ability was still improved in the treatment cohort.

3. Coco-Martin et al**.** (2013, 151-159) in *Design and Evaluation of a Customized Reading Rehabilitation Program for Patients with Age-related Macular Degeneration* investigated the effectiveness of a reading rehabilitation programme (RRP) specifically designed for patients with AMD and its effect on the quality of life. In addition, predictable improvements in reading performance during the programme were being established. The prospective case series included 41 patients with AMD. They were

subjected to a programme intended to enhance functional reading abilities via means of home and clinic-based training methods. Prior to intervention, a multidisciplinary team saw the patients. They were diagnosed by an ophthalmologist and further assessed by an optometrist, after which a low vision therapist along with a psychologist and a social worker gave support if needed. The RRP protocol in turn comprised four 30-minute clinic sessions in a fortnight together with 13 sessions at home interspersed between clinical visits. Low vision devices and eccentric viewing were used as part of customised reading strategies for each patient. Importantly, caregivers at home were considered as vital partners in the RRP. Outcome variables that were measured included reading performance (speed, duration, font size) and quality of life. The study found statistical significance both in enhanced reading performance and perceived quality of life after RRP. However, there was no control group or follow-up on long-term effect.

4. Amore et al. (2014, 31-36) in *Vision Rehabilitation in Patients with Age-related Macular Degeneration* investigated the outcomes of a visual rehabilitation process in patients with AMD. The retrospective review had a sample of 95 patients, who partook in a one-year long multidisciplinary low vision rehabilitation intervention. It consisted of an initial low vision assessment conducted by a psychologist, who assessed the individual needs of patients, and by an ophthalmologist, who performed vision assessments. A multidisciplinary team additionally comprising orthoptists, an O&M teacher and an expert on typhlology were briefed on the results, after which an individual rehabilitation plan was co-designed for each patient, resulting in other professionals meeting the patient if and when needed. Outcome variables that were measured included contrast sensitivity, reading speed and fixation stability. The study reported on the value of the multidisciplinary teamwork being able to attend to concrete needs raised by the patients. In terms of reading aids, the study found particular value in allocating medical filters to reduce glare problems and increase contrast vision. Strong reading glasses, CCTVs, aplanatic systems, monocular or prismatic magnifying spectacles and hand-held magnifiers were among the devices utilised for reading tasks. There were no control group or long-term follow-ups in the study.

5. Rees et al. (2014, 174-181) in *A randomised controlled trial of a self-management programme for low vision implemented in low vision rehabilitation services* assessed the effectiveness of a low vision self-management programme (LVSMP) among older people with low vision. The RCT featured a control group of 60 clients who attended normal low vision services, and an LVSMP intervention group of 93 clients who also received usual services. A multidisciplinary team initially assessed the needs of clients within usual services, resulting in optical aids being allocated and taught how to use, for example. The eight-week long LVSMP intervention included meeting two low vision rehabilitation counsellors in a weekly session. In addition, clients met an orthoptist, a technology support person and an O&M instructor at a rehabilitation centre. Self-management assignments concentrated on goal planning and problem-solving skills especially in relation to independent living skills in home environment. There were one-month and six-month follow-ups to the interventions. The study did not find any statistical significance by LVSMP on vision specific quality of life, adaptation to vision loss or self-efficacy on follow-ups. Depression was also measured as an outcome variable. No specific details were given of reading aids that were used as part of the study design.

6. Tunay et al. (2014, 118-122) in *Low vision rehabilitation for older adults* assessed the causes of low vision in addition to low vision rehabilitation methods and their utilisation in Turkey. The retrospective review comprised 139 patients in a clinical setting. The most common cause for low vision was by far AMD in both 65—74 and 75— age groups. The priority of improving near vision was identified as a main issue for low vision rehabilitation, but there were also benefits to be found in addressing distance vision impediments (e.g. by allocating spectacles if useful) to counter their effect on visual ability. Moreover, the study found overall advantage in referring geriatric patients with no upper age limit to low vision rehabilitation. In terms of reading aids being utilised in Turkey, hyperocular lenses counted for 66.9%. Reading glasses, telemicroscopes, head-mounted labo-clips, hand-held and stand magnifiers as well as electro-optical systems were in use. In contrast to data from western studies, electro-optics were not utilised to a great degree in Turkey. There was no control group in the study. There was a little ambiguity in reporting the 12-month follow-up process.

7. Deemer et al. (2017, 1514-1520) in *Functional outcomes of the low vision depression prevention trial in age-related macular degeneration* investigated the efficacy of behavioural activation conducted in occupational therapy-based low vision rehabilitation by comparing it with standard supportive therapy. The RCT included 188 patients, all of whom had AMD and comorbid depressive symptoms. All participants were twice assessed by optometrists for their need of low vision devices before randomisation. The intervention group of 96 patients was treated by an occupational therapist in one-hour sessions six times within an eight-week span at each patient's home. The focus was on treating depression, and individual plans were jointly based on professional evaluation and patient goals. The control group of 92 patients were supported respectively at home by social workers or counsellors within a similar time frame. All the participants were examined for 50 different targeted vision function goals, which were grouped according to reading, inside-the-home and outside-the-home themes. The study found more statistical significance in the intervention group but also to a lesser degree in the support group in terms of their improved abilities to perform goal-oriented daily activities. No specific details were given as to which reading aids were used in the study, apart from the mention that each participant had been given $350 for paying for the one(s) that the optometrist had recommended.

8. Leat et al. (2017, 354-368) in *The Experience of a Randomized Clinical Trial of Closed-Circuit Television Versus Eccentric Viewing Training for People with Age-Related Macular Degeneration* investigated the effectiveness of both CCTV and eccentric viewing training as a low vision intervention in the rehabilitation of patients with AMD. The parallel-armed RCT had only 10 participants due to difficulties in recruiting. Four of them were randomised into the CCTV group and six into the eccentric viewing training group. Prior to randomisation, each participant partook in a standard comprehensive low vision assessment performed by a low vision therapist to see if they met eligibility criteria, but also for an assessment of their need for optical devices. Reading aids that were considered featured large print, reading stands, line guides, illumination, glare-reducing fit-overs, spectacle-mounted microscopes and hand-held and stand magnifiers. During a baseline visit after six weeks of using the preferred devices, participants were further assessed for their reading performance.

In terms of six-week long interventions, the CCTV group used the same 22" tabletop models at home for a duration of at least 10 minutes twice a day. The eccentric viewing subjects were first trained by a specialist, and then received home assignments, phone call check-ups and a mid-term training visit. The study found statistical significance in the CCTV group for improving the reading speed for 1.3M print. Eccentric viewing was deemed to be less beneficial in reading, since most subjects needed magnification in order to accomplish reading tasks. However, the results of the study were not persuasively generalisable for limitations in the sample size.

