

Emotions and Feelings as Predictors of Depression and Attention Deficit Hyperactivity Disorders among Children and Adolescents with Complete Blindness

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Abstract

Introduction

Although blindness is a detrimental physical condition affecting almost all aspects of the lives of children and adolescents with blindness, little is known about the negative emotions and feelings they express and how they are linked with psychological disorders. Thus, this study aimed at examining the links between negative basic emotions, feelings, depression, and attention deficit and hyperactivity disorders (ADHD).

Methods

Sixty children and adolescents with blindness were selected from HVP Gatagara-Rwamagana. We computed the regression analysis to identify the associations between emotions and feelings and depression and ADHD symptoms.

Results

Results indicated clinical levels of sadness in 29 of 60 (48.3%), low self-esteem in 27 of 60 (45%), anger in 26 of 60 (43.3%), guilt and shame in 25 of 60 (41.6%), depression in 26 of 60 (43.3%), inattention in 11 of 60 (18.3%) and hyperactivity in 3 of 60 (5%). This study revealed that self-esteem ($\beta = -0.81$, $p < 0.001$), anger ($\beta = 0.76$, $p < 0.001$), sadness ($\beta = 0.75$, $p < 0.001$), low happiness ($\beta = -0.53$, $p < 0.001$), guilt and shame ($\beta = 0.70$, $p < 0.001$) predicted depressive symptoms. Only sadness ($\beta = 0.540$, $p = 0.04$) and anger ($\beta = -0.556$, $p = 0.04$) were significant predictors of attention deficit hyperactivity disorder (ADHD) in children with blindness.

Conclusion

Interventions designed to elevate self-esteem and happiness as well as decrease anger, sadness, shame and guilt are needed for decreasing the risk of depression and ADHD.

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Introduction

Children and adolescents with blindness may experience severe difficulties that may lead to emotional disturbances. Blindness refers to “visual acuity below three out sixty, or an equivalent visual field loss below 10° in the better eye after the best possible correction. [1] In 2015, statistics showed that the global blind population stood at 253 million and on a global scale 82% of people with blindness reside in low middle-income countries of Africa and Asia.[2] Blindness as a condition can be overwhelming and may have detrimental effects at an individual, family and community level. The incidence of psychological disorders is higher in adolescents with blindness compared with sighted adolescents. Different studies indicate that almost 5/7 of persons suffering from Visual Impairment suffer from major depression.[3,4] Consistently, the pool of literature shows that the risk of depression and ADHD is higher in children with Visual Impairment compared to their normal-sighted peers.[5–10]

Children and adolescents with blindness are at elevated risk of being neglected or over-protected by their family which may account for the high rate of behavioural and emotional difficulties.[11] This particular population frequently feel helplessness and economic insecurity. They are fearful of a range of things and circumstances such as darkness. This shock may lead to “*withdrawal, suicidality, frustration, emotional problems and maladjustment*”.[12] In his recent systematic review of 17 articles, Augestad [6] showed that children with visual impairment had elevated depression and ADHD symptoms than their peers with normal sight.[13]

It is well documented that visuomotor problems are closely related to substantial psychological disorders such as depression, anxiety and ADHD.[14] As such, it is not surprising that emotional problems are more likely to be observed in individuals with VI than normally sighted individuals.[14] The absence of vision poses difficulties in “education, communication, and emotion”. [15]

Vision loss comes with different challenges including economic disadvantages, mental ailments and physical complications that lead to a poor standard of life. Children and adolescents with blindness in post-conflict settings of sub-Saharan Africa are suffering from extreme poverty, with any forced to become street beggars due to lack of assistive devices, stigma, violence and lack of financial support, which may account for the burden on mental health especially depression. Similarly, it has also been found that the rate of depression is quite high in persons with visual impairment. [16] This may explain substantial cases of suicidality reported in this population. It was also found that suicidality in the adult population with visual impairment is high compared with people with other different neurological conditions.[6]

