Child Psychiatry & Human Development
https://doi.org/10.1007/s10578-021-01223-5

ORIGINAL ARTICLE

Street Children in Ghana's Golden Triangle Cities: Mental Health Needs and Associated Risks

Ernestina Dankyi[1] · **Keng-Yen Huang**[2]

Accepted: 26 July 2021

Abstract

More than 61,000 persons below the age of 18 are living on the streets in the Greater Accra region in Ghana. Street children is a hidden vulnerable population and a global public health issue in the world, but little is known about their mental health and health needs, and mechanisms that contribute to their poor health. With a lack of mental health research to guide intervention or psychoeducation programme and policy planning, this study aimed to address these research gaps by examining prevalence of mental health problems and a set of associated risk factors (i.e. Perceived quality of life, and social connection). In addition, we examined whether the associations between risk factors and mental health problems were moderated by demographic and contextual factors (i.e., gender, age, work status, reason for living on street, number of years in street). Two hundred and seven children between age 12 and 18 who lived on the street in three cities (Accra, Sekondi Takoradi, and Kumasi) were recruited. Data were gathered through adolescent survey/interviews. Multiple regression was utilized to examine risk factors and moderation effects. Results support high mental health needs among street children. Approximately 73% street children experienced moderate to severe mental health problems, and 90% experienced poor quality of life. Perceived quality/happiness of life was the strongest predictor for street children's mental health. Social connection was associated with children's mental health only in certain subgroups and contexts. This study adds new epidemiological evidence for street children, an extremely vulnerable population, in Ghana and global child and adolescent mental health.

Keywords Street children · Mental Health · Ghana · Quality of Life · Moderation

Introduction

Children and adolescents in Sub-Saharan African (SSA) countries comprise about 50% of the total regional population [1], but their mental health needs have been overlooked. The burden of mental disorders account for 10–27% of the Global Burden of Disease [2, 3]. Half of the mental cases develop by age 14 year [4, 5]. In Ghana, approximately 12–27% of primary school-aged children with emotional or conduct problems [6–8] and 20–29% high school students with mental health problems [9]. Psychopathology research conducted in Ghana that based on *stress, developmental, and social support models* has found support of these theoretical models. This research has documented expected associations between social demographic, poverty, stress, relationship, development, and support factors and child mental health [7, 10]. However, most child and adolescent mental health research in Ghana were focused on school or community samples, and rarely focused on vulnerable street or homeless children [11]. The aim of this paper is to extent the current child and adolescent research in SSA & Ghana, and further study mental health prevalence and psychopathology among street children in Ghana.

A census conducted on street children in the Greater Accra region in 2011 revealed a total number of 61,492 persons below the age of 18 [12]. Of the total population counted in the Greater Accra census, 65% of these are 'children of the street' that is children for whom the street is both a home and a place of work [13]. The remaining 35% comprise "children on the street" who often spend the day

✉ Keng-Yen Huang
Keng-Yen.Huang@nyumc.org

Ernestina Dankyi
ekdankyi@ug.edu.gh

[1] Centre for Social Policy Studies, University of Ghana, Accra, Ghana

[2] Department of Population Health, New York University Grossman School of Medicine, 227 East 30th Street, 7th Floor, New York, NY 10016, USA

Published online: 04 August 2021

working on the street but return home at night, and children born on the street by street children. These children have migrated from regions outside Greater Accra and are making a living at lorry parks and large markets centres [12]. Similar numbers can be found in the streets of other cities like Kumasi and Sekondi-Takoradi. Together with Accra, these three cities are referred to as the 'golden triangle' and the destination of choice for children who migrate mostly from other parts of the country to come and work [14].

Although the definition of the children of the street are varied, there are some characteristics that cut across geographical context: these children are riskily housed (live in the streets, market stations, abandoned buildings, lorry parks, and abandoned broken down vehicles); they are likely to be living in urban areas and have little or no adult supervision [15–20]. Additionally, the environment in which these children live and work makes them highly disposed to poor mental health conditions. They are emotionally and physically vulnerable because they lack protection and are exposed to others who might take advantage of their vulnerable state and exploit them [19, 21–23].

In Ghana, street children form part of a larger group of children called orphaned and vulnerable children (OVCs) [24]. National response to addressing the situation of OVCs includes national policy guidelines and a national plan of action developed in 2005, a study on the situation of OVCs, the development of a Child and Family Welfare policy and Juvenile Justice policy both launched in 2015. However, a careful analysis of the responses reveals that street children are marginalized even among the OVC population, as there are no deliberate steps to address their particular concerns. Their homeless status automatically excludes them from the two main social protection programmes that directly target children and their families namely the Livelihood Empowerment Against Poverty (LEAP) and the National Health Insurance Scheme (NHIS) as both are household-based.

The experiences of these children especially the challenges they encounter have been widely researched and well documented. Studies in this area fall broadly under causes and factors that lead them to the street [12, 17, 22, 25]; their income generating activities [26]; physical and reproductive health challenges [19, 21, 25]. Agarwal et al. [27], Boakye-Boaten [17] and other studies have indicated that girls on the street are more vulnerable as they are easily sexually assaulted by males resulting in unwanted pregnancies and contracting Sexually Transmitted Diseases. Additionally, they were still carrying the loads on their heads whereas the boys had started using wheel barrows to make the load carriage easy for them thus earning lower in spite of working harder.

There is a budding interest in the mental health experiences of this population of children, which has for a long time not been the focus of attention of research in Ghana. Focusing on the mental health experiences of street children is important for many reasons. The relationship between homelessness and mental health among all ages has been well documented [20, 28–30]. The living conditions of street children and youth may compel them to exhibit violent behaviour themselves or victims of violent behaviour from the general population [22, 23]. By leaving home at a young age they subject themselves to considerable stress and emotional turmoil that impacts on their mental well-being. There is also evidence that problems including sleep disturbance, eating problems, aggression and overactivity, depression anxiety and self-harm, sexual violence are common among homeless children [30–32].

Street Children's Mental Health in Low-and Middle-Income Country Contexts

To date, there are no data on mental health among children and adolescents in Ghana. The data used to extrapolate estimates for the prevalence and burden of adolescent mental disorders are based on few studies, which often sampled small and non-representative populations, thus offering only a very narrow snapshot of the situation for adolescents globally [33]. The study adopts the World Health Organization definition of mental health which states that "Mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" Children and adolescents in street situations (CASS), particularly those in low- and middle-income countries (LAMIC) could arguably be regarded as the most at-risk group of children for mental health and psychosocial impairments compared with any other group of children [34]. The different circumstances and events that pushed these children onto the street in the first place may have a lasting impact on how they are able to cope with the normal stresses of life that they are confronted with on daily basis. For example, the poor family conditions that pushed the child onto the streets continues to deprive the child of emotional and material support for years afterwards.