7.3   Reading aids in research data

Next, Table 8 is indicative of different kinds of reading aids that were identifiable within the studies included for this review. Three of the studies did not disclose in detail which reading aids were included in their assortment of low vision devices. The range of different devices and methods as reading aids was relatively wide. However, the emphasis seemed to be more on basic or long-running utilisations of technology (e.g. reading glasses or magnifiers), even if electro-optical devices did feature, especially closed-circuit televisions. Moreover, the use of eccentric viewing was reasonably prominent to notice overall.

Table 8 Readings aids in research data

No.	Study	Reading aids
1.	Girdler et al.	Not disclosed in detail
2.	Stelmack et al.	Reading glasses, closed-circuit televisions, monocular telescopes, hand-held and stand magnifiers, reading stands, lamps, glare-reducing filters, eccentric viewing
3.	Coco-Martin et al.	Eccentric viewing, +4D near addition, magnifiers, illuminated magnifiers, stand magnifiers, stand illuminated magnifiers
4.	Amore et al.	Filters, reading glasses, closed-circuit televisions, aplanatic lens systems, monocular and prismatic magnifying spectacles, hand-held magnifiers
5.	Rees et al.	Not disclosed in detail
6.	Tunay et al.	Reading glasses, hyperocular lenses, telemicroscopes, head-mounted labo-clips, hand-held and stand magnifiers, electro-optical systems
7.	Deemer et al.	Not disclosed in detail

8.	Leat et al.	Closed-circuit television, eccentric viewing, large print, reading stands, line guides, illumination, glare-reducing fit-overs, prescription tinted glasses, spectacle-mounted microscopes, hand-held and stand magnifiers

7.4 Data in view of integrated people-centred eye care model

Table 9 lists in numeric format all the strategic approaches of the IPEC model that were identifiable in research data. The numbers 1—8 that are used in this chart refer to numbers allocated for each study in data as shown in Table 7 in Chapter 7.1. The results indicated that there was some variation as regards the prevalence of IPEC among the studies but, overall, there were a few reasonably clear tendencies to be seen. It seemed that, as far as the four tiers of IPEC were concerned, most of the matches occurred in the first category that focuses on individuals, people and communities and in the third one of service integration. In contrast, the fourth category that deals with systems management was by far the least significantly represented.

Table 9 Integrated people-centred eye care model in research data

Empowering and engaging people and communities	Reorienting the model of care	Coordinating services within and across sectors	Creating an enabling environment
Empowering and engaging individuals and families **1, 2, 3, 4, 5, 6, 7, 8**	Defining service priorities based on life course needs **1, 2, 3, 4, 5, 6, 7, 8**	Coordinating care for individuals **1, 2, 3, 4, 5, 6, 7**	Strengthening leadership and management for change
Empowering and engaging communities **1, 2, 5, 7**	Revaluing promotion, prevention and public health	Coordinating health programmes and providers	Strengthening informations systems and knowledge management
Empowering and engaging informal carers **1, 2, 3, 5, 8**	Building strong primary care-based systems	Coordinating across sectors **1, 2, 3, 4, 5, 7**	Striving for quality improvement and safety
Reaching the underserved and marginalised **2, 5**	Shifting towards more outpatient and ambulatory care		Reorienting the health workforce **1, 5, 8**
	Innovating and incorporating new technologies		Aligning regulatory frameworks
			Improving funding and reforming payment systems

Note. Data excluding numbers retrieved and adapted from Framework on integrated, people-centred health services (WHO 2016b, 5-9).

8   Discussion

Since there apparently was no prior literature review into the use of reading aids in low vision rehabilitation of older adults from a people-centred, integrated perspective, the present study aimed to present a concise synthesis on the topic. Before embarking on a detailed discussion on the results, it seems advantageous to recall the research questions of the present study, which were the following ones:

1. What factors contribute to the outcomes involving the use of reading aids in low vision rehabilitation of older adults with low vision?
2. How do these factors appear in relation to the strategic approaches of the integrated people-centred eye care and rehabilitation model?

The final chapter is first divided into two subchapters that aim to answer the research questions according to the findings and draw inferences and conclusions from them. Then, ethicality and reliability of the present study will be contemplated. As a final note, there will be a conclusion to the present study alongside future implications in both practice and research domains.

8.1   Principal findings

To begin with, a tabulated synthesis of research data (Table 7) has indicated that there is a good deal of variation yet also some similarities between the chosen studies; notwithstanding their study designs, they all offer answers to the research questions set in the present study. As it happens, they are all quantitative studies (four randomised clinical trials, a cohort study and three case series studies) from which conclusions can be drawn. According to Coughlan and Cronin (2017, 88), differences in the robustness of quantitative study designs may limit the depth of conclusions, however. Since each included study has nonetheless been peer-reviewed and published in a scientific journal, in addition to having been validated for their quality in Chapter 6.6, they seem reasonably valid and reliable.

In answer to the first research question of the present study, it can be suggested that there are a number of factors that contribute to the outcomes in the research studies. They all seem to quite strongly add to the impression that, in essence, low vision rehabilitation involving readings aids can by nature be rather complex, featuring many different outcome measures (Virgili et al. 2018, 32). Summations of the main factors are below, followed by a more detailed discussion.

- The cause of low vision in the form of a single eye disease (age-related macular degeneration) seems to have a pivotal role as far as outcomes are concerned. The category of moderate vision impairment among subjects seems fairly similar across the studies.

- The origins of studies alongside their demographical information seem to explain to a certain degree some of the outcomes, as they originate from six different countries.

- There is a wide variety of outcome variables and their measurements in use in the studies that makes it difficult to compare their findings. They seem to affect the results in many ways as they predominantly aim to capture the effectiveness of low vision rehabilitation.

- The level of service integration may have a significant effect on the outcomes yet the role of a low vision therapist assessing for reading aids and other devices seems to be pivotal in the process at an early point.

- The spectrum of reading aids that are recommended for use in the studies may factor significantly in the outcomes as they are commonly then used by study participants at later stages in interventions.

As for similarities across the data, perhaps the most apparent one is that four studies, Coco-Martin et al., Amore et al., Deemer et al. and Leat et al. solely concentrate on age-related macular degeneration as the eye disease that has caused low vision in their study subjects, and a fifth, Stelmack et al., nearly identically, if not a little more widely, focuses on macular diseases only. In addition, the remaining three studies reveal values around 70—79% of their subjects having AMD, including Tunay et al., the study from Turkey. However, this pattern of evidence is in line with statistical information regarding the common causes of vision impairment, with AMD exceedingly being the main reason among older adults in high-income western societies (WHO 2019c). This circumstance does implicate, though, that findings of the present study

cannot be generalised to relate to other conditions outside macular diseases. On the other hand, they may be applicable to low vision rehabilitation concerning central vision loss caused by macular diseases instead.

