Mental Health among Children and Young Adults with Visual Impairments: A Systematic Review

Liv Berit Augestad

Structured abstract: *Introduction:* The purpose of this study was to summarize current scientific knowledge relating to the occurrence of mood disorders among children with visual impairments. *Methods:* A systematic review was conducted of articles published between January1998 and July 2016, inclusive. A total of 17 publications met the inclusion criteria, of which 15 reported studies with a cross-sectional design. The 17 publications represent 13 countries. *Results:* The majority of the studies suggested that children and young adults with visual impairments had more emotional problems than did their sighted peers. In addition, girls with visual impairments more often experienced serious symptoms of depression and anxiety than did boys with visual impairments, a finding that was in line with results for the general population. Two studies with a longitudinal design suggested that emotional problems among children and young adults with visual impairments might lessen over time. *Discussion:* Due to the different research purposes, study designs, definitions of visual impairment, participants' age ranges, cultures, countries, small sample sizes, measurements, and analyses of mental health, the overall results of the reviewed studies were inconsistent. To give children the best opportunities for good mental health, there is a need for more knowledge and for further longitudinal and randomized studies of high quality. *Implications for practitioners:* Social support, friendship, and independence in mobility seem to be important for enhancing the mental health of all children. Children with earlier onset and more severe visual impairments may be less likely to experience a reduction in their mental health problems over time.

Children with visual impairments may face difficulties that result in their experiencing emotional disturbances. There are various reasons for mood disorders among children with vision loss, such as reduced mobility (Kef, Hox, & Habekothe, 2000), loneliness (Hadidi & Al Khateeb, 2013), fewer opportunities to learn social skills (Hatlen, 2004), and greater dependency on help (Sacks, Kekelis, & Gaylord-Ross, 1992). Moreover, less participation in

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leisure-time activities may contribute to children having an increased risk of mood disorders (Augestad & Jiang, 2015; Brunes, Flanders, & Augestad, 2015). Additionally, children with vision loss may find it hard to predict other people's behavior and reactions from their facial expressions of their emotions (Pinquart & Pfeiffer, 2013).

The prevention of mood disorders and promotion of good mental health are important for all children (Grønmo & Augestad, 2007). In the *Diagnostic and Statistical Manual of Mental Disorders,* 5th Edition, *mood* is defined as a pervasive and sustained emotion that colors people's perceptions of the world (American Psychiatric Association, 2013). Common examples of mood disorders include depression, extreme elation, anger, and anxiety. Self-awareness of an impairment and perceived psychosocial functioning may be important for personal well-being. Furthermore, social competence is associated with interpersonal functioning and communication, and social cognition deficits may be linked to depression (Bora & Berk, 2016).

The most prevalent types of mood disorders are depressive disorders, which are characterized by persistent and severe low mood or loss of enjoyment and interest, and are associated with suffering and functional impairment (Bora & Berk, 2016). The American Psychiatric Association (2013, p. 155) states: "The common features of all the depressive disorders are the presence of sad, empty, or irritable mood, accompanied by somatic and cognitive changes that significantly affect the individual's capacity to function." Depression may affect 10–15% of adolescents, and girls are much more likely to be diagnosed with depression than are boys (Bradley, 2001).

According to the American Psychiatric Association (2013, p. 189), "Anxiety disorders include disorders that share features of excessive fear and anxiety and related behavior disturbances. Fear is the emotional response to real or perceived imminent threat, whereas anxiety is the anticipation of future threat." Further, the American Psychiatric Association divides anxiety disorders according to their diagnostic characteristics: separation anxiety disorders, selective mutism, specific phobias, social anxiety disorders, panic disorders, agoraphobia, generalized anxiety disorders, and anxiety disorders due to other medical conditions (American Psychiatric Association, 2013). Anxiety and mood disorders are among the more common emotional disorders in youths, and may affect 5–15% of children and adolescents (Bradley, 2001).

In cases where children and young adults with visual impairments are particularly prone to experiencing mood disorders, it is important for them to receive early intervention services as soon as these are identified in order to promote optimal mental health. The published literature on the occurrence of mood disorders among children and young adults with visual impairments contains contradictory evidence. It is plausible that people with visual impairments are more likely to experience problems with functioning, which may lead to them experiencing depression and anxiety. Since the early onset of depression is a precursor to serious mental health problems and psychological dysfunction in adulthood (Reynolds, 1994), it

is important to examine this literature closely so as to develop strategies to prevent the dysfunction.