The stress that street children experience makes them vulnerable to emotional problems, psychiatric disorders and learning difficulties. Sadly, they do not receive adequate care for these conditions. In most jurisdictions, interventions to address child and adolescent mental health are often not planned according to their specific mental health needs and they often do not include a careful evaluation of psychosocial components [35, 36]. An assessment of Ghana's mental health system conducted in 2012, revealed that the system was fraught with a number of challenges including low government spending and

unequitable distribution of resources across geographical space with almost all the services centred in urban centres in the south [35, 36]. On children and adolescents, the assessment revealed that, although 14% of all patients treated in mental health outpatient units were 17 years or younger, there were no services reserved exclusively for children them. There was no child and adolescent mental health service that provided, in-patient, outpatient and rehabilitation facilities such as counselling, social skills training and prevention programmes [35]. The situation is even more dire with hard to reach adolescents such as street children as most interventions that are planned for adolescents and children are often family based or school based [36–38]. The low literacy rates among street children and adolescents further makes access to health services including mental health care a huge challenge [39].

According to UNICEF [40], the rate of mental illness among homeless youth is very high, being two times greater than youth in the general population. Furthermore, a considerable high level of substance use and abuse has also been recorded among street children and adolescents. Substance use has often been presented as a coping strategy [20, 41–43] for dealing with tough jobs, discrimination and chronic hunger. Additionally, children of the street may also be exposed to dangerous situations where they are physically and sexually abused leading to trauma-related symptoms or the exacerbation of prior trauma symptoms. Moreover, the World Health Organisations (WHO) definition of mental health which emphasises functioning at a level where one can cope with normal stresses of life, work productively and contribute meaningfully to society requires that particular attention is paid to the mental health challenges among street children and adolescents. There is evidence of this in high income countries where psychological difficulties have been noted to adversely affect children's abilities to fulfil their potential [44, 45]. The situation may even more prevalent in lower-income countries, where adversity is most prevalent and the impact may be more detrimental [45]. A lack of attention, therefore, to the challenges that children and adolescent face may seriously hamper their capacity to live up to their maximum potential and become contributing members of society.

The growing body of literature on mental health among street children in Ghana have so far focused on the incidents of substance use and risky behaviours, the association between psychological functioning and social and health risk behaviours, behavioural experiences of street children and resilience [11, 21, 46, 47]. There is, however, still a lot more to unravel as far as mental health of street children is concerned. A first step to address significant public health and policy gaps of street children is to generate epidemiological evidence to inform mental health interventions, services and policy development. This study, therefore, adds to a growing body of literature by examining the level of psychological distress among street children and mechanisms for poor mental health. Different from previous street children studies, which are usually conducted in one of the three triangle cities in Ghana, this study enriches the existing literature by looking at children from the three cities simultaneously (Accra, Kumasi and Sekondi-Takoradi where the population of street children is concentrated) because various locations may present different experiences and mental health needs for street children. Figure 1 describes the conceptual model (based on a stress model) to be tested in this study [47]. We study whether high stress (i.e., perceived low quality of life/low happiness, low social connection) is associated with poor mental health in street children. This study contributes to new epidemiological evidence for street children in Ghana and global child and adolescent mental health in an extremely vulnerable population.

Research Questions and Hypotheses

(1) What are the mental health needs of street children in Ghana? Prevalence and level of mental health problems, and patterns by cities, child gender and age are studied to characterize the service needs. We *hypothesize* that prevalence and level of mental health problems

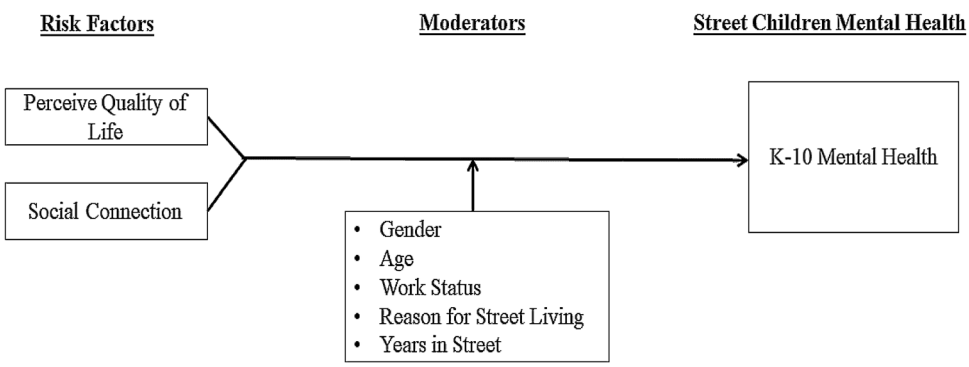

Fig. 1 Conceptual Model for the Study

for street children will be high, and patterns would be similar across cities, child gender and age.

(2) What aspects of life experience are associated with street children's mental health? Two broader domains of stress and life experience—*perceived personal well-being* (i.e., perceive life quality/happiness) and *social connection* (i.e., co-leaving, consecutiveness with family member, mobile phone access)—are studied to understand risks factors for poor street children's mental health. We *hypothesize* that perception about quality of life/happiness and social connection factors would be associated with street children's mental health outcomes.

3. Whether the (2) association is moderated (or varied) by demographic characteristics (i.e., age, gender, work status, years living on street, reason left home). We hypothesize that the associations between street children's life experiences and mental health would be moderated by certain demographic factors (e.g., gender). The moderation effect testing would be exploratory, and not specific directions were assumed.

