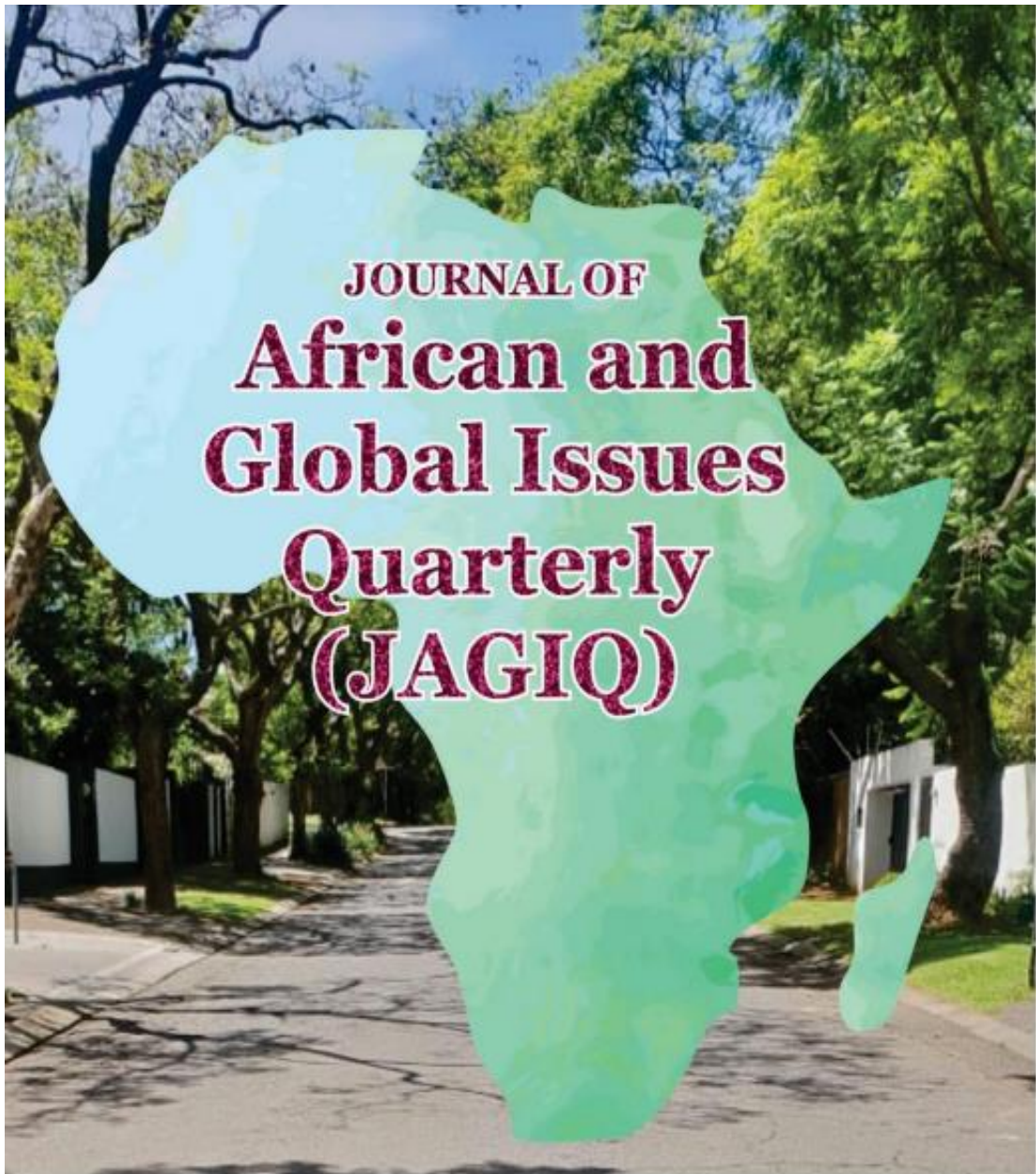




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Editorial Note

Indigenous Knowledge, Institutional Capacity, And Africa's Quest For Self-Determination

Welcome to the October 2026 issue of the African and Global Issues Quarterly. The collection of articles assembled here reflects the journal's enduring commitment to interrogating the multifaceted challenges and opportunities confronting the African continent and its place in the global order. The contributions in this volume share a common thread: a determination to look inward for solutions while engaging critically with external frameworks and legacies.