The origins of the studies are also of interest, since they may offer representations of how low vision services are institutionally being organised. There are two studies from USA, two from Australia, and one each from Spain, Italy, Turkey and Canada. It appears that, as all the studies at some point involve or refer to both eye care professionals and rehabilitation workers, they can be considered representative of tertiary level services (Lim et al. 2014, 311). However, some study protocols seem to indicate that the study subjects may have benefitted from services that would normally have been out of their reach. For example, both Stelmack et al. and Girdler et al. report having offered transportation services for free in their focus groups. Deemer et al. have provided their intervention subjects with $350 for buying recommended low vision devices. Therefore, it may be partly feasible to infer that in USA and Australia (origins of the above-mentioned studies) there may be barriers within the healthcare system, which is largely based on insurance and third-party models (Lim et al. 2014, 314-315). However, this aspect of service funding is not elaborated in detail in the studies, which limits interpretations on it.

As for demographics, studies feature participant groups that are between 76 to 84 years old in terms of their mean ages. The somewhat high age range brings attention to the implication that in many interventions there is a need to take into account confounding factors such as comorbidities and other age-related issues that may affect low vision rehabilitation. Attesting to prior knowledge (Fraser 1997, 86), comprehensive low vision assessments that take into account cognitive, social and psychological functions are being deployed in many of these studies, and apparently for good reason. However, it seems that only Tunay et al. specifically highlight the assessment of very old people's needs for reading aids. In doing so, they appear to affirm Lim and others (2014, 314-315) in their notion of systemic barriers existing in healthcare by noting the lack of referrals for a specific segment of people to low vision service provision.

In regard to mean distance visual acuities with best correction (BCVAs) that are referenced in the studies, most are reported between 0.1—0.2 in decimal notation, which probably located many of their subjects in the moderate vision impairment category (ICD-11). The only exceptions are Rees et al., who only refer to a full range below 0.45 (of which 87% are below 0.3), and Leat et al., with a range of 0.05—0.125. The latter range seems understandable in a study about CCTVs, since they are often allocated in cases of severe vision impairment when magnification demands are higher than basic optical magnifiers can attain (Wilkinson 2010, 276). However, it must be reiterated that these BCVA readings are for distance vision and, as such, may be a little problematic as a starting point for low vision assessments, since it has previously been demonstrated in macular diseases in particular that near visual acuities may be lower than those of distance ones under examination (Wilkinson 2010, 262). Notably, the International Council of Ophthalmology has been advocating since 2002 the inclusion of both near and distance BCVAs into a standard eye test procedure when trying to assess reading ability (Visual Standards 2002, 25). In fairness, some of the research articles do report near BCVAs (in particular the ones that deal with reading ability, albeit with differing protocols), and ICD-11 is expected to highlight near vision deficits in the near future, which is promising since near-vision related everyday tasks are not limited to reading only.

The question of different outcome measures being used in the studies seems a rather easy one to notice, but more difficult to answer. Virgili and others (2018, 32) have noted that the reason for such designs may originate from trying to cater for "the whole experience" in low vision rehabilitation. It is an interesting concept, yet in terms of only comparing the results from depression-related outcome measures in Girdler et al., Rees et al., and Deemer et al. it appears that concerted efforts to validate certain methods of measurement in interventions most studied in low vision rehabilitation could perhaps better advance making comparisons of them. According to Ehrlich and others (2016, 46), both patient-reported and performance-based outcome measures can be used effectively in low vision research, particularly in RCTs, but they should be used in view of addressing the individual objectives of participants in a more prominent manner so that they could better realise the relevance of the outcomes by and to themselves.

Furthermore, it is somewhat clear according to research data that integrated low vision services are being widely used to achieve better results in low vision rehabilitation. Six studies, Girdler et al., Stelmack et al., Coco-Martin et al., Amore et al., Rees et al. and Deemer et al., can be deemed to focus on integrated services, that is, the interventions depicted in their studies take place using multi- or interdisciplinary teamwork approaches in expansive outpatient services. This pattern of evidence seems to be consistent with Binns and others (2012, 36), who have stated that low vision service integration has gradually deepened from hospital services to include social, psychological or counselling services, among others. However, it is fairly difficult to compare the integrated services depicted in the studies, due to the different nature of their interventions and outcome variables.

Notwithstanding the level of service integration, in practically every study there appears to be one essential part present either in the early phases of prospective research or in the early steps of service provision in retrospective reviews: that of a low vision therapist or an optometrist performing an assessment to evaluate individual needs for low vision devices, inclusive of reading aids. As a result, this finding appears to positively attest to the hypothesis of the present study, which referenced Owsley and others (2009, 687) stating that assessing for low vision devices is an integral part of low vision rehabilitation regardless of other components in service provision.

Moreover, it is interesting to note that both Australian RCT-studies feature similar self-management interventions, the origins of which seem to stem from the same model, yet they reach quite polarising results based on their findings. This may at least partly be explained by Rees et al.'s allusion of Girdler et al.'s research team having been part of the low vision rehabilitation staff in their own study, which is an obvious concern for researcher bias in Girdler et al. Nonetheless, seemingly contradictory results like these call for more rigorous study methods to be applied in low vision rehabilitation research, as has previously been inferred (Binns et al. 2012, 59; Virgili et al. 2018, 34).

There is a range of specific reading aids mentioned in research data, as can be seen in Table 8. They are mostly optical devices, except for electronic devices (CCTVs and electro-optics) and other means (eccentric viewing, large print, illumination). Three studies, Girdler et al., Rees et. al. and Deemer et al., all of which are RCTs, have not disclosed their aids. Nevertheless, the principal role of AMD and its effect on choices is reasonably clear to see among the set of reading aids. For example, the somewhat high frequency of eccentric viewing as a method is probably due to this reason. Eccentric viewing is known to be of use in cases of central vision loss, as peripheral vision is being used to seeing monocularly (Fraser 1997, 101).

Furthermore, Leat et al. present an interesting comparison between eccentric viewing and CCTVs as reading aids, whilst rearing the cost-effectiveness of different devices and methods to the fore. At face value it may appear that eccentric viewing training is quite an inexpensive method, but usually there has been a lot of training involved for therapists before actual work even commences. In addition, it is a time-consuming method to practice in comparison to teaching the use of CCTVs, the fact of which is realised in the wages of low vision therapists, in particular. Moreover, previous research concerning portable optical devices, which are usually by far cheaper than CCTVs, has already indicated that in terms of cost-effectiveness they are best used when supplementing basic optical magnifiers instead of superseding them (Bray, Brand, Taylor, Hoare, Dickinson & Edwards 2017, 422). However, it cannot be postulated that CCTVs ought to be used as supplementary items due to cost-effective measures, since it seems there is not enough conclusive research into the matter.