Methods

Participants and Procedure

This study utilized a cross-sectional design. Study participants included 207 street children who were recruited in August 2017. To have a diverse sample, street children were recruited from the three golden triangle cities, and in areas that they were mainly concentrated and most active: market squares and lorry stations. These are the traditional places of work and rest for the children. However, in Sekondi-Takoradi, they were mostly reached at the seaport where a majority of them lived and worked. In Accra, in addition to three selected lorry stations and two market centres, one new shopping mall was also included because of the high number of street children that hang around it. Street children in facilities such as daycare and drop in centres were not included in this survey. Children who were living on the street at the time of recruitment and between age 12 and 18 were eligible to participate. The participation was completely voluntary. The survey was conducted at the same time of recruitment because working with this population of children comes with its own challenges, chief among them being the transient nature of their stay on the street. This required that we conducted the survey immediately we found them, any delay would mean meeting their absence and starting a search for new respondents altogether. Children's consent was obtained, however, no incentives were provided for the children to participate in the study. To mitigate the effect of the asymmetric power relations (informed notably age, sex and language) between the street children and research team on the findings of the study, we recruited young University students all of whom were a little over 20 years. Further, there were two males and a female so we as much as practicable matched male assistants to male respondents and vice versa. Administering the questionnaire in the Akan language also helped to break any form of intimidation on the part of these street children. The Census and Survey Processing System's (CSPro) Computer Assisted Personal Interviewing (CAPI), a tablet version data collection system, was utilized. The CAPI was administered by three trained research staff using an interview format. All interviews were conducted in the Akan language and each interview lasted approximately half an hour. Three research assistants that were involved in the interviews were bilingual (speak both Akan and English), and trained in Akan interview procedures. During the interview training, research staff went through questionnaire item-by-item in Akan language and practice interviews using consistent/equivalent Akan terms to ensure data collection standardization across the three sites. The study was given approval by the Institutional Review Board of the College of Humanities, University of Ghana (ECH 135 16/17).

Table 1 presents the demographic information on the study sample from three study cities. Most children were below age 15 (67%). The main reason for living on the street was because of family poverty (64%). About 41% of children lived alone and 36% lived with family members (father, mother, or siblings) on the street, and most children have lived on the street for less than 3 years (77%). About one half of children engaged in one income generating activity or the other (48%). Most of the street children had mobile phones (81%), and maintained contact with family members (73%), and perceive having poor quality of life (90% categorized as at high-risk for poor quality of life; assessment described below).

Measures

Child mental health measure has been validated and used in Ghana contexts. To ensure measurement appropriateness for street children, all the study measures were checked for internal consistency using the current street children sample (Cronbach alpha α presented below).

Child Mental Health

The Kesslar psychological distress scale (K10; 10 items; Cronbach alpha $\alpha = 0.82$ our Ghana sample) was used to assess children's mental health problems, especially in anxiety and depression related symptoms [49]. The Kessler Psychological Distress Scale have been validated and found to be appropriate for use within the Ghanaian context [50–53] and LMIC contexts [54]. Children rated 10

Table 1 Characteristics of study sample

	Total (n = 207)	Sekondi-Takoradi(n = 67)	Accra (n = 70)	Kumasi (n = 70)	*P*
	%	%	%	%	
Gender-Male	53.1	71.6	47.1	41.4	< .001
Age					
12 to 14 years old	66.7	82.1	58.6	60.0	.005
15 to 17 years old	33.3	17.9	41.4	40.0	
Education					
12 to 14 years old Group					.112
≤ Class 3	52.2	33.3	62.1	50.0	
Class 4–6	30.4	50.0	61.0	21.4	
Junior high school	17.4	16.7	6.9	28.6	
15 to 17 years old Group					< .001
≤ Class 3	21.7	14.5	22.0	31.0	
Class 4–6	3.1	20.0	53.7	33.3	
Junior high school	44.2	65.5	24.4	35.7	
Years lived on the street					
≤ 1 year	37.2	22.4	47.1	41.4	.003
1–2 years	40.1	38.8	42.9	38.6	
3–5 years	16.4	29.9	7.1	12.9	
> 5 years	6.3	9.0	2.9	7.1	
Reason living on the street					
Family poverty	64.3	64.2	74.3	54.3	.059
Maltreatment/Abuse	11.6	10.4	12.9	11.4	
Other	24.2	25.4	12.9	34.3	
Person live with now					
Mother or Father on the street	17.9	40.3	11.4	2.9	< .001
Sibling on the street	18.4	11.9	20.0	22.9	
Live alone on the street	40.6	29.9	44.3	47.1	
Other people	23.2	17.9	24.3	27.1	
Religion					
Christian	60.9	76.1	52.9	54.3	.003
Moslem	35.3	19.4	47.1	38.6	
Have work	48.3	55.2	20.0	70.0	< .001
In contact with family members	72.9	83.6	61.4	74.3	.014
Mobile phone ownership	80.7	76.1	85.7	80.0	.358
Quality of Life					
0–50 (High risk)	89.9	85.1	98.6	85.7	.012
≥ 51 (Normal or low risk)	10.1	14.9	1.4	14.3	

symptom items over the last 4 weeks on a 5-point scale (0 = None of the time; 5 = All of the time; sample item: "how often did you feel nervous" "how often did you feel hopeless"). A total score was created for the analysis. To examine prevalence, a group variable was created based on recommended cut-off [48], which defines scores < 20 as normal, 20–24 as mild mental disorder, 25–29 as moderate mental disorder, and ≥ 30 as severe mental disorder.

Predictors for Street Children's Mental Health

Two broader domains of life experience—perceived quality of life and social connection (i.e., co-living, connectedness with family members, mobile phone access) are measured and conceptualized as predictors for child mental health. ***Perceived quality of life*** was assessed using the Personal Wellbeing Index for school children and

adolescents (PWI-SC; 7 items; α = 0.83 using our Ghana sample) on a 11-point scale (0 = very sad; 5 = neither happy nor sad; 10 = very happy). PWI-SC assesses how happy the youth is with his/her health, with the things he/she want to be good at, about the things he/she have, or about doing things away from your home. We use PWI-SC scale (quality of life indicator) as a way to capture stress children's perceive stress. A total PWI score as well as a risk-group variable were created for subsequent analysis [55]. The risk-group variable was created based on Cummins et al.'s recommendation. A score of 70 or above reflects a normally functioning homeostatic system; a score between 51 and 69 indicates the challenged range (medium stress); and a score between 0 and 50 indicates high-risk range (high stress) [56]. PWI-SC has been translated into six languages and used globally [57]. Social Connection was assessed using three binary indicators: *in contact with family members* (1 = yes, 0 = no), liv*ing alone* (1 = live alone, 0 = live with mother, father, sibling, or others on the street), and *having mobile phone* (1 = yes 0 = no).

Demographic Covariates and Moderators

Data were also obtained on socio-demographic characteristics, such as age, gender, reasons for being on the streets, years living on the street, and work status.