Several articles in this issue foreground the imperative of harnessing indigenous knowledge and frameworks as vehicles for progress. Nkemakolam and Amaechi propose "Igbozealotism" as an indigenous framework for socio-political and economic advancement, challenging scholars and policymakers to centre African philosophical traditions in contemporary governance discourse. Similarly, Mthethwa, Kolanisi, and Singh explore the repositioning of indigenous knowledge in fostering "studentpreneurship," while Mahlala and colleagues examine indigenous governance systems through a public administration lens. Kilonzo and her co-authors contribute a profile of indigenous banana cultivars, reminding us that agricultural biodiversity and traditional knowledge are integral to food security and rural livelihoods. These contributions collectively affirm that sustainable development in Africa must be rooted in, rather than detached from, local epistemologies and practices.

The issue also engages critically with questions of institutional effectiveness and the delivery of public goods. Lamidi and Hofisi examine the implementation gap in South African public service delivery, highlighting the centrality of bureaucratic capacity. Malope's study of community health worker programmes illuminates the intersection of recruitment, governance, and the democratisation of public administration. These articles underscore that institutional strengthening is not merely a technical exercise but a deeply political one, requiring accountability, inclusivity, and responsiveness to community needs.

On the continental and global stage, Odaudu's analysis of post-Françafrique dynamics in the Sahel offers a penetrating account of shifting dependencies and external realignments in Mali, Burkina Faso, and Niger, a region of immense strategic significance. Taleat, Lukamba, and Diedericks examine the localisation of the Sustainable Development Goals, arguing that global agendas must be adapted to local

realities if they are to deliver meaningful prosperity. Maeresera's study of strategic communication and nation branding during Zimbabwe's COMESA chairmanship illustrates the role of media in projecting regional leadership.

Finally, the issue addresses pressing social and demographic concerns. Omopo and Pillay investigate the psychological distress associated with food insecurity and housing conditions among school-going children and adolescents, while Ifanayajo, Palamuleni, and Adebowale provide a decomposition analysis of fertility rates among women of reproductive age in Sub-Saharan Africa.

Taken together, these thirteen articles offer a rich and diverse body of scholarship. They challenge us to think deeply about the relationship between indigenous agency and institutional effectiveness, between local realities and global agendas. We trust that this issue will stimulate further research and debate and contribute meaningfully to the advancement of knowledge on African and global affairs.

We thank our authors, reviewers, and readers for their continued support.

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FOOD INSECURITY, HOUSING CONDITIONS AND PSYCHOLOGICAL DISTRESS AMONG SCHOOL-GOING CHILDREN AND ADOLESCENTS AGED 9–19 YEARS

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Abstract

South African school-going youth remain insufficiently studied. This cross-sectional study investigated food insecurity, housing insecurity, and psychological distress among 1,500 learners aged 9–19 years from public schools in Gauteng, KwaZulu-Natal, Eastern Cape, Limpopo, and Western Cape, using multistage stratified random sampling. Variables included access to food and housing conditions obtained from the Child and Youth Mental Health Profiler System Questionnaire and DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure. Data were analyzed using descriptive statistics, Pearson's correlation, and hierarchical multiple regression analysis. Food insecurity was high in 46.9%, medium in 24.6%, and low in 28.5%. Less stable or vulnerable household conditions were reported by 64.0%, and unstable conditions by 36.0%. Psychological distress was high in 45.6%, medium in 28.1%, and low in 26.3%. Food insecurity had a weak relationship with psychological distress ($r = .136, p < .001$). Housing conditions and psychological distress showed a very weak relationship ($r = .084, p = .001$). Food insecurity was related to housing conditions ($r = .245, p < .001$). However, in the hierarchical regression analysis, food insecurity ($\beta = .058, p = .106$) and housing conditions ($\beta = -.016, p = .536$) were no longer statistically significant predictors of psychological distress after controlling for age, sex, province, adverse childhood experiences, and resilience. Adverse childhood experiences ($\beta = -.616, p < .001$) and resilience ($\beta = -.158, p < .001$) remained significant predictors, the final model explained 8.2% of the variance in psychological distress ($R^2 = .082$). The study highlights the importance of socio-economic and psychosocial environments in addressing young people's mental health through school-based mental, nutritional, familial, and social support.

Keywords: children; adolescents, food insecurity; housing conditions; psychological distress

Introduction

Adolescent psychological distress has become a public health concern due to the relationship between these experiences and emotional wellbeing, poor quality of life, and development. Several studies involving adolescents in Africa and LMICs have shown that social disadvantage in relation to poverty and the limited access to basic amenities increases the vulnerability of adolescents to psychological distress. Lack of food security has been identified as one of the socioeconomic stressors frequently linked to mental well-being outcomes. Studies involving school-going adolescents from different LMIC and African contexts have shown relationships between food insecurity and psychological distress measures such as depression, anxiety, suicidal thoughts, planning, and attempts (Smith et al., 2023; Tetteh et al., 2023). For example, Dlamini et al. (2024) have shown that household food insecurity in families of children in South Africa was linked to higher risks of anxiety and depression, thus proving the importance of food availability for the psychological wellbeing of disadvantaged adolescents. This suggests that adolescent psychological distress is a phenomenon that should be considered in the context of socioeconomic determinants of the youth's wellbeing.