Despite a pool of literature highlighting the detrimental effects of visual impairment in general, very little is known about negative feelings and emotions consistently observed in children and adolescents with blindness with complete visual impairment and the extent to which they predict depression and ADHD symptoms in an African post-conflict setting. Mental disorders and negative emotions and feelings are strongly interconnected and the relationships are bidirectional in nature. Feelings like low self-esteem may lead to mental disorders and in the same way low “self-esteem” may root in mental disorders. [17] However, there is little known whether the same applies to guilt and shame as feelings and emotions such as anger, sadness, and low happiness, especially in children and adolescents with blindness. Therefore, this study aimed at finding out the links between negative emotions and feelings and depression and ADHD in Rwandan children and adolescents. We hypothesized that there would be associations between feelings and emotions and depression and ADHD symptoms. Specifically, we hypothesized that anger, sadness, low happiness, shame, low self-esteem and guilt would predict depression and ADHD symptoms among Rwandan children and adolescents with blindness.

Methods

Study setting

Participants of the study were selected from Home de la Vierge des Pauvres (HVP) Gatagara-Rwamagana. This is a centre for special primary and secondary education for children with visual impairment. The centre is located 50 km east of Kigali and provides special primary education for completely blinded and partially sighted children. This centre received official recognition from the government to start with Fast Track 9 Years Basic Education for blind children. The centre has also a secondary school with integrated education for children with visual impairment and a small number of children with other physical disabilities.

Study design

An institutional cross-sectional design was used to assess how emotions and feelings are associated with depression and ADHD symptoms in Rwandan children and adolescents with blindness.

Population and sampling

The population of the study was 162 students with different degrees of visual impairments and other disabilities attending "Home de la Vierge de Pauvres (HPV) Gatagara-Rwamagana". A convenient sample of 60 students who met inclusion criteria was selected to partake in this study. The study participants represented 37% of the total population. The inclusion criteria were being aged from 7 years old to 17 years, having a complete visual impairment and being able to communicate verbally. Participants who had a second handicap (mental or physical) other than visual impairment or any chronic medical disorder or chronic illness were excluded from this study.

Measures

The current study used a standardized measure of negative emotions and feelings such as shame and guilt[18,19], anger and sadness [20] and low self-esteem as independent variables, and the standardized measure of depression[21] and attention deficit and hyperactivity disorder [22] as dependant variables.

They were translated and back-translated and adopted into the Rwandan context before being used. Interestingly, by using Cronbach's alpha we found that the internal reliability was above the recommended threshold (i.e. 0.70). [23,24] The tools used are described below:

1.Children's Depression Inventory 2nd Edition

Children's Depression Inventory 2nd Edition (CDI2) is a 12-item measure for the existence of "*cognitive, affective, and behavioural*" symptoms of depression in individuals aged from 7 to 17 years.[21] Children responded to each question on a three-point Likert scale (0, 1 and 2). Cut-off scores of less than 12/24 = Sub-levels significant, 12 – 15 = Mild symptoms of depression, 16 – 20 = Moderate symptoms of depression, and 21 – 24 = Severe symptoms of depression. The Cronbach's alpha was 0.78 in our sample.

2."The Brief Shame and Guilt Questionnaire for Children"

This 12-item tool assessed feelings of shame (six items) and guilt (six items) in the current sample. The tool was developed in light of Maladaptive and Adaptive Scales.[18,19] Children were asked to rate each question on a 3-point Likert scale that ranged from not at all (1) to a lot (3). Cut-off scores ranged as follows: subclinical level of depression (below twelve), mild (thirteen to fifteen), moderate (sixteen to twenty), and severe level (twenty-one to twenty-four). Cronbach's alpha was .792 in our sample.

3."Children's Sadness and Anger Management Scales (CSMS, CAMS)"

According to the tool developers.[20]. The tool is composed of twelve questions for sadness (CSMS) and eleven questions for anger (CAMS) subscales. Each question was scored on a Likert scale of three points; one (hardly ever), two (sometimes) and three (often). Cut-off scores for the sadness subscale ranged from the mild stage (18-24), moderate (25 – 30), the severe stage (31 – 36). For the Anger subscale, 16-21 stood for the mild stage, 22 – 27 for the moderate and 28 –33 stood for the severe stage. The Cronbach's alpha was .801 for anger and .831 for sadness subscales, and .905 for a total scale.

4. The Children's Happiness Scale (CHS)

CHS is a 20-item self-report questionnaire based on “**children's views and judgements**”.[25] The total score was computed to estimate the happiness level of each participant; a total score ranged from 1.68 to 4.25. The Cronbach's Alpha was .74 in our sample.

