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Research Paper

Association between remembering difficulty and anxiety and depression among children in Ghana

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1. Introduction

Anxiety and depression co-occur or occur sequentially among children, sometimes from the same or similar factors (Garber and Weersing, 2010). These conditions, common among children, are often unnoticeable, and could be a precursor for a full-blown mental health problem in the future (Al-biltagi and Sarhan, 2016; Ashford et al., 2008; Costello et al., 2003; 2005). In Ghana, these conditions are less recognized by parents, even though about 1.31% and 1% prevalence of depression and anxiety, respectively, have been reported among Ghanaian children (Kusi-Mensah et al., 2019). The difficulty in children expressing their feelings makes it imperative for parents to do so on their behalf (Lagattuta et al., 2012; López-pérez and Wilson, 2015). However, the appreciation of childhood mental health is generally poor among parents (Lagattuta et al., 2012), which makes it difficult to observe the link between mental health and associated factors among children in Ghana.

Studies have identified several factors associated with child anxiety and depression. For example, low socioeconomic status (Capistrano et al., 2016; Wadsworth and Achenbach, 2005) and stressful life experiences (Cole et al., 2006; Eisenbarth et al., 2019) have been linked to psychopathology in early life. Other factors include parental psychopathology, single parenting, and poor school results (Leve et al., 2005; Mesman and Koot, 2000; Ormel et al., 2005), corporal punishment (Ferguson, 2013), prenatal drug exposure, and child's cognitive ability problems such as memory problems or remembering difficulties (Leech et al., 2006).

Remembering difficulty can be defined as the experience or feeling that one's capacity to remember and to retrieve information is not operating at an optimal level due to neural, social, or psychological factors (Cutler and Grams, 1988; McWhirter et al., 2020). This difficulty is measured objectively using neuropsychological assessments like the Children's Memory Scale or subjectively using single-item self-reports (Salis et al., 2019; Snitz et al., 2015).

Until recently, the inability to recall or rather poor memory has been treated as a comorbid symptom of other childhood problems like ADHD or dyslexia (Holmes et al., 2014). However, advances in neurocognitive research have led to the proposal of considering memory problems as a sole diagnosable condition (Alloway et al., 2009) as it has implications for a child's life and well-being, especially his/her education (academic achievement), social interactions and mental health (Alloway et al., 2005; Holmes et al., 2010). Theoretically, recall failure or poor memory is explained through different perspectives. For instance, theories of interference state that interference of one information in other stored information result in recall difficulties, be it proactive or retroactive (Alves and Bueno, 2017; Postman and Hasher, 1972). For some specific memories such as autobiographical memories, the theory of transition

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memory indicates that these memories are built in early childhood under the influence of social and cultural factors. Discrepancies in such memories would mean an unfavorable impact on society (Nelson and Fivush, 2004).

Remembering difficulty among children is a functional impairment that could create emotional, behavioral, and social problems (e.g., state of apprehension, confusion, and sadness among children) (Alloway et al., 2009). Recent studies amongst children report that optimal cognitive abilities were associated with a lower likelihood of anxiety and depression (Blanken et al., 2017; Weeks et al., 2014). On the other hand, poor cognitive abilities were linked to a high probability of recurrent depressive episodes, longer episode duration, admission to hospital for depression and suicide ideation and attempt, outcomes that project into adult life (Hung et al., 2016). Also, a child's mental health such as anxiety and depression impacts their memory or recall ability (Visu--Petra et al., 2011). For example, anxiety affects working memory processes and capacity (Ansari et al., 2008). Depression also has been associated with poor processing speed among children (Emerson et al., 2005). The link between remembering difficulties and internalizing symptoms among children in Ghana remains nascent in the literature. Few studies in Ghana have examined the association between cognitive abilities and psychosocial outcomes. For example, a study published in 2018 found that psychosocial stimulation was positively related to three milestone measures (i.e., receptive, expressive, and cognitive) assessing cognitive and language development amongst 330 children in rural Ghana (Ahun et al., 2017). Another study examined the association between cognitive skills and mental health problems and found that low levels of cognitive skills were related to high mental health problems of adolescents aged 14-17 years old (Nyarko et al., 2020). Likewise, studies amongst children with special needs in Ghana highlights the experiences of poor psychosocial outcomes such as low academic performance (Obeng, 2012) and discrimination and stigma (Kassah et al., 2018; Mantey, 2017).