Food insecurity is a significant socioeconomic challenge which not only involves insufficient food intake but also entails uncertainties, stress, and anxiety in relation to inconsistent access to adequate food. The prevalence of food insecurity among families with children was confirmed by the results of studies conducted in South African families. According to Dlamini et al. (2024), using national representative South African data, 23.7% of South African families with children suffered from food insecurity, and higher levels of food insecurity increased anxiety and depression risk by over 1.6-fold. In addition, Mkhize et al. (2022) identified food insecurity among children and adolescents as a problem in South Africa, where household socioeconomic status plays a key role. In the case of adolescents from 22 LMICs, Smith et al. (2023) noted the correlation between moderate and severe food insecurity and higher chances of experiencing depression, with a greater association noted among adolescents who faced severe food insecurity. Moreover, research conducted among African adolescents by Tetteh et al. (2024) showed that food insecurity was associated with increased occurrence of suicidal ideation, suicidal planning, and multiple attempts of suicide among adolescents enrolled in schools.

Several mechanisms linking food insecurity and psychological distress can include a combination of different

psychosocial and behavioural factors. According to Dlamini et al. (2024), households with food insecurity in South Africa often resort to coping tactics such as having meals of less preferable foods, while the severity of the use of coping mechanisms was linked to compromised mental health outcomes. In addition, food anxiety, poor food quality, and insufficient food quantity mediated relationships between pandemic-related social disruptions and psychological outcomes in the form of depression, anxiety, and low self-esteem among young South Africans with HIV, as Bondarchuk et al. (2024) revealed. Similar findings have been reported for adolescents' perceptions of household food insecurity, which are linked to poor psychological outcomes in adolescents in Kenya, as McRell et al. (2022) discovered. Moreover, longitudinal data indicate that prolonged food insecurity experiences may increase psychological distress, as demonstrated by the existence of links between food insecurity and depressive symptoms, sleep problems, loneliness, and other related outcomes among South African individuals.

While food insecurity has been studied extensively, housing is an additional factor that can contribute to household vulnerability and, in turn, affect children's well-being. However, studies assessing the impact of housing conditions on psychological distress among South African adolescents attending schools are rare. Studies

suggest a link between the household environment and children's experiences of deprivation and well-being, considering factors such as household dynamics, resource availability, and living conditions. The scoping review of low-income households with school-aged children revealed that the household environment was an important determinant in shaping diet quality and food security status (Eicher-Miller et al., 2023). Specifically, in South Africa, Nenguda and Scholes (2022) showed that peri-urban households were experiencing food deprivation due to unemployment, rising food prices, and household dependency pressures; accordingly, coping strategies included borrowing food and money from social networks. This implies that the household environment and socioeconomic situation interact to affect children's experiences of deprivation.

Therefore, these two factors can be considered interconnected forms of socioeconomic inequality that affect psychological well-being among school-going children and adolescents. There is evidence suggesting that deprivation does not occur in a single dimension but rather through overlapping forms of food access, material poverty, and poor living conditions. For instance, in South Africa, Nenguda and Scholes (2022) emphasised the impact of economic challenges and social vulnerabilities on food insecurity experiences among the peri-urban population. Internationally,

evidence shows that food insecurity and child well-being depend on economic conditions and environmental circumstances, with household factors mediating these relationships (Eicher-Miller et al., 2023). However, there is a lack of knowledge about the association between food insecurity, housing conditions, and psychological distress among South African school-going children and adolescents. The low number of studies assessing the mentioned problems concurrently suggests a gap in the literature.

Thus, the current study intends to bridge this significant gap by examining food insecurity, housing, and psychological distress among school-going children and youth aged 9-19 years in selected communities in South Africa. The specific objectives of the study include investigating the prevalence of food insecurity, housing, and psychological distress among the participants; examining the associations between food insecurity, housing, and psychological distress; and assessing the joint association of food insecurity and housing with psychological distress.

Research Question

Food insecurity is one of those social determinants that affect the mental health of children and adolescents through poor nutrition as well as food inadequacy, hunger, and stress associated with food acquisition. Thus, food insecurity may be considered an inability to have sufficient resources at

The following research questions were raised and answered:

1. What are the levels of food insecurity, housing conditions, and psychological distress among school-going children and adolescents aged 9–19 years in selected provinces of South Africa?
2. What are the relationships between food insecurity, housing conditions, and psychological distress among school-going children and adolescents aged 9–19 years in selected provinces of South Africa?
3. What is the combined relationship of food insecurity and housing conditions with psychological distress among school-going children and adolescents aged 9–19 years in selected provinces of South Africa?