5. “The Rosenberg's Self-esteem Scale” (RSE)

RSE is a measure composed of ten items that are scored using a four-point Likert scale ranging from one (agree) to four (“*strongly disagree*”) to assess one's feelings (positive or negative). The purpose of the 10-item RSE scale is to measure self-esteem. Originally the measure was designed to measure the self-esteem of school students. [26] However, since its development, the scale has been used with a variety of groups including adults, with norms available for many of those groups. Cut-off scores below fifteen out of 30 were applied to the severe category of low self-esteem, 15 to 20 the moderate category and 21 to 25 the mild category of low self-esteem.[27] The Cronbach's alpha was .70 in our sample.

6. “The SNAP-IV Teacher and Parent 18-Item Rating Scale”

This tool was a short version of “The Swanson, Nolan, and Pelham (SNAP) Questionnaire” that assesses ADHD symptoms. These symptoms are classified into inattention symptoms (from 1st to 9th question) and hyperactivity symptoms (from 10th to 19th question). A total score range of 23 to 27 in any subscale indicated severe inattention or hyperactivity. [22] The Cronbach's alpha was 0.918 for Inattention and 0.70 for hyperactivity subscales, and 0.85 for the total scale.

Data collection procedures

We provided a “written request letter” and research approval from the “Institutional review board of the College of Medicine and Health Sciences” to the director of HVP Gatagara to conduct the study. Once the permission was secured, we met pupils with blindness at the general meeting organized by school leaders and explained the objectives,

benefits and inclusion criteria of the study three weeks before data collection. Two matrons and two teachers whom we had trained received a sample questionnaire one week before. All self-report questionnaires were translated into Kinyarwanda, and they included no self-identifiable information. Through the clear description of the study, the participants received extra knowledge of feelings, emotions and psychological disorders. During data collection, trained matrons and teachers helped participants to read and wrote for them the appropriate answer from the questionnaires' Likert scale. However, the children who were able to write were only helped to read. The children were welcomed one by one and the data collection process took two months to complete.

Data Analyses

We computed all data analyses using SPSS (Version 25). In the first step, normality testing was performed using the one-sample Kolmogorov-Simonov normality test, where the p-value should be greater than .05, and the Z value between -1.96 and +1.96 for normal distribution. As the data were normally distributed, we computed Pearson correlation and regression analysis to assess the associations between feelings and emotions and depression and ADHD. We considered $p \leq 0.05$ for statistical significance.

Ethical consideration

We submitted a written request to conduct this study to the Institutional Review Board of the College of Medicine and Health Sciences, at the University of Rwanda. The registration number was 018/CMHS IRB /2020. Once the permission was secured, the principal investigator met pupils with blindness at the general assembly organized by leaders and explained the objectives, benefits and inclusion criteria of the study three weeks before the study began. All those involved in the research were provided with the assurance of the confidentiality of the identity of the research participants through ethical data management. Participation in the study was voluntary and before taking part, pupils as well as their parents

or caregivers signed an agreement to informed consent. Participants were assured of their right to withdraw from the study.

Results

As demonstrated in Figure 1, many respondents were aged from 18 to 19 years (n=20), followed by 7 to 9 years (n=15) and fewer were aged 10 to 12 years (n=13) and 13-15 years (n=12).

The numbers of female and male participants were equal. Regarding education, most of the participants were recruited from the classes of P6 (12/60), followed by those recruited from P1 (10/60) and P3 (9/60), and the least were selected from P2 (5/60). There were equal recruitments of participants from P4, P5 and S1 with 8/60 each. Of the orphaned participants (35/60), 15/60 were double orphaned (8 boys), 9/60 were maternally orphaned (5 boys) and 11/60 were paternally orphaned (5 boys) and 11/60 were paternally orphaned