Although the literature outlines important information about the potential outcomes of children's cognitive problems in Ghana, no study has investigated the link between remembering difficulty and anxiety and depression. Regardless of what causes memory to be lost, resulting in poor performances or total failure, it can be embarrassing for children as parents may tend to expect better mnemonic abilities from them. In turn, this has implications for general mental health in children. This study sought to examine the link between remembering difficulty and anxiety and depression among children aged 5–17 years using nationally representative data. The study hypothesized that remembering difficulty is significantly related to (1) anxiety and (2) depression among Ghanaian children.

2. Methods

2.1. Study design

The study relied on the children (5–17 years) dataset of 2017/2018 Ghana Multiple Indicator Cluster Survey Six (MICS 6) (Ghana Statistical Service, 2018). The MICS 6 is a cross-sectional survey that was conducted by the Ghana Statistical Service (GSS) in collaboration with the Ghana Health Service (GHS), the Ministry of Health (MOH), and the Ministry of Education. GSS and other key institutions received funding and technical support from United Nations Children's Fund (UNICEF) and other international donors (Ghana Statistical Service, 2018). The survey started in the 1990s with the purpose to assist countries to generate information from data collected on key indicators. This generated information becomes a source for designing national development plans, policies, and programs as well as for measuring progress towards the Sustainable Development Goals (SDGs) and other internationally signed agreements (Ghana Statistical Service, 2018).

2.2. Data collection procedure and sample

Field officials were recruited and trained to handle data collection on behalf of GSS and UNICEF. The data collection procedure adopted a multi-stage, stratified cluster sampling approach to survey a nationally representative sample of children and women in urban and rural areas (sampling strata) situated in the previously 10 administrative regions in Ghana: Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East and Upper West (Ghana Statistical Service, 2018). The first stage of sampling involved the identification and selection of enumeration areas (EAs) within each stratum based on the 2010 Population and Housing Census (PHC) sampling frame of Ghana. The EAs were selected using systematic probability proportional to size (PPS) sampling procedures and became the primary sampling units (PSUs). In the second stage, households in each EA were itemized and a sample of households was selected using systematic random sampling. A nationally representative sample size of 13,202 households was chosen as the final sample.

2.3. Analytic data

In this study, data collected about children aged 5–17 from mothers/primary caretakers in the surveyed household was analyzed. A total number of 8963 responses about children aged 5–17 was analyzed.

2.4. Measures

2.4.1. Dependent variables

A single-item survey question was used to measure anxiety: 'how often child seems very anxious, nervous or worried"). Another single item was used to measure depression: 'how often child seems very sad or depressed". Participants indicated their responses for both questions on the same five-point ordered response scale ranging from, '(0) Never', '(1) a few times a year', '(2) monthly', '(3) weekly' and '(4) daily'.

2.4.2. Independent variables

Remembering difficulty was selected as the predictor variable for this study. The MICS measured this variable with a validated single-item question namely, "Compared with children of the same age, does your child have difficulty remembering things?". Participants had to respond using a 4-point response scale as follows: "0=No difficulty", "1=Some difficulty", "2=A lot of difficulty", and "3=Cannot remember at all". For easy interpretation and based on the recommended cut-off points (Cappa et al., 2018), the responses of "A lot of difficulties" and "Cannot remember at all" were combined. The new categories became "0=No difficulty", "1= Some difficulty", "2=A lot of difficulty or cannot remember at all".

2.4.3. Control variables

Child's gender, and age, maternal education, household wealth index, rural-urban residence, and region of residence were controlled in the analyzes based on variable availability and reports from previous literature (Chen et al., 2006; Burns et al., 2019; Frigerio et al., 2009). These selected covariates and their categorizations are described in Table 1.

2.5. Ethics approval

The GSS obtained informed child assent and parental/adult consent from participants (Ghana Statistical Service, 2018). Each participant was assured of anonymity and confidentiality as well as their right to refuse to answer any/all questions.

2.6. Data analysis

Data analyses were conducted in Stata version 14. Before proceeding

Table 1
Summary of sample characteristics.