After searching the literature, I found one systematic review related to the psychological adjustment of children and youths who are visually impaired (Ammerman, Van Hasselt, & Hersen, 1986), one on rehabilitation methods for children with low vision (Chavda, Hodge, Si, & Diab, 2014), and one related to the management of sleep disorders in children with visual impairments (Khan et al., 2011). In addition, I found one meta-analysis related to adults and psychological well-being in individuals with visual impairments and those without it (Pinquart & Pfeiffer, 2011).

Due to the paucity of research, I considered it important to carry out a systematic review, since practical clinical work should be based on scientific evidence. If children with vision loss are more vulnerable to developing mood disorders, relevant interventions need to be developed. The purpose of this review was to summarize the current knowledge of the occurrence of mood disorders among children and young adults with visual impairments.

Methods

Search strategy

To identify relevant published articles, I searched the databases PsycNET, PsycArticles, PsycINFO, SCOPUS, PubMed, ERIC, MEDLINE, Google Scholar, and Web of Science using the following search terms: visual impairment, blind, low vision, emotional problems, mental disorders, mood disorders, fear, depression, and anxiety.

Criteria for inclusion and exclusion

I included studies of children and young adults with visual impairments in the age range 5 to 20 years, with one exception: the study by Ishtiaq, Chaudhary, Rana, and Jamil (2016) was included because the mean age of the study sample was 17 years (10 to 22 years). The reason for the wide age range was to include studies of children of school age. Children with severe visual impairments may have major problems with accessing information, and where possible they may use additional years to graduate from high school (Adak, Yurtay, & Yurtay, 2015). I included articles written in English, published between January 1, 1998, and July 31, 2016, inclusive, which reported studies of humans with original data collection and were peer-reviewed literature. The search yielded 85 articles. I then read and manually searched their reference lists, from which I found a further five articles. I excluded articles on children and young adults who had visual impairments as well as comorbidity or multiple disabilities (10 articles). I also excluded studies with only one subject, studies focusing mainly on social support, social interaction, or psychosocial adjustment, studies not based on collected data, and studies that were duplicated in the searched databases (63 articles). Thus, 17 studies were included in the review.

Data extraction

I used a standardized protocol and reporting form to abstract the following data from each publication: name or names of the authors, year of publication, country in which the study was conducted, age and number of persons in the study population, number of persons with visual

impairments and number of sighted persons in each study, main test measurements of psychological adjustment and mental health disorders, definition of visual impairment, school type, and main results of each study.

Evaluation of the studies

I used the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) to evaluate the selected studies (Sirriyeh, Lawton, Gardner, & Armitage, 2011). The tool, which was developed to assess the quality of studies with one topic but using different approaches or designs, has been found to have good reliability (Cohen's kappa, $\kappa = 71.5$) and good face validity (Sirriyeh et al., 2011). I used the version of QATSDD with 14 items related to quantitative studies. Each item was rated on a 4-point scale ranging from "not at all" (0), "very slightly" (1), and "moderate" (2) to "completely" (3), with a maximum score of 42. The percentage score was calculated by dividing the actual score by the maximum score (42). Studies scoring over 75% were considered "high quality," between 50% and 75% "good quality," and between 50% and 25% "moderate quality"; those scoring below 25% were considered "poor quality." The quality ratings are presented in Table 1.

A second reviewer evaluated eight randomly selected papers. The weighted kappa was 0.5 (indicating moderate agreement), and the Spearman correlation was 0.75 (indicating a strong association or relationship). Five papers were given an identical rating, and three differed by one category between the two reviewers. Cohen's kappa coefficient is a statistic that measures inter-rater agreement for categorical items (Viera & Garrett, 2005). Kappa is one measure of interobserver agreement, and is the most commonly reported measure in medical literature.

Results

General results

Table 1 lists the 17 included articles, all of which assess mental health problems.