Literature Review

Food Insecurity and Psychological Distress

the right time. Moreover, food insecurity is linked with depression, anxiety, behaviour disorders, stress, and even suicidal tendencies in children and adolescents based on existing research studies (Chambers et al., 2024; Hines et al., 2021; Smith et al., 2023; Tetteh et al., 2024). In addition, according to the

existing literature review, both moderate and severe food insecurity were associated with higher risks for developing depression among adolescents in 22 low- and middle-income countries (LMICs) (Smith et al., 2023). Furthermore, food insecurity is associated with suicidal thoughts, plans, and actions in school-going adolescents in Africa (Tetteh et al., 2024). Evidence from South Africa indicates food insecurity among the households of children and adolescents. Dlamini et al. (2024) have reported, using nationally representative data, that household food insecurity is associated with increased risks of anxiety and depression, and Mkhize et al. (2022) have recognised food insecurity among children and adolescents as a reflection of household socio-economic deprivation.

The mechanism through which food insecurity and psychological distress interact could be explained through nutrition, emotion, and family pathways. Nutritional deficiencies, financial problems, family stress stemming from uncertainty about food sources, and parental distress can contribute to psychological vulnerabilities, with the latter affecting children's emotions (Casey & Winsler, 2025). Food insecurity among young South Africans suffering from HIV infection has been found to correlate negatively with their psychological well-being (Bondarchuk et al., 2024). Nevertheless, food insecurity is typically accompanied by other material problems, making it hard to say whether

this correlation is due to food insecurity per se or to material hardship more broadly.

Housing Conditions and Psychological Distress

Housing also constitutes another significant aspect of household vulnerability. Housing conditions include the physical structure of housing, housing stability, housing arrangements, housing overcrowding, housing safety, and housing adequacy. In this study, the term housing conditions refers to the overall state and stability of the learner's household living environment, including aspects of house condition, housing stability, living arrangement, adequacy, and vulnerability. These dimensions were considered together to provide an overall indication of housing vulnerability rather than as separate predictors of psychological distress. Unfavorable housing may lead children and adolescents to experience constant stress, insecurity, disruption of routine, and lack of privacy, which may have an impact on their psychological well-being. This is particularly important in the South African context, where some children and adolescents live in overcrowded, unstable, or inadequate housing conditions. South African research has shown that housing conditions are related to children's health and socio-emotional well-being, with factors such as overcrowding, housing quality, household stability, and the wider home environment being

important considerations (Chatindiara et al., 2022; Marais et al., 2013; Marais et al., 2022). Social determinants literature highlights living conditions, poverty, and material conditions as important factors associated with mental well-being in life (Kirkbride et al., 2024; WHO, 2008). Poor housing may therefore expose children to conditions that increase stress and insecurity and may affect their emotional and psychological well-being.

Housing conditions may also influence psychological well-being through overcrowding, lack of privacy, poor physical conditions, and instability within the household. In South Africa, studies have linked housing conditions with children's health and socio-emotional outcomes, suggesting that the home environment is an important part of children's development (Chatindiara et al., 2022; Marais et al., 2022). While there is little direct evidence regarding the impact of housing conditions on the psychological distress of South African school-aged children and adolescents, the available information implies that unstable and deprived household conditions may cause emotional problems due to the accumulation of stress and a sense of insecurity. Marais et al. (2013) also highlighted the importance of housing conditions in understanding the socio-emotional health of vulnerable children in South Africa. These findings suggest that housing should not only be viewed as a physical structure but also as part of the

social and emotional environment in which children and adolescents grow and develop.

Housing status is also another problem that co-exists with food insecurity and other types of material deprivation. According to Bowen et al. (2021), housing and food insecurity may co-occur within a larger pattern of socioeconomic deprivation. In South Africa, household food insecurity has been linked to unemployment, higher food prices, household dependence, and reliance on social networks for food and money (Nenguda & Scholes, 2022). Therefore, housing conditions and food insecurity may represent interconnected forms of socioeconomic disadvantage that can jointly affect children's experiences and well-being. Although South African evidence on the direct relationship between housing conditions and psychological distress among school-going children and adolescents remains limited, the available literature supports the importance of examining housing alongside food insecurity and other psychosocial factors. It is clear from the above discussion that household deprivation encompasses multiple dimensions, including food security, housing, and economic security. Thus, examining housing conditions alongside food insecurity would yield a better understanding of the socioeconomic factors underlying psychological distress among youth.