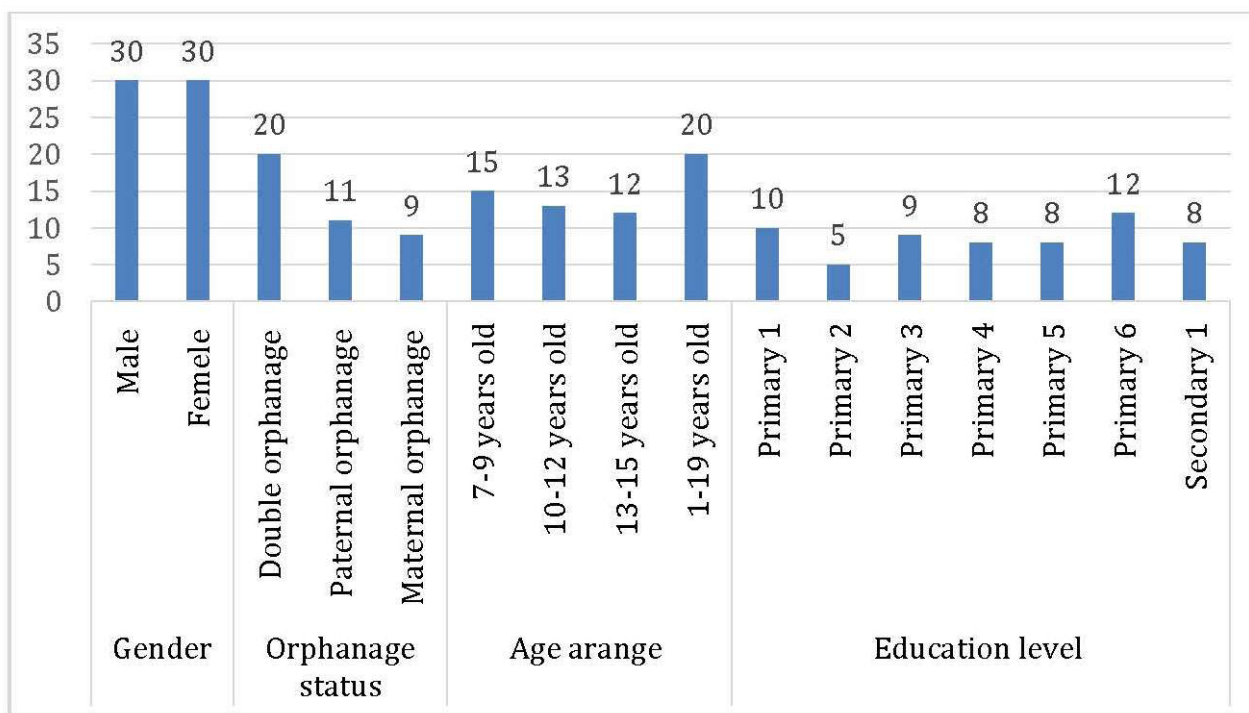


Figure 1. Sociodemographic characteristics

Figure 2 indicates that the participants who had clinical levels of sadness were 29/60, low self-esteem were 27/60, anger were 26/60, and those who had a clinical level of guilt and shame were 25/60. The clinical level of depression stood at 26/60, inattention at 11/60 and hyperactivity stood at 3/60 in the current sample.