Data Analysis

Data analysis was conducted using SPSS version 26. To examine *prevalence of mental disorder* and *level of mental health problems*, a series of chi-square (using K10 categorical variable) and univariate analysis of variance (using K10 total score) were conducted. To study *predictors* of mental health problem, multiple linear regression analysis was applied. Perceived quality of life (using a continuous scale) and social connection predictors were included as predictors, and models with and without adjusting demographic covariates were compared. To study *moderation effects*, we built on the multiple linear regression model and added moderators and predictors-by-moderator interaction terms in the models. Five demographic moderators (gender, age, work status, years, and reasons living on street) were studied and each moderator was examined separately. A significant predictor-by-moderator interaction effect would indicate a significant moderation effect.

Results

Mental Health Needs of Street Children

Table 2 presents K10 Mean (SD) score and prevalence of mental disorder for the full and subsample. Level of mental health problems among the respondents was generally high

Table 2 Mental health of street children by city

	Total	Accra	Sekondi-Takoradi	Kumasi	3-city Comparisons *p*
	%	%	%	%	
K10 Mental Disorder (Severity Level)					
Normal (< 20)	9.7	22.9	4.5	1.4	< .001
Mild mental disorder (20–24)	17.4	21.4	14.9	15.7	
Moderate mental disorder (25–29)	21.4	21.4	17.9	24.3	
Severe mental disorder (≥ 30)	51.7	34.3	62.7	58.6	
	M (SD)	M (SD)	M (SD)	M (SD)	
K10 Mental Health (Sum score)	28.21 (6.44)	25.60 (6.84)	29.45 (5.89)***	29.63 (5.77)***	< .001
City-by-Group Comparisons					
K10 Sum Score by City-and-Gender					.591
Male	28.67 (5.82)	26.61 (6.70)	29.60 (5.31)	29.48 (5.77)	
Female	27.68 (7.07)	24.70 (6.93)	29.05 (7.31)	29.73 (6.26)	
K10 Sum score by City-and-Age					.664
12 to 14 years old	27.51 (6.68)	25.66 (5.23)	29.42 (5.42)	28.61 (6.41)	
15 to 17 years old	28.21 (6.43)	25.56 (7.85)	29.45 (6.04)	30.31 (5.26)	

Mean score differences in three cities remain after adjusting for confounders (i.e., in contact with family, have work, live with family members/others or alone, age, gender, year live on street)

***$ps \leq .001$

with over a half suffering from moderate to severe mental disorder across all 3 cities. Respondents in Sekondi-Takoradi and Kumasi had significantly higher mental disorder compared to Accra ($p < 0.01$). The city differences remained significant even after adjusting for confounders (i.e., in contact with family, work status, live alone or with family members/others, age, gender, year live on street). There was no overall gender ($p = 0.416$) or age group ($p = 0.572$) differences on level of mental health problems. There was also no city-by-gender or city-by-age group differences on mental health problem.

Factors Associated with Street Children's Mental Health

Multivariate linear regression analyses were carried out to understand factors associated with the mental health of the street children. Table 3 shows results for the non-adjusted main effect and adjusted models. In both main effect model (Model 1) and adjusted model (Model 2), perceived quality of life was consistently identified as a significant predictor for child mental health. True to our expectation, high perceived satisfaction about quality of life was associated with lower mental health symptoms. Social connection factors were not associated with child mental health in both adjusted and non-adjusted models. Demographic factor, such as work status, was associated with mental health outcome (see Model 2). Children who worked was associated with higher mental health symptoms than children who did not work. Perceived quality of life and social connection indicators explained 16% of variance for mental health symptoms, and demographic factors explained additional 7% of variance.

Moderating Effects

We next examined whether the associations between quality of life, social connection and mental health are moderated by demographic factors. Five demographic moderators (i.e., gender, age, work status, reason living on street, years in street) were studied to understand how these moderators interact with the main predictors (quality of life and social connection). We built on the main effect model (described above) and added moderators and interaction of moderators-by-predictors in the model. We conduct moderation analysis separately for each moderator. As shown in Table 4, results indicated significant interaction effect for gender, work status, reason for leaving home, and years of living on street.

Specifically, for *gender moderation effect*, we found mobile ownership (social connection) was associated with more mental health problems in males, but an opposite association was found for females (mobile ownership was associated with lower mental health problems in females) (Fig. 2a). Similarly, living with others (more social connection) was associated with more mental health problems

Table 3 Predictors for street children's mental health (K-10)

	Model 1 (Non-adjusted)			Model 2 (Adjusted)		
	B	*SE*	*p*	*B*	*SE*	*p*
Perceive quality of life						
Personal wellbeing index score	− 1.03	.19	< .001	− 1.18	.19	< .001
Social connection						
In contact with family members (1 = yes)	1.93	1.06	.070	1.69	1.08	.117
Living alone (1 = yes)	.75	.93	.419	.13	.95	.896
Have mobile phone (1 = yes)	− .84	1.12	.454	− 1.61	1.11	.150
Demographic						
Have work (1 = yes)				2.45	.89	.006
Age (1 = 15–17 years, 0 = 12–14 years)				1.40	.90	.121
Male (1 = male, 0 = female)				− .06	.87	.945
Years lived on street						
< 1 year (Reference)				–	–	
1–2 years				− .17	.93	.852
3 or more years				1.75	1.14	.125
Reason left home (1 = poverty, 0 = other)				.24	.90	.793
R^2	.16		< .001	.22		< .001
$R^2\Delta$	–			.07		.008

Results were based on multiple linear regression. Perceive quality of life was measured using a mean scale score. Child mental health outcome was measured by K-10 sum score. Children who work tend to be living on stress for longer. R^2 is variance explained by the entire set of predictors. $R^2\Delta$ is the variable explained by the added variables (i.e., a set of demographic variables)