Interrelated Socioeconomic and Psychosocial Vulnerabilities

Food insecurity and housing problems could be related socioeconomic disadvantages. Children who suffer from poor food security may also reside in precarious and poor households, facing multiple risks that may impact psychological health. There is evidence that material deprivation often co-occurs with food insecurity, housing problems, poverty, and other household-level stresses (Bowen et al., 2021; Kirkbride et al., 2024). Looking at these factors collectively could thus enhance understanding of the socioeconomic context in which psychological distress arises. The concept of Social Determinants of Health also supports this view, stating that psychological well-being is affected by the socioeconomic environment in which people are born and live (WHO, 2008).

In addition to these, material conditions also function alongside psychosocial processes. Mental health outcomes have been associated with risk factors such as childhood adversity, comprising abuse, neglect, and family dysfunctionality (Felitti et al., 1998), which may coexist alongside socioeconomic adversity. In contrast, resilience may offer protective mechanisms, which could counter the psychological impact of adversity. Therefore, the effect of material disadvantage on psychological distress may also be contingent on psychosocial context. Taking psychosocial factors into account, food security and housing conditions, along with ACEs and

resilience, could help determine whether material conditions have an independent effect on psychological distress.

Broader evidence from Nigeria also indicates that psychological and behavioural difficulties may occur alongside substance-related behaviours and other mental health concerns. Adebayo-Oke et al. (2021), for example, examined the relationships between smoking behaviour, alcoholism, psychosis, educational status, and aggression among local security operatives in Ibadan.

Research Gap

Though there has been growing evidence that suggests the association of food insecurity with poor mental health, many gaps still exist. Most of the studies conducted to date have only focused on the issue of either food insecurity or housing disadvantage separately; there have been few studies that examined the combined effects of food insecurity and housing conditions on psychological distress amongst school-going children and adolescents. There has also been a paucity of research in the context of South Africa, where socio-economic disparities and vulnerability of households could expose youth to multiple disadvantages.

This paper seeks to fill this gap by exploring the extent and the bivariate relationships among food insecurity, housing conditions, and psychological distress among school-aged children and teenagers aged 9 to 19 years in

selected provinces of South Africa. It will also investigate the associations between food insecurity, housing conditions, and psychological distress independently, while controlling for confounders such as age, gender, province, adverse childhood experiences, and resilience.

Theoretical Framework

This study is based on the Social Determinants of Health (SDH) theory, which is based on the premise that health and psychosocial factors are mainly influenced by the social, economic, and environmental determinants within which people are born, live, work, grow, and learn (World Health Organisation [WHO], 2008). The theory highlights that determinant such as socioeconomic status, resource adequacy, living environment, nutrition, and social networks influence health outcomes via intricate relationships. In the context of the present study, the SDH framework provides the basis for understanding food insecurity and housing conditions as social and material determinants that may influence psychological distress among school-going children and adolescents. The framework also suggests that these determinants do not operate in isolation but may interact with demographic and psychosocial conditions to shape mental health outcomes. In the context of the current study, the SDH theory implies that psychological issues among students are not exclusively psychosocial problems but can be the consequence of exposure to adverse

social environments, such as food insecurity and inadequate housing conditions. In this regard, food insecurity is a form of material deprivation that may cause chronic stress, anxiety, and emotional insecurity due to the insecurity associated with accessing adequate food. Meanwhile, poor housing can create situations where adolescents will be exposed to environmental stressors, instability, overcrowding, and lack of safety. This may lead to the interaction of various factors, causing cumulative socioeconomic disadvantages and increased exposure to psychological distress. The framework therefore guided the interpretation of the study findings by considering whether food insecurity and housing conditions were associated with psychological distress both independently and alongside other social and psychosocial factors. The theory also allows for the analysis of independent and interactive associations among food insecurity, housing, and psychological distress, as social determinants usually function together rather than individually. Overall, the SDH Theory offers a relevant conceptual framework for this study

Methods

Study Design and Participants

This cross-sectional analysis investigated the relationship between food insecurity, housing quality, and psychological distress in a sample of 1,500 school children and adolescents

aged 9 to 19 years in Gauteng, KwaZulu-Natal, Eastern Cape, Limpopo, and Western Cape. This sample had sufficient power to detect moderate effect sizes in multiple regression.

Sampling and Inclusion Criteria

Multistage stratified sampling included selecting provinces for regional diversity, schools based on geographic and school characteristics, and proportionate sampling of learners by age and grade. Approximately 300 learners were selected in each province. Ages between 9 and 19 years, being enrolled in a selected school, and the capacity to understand and complete the questionnaire with assent (and consent where applicable from the parent or guardian) were inclusion criteria.