	Frequency	Percentage
Dependent variables		
Anxiety		
(0) Never	4245	48.34
(1) A few times a year	3073	36.29
(2) Monthly	803	7.63
(3) Weekly	397	3.51
(4) Daily	426	4.23
Depression		
(0) Never	4297	48.09
(1) A few times a year	3301	38.91
(2) Monthly	729	7.15
(3) Weekly	347	2.93
(4) Daily	270	2.92
Independent variable		
Remembering difficulty		
(0) No difficulty	6832	75.99
(1) Some difficulty	1772	19.92
(2) Lot of difficulty/cannot at all	341	4.09
Control variables		
Child age		
(0) 5–9 years	3839	43.78
(1) 10–14 years	3495	38.64
(2) 15–17 years	1612	17.58
Child gender		
(0) Boys	4571	51.27
(1) Girls	4394	48.73
Maternal education		
(0) None/Pre-Primary	3568	37.14
(1) Primary	1601	20.54
(2) JHS	2707	32.55
(3) SHS	700	6.85
(4) Higher	370	2.93
Household wealth index		
(0) Poorest	2514	22.25
(1) Second	1604	22.41
(2) Middle	1618	20.51
(3) Fourth	1584	18.90
(4) Richest	1626	15.92
Urban-rural residence		
(0) Urban	3990	42.93
(1) Rural	4975	57.07
Region of residence		
(1) Western	828	9.89
(2) Central	816	10.05
(0) Greater Accra	933	8.88
(3) Volta	814	8.59
(4) Eastern	902	11.74
(5) Ashanti	1111	23.41
(6) Brong Ahafo	829	9.61
(7) Northern	943	11.70
(8) Upper East	884	3.46
(9) Upper West	905	2.66

onto data analyses, the "svyset" complex survey command was activated to correct for clusters, stratification, and sample weights that characterize secondary datasets collected using complex survey designs. This correction procedure has been recommended by West et al. (2016) as necessary to generate error-free results that can produce good inferences. Univariable analysis was then performed generating the proportions and percentages of all the study variables (see Table 1). The next step involved conducting bivariable and multivariable analyses using ordered logistic regression because the responses of the outcome variables were ordered. These analyses were next performed with "ologit", reporting both crude proportional odds ratios (PORs) and adjusted proportional odd ratios (APORs). First, remembering difficulty and the covariates were independently regressed onto anxiety as depicted in Model 1 in Table 2 and online supplementary Table S1. Second, in Model 2, the predictor was regressed onto anxiety while controlling for the covariates. The same thing was done for the depression Model as seen in Table 2. Specifically, remembering difficulty and the covariates were independently and together regressed onto depression.

Table 2
Difficulty remembering regressed on anxiety and depression.

Variables	Anxiety			Depression		
Model 1	*B*	POR [95% CI]	*p*-value	*B*	POR [95% CI]	*p*-value
Remembering difficulty						
No difficulty		1 [ref]			1 [ref]	
Some difficulty	0.27	1.31** [1.12, 1.55]	0.002	0.34	1.41*** [1.21, 1.65]	<0.001
Lot of difficulty/ cannot at all	0.09	1.10 [0.78, 1.53]	0.590	0.42	1.51* [1.08, 2.13]	0.017
Model 2	*B*	APOR [95% CI]	*p*-value	*B*	APOR [95% CI]	*p*-value
Remembering difficulty						
No difficulty		1 [ref]			1 [ref]	
Some difficulty	0.28	1.33*** [1.12, 1.58]	0.001	0.35	1.42*** [1.21, 1.66]	<0.001
Lot of difficulty/ cannot at all	0.19	1.21 [0.85, 1.72]	0.300	0.50	1.65* [1.17, 2.31]	0.004
Additional information						
Number of observations	8962			8962		
N	21,863.976			21,864.087		
Strata	20			20		
Primary Sampling Units	660			660		
Design *df*	640			640		
F Statistics	F (23, 618) = 9.46, p<0.0001			F (23, 618) = 7.84, p<0.001		

Note. 95% CI = 95% confidence intervals; POR= Proportional odds ratio; APOR= Adjusted proportional odds ratio
* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$

3. Results

3.1. Sample characteristics

Table 1 presents the results of the study variables and sample characteristics. Approximately 4% of children were anxious daily, 4% weekly, and 8% monthly. For depression, about 3%, 3%, and 7% of the children experienced it daily, weekly, and monthly, respectively. About 1772 children experienced some remembering difficulties (19.92%). Three hundred and forty-one (341) children encountered a lot of difficulties or could not remember at all (4.09%). The majority of mothers/caretakers had no formal education or only attained a pre-primary education (37.14%). Also, the majority of the children sampled were within the 5–9 years age (43.78%), boys (51.27%), and resided in rural areas (57.07%) (see Table 1).