Interestingly, Amore et al. and Leat et al. have filters or other glare-reducing items in their studies as reading aids. In particular, Amore et al. advocate the use of polarised filters in their practice implications for increasing visual comfort levels and acting as anti-radiation items; they also refer to supporting evidence. However, according to the recent systematic review by Virgili and others (2018, 4) on the effects of reading aids, there exists no strong evidence in favour of using filters as reading aids. Similarly, prismatic glasses are viewed favourably in Amore et al., but Virgili and others (2018, 4) have demonstrated that their effectiveness seems limited at best.

Therefore, due to contradictory findings, it appears that there should be more studies on the usage of both filters and prism spectacles, in particular on their long-term effects when applied to low vision reading rehabilitation.

In conclusion, it seems reasonable to infer that many of these above-mentioned factors are often intertwined with one another in the very context of low vision interventions taking place and, as such, they seem holistic by nature and thus difficult to differentiate from each other. The analysis to which they were subjected may also be lacking in understanding, for example, cultural, societal or institutional factors deeply engrained in these studies. Additionally, the number of studies included in this review is relatively low, and their study designs and implementations vary a great deal from one another, which may all significantly hinder the generalisability of these findings. Therefore, it seems reasonable to simply conclude that, ultimately, low vision rehabilitation of older adults involving reading aids seems to be a multifaceted and to some extent effective experience for its subjects.

8.2   Findings in view of integrated people-centred eye care model

The secondary objective of the present study was to assess the extent to which strategic approaches of the IPEC model could be detected in the factors that contribute to research outcomes. As can be seen in Table 9 earlier, there is a certain degree of detectable correlation among the data. The synthesis below will be categorical as per the IPEC model and its strategic approaches, after the second research question has been addressed.

In answer to the second research question of the present study, it can be surmised that the extent to which factors related to the outcomes in research data appear in strategic IPEC approaches seems limited in certain categories yet relatively assured in others, as the two most frequently matched IPEC categories seem to reflect the intrinsic nature of low vision rehabilitation practices: that of treating people in a comprehensive and empowering manner while also guiding them within and across different sectors in and out of the healthcare. However, as the number of studies

included in this review is relatively low, and there are differences in their study designs and implementation, these findings may not be generalisable to a high degree.

1. *Empowering and engaging people and communities*

First and foremost, the category that deals with individuals, families and communities appears to have amassed the highest number of matches in data. It is somewhat evident from data that there is a concerted effort in all of the interventions in different studies to include their subjects in shared decision making at various points in the rehabilitation process. Typically, it shows in instances where individual needs are being attended, for example, while assessing for low vision aids. In addition, self-management programmes such as those figuring in Girdler et al. and Rees et al. are in accordance with IPEC. It can also be seen that community-based models of rehabilitation feature in Girdler et al., Stelmack et al., Rees et al. and Deemer et al.

Moreover, informal caregivers are included in half of the studies: Girdler et al., Stelmack et al., Coco-Martin and Rees et al. highlight their roles, for example, as those who can assist while various daily activities are being performed at home or who can give direct feedback in reading assignments. Rees et al. have included an expert advocacy group in their rehabilitation programme as a way of engagement. Lastly, in terms of providing outreach services, Stelmack et al. and Rees et al. feature examples of them: treatment group patients have access to free transportation to and from the rehabilitation centre in the former, whereas the latter describe provisions of free transportation for their subjects as a way of helping them reach their planned individual goals in urban areas.

One of the reasons why this category may have gathered a good deal of correlation is that low vision rehabilitation practices have long been known to being aware of how important it is to treat clients with respect and dignity. As the focal point of this IPEC category is to view people and communities as true assets, measures that aim at empowering them are considered vital (WHO 2015, 21). Such measures are included in general low vision practice instructions, for example, by advising low vision

assessments of older people to include their families and communities in the process from the beginning (Watson & Echt 2010, 883).

2. *Reorienting the model of care*

The second category of IPEC brings to attention the need to reorient the models of care and rehabilitation on the grounds of life course-specific needs. According to the data, there seem to be a somewhat clear pattern in all of the studies as regards their sensitivity to age-related services – and quite plausibly so, since the target populations are restricted to those of older adults. Interestingly, even if it is not eminently underlined, the study of Stelmack et al. that features an all-male treatment group, and a predominantly male support group, appears as the most gender-sensitive one among the data. This appears to result from the focus group of the study, which is derived from a rehabilitation trial concerning veterans of war. In addition, it can be said with high probability that all of the research studies seem to feature health technology assessments, including those of reading aids, that fit the IPEC criteria.

However, as far as rest of the approaches in this category are concerned, it somewhat unavoidably seems as though IPEC is more primary care-oriented here in essence than any of the research studies, since most of them are concerned with tertiary-level rehabilitation processes. There are examples of outpatient rehabilitation in Stelmack et al. and ambulatory services in Deemer et al., but since they are not part of primary care, they cannot be included in the category. It appears in this connection that, as Lim and others (2014, 314) have stated, there may well be a need for systemic changes in eye healthcare, so that modes of evidence-based rehabilitation practices, such as those aroused in research data, could be incorporated into primary care services as well. Moreover, as the exclusion criteria of the present study contained brand-new technology, no major technological advancements as advocated by IPEC can be detected in research data.

3. *Coordinating services within and across sectors*

The third category of strategic IPEC approaches is another one that is reasonably widely featured in research data, as the focus falls on the coordination of care and rehabilitation services. For example, Tunay et al. have voiced a demand for better, more effective referral pathways into low vision services. Furthermore, case management is seen as an effective way of improving coordination between services in all the studies except in Leat et al. whose study is more low vision aid specific. However, it must be noted that only Girdler et al. actually name 'case management' verbatim in their study, but similar modes of action (bar the actual term) can be detected elsewhere. The role of a case manager seems to fall on different personnel, most often it seems to be the onus of counsellors or nurses. In addition, intersectional partnerships can be detected among the studies. Usually these include at least social services, such as in Girdler et al., Stelmack et al., Coco-Martin et al., Rees et al. and Deemer et al. This kind of service integration can be deemed typical for recent low vision services (Binns et al. 2012, 36).