Study characteristics

All but two of the evaluated articles reported observational studies with a cross-sectional design; the studies conducted by Brunes et al. (2015) and Pinquart and Pfeiffer (2014) had a prospective design. The 17 articles represent 13 countries and four continents. Five studies had more than 100 participants with visual impairments (Harris & Lord, 2016; Huurre & Aro, 2000; Huurre, Komulainen, & Aro, 2001; Pinquart & Pfeiffer, 2012, 2014). Further, the studies differed in terms of the age ranges of the participants, the participants' school types, the researchers' definitions of visual impairment, and the outcome measurements.

Emotional problems

Nine studies examined the general emotional or psychological problems of children with visual impairments (Brunes et al., 2015; Garaigordobil & Bernarás, 2009; Harris & Lord, 2016; Huurre & Aro, 1998, 2000; Ishtiaq et al., 2016; Konarska, 2007; Pinquart & Pfeiffer, 2012, 2014), and one studied fear (Visagie, Loxton, Ollendick, & Steel, 2013). Among the nine above-mentioned studies, six found that children with visual impairments had more emotional problems than did their sighted peers (Brunes et al., 2015; Harris & Lord, 2016; Huurre & Aro, 1998, 2000;

Table 1
Characteristics of the evaluated studies of mental health problems.

Study	Methods[1]				Main results (quality rating of study according to the Quality Assessment Tool for Studies with Diverse Designs [QATSSD])
	Sample	Main measurements	Definition of visual impairment (VI)[2]	School type	
Harris & Lord, 2016, UK	Parents of 189 children with VI and 6,328 sighted children Teachers of 138 children with VI and 6,328 sighted children All children aged 11 years	Strength and Difficulties Questionnaire (SDQ)	The parent or teacher reported child had impaired sight or was receiving special education due to a problem with their sight	MS[3] Special education in the classroom	Children as young as 11 years of age with VI were associated with an increased risk of psychiatric disorders compared with children with no VI. (High quality)
Ishtiaq et al., 2016, Pakistan	40 blind persons 10–22 years	Customized questionnaire	World Health Organization grading of blindness	Higher secondary school for blind students	Of 40 children with blindness, 24 experienced difficulty in their lives, 22 were found to be depressed when assessed with DSM IV, and 20 had difficulty making new contacts. (Moderate quality)
Brunes et al., 2015, Norway	46 with VI 1,371 sighted 12–17 years	Hopkins Symptoms Checklist (HSC)	Self-reported population-based	MS	Adolescents with VI had higher scores on mental health problems at baseline than sighted adolescents. At follow-up four years later, introverted and emotionally disturbed adolescents with VI who had been physically active had fewer mental health problems. (Good quality)
Pinquart & Pfeiffer, 2014, Germany	182 with VI 560 sighted 11–16 years	Strength and Difficulties Questionnaire (SDQ)	Blind (37%) Low vision (63%) Congenital VI (75%)	MS BS[4] DSFVI[5] RSFVI[6]	Children with VI reported more psychological problems, but 61–72% did not score in the abnormal range. Between-group differences in total and emotional problems narrowed over time. Adolescents with earlier onset of VI were less likely to reduce their problems. (High quality)

(cont.)

Table 1
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Study	Methods[1]				Main results (quality rating of study according to the Quality Assessment Tool for Studies with Diverse Designs [QATSSD])
	Sample	Main measurements	Definition of visual impairment (VI)[2]	School type	
Emam, 2013, Egypt	91 with VI (83% with loss of vision from birth) 12–17 years	BDI-Y[7] APS long form for depression[8] SPSI-R[9] short form for PSO[10] CASQ-R[11] for AS[12]	Not mentioned	RSFVI	Gender, negative AS, and negative PSO related to depression symptoms. (High quality)
Visagie et al., 2013, South Africa	67 with VI 62 sighted 8–13 years	FSSC-SA[13] for fear	No measurable or limited degree of light perception or defined as severe VI	DSFVI	Different content of fear for children with VI. More fear among girls compared with boys. Increased fear with more severe VI. (Good quality)
Pinquart & Pfeiffer, 2012, Germany	158 with VI 158 sighted 10–15 years	SDQ for behavior and emotional problems (both self-reported and teacher-reported forms)	World Health Organization grading of blindness	DSFVI RSFVI	More emotional peer problems and total difficulties for children with VI compared with the sighted group. More emotional problems in older children and girls with VI compared with sighted girls. (High quality)
Halder & Datta, 2012, India	60 with VI 100 sighted 15–18 years	General Information Schedule (GIS) Piers-Harris Children's Self-Concept Scale: subscale anxiety	Visual acuity did not exceed 6/60 or 20/200 (partially sighted excluded from the study)	Selected government schools in West Bengal	No significant differences noted in behavior and anxiety dimension between adolescents with blindness and sighted adolescents. (Good quality)
Bakhla et al., 2011, India	92 with VI 6–20 years	General Health Questionnaire GHQ-60, Hindi translation, and Diagnostic Interview Schedule for Children, Parent version, DISC-P	Visual acuity below 3/60	Schools for blind students (4)	Prevalence of psychiatric morbidity among children was 8.7%, and among comparable sighted children in the community was 12.8%. No sociodemographic variable associated with the occurrence of psychiatric disorders. (Moderate quality)