Table 4 Moderation effect-results from linear regression

	B	*SE*	*p*
Gender moderation effect (1 = male, 0 = female)			
Personal wellbeing index × gender	− .23	.37	.541
In contact with family × gender	.51	2.09	.807
Living alone × gender	**− 4.95**	**1.90**	**.010**
Have mobile phone × gender	**6.12**	**2.19**	**.006**
Age moderation effect (1 = 15–17 years, 0 = 12–14 years)			
Personal wellbeing index × age	.52	.47	.272
In contact with family × age	− 1.72	2.19	.433
Living alone × age	1.01	2.09	.630
Have mobile phone × age	1.79	2.81	.524
Work status moderation effect (1 = have work, 0 = no work)			
Personal wellbeing index × work	− .12	.38	.754
In contact with family × work	− .94	2.07	.650
Living alone × work	− 1.82	1.84	.324
Have mobile phone × work	**6.90**	**2.23**	**.002**
Reason for street living moderation effect (1 = poverty Reason, 0 = other)			
Personal wellbeing index × poverty	.48	.42	.258
In contact with family × poverty	**5.46**	**2.16**	**.012**
Living alone × poverty	2.18	1.93	.260
Have mobile phone × poverty	− 4.13	2.62	.117
Years in street moderation effect (1 = 3 or more years, 0 = < 3 years)			
Personal wellbeing index × street years	**.90**	**.44**	**.043**
In contact with family × street years	− 4.32	2.56	.093
Living alone × street years	− 3.35	2.19	.128
Have mobile phone × street years	2.19	2.61	.403

Child mental health outcome was measured by K-10 sum score. All analysis included 4 main effects (perceive quality of life and social connection variables), the moderator, and 4 interaction terms (main effect variable-by-moderator). Perceived quality of life was centred at mean. Only results from the interaction terms are showed in the table. A significant interaction term indicates a moderation effect

in males, but living with others show protective effect for female (showed lower mental health problems) (Fig. 2b). For *work status moderation effect*, we found mobile ownership (social connection) was associated with better mental health only for street children who did not work (Fig. 2c). The association between social connection with family and child mental health was also moderated by *reason for living on the street*. We found that maintaining connection with family was associated with poorer mental health for children living on street due to family poverty, but such association was less so for children living on street for other reasons (Fig. 2d). For *years lived on the street* moderation effect, we found among children who lived on street for less than 3 years, higher perceived quality of life was associated with lower mental health problem, while this association was weak among children who live on street for 3 or more years (Fig. 2e).

Discussion

The study sort to examine mental health needs among street children in three cities of Ghana, and factors associated with their mental health. The results show that 73% of street children experienced moderate to severe mental disorder (or range 56% to 83% across cities) and 85% to 99% experienced poor quality of life across the three cities. This finding is corroborated by Oppong Asante et al. [45] who found that approximately 87% of the street children that participated in their study in Accra exhibited moderate to severe psychological symptoms. There were no gender or age group differences on mental health problems. The finding was consistent with several studies on street children across various geographical contexts in Ghana [11, 17, 21]. These studies posit that the very condition under which the children live disposes them to psychological stress. The everyday experiences of hunger, unstable income, risky living and sleeping arrangements, the fear of being assaulted physically and sexually are a source of worry, excessive thinking, and anxiety. For some of the children, the stress emanating from the challenges are experienced daily while for others, it is intermittent.

Interestingly, we found significant differences in the three study cities, with lower mental health problem in Accra after adjusting for demographic confounders. The Greater Accra region is known to have the highest number of street children resulting in the establishment of several non-governmental organisations that provide a range of services for street children including mental health support. The presence of these organisations and the nature of the psycho-education programmes they run for these vulnerable population may have led to improved mental wellbeing of these participants compared to their counterparts in the other two regions.

In studying mechanisms for street children's mental health problems, we found *perceived quality/happiness of life* to be the strongest predictor for child mental health, but the association is also moderated by number of years of living on street. Perceived quality of life negatively associated with mental health problems in children who had lived on street for less than three years. It is well established in the literature that prolonged stay on the street is detrimental to the mental health of street children [58, 59] and this is possibly likely to influence their quality of life. It is therefore plausible that when quality of life of this population increases, it is possible to see changes in approved mental health. In the Ghanaian context, factors that foster resilience in this population could be attributable to increase happiness among street children [60]. However, the relationship between quality of life and mental health among this population is not clearly delineated and may warrant for further investigation.