4. *Creating an enabling environment*

The final category of IPEC is also the least represented among the research data. The reason for this may simply rest in the notion that the main purposes of the studies do not concern themselves with quality assurance or management issues. Rather, they are interested in other means of effectiveness, whereas the focus of IPEC is here based on strengthening information and finance systems to be more effective (WHO 2016b, 10). However, there is one subcategory that is featured in data: *Reorienting the health workforce.* In terms of transorganisational, multiprofessional teams, this ideal model is clearly depicted in one way or another in both Girdler et al. and Rees et al. as there are services incorporated from outside their home organisations (named as external providers in the former and advocacy group representatives in the latter). Moreover, the study of Leat et al. can be viewed to be pondering health workforce training issues in its depiction of eccentric viewing training costs. In this respect, there is an effort to consider the total expenditure of low vision service provision (Wang et al. 2018, 850).

In conclusion, it appears that there are a number of strategic approaches of IPEC present in research data, but for several reasons they are mostly found in a few categories and subcategories. On the grounds of these findings, it seems plausible to infer that low vision services that include assessments of reading aids are already at a good level of empowering and engaging individuals, people and communities as part of their practice. In doing so, they form a wider, all-inclusive context that is fundamentally integrated and people-centred (De Maeseneer et al. 2012, 602). Similarly, service integration seems to be a somewhat crucial part of recent practices.

However, low vision rehabilitation is shown to be limited at best in creating new environments within the service or reorienting the models of rehabilitation on the basis of the research studies. This may partly be due to IPEC being country-led in its implementation procedure concerning the strengthening of the eye healthcare system (WHO 2016b, 10), the level of which is not present in data. In fairness, though, these two categories do concern themselves more with issues related to either primary care or systems management. It seems fair to say that, after all, it is in IPEC's inherent nature to cater for universal eye healthcare worldwide (WHO 2019b, 147), which means advocating all areas of eye care and rehabilitation on every systemic level, to which the sample of the present study can only partly answer.

8.3   Ethicality and reliability of the study

There are different strategies available for assessing the ethicality and reliability of an integrative review. The following assessment will relate to the methodological pattern that was implemented in the present study. To be reliable, in essence, an integrative review needs to pay close attention to its congruence by acknowledging a variety of factors that are related to its credibility and integrity (Coughlan & Cronin 2017, 151).

To start with, the present study was initially formulated from the premise of being intrigued by low vision assessments of older adults. The planning and preparation stage consisted of some careful groundwork especially into the eligibility criteria so that it had a clear focus based on the research questions and overall study design

(Aveyard 2014, 76). Whilst planning for the study, the author perused through literature on methodology, previous integrative reviews and systematic reviews, alongside theses and dissertations on similar topics. The purpose was to identify the aim and objectives of the study while simultaneously developing research questions. A PICoS framework was utilised in the process of framing the research questions and eligibility criteria more clearly. (Lockwood, Munn & Porritt 2015, 181.) Research questions were not altered after data extraction, and they had already been pre-assessed for suitability while testing different databases. However, it appears as though the initial framing may have possibly been too strict, as it eventually resulted in only eight quantitative studies. Nonetheless, the aim was to decrease the possibility of an early systematic bias, which could have later resulted in wide-ranging false inferences (Malone, Nicholl & Tracey 2014, 279).

The search strategy was formulated on the basis of research questions and eligibility criteria. The choice was taken to search systematically for three different databases, Cochrane Database of Systematic Reviews, ProQuest Central and Scopus. The first one was used mainly as a tool to scope for systematic reviews whereas the latter two were intended as main tools for extracting various study designs. The search terms were exactly the same in each database apart from idiosyncrasies involving, for instance, the use of quotations marks. It must be acknowledged that the choice of databases may have contributed to a selection bias by not including documents that could have been instrumental as regards the target population (Malone et al. 2014, 279). No library information specialist was approached for guidance at any stage, either, which may have decreased the credibility of the study. Nonetheless, the data extraction process is clearly outlined and ought to be reproducible. Figure 2 could have included clearer information on what kind of documents were excluded at various stages in order to ensure unequivocal plausibility (Lockwood et al. 2015, 183).

Furthermore, as the critical appraisal of data quality for final analysis was executed solely by the author of the present study with no outside assistance, it may have contributed to another selection bias and, as such, decreased the credibility of the study. However, it must be noted that each original research article had been peer-reviewed and published in a scientific journal in the first place. The results of the study

were duly noted by using different tabulations, which were briefly introduced, alongside textual summaries of the research articles. Strategic IPEC approaches were identified in a tabulation of their own. All of this was aimed at synthesising data into more coherent units, by structuring and presenting them in a detailed manner (Coughlan & Cronin 2017, 94). However, parts of the quantitative data were difficult to decipher; possible misunderstandings related to them may have decreased the credibility of the present study. Additionally, methods of outcome measures in data were only superficially discussed, which may have been detrimental to the integrity of the analysis.

The discussion of findings was divided into two parts, chiefly for the reason of being able to answer the twofold research question in separate parts. Principal findings were based on being able to connect main data points with previous studies, as described earlier in background information, and other relevant studies, in order to identify them. However, for the integrity of the study, they could have been summarised and synthesised more succinctly, even if critical discussive points were directly derived from the results (Aveyard 2014, 158). Additionally, in the second part of discussion there was a categorical grouping following the IPEC strategies. For the credibility of the study, the subchapter in question may not have had enough critical discussion in terms of the integrated people-centred eye care model and, in effect, the framework of the present study. However, there was more integrity to be found when presenting research and practice implications, which included direct links to principal findings in discussion (Aveyard 2014, 163). Lastly, it is to be hoped that both the penmanship and prior expertise on the topic by the author have been expressed clearly enough in writing (Coughlan & Cronin 2017, 151).

To conclude, conducting an integrative literature review is a rigorous process that is demanding on many levels. The above-mentioned account was first and foremost told in relation to the reliability of the present study, but it also had everything to do with ethical considerations, since almost all of the decisions taken in the study have been taken by the author of the study in an independent manner. A lone author can be susceptible to errors and faults when trying to stay objective and truthful to the cause of the study, but in terms of autonomy, the goal has been from the very

beginning to act in an honest and principled manner (Coughlan & Cronin 2017, 149). Nevertheless, during the study process it has emerged that an integrative review can in fact be a powerful tool in unearthing new viewpoints within a complex world of a chosen topic (Whittemore & Knafl 2005, 552).

8.4   Conclusion, research and practice implications

There is an old saying in the field of low vision rehabilitation that goes, *"There is a long way ahead for them."* Regardless of what an individual life course may in fact retain for anybody concerned, it is meant to convey the idea of coming to terms with an adventitious vision impairment that may take years to realise. By all accounts, there appears to be a multitude of factors that can contribute to such a potentially life-altering process. Watson and Echt (2010, 886) have provided with a set of principles that low vision assessments of older people in such cases need to be aware of. First of all, the individual in question needs to be viewed as a whole entity, along with their family and close ones. Other health conditions that may influence the assessment need to be taken into account. Moreover, rehabilitation process should be approached using multidisciplinary work methods. Crucially, realistic objectives that are shared by all parties ought to be created in order to facilitate the process.