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Study	Methods[1]				Main results (quality rating of study according to the Quality Assessment Tool for Studies with Diverse Designs [QATSSD])
	Sample	Main measurements	Definition of visual impairment (VI)[2]	School type	
Bolat et al., 2011, Turkey	40 congenitally blind 40 sighted 11–14 years	CDI[14] for depression PHCSCS[15] for self-concept STAIC[16] for anxiety	Braille users, congenital blindness	DSFVI	No differences in depression symptoms and some domains in self-concept among the groups. Higher anxiety levels for children with blindness. (Good quality)
Garaigordobil & Bernarás, 2009, Spain	29 with VI 61 sighted 12–17 years	LAEA[17] RSE[18] SCL-90-R[19] NEO-FFI [20]	Eye diagnostic VI: 24% vision level between 0.4 and 0.3, 28% between 0.25 and 0.12, and 35% with a level of 0.1 or less	Centre of Resources for the Educational Inclusion (CRI) Three capitals of the Basque Country MS	The adolescents with severe VI scored significantly higher on Total Psychopathological Symptoms (TPS) compared with the sighted group. Girls with severe VI scored lower on self-esteem and higher on TPS (depression, anxiety, hostility, and obsession-compulsion) compared with boys with VI. (High quality)
Konarska, 2007, Poland	40 blind 40 partially sighted 60 non-disabled 14–19 years	Emotional Factor Inventory (EFI) Adjective Check List (ACL) The Rotter Unfinished Sentence Test	Not mentioned	Students of special schools across Poland	Youths in the blind and partially sighted groups differed with respect to their sense of their own inefficiency, depression, and sensitivity regarding their disability. The youths in the partially sighted group were more sensitive and scored higher on depression. Youths with VI scored higher on somatic indisposition, helplessness, and depression than the sighted group. (Moderate quality)
Hurre et al., 2001, Finland	115 with VI (11% with severe low vision) 607 sighted 12–17 years	BDI[21] Self-esteem questionnaires about relationship with parents and relationship with friends	The Finnish Register of Visual Impairment	Grades 7–9 integrated in comprehensive schools	No differences in depression between children with VI and sighted controls. Excessive risk of depression among girls with VI compared with girls without VI. Relationships with friends was an important protective factor against depression among children with VI. (High quality)

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Table 1
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Study	Methods[1]				Main results (quality rating of study according to the Quality Assessment Tool for Studies with Diverse Designs [QATSSD])
	Sample	Main measurements	Definition of visual impairment (VI)[2]	School type	
Koenes & Karshmer, 2000, U.S.	22 legally blind from birth 29 sighted 12–18 years	BDI for depressive symptoms	New Mexico state standard for legal blindness	RSFVI	Higher level of depression in blind children compared with sighted children. (Good quality)
Huurre & Aro, 2000, Finland	115 with VI 44 with chronic health conditions 607 sighted, with no disabilities 12–17 years	Short-form BDI for depression, CPPS[22] for distress symptoms, Finnish 5-point scale for self-esteem and social relationships, self-reported grades for school performance	Braille users defined as blind	MS	Less distress, fewer depression symptoms, and higher self-esteem in boys with VI. More depression symptoms, lower self-esteem, and lower school performance in girls with VI. Children with VI had more problems in relationships with friends, and the severity of VI and onset of VI affected their psychological well-being. (High quality)
Huurre & Aro, 1998, Finland	54 VI 385 sighted 12–15 years	Short-form BDI for depression, CPPS for distress symptoms, Finnish 5-point scale for self-esteem, MESS[23] for social skills, self-reported grades for school performance	Braille users defined as blind	MS	No differences in the frequency of distress or depression symptoms between the groups. Lower self-esteem, lower school performance, and fewer social skills for girls with VI compared with sighted children. Fewer friends associated with more loneliness for children with VI compared with sighted children. (High quality)
Yoshida et al., 1998, Japan	52 with VI 92 HI[24]) 144 with no disability 18–19 years	UPI[25] for depression and anxiety	Not mentioned	DSFVI	No differences in depression and anxiety between youths with VI and children without disability. (Moderate quality)