3.2. Association between remembering difficulty, and anxiety and depression among children in Ghana

Considering the aim of the study, only the results for hypotheses examining the relationship between remembering difficulty and (1) anxiety, and (2) depression among children in Ghana are reported (see Table 2). A full version of the results with covariates can be found in the online supplementary Table S1. Remembering difficulty was associated with anxiety in Model 1 and 2 which confirmed our first hypothesis. In Model 1, the odds of feeling anxious for children who had some difficulties with remembering [POR=1.31, 95% CI:1.12, 1.55, p=0.002]

were higher than those who did not have difficulties. However, this was not the case for those who had a lot of difficulties or could not remember at all as no significant relationship was found with anxiety [POR=1.10, 95% CI:0.78, 1.53, p=0.590]. In Model 2 when holding constant the covariates, the children who had some remembering difficulties had higher odds of becoming anxious [APOR=1.33, 95% CI:1.12, 1.58, p=0.001] than those who had no difficulties. Again, no significant relationship was found between children who had a lot of difficulties or could not remember at all and anxiety [APOR=1.21, 95% CI: 0.85, 1.72, p=0.300]. Remembering difficulty was also related to depression in both Models and this supported our second hypothesis. In Model 1, children who had some difficulties with remembering [POR=1.41, 95% CI:1.21, 1.65, p<0.001] and a lot of difficulties or could not remember at all [POR=1.51, 95% CI:1.08, 2.13, p=0.017] were more likely to be depressed. Similarly, in Model 2, children who had some difficulties remembering [APOR=1.42, 95% CI:1.21, 1.66, p<0.001] and a lot of difficulties or could not remember at all [APOR=1.65, 95% CI:1.17, 2.31, p=0.004 were more likely to be depressed after adjusting for covariates.

4. Discussion

This study examined the link between remembering difficulty and anxiety as well as depression among Ghanaian children. Interestingly, the study showed that children with some level of remembering difficulties were more likely to experience anxiety compared to those with no remembering difficulties. Similarly, children with some remembering difficulty or a lot of remembering difficulty were more likely to experience depression. Our finding, therefore, supports that of Alloway et al. (2005) and Holmes et al. (2010) reporting that children with some remembering difficulty were more likely to experience anxiety. According to these authors, remembering difficulty is associated with mental health challenges among children (Alloway et al. 2005; Holmes et al., 2010). Children, because of their remembering difficulties, may experience poor interpersonal relationships and school achievement problems which may cause them to worry, and become apprehensive or be nervous (Hung et al., 2016). Moreover, these children may worry greatly whenever their poor memory comes under scrutiny or compared to their peers or siblings with better memories. Many Ghanaian parents have high academic expectations for their children, and some are heavily involved in their children's education to ensure success (Chowa et al., 2013). It is, therefore, possible that children with remembering difficulties knowing very well that they cannot meet these expectations due to their circumstances may begin to worry and become anxious (Almroth et al., 2019). On the contrary, the result shows no significant relationship between children with lots of remembering difficulty and anxiety. Perhaps, when parents conclude that their children have a perpetual problem with remembering things, they may develop low expectations and are less likely to put pressure on the child to achieve academically (Opoku et al., 2020).

Furthermore, remembering difficulty at all severity levels had a significant relationship with depression. This finding is similar to the study conducted by Hung et al (2016) who reported that childhood poor cognitive ability was related to recurrent depressive episodes. It is also consistent with recent studies amongst adults showing that self-reported memory problems were associated with depressive symptoms (Bhang et al., 2020; Huang et al., 2019). As mentioned earlier, memory is an important cognitive function that enables children to process parents' and teachers' instructions, learn effectively and complete assigned tasks (Roberts et al., 2011). Children who have remembering difficulties are unable to execute these activities and may become subjects of embarrassment, ridicule, and chastisement (Wiguna et al., 2012). Without intervention to improve their memory, these children would begin to develop a lowered sense of self-esteem, self-stigmatization, feeling of worthlessness, and hopelessness (Blanken et al., 2017; Hung et al., 2016; Weeks et al., 2014). This can, therefore, translate into serious mental health challenges such as depression.