The above-mentioned set of principles seems to fit quite well with the answers that the present study was able to achieve through its implementation of an integrative literature review. There seems to be a number of wide-ranging factors related to the the use of reading aids in low vision rehabilitation of older adults. As the focus was on how these factors were relative to the strategic integrated and people-centred approaches of IPEC, it appears that the principal findings do support to a certain extent the multidisciplinary and integrated nature of low vision rehabilitation practices involving the use of reading aids in high-income countries. As a consequence, these findings may hold promise for older adults with low vision, in so far as their service provision is concerned that they will be provided and treated with comprehensive means of low vision rehabilitation, including the assessment of reading aids as a vital component in the process. In that regard, nobody will be left as an island in the grand scheme of things.

Naturally, the long way ahead includes those that will continue to work in the field of low vision rehabilitation. In an ideal world, there would be no limitations on time or resources in the very field, but since there are – and probably will continue to be – there was a timely need to conduct the present study in order to find new and effective ways that could be of use for expanding expertise, among other things. As a result, there are a few practice and research implications to be drawn on the grounds of findings that have been unearthed by the present study.

First, in terms of research, the following implications can be suggested from the findings:

- There is a need for more robust study designs to be incorporated when conducting low vision rehabilitation research. Prospective analytic designs such as randomised controlled trials, cohort studies and case-control studies should be favoured before other designs. Studies should include follow-ups for long-term effects.

- The scale of different outcome measures should be more condensed to include generally accepted and certified ones in order to facilitate the comparisons between outcomes as there seems to be a lot of incompatibility as to which outcome measures are being applied in low vision research in the present.

- Based on the data extraction phase of the present study, there seems to be an apparent lack of studies concentrating on the very old people, those aged 80 or more. This is an age segment that should be studied in more detail because it is growing in numbers as clients-to-be in low vision rehabilitation.

Second, for practice implications with regard to reading aids in particular, the following inferences are suggested to be taken into consideration:

- Low vision assessment by a low vision therapist should be undertaken in the early stage of the rehabilitation process so that any recommended device would be adopted into use as early as possible for better outcomes during later stages.

- The role of a low vision therapist conducting low vision assessments seems pivotal in many service environments; it may pay dividends not to decrease the funding of such service providers ahead of a projected influx of aging populations.

- It should be critically considered how to effectively conduct low vision assessments of reading aids and in which environment. According to data, compherensive assessments were mostly performed in a clinical setting, followed by in-home training.

References

Aveyard, H. 2014. Doing a literature review in health and social care: A practical guide (3rd edition ed.). Maidenhead: Open University Press.

Binns, A.M., Bunce, C., Dickinson, C., Harper, R., Tudor-Edwards, R., Woodhouse, M., Linck, P., Suttie, A., Jackson, J., Lindsay, J., Wolffsohn, J., Hughes, L. & Margrain, T.H. 2012. How Effective is Low Vision Service Provision? A Systematic Review. Survey of Ophthalmology, 57, 1, 34-65. Accessed on 28 September. Retrieved from https://doi.org/10.1016/j.survophthal.2011.06.006

Bray, N., Brand, A., Taylor, J., Hoare, Z., Dickinson, C. & Edwards R.T. 2017. Portable electronic vision enhancement systems in comparison with optical magnifiers for near vision activities: an economic evaluation alongside a randomized crossover trial. Acta Ophthalmologica, 95, 5, 415-423. Accessed on 28 October 2020. Retrieved from https://doi.org/10.1111/aos.13255

Corn, A.L. & Lusk, K.E. 2010. Perspectives on Low Vision. In Corn, A. L., & Erin, J. N. (Eds.). Foundations of Low Vision: Clinical and Functional Perspectives (2nd ed.). New York: AFB Press, American Foundation for the Blind.

Coughlan, M., & Cronin, P. 2017. Doing a literature review in nursing, health and social care (2nd edition ed.). London: SAGE Publications Ltd.

De Maeseneer, J., Van Weel, C., Daeren, L., Leyns, C., Decat, P., Boeckxstaens, P., Avonts, D. & Willems, S. 2012. From "patient" to "person" to "people": the need for integrated, people-centered healthcare. The International Journal of Person-Centered Medicine, 2, 3, 601-614. Accessed on 26 September 2020. Retrieved from https://biblio.ugent.be/publication/3181476/file/6788443.pdf

Dister, R. & Greer, R. 2004. Basic Optics and Low Vision Devices. In Lueck, A.H. (Ed.). Functional Vision: A Practitioner's Guide to Evaluation and Intervention (1st ed.). New York: AFB Press, American Foundation for the Blind.

Ehrlich, J.R., Spaeth, G.L., Carlozzi, N.E. & Lee, P.P. 2017. Patient-Centered Outcome Measures to Assess Functioning in Randomized Controlled Trials of Low-Vision Rehabilitation: A Review. The Patient – Patient-Centered Outcomes Research, 10, 1, 39-49. Accessed on 1 November. Retrieved from https://link.springer.com/article/10.1007/s40271-016-0189-5

Flom, R. 2004. Visual Functions as Components of Functional Vision. In Lueck, A.H. (Ed.). Functional Vision: A Practitioner's Guide to Evaluation and Intervention (1st ed.). New York: AFB Press, American Foundation for the Blind.

Fraser, K.E. 1997. Low vision and Low Vision Devices. In Moore, J. E., Graves, W., & Patterson, J. B. (Eds.). Foundations of Rehabilitation Counseling with Persons who are Blind or Visually Impaired (1st ed.). New York: AFB Press, American Foundation for the Blind.

Goldstein, J.E., Massof, R.W., Deremeik, J.T., Braudway, S., Jackson, M.L., Kehler, K.B., Primo, S.A. & Sunness, J.S. 2012. Baseline Traits of Low Vision Patients Served by Private Outpatient Clinical Centers in the United States. Archives of Ophthalmology, 130, 8, 1028-1037. Accessed on 28 October. Retrieved from https://doi.org/10.1001/archophthalmol.2012.1197

Goodrich, G.L. & Huebner, K.M. 2010. Low vision: A History in Progress. In Corn, A.L., & Erin, J.N. (Eds.). Foundations of Low Vision: Clinical and Functional Perspectives (2nd ed.). New York: AFB Press, American Foundation for the Blind.

Griffin-Shirley, N. & Bozeman, L. 2016. Vision Loss and Older Adults: Considerations for the Orientation and Mobility Professional. In Griffin-Shirley, N. & Bozeman, L. (Eds.). O&M for Independent Living: Strategies for Teaching Orientation and Mobility for Older Adults. New York: AFB Press, American Foundation for the Blind.