[1] All studies were cross-sectional studies except Brunes et al. (2015) and Pinquart & Pfeiffer (2014); [2] VI = visual impairment; [3] MS = mainstream schools; [4] BS = boarding schools; [5] DSFVI = day school for children with VI; [6] RSFVI = residential school for children with VI; [7] BDI-Y = Beck Depression Inventory for Youth; [8] APS long form = depression subscale of the Adolescent Psychopathology Scale; [9] SPSI-R = Social Problem-Solving Inventory-Revised short; [10] PSO = problem-solving skills; [11] CASQ-R = Children's Attributional Style Questionnaire-Revised; [12] AS = Attributional Style I; [13] FSSC-SA = South African version of the fear Survey Schedule for Children; [14] CDI = Children's Depression Inventory; [15] PHCSCS = Piers-Harris Children's Self-Concept Scale; [16] STAIC = State-Trait Anxiety Inventory for Children;[17] LAEA = Adult and Adolescent Self-concept Adjective Checklist; [18] RSE = Rosenberg Self-esteem Scale; [19] SCL-90-R = Symptom Checklist-90-Revised; [20] NEO-FFI = Neo Five-Factor Inventory; [21] BDI = Beck's Depression Inventory; [22] CPPS = Checklist of 17 Physical and Psychological Symptoms; [23] MESS = Matson Evaluation of Social Skills; [24] HI = hearing impairment; [25] UPI = University Personality Inventory.

Pinquart & Pfeiffer, 2012, 2014), and one study indicated different content and more fear among children with visual impairments compared with sighted children (Visagie et al., 2013). Of the 17 studies, four did not find any emotional or behavioral differences between children with visual impairments and sighted children (Huurre & Aro, 1998; Huurre et al., 2001; Konarska, 2007; Yoshida, Ichikawa, Ishikawa, & Masashi, 1998).

Severity of visual impairment

Two studies indicated that increases in the severity of visual impairment might increase the mood disorders and sense of loneliness and fear experienced by children with visual impairments (Huurre & Aro, 1998; Visagie et al., 2013).

Psychopathology

Three studies showed that children with visual impairments had levels of depression similar to their sighted peers (Bolat, Dogangun, Yavuz, Demir, & Kayaalp, 2011; Huurre & Aro, 1998; Yoshida et al., 1998). By contrast, the results of four studies showed that the prevalence of depression among children with visual impairments was higher than that among their sighted peers (Garaigordobil & Bernarás, 2009; Huurre & Aro, 2000; Koenes & Karshmer, 2000; Konarska, 2007).

One study from India (Halder & Datta, 2012) and one from Japan (Yoshida et al., 1998) found no difference in anxiety among adolescents with visual impairments compared with sighted adolescents, but three studies reported the opposite results (Bolat et al., 2011; Garaigordobil & Bernarás, 2009; Konarska, 2007). Only one study reported different types and more fear among children with vision loss compared with sighted children (Visagie et al., 2013).

Bakhla, Sinha, Verma, and Sarkhel (2011) reported a prevalence of 8.7% for psychiatric morbidity among 92 students from schools for blind students in India, whereas the prevalence among sighted children was 12.8%. In a recent study from the United Kingdom, Harris and Lord (2016) found an increased risk of psychiatric disorders among children aged 11 years with visual impairments compared with sighted children of the same age.

Gender differences

Seven studies suggested that girls with visual impairments had more serious depressive and anxiety symptoms than did boys with visual impairments (Emam, 2013; Garaigordobil & Bernarás, 2009; Huurre & Aro, 1998, 2000; Huurre et al., 2001; Pinquart & Pfeiffer, 2012; Visagie et al., 2013).