Measures

Demographic and household factors were assessed using the researcher-developed Child and Youth Mental Health Profiler System Questionnaire, which assessed age, gender, grade, family structure/composition, household conditions, food security, house condition, housing stability, and living arrangement. Food security was assessed using the adequacy of breakfast, lunch, supper, and snacks. Responses indicating inadequacy were coded and summed to obtain a total food insecurity score, with higher scores indicating greater food insecurity. Based on the total number of inadequate food items, participants were categorised into three groups: low food insecurity,

moderate food insecurity, and high food insecurity. The low category represented participants reporting fewer food inadequacy indicators, the moderate category represented those reporting an intermediate number of inadequate food indicators, and the high category represented those reporting a greater number of inadequate food indicators. Housing conditions were assessed using items relating to house condition, housing stability, and living arrangement. These items were combined to provide an overall measure of housing vulnerability rather than separate measures of individual housing dimensions. The housing-related responses were combined to identify the overall level of housing vulnerability and were dichotomised into two categories: stable/less vulnerable housing conditions and less stable/more vulnerable housing conditions. Participants were classified as having stable/less vulnerable housing when their responses indicated generally adequate and stable housing circumstances, whereas participants whose responses indicated one or more vulnerable housing circumstances were classified as having less stable/more vulnerable housing conditions. Psychological distress was evaluated using the DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure. The measures used to capture psychosocial characteristics included the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), the Adverse Childhood Experiences Questionnaire (Felitti et al., 1998), and the Child and

Youth Resilience Measure-28 (CYRM-28; Liebenberg, Ungar, & Van de Vijver, 2012). The ACE score was reverse-coded for the regression analysis, such that higher scores represented fewer adverse childhood experiences and lower scores represented greater exposure to adverse childhood experiences. This coding was used to make the direction of the ACE variable consistent with the interpretation of the regression analysis. Standardised instruments with psychometric characteristics were used. Internal reliability was determined using Cronbach's alpha coefficient ($\alpha \geq 0.70$). Indicators of food insecurity and housing were analyzed for content and construct validity, given their correlation with social determinants of health constructs.

Data Analysis

Frequencies, percentages, means, and standard deviations were used to describe the data. Linearity, normality, homogeneity of variance, and multicollinearity were assessed, where the VIF coefficient was used for multicollinearity. Pearson correlations were used to assess bivariate relationships, and the independent-samples t-test was used to identify differences between groups. Hierarchical regression analysis was

conducted to determine the independent and incremental effects of food insecurity and housing conditions on psychological distress. Model 1 included the variables age, sex, and province; Model 2 included the additional variables ACE and resilience; Model 3 included the additional variables food insecurity and housing conditions. Hence, the final model checked the joint incremental effect but not the interaction effect. B, SE, β , 95% CI, R^2 , adjusted R^2 , ΔR^2 , and F coefficients were presented. The significance level was set to $p < 0.05$.

Ethics

Permission to conduct research was granted by the Research Ethics Committee of the Faculty of Education at the University of Johannesburg, as well as by the KwaZulu-Natal Department of Education and the National Director-General of Education. Consent from parents/legal guardians was obtained.

Results

Research Question One

What are the levels of food insecurity, housing conditions, and psychological distress among school-going children and adolescents aged 9–19 years in selected South African communities?

Table 1 presents the levels of food insecurity among school-going children and adolescents.

Table 1: Levels of Food Insecurity among School-Going Children and Adolescents (n = 1,500)

Food insecurity level	Frequency (n)	Percentage (%)
Low food insecurity	428	28.5
Moderate food insecurity	369	24.6
High food insecurity	703	46.9
Total	1,500	100.0

The findings show high levels of food insecurity among the participants. The prevalence of food insecurity was high among 46.9% of learners, moderate among 24.6%, and low among 28.5%.

Table 2: Housing Conditions among Respondents (n = 1,500)

Housing condition category	Frequency (n)	Percentage (%)
More stable household conditions	540	36.0
Less stable/vulnerable household conditions	960	64.0
Total	1,500	100.0

These findings indicate that 64.0% of participants were in less stable or vulnerable household circumstances, while 36.0% were in more stable circumstances, suggesting high household vulnerability among participants.

Table 3: Levels of Psychological Distress among Respondents (n = 1,500)

Psychological distress level	Frequency (n)	Percentage (%)
Low distress	394	26.3
Moderate distress	421	28.1
High distress	685	45.6
Total	1,500	100.0

Distress was common among the participants. Half the participants showed symptoms of high psychological distress (45.6%), while 28.1% and 26.3% had symptoms of moderate and low psychological distress, respectively. Generally, 73.7% of the participants suffered from moderate or high psychological distress.

Research Question Two

What are the relationships between food insecurity, housing conditions, and psychological distress among school-going children and adolescents?