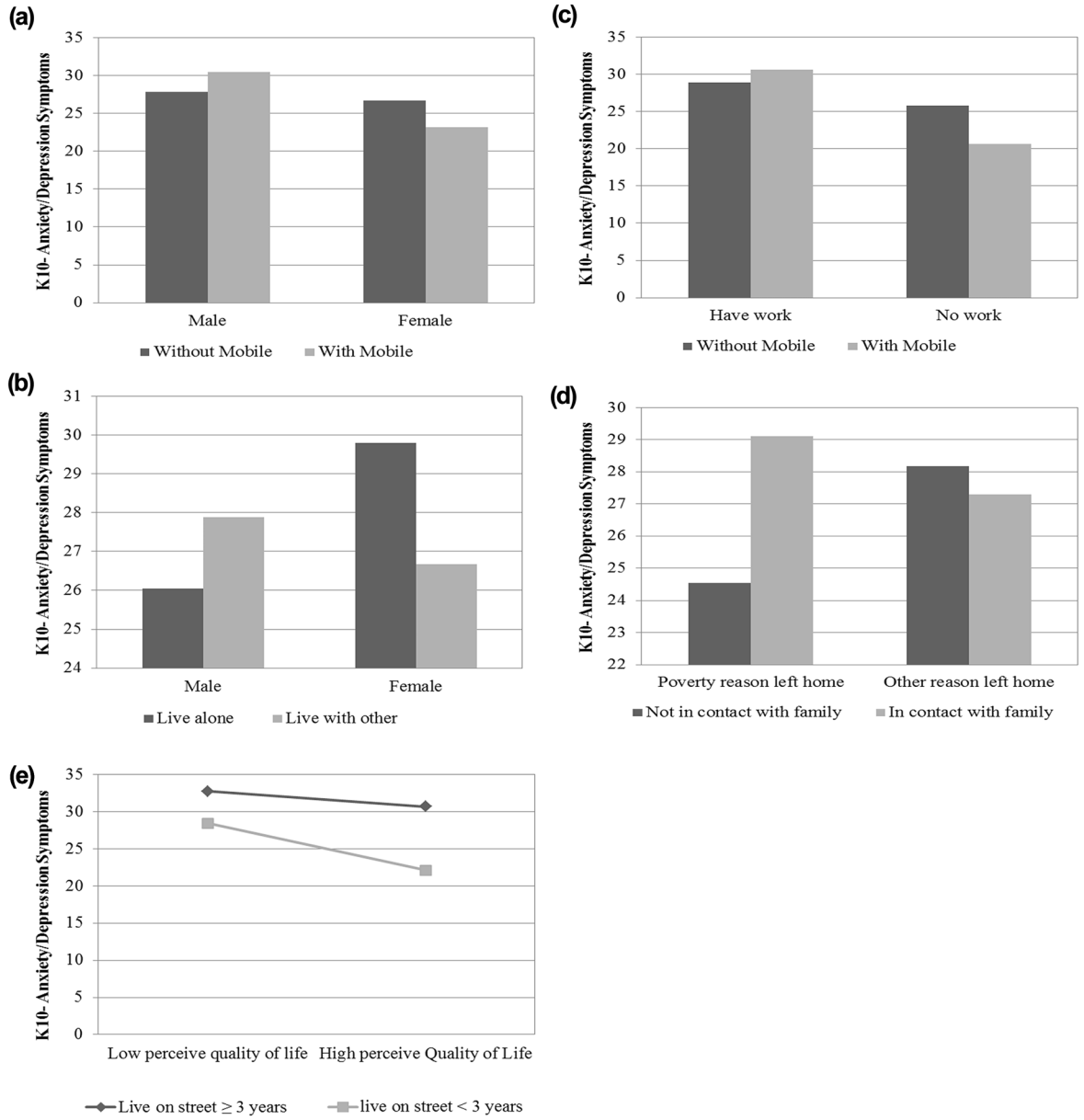

Fig. 2 Moderation Effects. **a** Gender-by-Social Connection (Mobile Phone Ownership) Moderation Effect. **b** Gender-by-Social Connection (Living Status) Moderation Effect. **c** Work Status-by-Social Connection (Mobile Ownership) Moderation Effect. **d** Reason for Leaving Home-by-Social Connection (Family Connection Status) Moderation Effect. **e** Year Live on Street-by-Perceive Quality of Life Moderation Effect

In the association between *social connection* (i.e., in contact with family members, living alone, have mobile phone) and mental health, we found no direct association, but there were gender, work status, and reason for living on the street moderation effects. Specifically, we found high social connection (i.e., mobile phone ownership, living with others) to be a risk factor for males' mental health problem, but a protective factor for female's mental health. In addition, social connection with family appears to be a risk factor for poor mental health in children who left home due to family poverty (but not for children who left home due to other reasons). The literature on street children has established that many children have been said to end up on the street to escape family poverty and abuses within the domestic abuses among others [17, 32, 46, 61, 62]. A continuous contact with family members may only aggravate the mental state of these children as it may serve as a constant reminder of the conditions they are trying to escape from. Also, studies have found most street children do support their families financially which could be a source of pressure for them as

they earn so little from their toil on the streets but still feel obliged to support their families [63].

Furthermore, mobile phone ownership (connection with outside world) was not always associated with better mental health. Mobile phone ownership was associated with better mental health only for street children who did not work. So far, the literature on street children have not interrogated the use of mobile phones or digital devices and the implication for their wellbeing. This finding has therefore triggered an interest and a call for further studies on street children and technology. Further, our findings add new evidence to the literature, and also highlight the complexity of mechanisms for mental health problem development. This study is one of few studies to examine the mechanisms of mental health on multiple domains of individual and contextual factors and with street children in an African context. This is an important contribution because street children's health and development research in Africa is scarce. More research is needed to better understand and better inform intervention or social welfare policy development.

In the associations between demographic factors (i.e., years lived on street, work status, and reason left home) and child mental health, we did not find expected direct associations. Instead, the associations were influence by other contextual factors. Previous study found that children who have low wellbeing and left home due to other reasons (e.g., abuse, parental divorce) were at greatest risk for anxiety/depression. Evidence from previous studies shows that children may come to the streets with prior trauma symptoms because they experience a considerable amount of adversity from a young age [56]. Some of these prior trauma symptoms emanate from abuse suffered at the hands of foster and sometimes biological parents, intimate partner violence especially for girls who have escaped from forced marriages among other things. Their condition may be exacerbated by the harsh living conditions on the street if the symptoms, are not adequately addressed (and they are often not). The finding of this study that children who in addition to poverty, escape to the street as a result of abuse are likely to report a low level of wellbeing and also are at greatest risk for anxiety/depression is thereby supported. Our moderation analysis findings reveal complexity and variation of experience that may contribute to different mental health outcomes in street children.

This study has some limitations. First, the cross-sectional nature of the research did not allow cause–and–effect relationships to be established. Longitudinal research, although challenging especially with transient populations such as homeless youth may be necessary to help determine the trend of the relationships between the variables identified in this study. Secondly, we measured only psychological symptoms, and therefore could not determine the prevalence of specific mental disorders such as depression and Post-Traumatic Stress Disorder (PTSD). The need for future studies to examine the prevalence of specific disorders among this population is highlighted. Third, although the PWI-SC perceive quality of life/happiness measure has been used and validated in other countries, the measure is the first time used in Ghana with street children. It may not capture the important aspects of life experience perceived by street or Ghanaian children. More qualitative and measurement validation work may be needed to ensure the measure captures important aspect of life experience for children and adolescents in Ghana. Finally, the questionnaire was interviewer-administered, it is possible that systematic and social desirability biases may have confounded some of the outcome variables. A qualitative study that seeks to understand the stories behind the scores will create a more holistic account of psychological state of the children.

Summary

Most child and adolescent psychopathology research in LAMICs has been focused on school, community, or clinical-based samples, and rarely focused on vulnerable street or homeless children. Studying mental health needs and influence of living experience on street children's mental wellbeing is urgently needed in global research given over 100 million street children in the world. This study addresses gaps in the literature and adds new evidence and understanding of risks and protective factors for street children in LAMIC contexts. Using a standardized measure, we found that 73% of street children experienced moderate to severe mental disorder and about 90% experienced poor quality of life and unhappiness. Negative living experience might not be consistent with street children's original expectation in pursuing new life. In investigating psychopathology mechanisms, we found perceived quality/happiness of life is the strongest predictor for child mental health, but the association is also moderated by years of living on street. In addition, there is no direct association between social connection and mental health, but the association was moderated by gender, work status, and reason for living on street. Our findings fill an important gap as it is one of the few studies to examine the mechanisms of mental health on multiple domains of individual and contextual factors and with street children African contexts. The finding highlights the importance of public education and social service needs to promote youths' awareness of street children issues and support high-risk youths' basic and financial needs in order to reduce rate of street children globally. In addition, future research must not only addresses and meets the pressing mental health and psychosocial needs of CASS in LAMIC, but also the need for more systematic psychopathology research using larger

scale of data, especially data from the low- and middle-income countries.