Longitudinal study design

The two studies with a longitudinal design found that children and young adults with visual impairments scored higher on mental health problems than did sighted children and adolescents (Brunes et al., 2015; Pinquart & Pfeiffer, 2014). Brunes et al. (2015) claim that in a four-year period, those who were physically active had a greater reduction in their psychological problems than did those who remained inactive in the same period. Pinquart and Pfeiffer (2014) found that adolescents with earlier onset of severe vision loss were less likely to reduce their emotional problems later in life.

Discussion

The majority of the studies suggested that children and young adults with visual impairments had more emotional problems than did their sighted peers. The results showed that girls with visual impairments might experience serious symptoms of depression more often than might boys with visual impairments, which is in line with results for the general population of adolescents reported by Bradley (2001). Due to the different research purposes, study designs, samples, measurements, and analyses of mental health, the results of the studies in the reviewed articles were inconsistent.

Young people with visual impairments may have fewer opportunities to make friends and may face problems of social isolation and, consequently, they may develop emotional and communication problems (Huurre et al., 2001). However, different societies have different educational systems for children and youths with visual impairments, and this arrangement may lead to the occurrence of different types of mental health problems. Lifestyle, support from family and friends, level of integrations, and social networks may differ (Kef, 1997; Sacks & Wolffe, 2006). Sacks, Wolffe, and Tierney (1998) claimed that, for many students, success in independent living was highly dependent upon the nature and scope of the services they received during their secondary and post-secondary school programs. Overprotection could leave them feeling less attractive and frustrated and, consequently, they could have relatively more emotional or behavioral problems (Huurre & Aro, 1998, 2000).

Better social support, especially support from friends, may be important to help children with visual impairments reduce the number and severity of their emotional problems (Pinquart & Pfeiffer, 2011, 2012, 2013, 2014), as well as their depression and anxiety symptoms (Halder & Datta, 2012; Huurre & Aro, 2000). Opportunities for children with vision loss to join leisure and other social activities with friends may be especially important (Brunes et al., 2015; Huurre & Aro, 2000).

The reported importance of the degree of vision loss differed between the studies. Moreover, most of the studies paid little attention to children with moderate visual impairments. Lack of evidence in this respect may therefore have biased the conclusions.

School system

The inclusion of children with visual impairments in mainstream schools did not seem to have a negative influence on the occurrence of mood disorders (Huurre & Aro, 1998). In 12 of the 17 studies, the samples were obtained from special schools for students who are blind. However, Bakhla et al. (2011) reported fewer psychiatric disorders among children in special schools in India compared with sighted children in the comparison group from mainstream schools. In some countries, children with visual impairments may have a better support system if they attend special schools for students who are blind. Bakhla et al. (2011) concluded that the differences in the number of psychiatric disorders could have reflected the school-based approach, since children with severe problems had either failed to start their schooling or had dropped out of

school early. Due to differences in the school systems in the 13 countries and the samples, it is somewhat difficult to summarize whether the children and young adults with visual impairments in mainstream schools had more mental health problems than did those in special schools.

Observing behavior

One article showed that parents and teachers played important roles in identifying possible mental health problems among children with visual impairments (Pinquart & Pfeiffer, 2013). Spending more hours per day with children provides opportunities to observe and evaluate their behavior. It is also possible that children are generally more likely to express their feelings and thoughts if they feel they are in protected and safe environments.

Limitations

The aims, study designs, participants, and outcome measures all differed between the 17 studies. The studies also differed with respect to the age ranges of the individuals studied and the measurements of mental health problems, which therefore complicated comparisons. However, despite the extensive literature on sighted participants, research on mental health problems may be flawed due to ambiguous definitions and lack of adequate instruments to assess the constructs (Groth-Marnat, 2003).

A further limitation was that different definitions of visual impairment were used in the studies. The majority of the articles do not mention the diagnoses, progression of the disease, or onset time of vision loss. However, Visagie et al. (2013) and Huurre & Aro (1998) found that more severe vision loss might lead to more mental health problems.