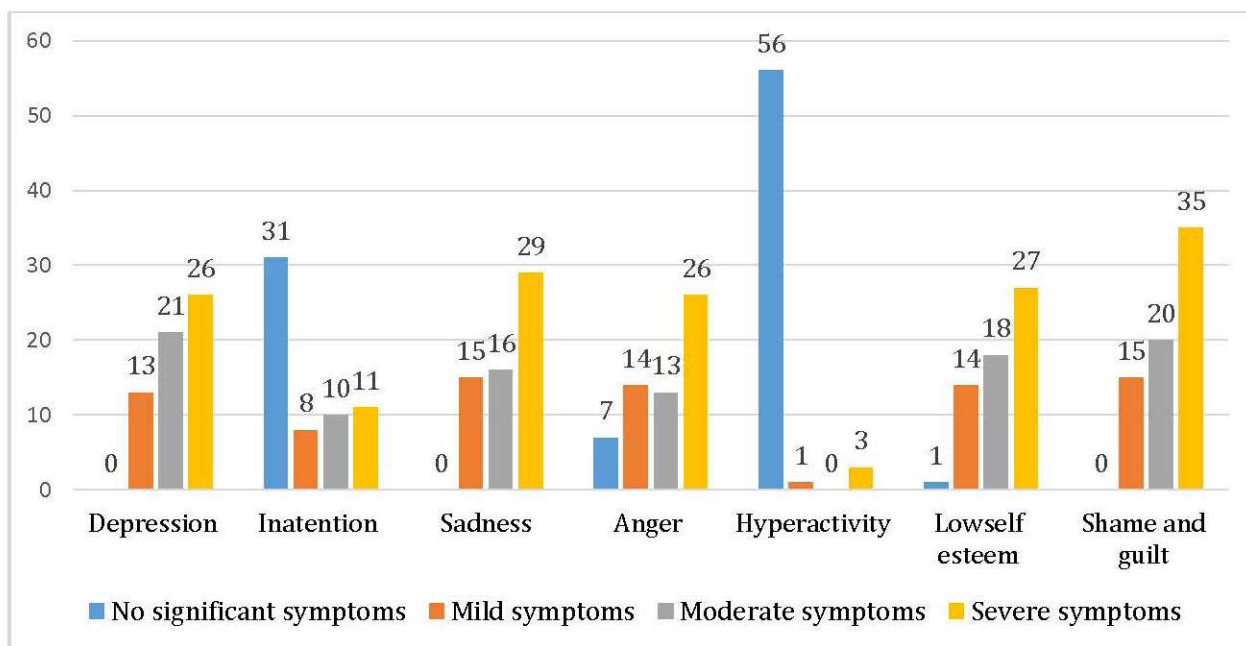


Figure 2. Clinical levels of negative emotions and psychological disorders

Intercorrelation of the negative emotion and feelings with depression and ADHD symptoms

As shown in Table 1, the results showed strong positive and negative correlations between negative feelings and basic emotions ($r \geq 0.526$). Negative feelings such as guilt ($r = 0.702, p < 0.001$) and shame ($r = 0.694, p < 0.001$) were positively correlated with depression.

A positive correlation was detected between low self-esteem and depression among children and adolescents with blindness ($r = -0.790, p < 0.001$). However, no negative feelings were significantly correlated with inattention and hyperactivity symptoms and age.

Table 1. Inter-correlations between variables

	Pearson Correlation	Sadness	Anger	Happiness	Guilt	Shame	LSE	Depression	Inattention	Hyper-activity
Sadness	r	1								
Anger	r	.875**	1							
Happiness	r	-.673**	-.69**	1						
Guilt	r	.736**	.839**	-.634**	1					
Shame	r	.725**	.855**	-.640**	.780**	1				
Low self-esteem (LSE)	r	-.811**	-.87**	.59**	-.81**	-.84**	1			
Depression	r	.750**	.756**	-.526**	.702**	.694**	-.790**	1		
Inattention	r	.103	.242	-.068	.241	.210	-.118	.174	1	
Hyperactivity	r	-.045	.057	-.037	.113	.064	-.047	.059	.119	1

*Correlation is significant at the 0.05 level (2-tailed), **. Correlation is significant at the 0.01 level (2-tailed).

Negative emotions and feelings as predictors of depression symptoms

The model composed of self-esteem, anger, sadness, low happiness, guilt and shame explained 60% of the variance of depressive symptoms. Depression symptoms were predicted by self-esteem ($\beta = -0.81, p < 0.001$), anger ($\beta = 0.76, p < 0.001$),

sadness ($\beta = 0.75, p < 0.001$), low happiness ($\beta = -0.53, p < 0.001$), guilt and shame ($\beta = 0.70, p < 0.001$), (Table 2). The strongest predictors were low self-esteem ($\beta = -0.81, p < 0.001$), anger ($\beta = 0.76, p < 0.001$) and sadness ($\beta = 0.75, p < 0.001$) in the current sample.

Table 2. Negative emotions and feelings as predictors of depression symptoms

Model		Unstandardized Coefficients		Standardized	t.	Sig.
		B	Std. Error(SEB)	Coefficients		
Emotions	Sadness	.549	.064	.750	8.625	.000
	Anger	.535	.061	.756	8.792	.000
	Happiness	-.541	.115	-.526	-4.70	.000
Feelings	Guilt	1.37	.184	.702	7.51	.000
	Shame	1.13	.153	.694	7.340	.000
	Low self-esteem	-.72	.073	-.81	-9.82	.000

Negative emotions and feelings as predictors of ADHD symptoms

The model composed of all emotions (sadness, anger, and happiness) and feelings (guilt, shame and low self-esteem) explained 26% of the total variance of ADHD symptoms. Only sadness ($\beta=.540$, $p=.04$) and anger ($\beta=-.556$, $p=.04$) were significant predictors of ADHD in children and adolescents with blindness (Table 3).