A bivariate association between food insecurity, housing quality, and psychological well-being was analyzed using Pearson’s product-moment correlation coefficient. Linearity and normality assumptions were checked and deemed met.

Table 4: Correlation Matrix of Food Insecurity, Housing Conditions, and Psychological Distress

Variables	Psychological distress	Food insecurity	Housing conditions
Psychological distress	1.000		
Food insecurity	.136**	1.000	
Housing conditions	.084**	.245**	1.000

Note. **p < .01.

A statistically significant but weak positive correlation was observed between food insecurity and psychological distress ($r = .136$, $p < .001$). This indicates that higher levels of food insecurity were associated with greater psychological distress among participants, although the association was weak. Furthermore, a statistically significant positive correlation was observed between food insecurity and housing conditions ($r = .245$, $p < .001$), indicating that higher levels of food insecurity were associated with less stable or more vulnerable housing conditions.

Research Question Three

What is the combined relationship of food insecurity and housing

conditions with psychological distress among school-going children and adolescents?

Hierarchical multiple linear regression was conducted to assess the independent effects of food security and housing status on psychological distress, controlling for demographic and psychosocial factors. The first model included the demographic variables (age, sex, and province). The second model included ACE and resilience. The third model included food security and housing status. This enabled the assessment of whether food security and housing status accounted for any additional variance in psychological distress beyond other demographic and psychosocial factors.

Table 5: Hierarchical Multiple Regression Predicting Psychological Distress from Demographic Characteristics, Psychosocial Factors, Food Insecurity, and Housing Conditions (n = 1,500)

Predictor	B	SE	β	t	p
Constant	64.887	5.622	—	11.541	< .001
Age	0.120	0.183	.018	0.656	.512
Gender	3.637	0.898	.103	4.051	< .001
Province	-0.596	1.114	-.012	-0.535	.593
ACE score (reverse-coded)	-1.441	0.263	-.616	-5.469	< .001
Resilience score	-0.156	0.026	-.158	-5.923	< .001
Food insecurity	0.537	0.332	.058	1.620	.106
Housing conditions	-0.595	0.961	-.016	-0.618	.536

Model Summary

Model	Predictors entered	R ²	Adjusted R ²	ΔR ²	F	ΔF
1	Age, gender, province	.012	.010	.012	6.06	6.06
2	+ ACE, resilience	.075	.072	.063	24.23	50.82
3	+ food insecurity, housing conditions	.082	.078	.007	19.04	5.69

In the hierarchical regression analysis, the findings indicate that the model explained 8.2% of the variance ($R^2 = .082$; adjusted $R^2 = .078$). Model 1 accounted for 1.2% of the variance, while the introduction of ACE and resilience in Model 2 increased the explained variance to 6.3%. Further, the inclusion of food insecurity and housing conditions in Model 3 increased the explained variance by 0.7%. Finally, the findings indicate in the last model that only three predictors were significant, i.e., gender ($\beta = .103$, $p < .001$), reverse coded ACE ($\beta = -.616$, $p < .001$), and resilience ($\beta = -.158$, $p < .001$), while the remaining variables age ($\beta = .018$, $p = .512$) and province ($\beta = -.012$, $p = .593$) were not significant. Thus, although food insecurity and housing conditions were significantly associated with psychological distress at the bivariate level, neither retained a statistically significant independent association after adjustment for demographic and psychosocial factors. The findings suggest that psychological distress is associated with multiple demographic and psychosocial influences rather than being

independently explained by food insecurity or housing conditions.

Discussion

The results indicated a high prevalence of food insecurity among school-going children and adolescents, with 46.9% of respondents highly food insecure and 24.6% of the sample having moderate food insecurity. This implies that 71.5% of the sample had either moderate or high food insecurity. The results indicate limited access to adequate and appropriate food sources. These results are consistent with the SDH theory, in which access to adequate resources such as food, housing, and other social supports is among the factors that contribute to people's health and well-being (WHO, 2008). From the SDH perspective, the high prevalence of food insecurity demonstrates the importance of material and socioeconomic conditions in understanding the psychological experiences of the learners. However, the framework also recognises that social determinants operate within broader social and psychosocial environments rather than

as isolated causes of poor mental health. It can be noted that food insecurity not only implies inadequate nutrition but also implies the larger issue of socioeconomic deprivation that causes stress and anxiety among those affected. Similar findings have been found previously in connection with increased risks for depression, anxiety, stress, and other psychological problems among children and adolescents due to food insecurity (Chambers et al., 2024; Hines et al., 2021). Studies conducted in low- and middle-income settings have shown that food insecurity has been linked to vulnerability and increased risk of depression and suicidal ideation among adolescents (Smith et al., 2023; Tetteh et al., 2023).