In most studies, the age range of the participants was wide, which might have affected the results because a child's emotional state and behavioral performance differs according to his or her age and stage of development (Pinquart & Pfeiffer, 2012, 2014). A further challenge was the reliability and validity of different psychometric assessments, since the results of the measurements might have reflected the ages of the participants. Therefore, the different results for emotional problems experienced by children with visual impairments might have been partly due to normal psychological development with increasing age.

Additionally, most of the studies used small sample sizes and were limited to specific geographical areas; only five studies had sample sizes of over 100 children with visual impairments. All of the studies had a cross-sectional design, except for two prospective population-based studies. Therefore, the results could not be synthesized in a meta-analysis, due to the small number and heterogeneity of the studies.

Further, I suggest that bias due to selection or confounding occurred in at least some of the studies, including those by Emam (2013), Bakhla et al. (2011), and Ishtiaq et al. (2016). I suspect there was bias in the studies that lacked randomization, especially when few children with visual impairments were included in a convenience sample from a school for children with visual impairments. Thus, the study samples may not have represented the target population. Some studies' conclusions might not be accurate in

cases where selection bias was not taken into account. Unfortunately, many studies need to use convenience samples in order to ensure similarity in the characteristics of the participants. Lastly, the results might have been influenced by differences in the represented countries' economies, culture, ethnic groups, governmental systems, and support systems in the period covered by the published articles.

Implications for practitioners

The findings presented in this review may have implications for the education of children with visual impairments. It is important for children to develop appropriate coping strategies for disabilities, and for their teachers to detect whether some students show signs of behavior that could increase their risk of developing mental health disorders. Symptoms such as headaches, digestion problems, and nightmares may relate to somatic anxiety. Irritable moods, loss of enjoyment and interest, and cognitive changes that affect an individual's capacity to function may all be risk factors for depression. Additionally, information about the age of onset of visual impairment and the prognosis of the diagnosis may be important for teachers and service providers, since the risks of mood disorders differ. Early detection of potential mental health problems among children with visual impairments may contribute to the children's mental well-being if appropriate interventions are put in place.

In general, girls may be more at risk of developing mood disorders than are boys. In schools, it is particularly important for children to learn skills the skills they need to initiate relationships that will lead to friendships. Children and young adults with visual impairments should be encouraged by their parents and teachers to be as independent as possible. Additionally, participation in leisure-time activities with friends may be important to promote well-being and reduce the risk of mood disorders.

The findings may have implications for the education of children with visual impairments, as well as for the provision of services for them. More cooperation between caregivers, parents, teachers, and health professionals, and more opportunities to attend different activities, are important for children with vision loss. Furthermore, there is a need for a better evidence-based understanding of the emotional and social needs of children with visual impairments, in order to improve their mental health and to enhance their psychological well-being. Through a successful development process, it is more likely that children can become well-adjusted and emotionally balanced individuals.

Conclusions

The lack of longitudinal observational studies and randomized clinical trials in the reviewed articles reduced the possibilities of drawing cause-and-effect conclusions. Due to the different research purposes, study designs, definitions of visual impairment, age ranges of the participants, cultures, countries, measurements, and analyses of mental health, as well as the small sample sizes, the results of the reviewed studies were inconsistent. However, the majority of them showed that children and young adults with visual impairments had more emotional problems than did sighted children and young

adults. Friendships, leisure-time activities, and independence in mobility seemed important to promote good mental health in all children. Regardless, there needs to be more evidence-based knowledge of mental health problems among young people with visual impairments.

Implications for further research

Additional longitudinal and randomized clinical studies of high quality are also needed. The clinical trials need to include interventions for the prevention and treatment of mental health disorders. Measurements of mental health should be collected over time, and different age groups should be included. It is important to collect optimal information about diagnosis, age at onset, braille use, gender, culture, economics, and support systems. Different societies may have different opportunities for people with vision loss, and personal perspectives on life in the future may affect the mental health status of children and young adults.

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Liv Berit Augestad, Ph.D., *professor, Department of Neuromedicine and Movement Science, Faculty of Medicine and Health Science, Norwegian University of Technology and Science (NTNU), Trondheim, Norway; Department of Visual Impairments, Statped Midt, Heimdal, Norway, Olav Kyrresgate 13, 7491 Trondheim, Norway; e-mail: liv.berit.augestad@ntnu.no.*