Acknowledgements The study was supported by Carnegie Corporation, New York through the Building of a New Generation of Academics, Africa (BANGA-Africa) project

References

1. Patton GC, Sawyer SM, Santelli JS et al (2016) Our future: a Lancet commission on adolescent health and wellbeing. Lancet 387(10036):2423–2478
2. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C (2013) Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the global burden of disease study 2010. Lancet 380:2197–2223
3. Omar MA, Green AT, Bird PK et al (2010) Mental health policy process: a comparative study of Ghana, South Africa, Uganda and Zambia. Int J of Ment Health Syst 4:24
4. WHO (2014) Health for the world's adolescents: a second chance in the second decade. WHO. https://www.who.int/maternal_child_adolescent/documents/second-decade/en/. Accessed 1 Oct 2019
5. Kessler RC, Avenevoli S, Green J et al (2009) National comorbidity survey replication adolescent supplement (NCS-A): III. Concordance of DSM-IV/CIDI diagnoses with clinical reassessments. J Am Acad Child Adolesc Psychiatry. 48(4):386–399
6. Kusi-Mensah K, Donnir G, Wemakor S, Owusu-Antwi R, Omigbodun O (2019) Prevalence and patterns of mental disorders among primary school age children in Ghana: correlates with academic achievement. J Child Adolesc Ment Health 31(3):214–23. https://doi.org/10.2989/17280583.2019.1678477 (**PubMed PMID: 31805836. Epub 2019/12/07**)
7. Oppong Asante K, Kugbey N, Osafo J, Quarshie EN, Sarfo JO (2017) The prevalence and correlates of suicidal behaviours (ideation, plan and attempt) among adolescents in senior high schools in Ghana. SSM-Population Health 3:427–34. https://doi.org/10.1016/j.ssmph.2017.05.005 (**PubMed PMID: 29349236; PubMed Central PMCID: PMCPMC5769048. Epub 2018/01/20**)
8. Doku PN (2009) Parental HIV/AIDS status and death, and children's psychological wellbeing. Int J Ment Health Syst 3(1):26
9. WHO (2012) Global school-based student health survey- Ghana Junior High 2012 Fact Sheet. Available from: https://www.who.int/ncds/surveillance/gshs/2012_Ghana_junior_high_fact_sheet.pdf?ua=1. Accessed 1 Feb 2021
10. Glozah FN (2015) Exploring Ghanaian adolescents' meaning of health and wellbeing: a psychosocial perspective. Int J Qual Stud Health Well-being 10:26370. https://doi.org/10.3402/qhw.v10.26370 (**PubMed PMID: 25855158; PubMed Central PMCID: PMCPMC4390561. Epub 2015/04/10**)
11. Oppong Asante K, Meyer-Weitz A (2017) Prevalence and predictors of suicidal ideations and attempts among homeless children and adolescents in Ghana. J Child Adolesc Ment Health 29(1):27–37. https://doi.org/10.2989/17280583.2017.1287708 (**PubMed PMID: 28403747, Epub 2017/04/14**)
12. Department of Social Welfare (2011) Census on street children in the Greater Accra Region, Ghana. Ghana, Accra
13. Ennew J (1994) Street and working children: a guide to planning. developmental manual-4. Save the children, London
14. Kwankye SO, Addoquaye-Tagoe C (2009) City life outside the home: the experiences of independent child migrations in Ghana. University of Ghana Press, Accra, pp 132–170
15. Aidan M (1997) Stress and coping strategies among street children in Lusaka. J Psychol Afr 2:24–33
16. Aptekar L (1994) Street children in the developing world: a review of their condition. Cross Cult Res 28(3):195–224
17. Boakye-Boaten A (2008) Street children: experiences from the streets of Accra. Res J Int Studies 8:76–84
18. Cudjoe E, Alhassan A (2016) The social support of street children: the experiences and views of female head porters in Kumasi. Ghana ARJASS 1(6):1–11
19. Fiasorgbor D, Fiasorgbor E (2015) Street children: our health and coping strategies when we are sick. Journal of Health, Medicine and Nursing 15:45–50
20. McCay E (2011) Experience of emotional strength and resilience in street involved youth: the need for early mental health interventions. Health Q 14:66–70
21. Anarfi JK (1997) Vulnerability to sexually transmitted disease: street children in Accra. Healtranrev 7(supplement):281–306
22. Oppong Asante K (2015) Street children and adolescents in Ghana: a qualitative study of trajectory and behavioural experiences of homelessness. Global Social Welfare. https://doi.org/10.1007/s40609-015-0039-8
23. Oppong Asante K, Kugbey N, Osafo J, Quarshie NE, Sarfo OJ (2017) The prevalence and correlates of suicidal behaviours (ideation, plan and attempt) among adolescents in senior high schools in Ghana. SSM- Population Health 3:427–434
24. Bortei-Doku Aryeetey E, Afranie S, Andoh P, Doh D, Antwi-Bosiako, Amponsah-Nketia et al (2011) A study on the situation of orphans and vulnerable children in Ghana. UNICEF, Accra
25. Anarfi JK, Kwankye SO (2009) Independent migration of children in Ghana. Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Legon
26. Oppong-Asante K, Meyer-Weitz A (2015) Using reflective poems to describe the lived experiences of street children and adolescents in Ghana. Int J Adolesce Youth 20(2):148–150
27. Agarwal S, Attah M, Apt N, Grieco M, Kwakye EA, Turner J (1994) Bearing the weight: the Kayayoo, Ghana's working child girl. Int Soc Work 40(3):245–263
28. Edidin JP, Ganim Z, Hunter SJ, Karnik NS (2012) The mental and physical health of homeless youth: a literature review. Child Psychiatry Hum Dev 43(3):354–375
29. De-graft Aikins A, Ofori-Atta A (2007) Homelessness and mental health in Ghana: everyday experiences of Accra's migrant squatters. J Health Psychol 12(5):761–778
30. Vostanis P, Grattan E, Cumella S (1998) Mental health problems of homeless children and families: longitudinal study. BMJ 316:899–902
31. Cutuli JJ, Treglia D, Herbers JE (2020) Adolescent homelessness and associated features: prevalence and risk across eight states. Child Psychiatry Hum Dev 51:48–58. https://doi.org/10.1007/s10578-019-00909-1
32. Gigenhack R (2008) Critical omissions. How the street children studies could address self-destructive agency? In: Christensen P, James A (eds) Research with children: perspectives and practices, 2nd edn. Routledge, London, pp 205–219
33. Erskine HE, Baxter AJ, Patton G, Moffitt TE, Patel V, Whiteford HA et al (2017) The global coverage of prevalence data for mental disorders in children and adolescents. Epidemiology Psychiatric Sci 26(4):395–402
34. Watters C, O'Callaghan P (2016) Mental health and psychosocial interventions for children and adolescents in street situations in low- and middle-income countries: a systematic review. Child Abuse Negl 60:18–26
35. Robert M, Mogan C, Asare JB (2014) An overview oof Ghana's mental health system: results from an assessment using the world Health Organisation's assessment instrument for mental health systems (WHO-AIMS). Int J Ment Health Syst 8:16