Table 3. Emotions and feelings as predictors of ADHD

Model		Unstandardized Coefficients		Standardized	t.	Sig.
		B	Std. Error	Coefficients		
Emotions	Sadness	1.350	.668	.540	2.023	.04
	Anger	-1.342	.667	-.556	-2.014	.04
	Happiness	-.526	.635	-.150	-.829	.41
Feelings	Guilt	.303	1.602	.045	.189	.851
	Shame	.194	1.447	.035	.134	.894
	Low self-esteem	.172	.866	.055	.199	.843

Discussion

The main objectives of this research were to find if feelings and emotions are significantly linked to depression and ADHD symptoms among Rwandan children and adolescents with complete blindness. As predicted, this study revealed that sadness, shame and low self-esteem were significantly associated with depression. Despite the general lack of studies on children, the authors found that sadness, low self-esteem, and guilt were most prevalent in young people suffering from depression. [28] other Similar findings were found in other studies [29,30]. Relatedly, it is well documented that the main symptoms for diagnosis of major depression are sadness,

irritability or anhedonia.[31]Our study also highlighted that all participants presented symptoms of depression with 43.3% (26/60), 35% (21/60) and 21.6% (13/60) of children and adolescents with blindness for severe, moderate and mild symptoms of depression respectively. This prevalence is higher than the estimation indicated in another study which revealed that “one out of ten persons present major depression and approximately 1/5 five people had the diagnosis during their lifetime”. [32] Depression was predicted to be the strongest contributor to “world disability” by 2020 and “disease burden” by 2030.[33]

These predictions highlight the great public health concern for depression. The level of emotional pain for a person with depression can be illustrated by the fact that such people often choose death due to the disturbing symptoms of depression.[34]

The ADHD rate found in this current research 15% (9/60) was higher than the global rate of ADHD in children for which it is estimated that 5-7% of children have ADHD.[35] Additionally, as predicted, sadness and anger seemed to predict ADHD in children and adolescents with blindness. Those findings are in congruence with the results of another study, that showed that many children with ADHD are more irritable and sadder than their peers,[36] and more importantly, ADHD symptoms tend to persist into adulthood.[37] Children and adolescents with ADHD frequently have problems completing tasks, controlling impulses, and respecting directions.[38] Contrary to our hypothesis, low happiness, guilt, shame and low self-esteem did not predict ADHD in kids with blindness. Other authors found that ADHD may play a mediating role between self-esteem and poor academic achievements.[39]

Strengths and limitations

To the best of our knowledge, this was the first research to investigate the specific basic feelings and emotions associated with depression and ADHD symptoms among children and adolescents with blindness in African post-conflict countries, and few are conducted globally. However, the conclusions about the strength of the relationship between feelings and emotions are limited to a cross-sectional study and a small population. Therefore, the mechanisms and processes explaining the relationships of emotions, feelings and psychological disorders in children with blindness need further investigation through longitudinal studies in a large population.

Conclusion and study implication

The study findings highlight that emotions and feelings expressed by children and adolescents with blindness seem to predict depression and ADHD.

This implies that their education should be combined with interventions designed to elevate self-esteem. Caretakers in the different schools should be trained about the mental health issues that raise in such children and adolescents with blindness and should acquire knowledge related introduction of activities for raising happiness as well as decreasing anger, sadness, shame and guilt which are crucial in decreasing the risk of depression and ADHD.

Authors' contributions

ML made extensive contribution to the study conception, design, resource, study administration and data analysis. JM and IM played a supervision role, conception and data analysis. NJ and JMN contributed to conceptualization, methodology, reviewing and editing the manuscript as well as data analysis. TB took part in drafting the article and revising it critically for important logical content and searched the relevant journal to for the manuscript revision.

Conflict of interest declaration

Authors have no conflict of interest to declare

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