The results provide implications for interventions to improve the health of school children. Typically, mental health and cognitive challenges are ill-appreciated and unrealized in Ghana and many developing countries. The findings of this study could concern such stakeholders as parents, teachers, healthcare providers/professionals, and the government. Parents must endeavor to better understand child developmental issues (e.g., remembering and learning difficulties) and its association with mental health problems. This calls for an added priority to children's mental health as done for their physical health. As reported in other studies (Hetrick et al., 2015; Glozah et al., 2018), parents must strengthen their relationship with their children and monitor their general health conditions. In so doing, parents would be well placed to seek prompt medical support for their children. In addition, health authorities must recognize issues of knowledge deficiency among parents particularly relating to mental health literacy. Considering this, there must be opportunities for all parents to understand potential childhood problems so that the problems can be detected early. The health and social care architecture in the country must be strengthened to support parents with diagnosed children through financial and non-financial means.

Teachers must also be trained to utilize the best inclusive approaches to handling children with memory difficulties (Adom et al., 2019). Training for teachers on specialized cases will ease the stress teachers and children endure as a result of misunderstanding and poor support. This will also foster collaboration between teachers and mental health professionals in the provision of assistance for such children. Given this, mental health professionals must be engaged to provide training on empathetic treatment among students in the hope to reduce incidences of bullying and stigmatization often directed at children with disabilities. Besides, school directors should embark on training of more teachers in special needs education to help children with remembering difficulties to avoid mental health problems in the country. School-based interventions such as "Preschool PATHS Program" and "Fun FRIENDS" should be introduced to prevent anxiety and depression of children (Baughman et al., 2020). School authorities through health professionals can also equip families and communities through community-based sensitization programs so that they appreciate what children encounter and help them to recover from any depression and anxiety issues.

Finally, stakeholders must advocate for and implement systems that would offer free educational assessment and Individualized Education Plans (IEP) for children identified to be at risk of remembering difficulty. This will offer early detection and directed management of such children, reduce the financial burden on parents, and encourage inclusiveness of such children in society. These policies and systems will encourage parents to pay attention to their children, present them for assessment, and allow them to access IEPs to the benefit of the child.

4.1. Strengths and limitations

The main strength of the study is the use of a large nationally representative dataset that allows generalizing the findings to the larger population of 5–17years children in Ghana. Also, this large sample size and robust data collection procedure provides greater statistical power and minimizes sampling errors. Despite these strengths, the study has some limitations which need to be mentioned. The data on the study variables were obtained from parents using self-report measures and not the children themselves which could induce under or over reporting of difficulties. Moreover, some parents may hide the actual cognitive and mental health problems of their children. Future MICs data collection should be designed to obtain the data on the study variables directly from children as well. Also, the study variables were measured using screening tools and not diagnostic variants; therefore, findings must not be interpreted as clinical. Lastly, the relationship tested in this study is solely correlational and not causal. That said, studies on the cause-and-

effect relationship through longitudinal designs, for example, are recommended.

5. Conclusions

This study examined the relationship between remembering difficulty and depression and anxiety among children aged 5–17 in Ghana. Children with some remembering difficulties were more likely to experience anxiety compared to those with no remembering difficulty. Children with remembering difficulty were more likely to experience depression. The findings call on stakeholders to implement interventions geared at improving the mental health of all children in Ghana, particularly those with difficulties with cognition and related problems. Mental health professionals may need to proactively train would-be parents through public health interventions for early detection and support.

Data availability

To access the dataset for this study, permission must be sought from and granted by UNICEF at https://mics.unicef.org/surveys.

CRediT authorship contribution statement

Emmanuel Dziwornu: Conceptualization, Writing – original draft, Writing – review & editing. **Nutifafa Eugene Yaw Dey:** Conceptualization, Writing – original draft, Formal analysis, Methodology, Software, Data curation. **Kenneth Owusu Ansah:** Writing – original draft, Methodology, Visualization. **Francis Arthur-Holmes:** Writing – review & editing, Methodology, Visualization. **Henry Ofori Duah:** Writing – review & editing, Formal analysis, Software, Visualization. **Padmore Adusei Amoah:** Writing – review & editing, Methodology, Visualization. **Pascal Agbadi:** Conceptualization, Data curation, Formal analysis, Software, Visualization, Writing – review & editing, Methodology.

Declaration of Competing Interest

All authors declare that they have no conflicts of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jadr.2021.100212.

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