Hess, D.R. 2004. Retrospective Studies and Chart Review. Respiratory Care, 49, 10, 1171-1174. Accessed on 14 October. Retrieved from http://rc.rcjournal.com/content/respcare/49/10/1171.full.pdf

Joanna Briggs Institute. 2020a. Checklist for Case Series. The Joanna Briggs Institute. Accessed on 15 October 2020. Retrieved from https://joannabriggs.org/sites/default/files/2020-08/Checklist_for_Case_Series.pdf

Joanna Briggs Institute. 2020b. Checklist for Cohort Studies. The Joanna Briggs Institute. Accessed on 15 October 2020. Retrieved from https://joannabriggs.org/sites/default/files/2020-10/Checklist_for_Cohort_Studies.pdf

Joanna Briggs Institute. 2020c. Checklist for Randomised Controlled Trials. The Joanna Briggs Institute. Accessed on 15 October 2020. Retrieved from https://joannabriggs.org/sites/default/files/2020-08/Checklist_for_RCTs.pdf

Lim, Y.E. & Vukicevic, M. & Koklanis, K. & Boyle, J. 2014. Low Vision Services in the Asia-Pacific Region: Models of Low Vision Service Delivery and Barriers to Access. Journal of Visual Impairment & Blindness, 108, 4, 311-322. Accessed on 26 September. Retrieved from https://doi.org/10.1177%2F0145482X1410800406

Lockwood, C., Munn, Z. & Porritt, K. 2015. Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation. International Journal of Evidence-Based Healthcare, 13, 3, 179-187. Accessed on 4 November 2020. Retrieved from https://doi.org/10.1097/xeb.0000000000000062

Lueck, A.H. 2004. Compherensive Low Vision Care. In Lueck, A.H. (Ed.). Functional Vision: A Practitioner's Guide to Evaluation and Intervention (1st ed.). New York: AFB Press, American Foundation for the Blind.

Malone, H., Nicholl, H. & Tracey, C. 2014. Awareness and minimisation of systematic bias in research. British Journal of Nursing, 23, 5, 279-282. Accessed on 4 November 2020. Retrieved from http://dx.doi.org/10.12968/bjon.2014.23.5.279

Munn, Z., Stern, C., Aromataris, E., Lockwood, C., & Jordan, Z. 2018. What kind of systematic review should I conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences. BMC medical research methodology, 18, 5, 1-9. Accessed on 28 September 2020. Retrieved from https://doi.org/10.1186/s12874-017-0468-4

Natarajan, S. 2013. Low vision aids: A boon. Indian Journal of Ophthalmology, 61, 5, 191-192. Accessed on 7 October 2020. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3730499/

Ojamo, M. 2019. Näkövammarekisterin vuosikirja 2018. Näkövammarekisteri. Accessed on 21 September 2020. Retrieved from https://cms.nkl.fi/sites/default/files/2020-03/Näkövammarekisterin%20vuosikirja%202018%20näköisversio_0.pdf

OSF. 2019. Official Statistics of Finland: Population projection. Helsinki: Statistics Finland. Accessed on 2 November 2020. Retrieved from http://www.stat.fi/til/vaenn/2019/vaenn_2019_2019-09-30_tie_001_en.html

Owsley, C., McGwin Jr, G., Lee, P.P. & Wasserman, N. 2009. Characteristics of Low-Vision Rehabilitation Services in the United States. Archives of Ophthalmology, 127, 5, 681-689. Accessed on 6 October 2020. Retrieved from https://doi.org/10.1001/archophthalmol.2009.55

Sacks, S.Z. 2010. Psychological and Social Implications of Low Vision. In Corn, A.L., & Erin, J.N. (Eds.). Foundations of Low Vision: Clinical and Functional Perspectives (2nd ed.). New York: AFB Press, American Foundation for the Blind.

Virgili, G., Acosta, R., Bentley, S.A., Giacomelli, G., Allcock, C. & Evans, J.R. 2018. Reading aids for adults with low vision. Cochrane Database of Systematic Reviews 2018, issue 4. Accessed on 28 September. Retrieved from https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003303.pub4/full

Visual Standards. 2002. Visual Standards – Aspects and Ranges of Vision Loss with Emphasis on Population Surveys. Report. Sydney: International Council of Ophthalmology.

Waisbourd, M., Ahmed, O.M., Newman, J., Sahu, M., Robinson, D., Siam, L., Reamer, C.B., Zhan, T., Goldstein, M., Kurtz, S., Moster, M.R., Hark, L.A. & Katz, L.J. 2019. The Effect of an Innovative Vision Simulator (OrCam) on Quality of Life in Patients with Glaucoma. Journal of Visual Impairment & Blindness, 113, 4, 332-340. Accessed on 7 October. Retrieved from https://doi.org/10.1177%2F0145482X19869797

Wang, X., Sun, X., Birch, S., Gong, F., Valentijn, P., Chen, L., Zhang, Y., Huang, Y., & Yang, H. 2018. People-centred integrated care in urban China. Bulletin of the World Health Organization, 96, 12, 843–852. Accessed on 4 October 2020. Retrieved from https://doi.org/10.2471/BLT.18.214908

Watson, G.R. & Echt, K.V. 2010. Aging and Vision Loss. In Corn, A.L., & Erin, J.N. (Eds.). Foundations of Low Vision: Clinical and Functional Perspectives (2nd ed.). New York: AFB Press, American Foundation for the Blind.

Whittemore, R. & Knafl, K. 2005. The integrative review: Updated methodology. Journal of Advanced Nursing, 52, 5, 546-553. Accessed on 25 September 2020. Retrieved from https://doi.org/10.1111/j.1365-2648.2005.03621.x

WHO. 2017. 10 facts on ageing and health. World Health Organization. Accessed on 25 September 2020. Retrieved from https://www.who.int/news-room/fact-sheets/detail/10-facts-on-ageing-and-health

WHO. 2019c. Blindness and vision impairment. World Health Organization. Accessed on 20 September 2020. Retrieved from https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment

WHO. 2016b. Framework on integrated, people-centred healthcare services. World Health Organization. Accessed on 20 September 2020. Retrieved from https://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_39-en.pdf?ua=1

WHO. 2015. Global strategy on people-centred and integrated health services. Interim report. World Health Organization. Accessed on 23 September. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/155002/WHO_HIS_SDS_2015.6_eng.pdf?sequence=1

WHO. 2019a. Vision impairment including blindness. ICD-11 for mortality and morbidity statistics. World Health Organization. Accessed on 20 September 2020. Retrieved from https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f1103667651

WHO. 2016a. Visual impairment including blindness. ICD-10 Version:2016. World Health Organization. Accessed on 20 September. Retrieved from https://icd.who.int/browse10/2016/en#!/H53-H54

WHO. 2019b. World report on vision. World Health Organization. Accessed on 20 September 2020. Retrieved from https://www.who.int/publications/i/item/world-report-on-vision

Wilkinson, M.E. 2010. Clinical Low Vision Services. In Corn, A.L., & Erin, J.N. (Eds.). Foundations of Low Vision: Clinical and Functional Perspectives (2nd ed.). New York: AFB Press, American Foundation for the Blind.