36. Kieling C, Baker-Henningham H, Belfer M, Conti G, Ertem I, Omigbodun O et al (2011) Child and adolescent mental health worldwide: evidence for action. Lancet 378:1515–1525
37. Hoven CW, Doan T, Musa GJ, Jaliashvili T, Duarte CS, Ovuga E et al (2008) WPA awareness task force. Worldwide child and adolescent mental health begin with awareness: a preliminary assessment in nine countries. Int Rev Psychiatry. 20(3):261–70. https://doi.org/10.1080/09540260801995950 (**PMID: 18569178**)
38. Ssewamala FM, Bo Sensoy, Mckay MM et al (2018) Strengthening mental health and research training in Sub-Saharan Africa (SMART Africa): Uganda study ptotocol. Trials 19. https://doi.org/10.1186/s13063-018-2751-z
39. Amoah PA, Phillips DR, Gyasi RM, Koduah AO, Edusei J (2017) Health literacy and self-perceived health status among street youth in Kumasi. Ghana Cogent Med 4(1):1275091
40. United Nations Children's Fund (2012) The state of the world's children 2012: children in an urban world. UNICEF, New York
41. Kidd SA (2007) Youth homelessness and social stigma. J Youth Adolesc 36(3):291–299
42. Kidd SA, Carroll MR (2007) Coping and suicidality among homeless youth. J Youth Adolesc 30(2):283–296
43. Thomas de Benitez S (2013) State of the world's street children. Research Consortium for street children, London
44. Rutter M (2002) Development and psychopathology. In: Rutter M, Taylor E (eds) Child and adolescent psychiatry. Blackwell Science Ltd, Oxford, pp 309–324
45. Roberts RE, Attkisson CC, Rosenblatt A (1998) Prevalence of psychopathology among children and adolescents. Am J Psychiatry. 155(6):715–7259619142
46. Oppong Asante K, Meyer-Weitz A, Peterson I (2015) Correlates of psychological functioning of homeless youth in Accra, Ghana: a cross-sectional study. Int Journal of Mental Health Syst 9(1):1–9
47. Mizen P, Ofosu-Kusi Y (2010) Asking, giving, receiving: friendship as survival strategy among Accra's street children. Childhood 17(4):441–454
48. Auerbach RP, Admon R, Pizzagalli DA (2014) Adolescent depression: stress and reward dysfunction. Harv Rev Psychiatry 22(3):139–48. https://doi.org/10.1097/hrp.0000000000000034 (**PubMed PMID: 24704785; PubMed Central PMCID: PMCPMC4016104. Epub 2014/04/08**)
49. Kesslar RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand S-LT et al (2002) Short screening scales to monitor population prevalence and trends in non-specific psychological distress. Psychol Med 32(6):959–976
50. Chirwa GC, Suhrcke M, Moreno-Serra R (2020) The impact of Ghana's National Health Insurance on psychological distress. Appl Health Econ Health Policy 18(2):249–259
51. Gyasi RM, Phillips DR (2020) Risk of psychological distress among community-dwelling older adults experiencing spousal loss in Ghana. Gerontologist 60(3):416–427
52. Gyasi RM, Yeboah AA, Mensah CM, Ouedraogo R, Addae EA (2019) Neighborhood, social isolation and mental health outcome among older people in Ghana. J Affect Disord 259:154–163
53. Ibrahim A, Esena RK, Aikins M, O'Keefe AM, McKay MM (2015) Assessment of mental distress among prison inmates in Ghana's correctional system: a cross-sectional study using the Kessler psychological distress scale. Int J Ment Health Syst 9(1):1–6
54. Kumar M, Amugune B, Madeghe B, Wambua GN, Osok J, Polkonikova-Wamoto A et al (2018) Mechanisms associated with maternal adverse childhood experiences on offspring's mental health in Nairobi informal settlements: a mediational model testing approach. BMC Psychiatry 18(1):381. https://doi.org/10.1186/s12888-018-1953-y (**PubMed PMID: 30518351; PubMed Central PMCID: PMCPMC6280351. Epub 2018/12/07.**)
55. International Wellbeing Group (2013) Personal Wellbeing Index: 5th Edition. Melbourne: Australian Centre on Quality of Life, Deakin University. http://www.deakin.edu.au/research/acqol/instruments/wellbeing-index/index.php. Accessed 1 Oct 2020
56. Cummings EM, Davies PT (1996) Emotional security as a regulatory process in normal development and the development of psychopathology. Dev Psychopathol 8:123–139
57. Tomyn AJ, Stokes MA, Cummins RA, Dias PC, Rasch A (2020) Analysis of the personal well-being index in school children. Eval Health Prof 43(2):110–9. https://doi.org/10.1177/0163278718819219 (**PubMed PMID: 30612439, Epub 2019/01/08**)
58. Davou J, Yu-shau AA, Philip T, Taru M (2019) Street children: implication on mental health and the future of West Africa. Psychology 10:667–681. https://doi.org/10.4236/psych.2019.105041
59. Myburgh C, Moolla A, Poggenpoel M (2015) The lived experiences of children living on the streets of Hillbrow. Curationis 38(1), Art. #1274, p 8. https://doi.org/10.4102/curationis.v38i1.1274
60. Oppong-Asante K (2019) Factors that promote resilience in homeless children and adolescents in Ghana: a qualitative study. J Behavioural Sci 9(6):64
61. Mizen P, Ofosu-Kusi Y (2012) Engaging with a world outside of ourselves: vistas of flatness, children's work and the urban informal economy. Social Res Online 17(2):1–17
62. Senaratna BCV, Wijewardana BVN (2013) Street children in Colombo: what brings them to and sustains them on the streets? Sri Lanka J Child Health 42:70–75
63. Alem HW, Laha A (2016) Livelihood of street children and the role of social intervention: insights from literature using meta-analysis. Child Dev Res 2016(7):1–13