Wolffe, K.E. 2010. Rehabilitation Services for Adults with Low Vision: Personal, Social and Independent Living Needs. In Corn, A.L., & Erin, J.N. (Eds.). Foundations of Low Vision: Clinical and Functional Perspectives (2nd ed.). New York: AFB Press, American Foundation for the Blind.

Zimmerman, G.J., Zebehazy, K.T. & Moon, M.L. 2010. Optics and Low Vision Devices. In Corn, A.L., & Erin, J.N. (Eds.). Foundations of Low Vision: Clinical and Functional Perspectives (2nd ed.). New York: AFB Press, American Foundation for the Blind.

Original research articles included in final analysis

Amore, F.M., Fortini, S., Silvestri, V., Sulfaro, M., Pacifici, A. & Turco, S. 2014. Vision Rehabilitation in Patients with Age-related Macular Degeneration. Rehabilitation Process and Outcome, 3, 31-36. Accessed on 10 October 2020. Retrieved from https://doi.org/10.4137%2FRPO.S12364

Coco-Martin, M.B., Cuadrado-Asensio, R., Lopez-Miguel, A., Mayo-Iscar, A., Maldonado, M.J. & Pastor, J.C. 2013. Design and Evaluation of a Customized Reading Rehabilitation Program for Patients with Age-related Macular Degeneration. Ophthalmology, 120, 1, 151-159. Accessed on 10 October 2020. Retrieved from https://doi.org/10.1016/j.ophtha.2012.07.035

Deemer, A.D., Massof, R.W., Rovner, B.W., Casten, R.J. & Piersol, C.V. 2017. Functional outcomes of the low vision depression prevention trial in age-related macular degeneration. Investigative Ophthalmology and Visual Science, 58, 3, 1514-1520. Accessed on 10 October 2020. Retrieved from https://doi.org/10.1167/iovs.16-20001

Girdler, S.J., Boldy, D.P., Dhaliwal, S.S., Crowley, M. & Packer, T.L. 2010. Vision self-management for older adults: a randomised controlled trial. British Journal of Ophthalmology, 94, 2, 223-228. Accessed on 10 October 2020. Retrieved from http://dx.doi.org/10.1136/bjo.2008.147538

Leat, S.J., Si, F.F., Gold, D., Pickering, D., Gordon, K. & Hodge, W. 2017. The Experience of a Randomized Clinical Trial of Closed-Circuit Television Versus Eccentric Viewing Training for People with Age-Related Macular Degeneration. Journal of Visual Impairment & Blindness, 111, 4, 354-368. Accessed on 11 October. Retrieved from https://doi.org/10.1177%2F0145482X1711100405

Rees, G., Xie, J., Chiang, P.P., Larizza, M.F., Marella, M., Hassell, J.B., Keeffe, J.E. & Lamoureux, E.L. 2014. A randomised controlled trial of a self-management programme for low vision implemented in low vision rehabilitation services. Patient Education and Counseling, 98, 2, 174-181. Accessed on 10 October. Retrieved from https://doi.org/10.1016/j.pec.2014.11.008

Stelmack, J.A., Tang, C., Wei, Y. & Massof, R.W. 2012. The Effectiveness of Low-Vision Rehabilitation in 2 Cohorts Derived From the Veterans Affairs Low-Vision Intervention Trial. Archives of Ophthalmology, 130, 9, 1162-1168. Accessed on 11 October. Retrieved from https://doi.org/10.1001/archophthalmol.2012.1820

Tunay, Z.Ö., Idil, A., Petriçli, I.S. & Özdemir, Ö. 2015. Low vision rehabilitation for older adults. Turkish Journal of Ophthalmology, 46, 3, 118-122. Accessed on 11 October. Retrieved from http://dx.doi.org/10.4274/tjo.68878

Appendices

Appendix 1. Interventions and policy options of integrated people-centred eye care model

Empowering and engaging people and communities	Reorienting the model of care	Service coordination within and across sectors	Creating an enabling environment
health education	local health needs assessment	care pathways	transformational and distributed leadership
informed consent	comprehensive packaging of services for all population groups	referral and counter-referral systems	changing management strategies
shared clinical decision making between individual, families, carers and providers	strategic purchasing	health navigators	development of information systems
self-management including personal care assessment and treatment plans	gender, cultural and age-sensitive services	case management	systems research
knowledge of health system navigation	health technology assessment	improved care transition	knowledge management
community delivered care	monitoring population health status	team-based care	quality assurance
community health workers	population risk stratification	regional or district-based health service delivery networks	creating a culture of safety
development of civil society	surveillance, research and control of risks and threats to public health	purchasing integrated services	continuous quality improvement
strengthened social participation in health	improved financial and human resources allocated to health promotion and disease prevention	integrating vertical programmes into national health systems	tackling health workforce shortages and maldistribution
training for informal carers	public health regulation and enforcement	incentives for care coordination	health workforce training
informal carer networks	primary care services with a family and community-based approach	health in all policies	multiprofessional teams working across organizational boundaries
peer support and expert patient groups	multidisciplinary primary care teams	intersectional partnerships	improving working conditions and compensation mechanisms

caring for the carers	family medicine	merging of health sector with social services	provider support groups
respite care	gatekeeping to access other specialized services	working with education sector to align professional curriculum towards new skills needed	strengthening professional associations
integration of health equity goal into health sector objectives	greater proportion of health expenditure allocated to primary care	integrating traditional and complementary medicine with modern health systems	aligning regulatory framework
provision of outreach services for the underserved including mobile units, transport systems and telemedicine	home care, nursing homes and hospices	coordinating preparedness and response to health crises	asssuring sufficient health system financing and aligning resource allocation with reform priorities
outreach programmes for disadvantaged/marginalized populations	repurposing secondary and tertiary hospitals for acute complex care only		mixed payment models based on capitation
contracting out of services when warranted	outpatient surgery		bundled payments
expansion of primary care-based systems	day hospitals		
	progressive patient care		
	shared electronic medical record		
	telemedicine		
	mobile health		

Note. Data retrieved and adapted from Framework on integrated, people-centred health services (WHO 2016b, 5-9).