Furthermore, psychological distress was common, with 45.6% of the learners showing high distress and an additional 28.1% showing moderate distress. As such, 73.7% had moderate or high levels of psychological distress. Such findings call into question the psychological wellbeing of school-going children and adolescents, especially those who come from disadvantaged environments. The SDH approach offers a useful conceptual framework because it conceptualises mental health in terms of interrelated social, economic, and environmental factors, rather than individual characteristics (WHO, 2008). This finding is consistent with the SDH framework because the high level of distress observed in the sample occurred within a context where many learners also experienced material and

household vulnerability. The framework therefore supports interpreting psychological distress as an outcome that may reflect the accumulation and interaction of several social conditions rather than a consequence of a single socioeconomic factor. The cumulative effect of material hardship, including exposure to poverty, lack of food, poor household environment, and other related factors, may predispose individuals to poorer psychological functioning. Previous studies have also shown that children who are food insecure have more worries, loneliness, unhappiness, depression, anxiety, and behavioural problems compared to their food-secure peers (Casey & Winsler, 2025; Chambers et al., 2024). Sequeira et al. (2022) and Offor and Omopo (2025), on the other hand, found that depression, anxiety, emotional distress, and trauma disorders are among the mental health concerns faced by adolescents and adult population in sub-Saharan Africa, where there is no adequate provision of special mental health services.

In terms of correlation analysis, there exists a statistically significant but weak relationship between food insecurity and psychological distress ($r = .136$, $p < .001$), implying that learners who face more food insecurity are likely to exhibit more psychological distress. Despite being statistically significant, the small magnitude of the relationship suggests that food insecurity alone makes a limited contribution to explaining the variance in psychological

distress. This finding can be understood within the SDH framework as evidence that food insecurity may represent one component of a broader set of social determinants influencing psychological health. The weak association suggests that although access to food is relevant to psychological distress, other social, environmental, and psychosocial conditions may also contribute to learners' mental health. The obtained result is in line with the theory of SDH, which implies that lack of access to basic needs can lead to mental disorders due to interrelated material and psychosocial factors (WHO, 2008). Possible pathways include concerns about food security, family financial strain, malnutrition, and disruption of typical developmental experiences. Likewise, Casey and Winsler (2025) noted that food insecurity affects children's mental well-being through interconnected nutritional and psychosocial pathways, such as family financial strain and emotional distress. According to Dlamini et al. (2024), food insecurity causes anxiety and depression in South African families with children. Hence, the results of the study may be considered additional evidence of the statistically significant yet weak connection between food insecurity and psychological distress.

There was also a significant association between the state of housing and psychological distress, though the association was very weak ($r = .084$, $p = .001$). The findings indicate that those learners who experience high household

vulnerability tend to suffer from psychological distress to a limited degree. Moreover, the small coefficient of correlation indicates that housing conditions explain little of the variance in psychological distress. Housing is an important SDH, as good housing can provide security and protection, while poor housing and household material deprivation may cause psychological distress (WHO, 2008). Within the SDH framework, this finding indicates that housing conditions are relevant social and environmental circumstances, but their weak association with distress suggests that housing alone may not adequately explain psychological outcomes among these learners. Instead, housing vulnerability may form part of a wider pattern of socioeconomic and psychosocial disadvantage. The finding is supported by evidence that housing is often associated with food insecurity and other economic difficulties. In addition to the positive correlation between food insecurity and housing found in this research ($r = .245$, $p < .001$), it may be noted that material hardships such as these factors tend to co-occur with one another as parts of a larger set of socio-economic vulnerabilities. For example, Bowen et al. (2021) have shown that material hardships may cluster in distinct patterns, with food insecurity and housing issues often co-occurring among economically disadvantaged families.

Hierarchical regression offered a more detailed understanding of these

associations. While there was a significant association between food insecurity and housing and psychological distress at the bivariate level, neither was significant on its own after taking into account demographic and psychosocial characteristics. The association between food insecurity and psychological distress is not statistically significant ($\beta = .058$, $p = .106$), and the same holds for the association between housing and psychological distress ($\beta = -.016$, $p = .536$). This means that it did not have statistically significant independent associations after accounting for the other covariates. The difference between the bivariate and hierarchical regression findings is important because it shows that the initial relationships between material conditions and psychological distress were not maintained when other relevant characteristics were considered. Therefore, the findings should not be interpreted as showing that food insecurity and housing conditions are unimportant. Rather, they suggest that their associations with psychological distress may overlap with demographic and, particularly, psychosocial factors included in the model. The loss of significance may indicate that some of the distress associated with food insecurity and housing vulnerability is also related to adverse childhood experiences and the availability of resilience resources. In other words, learners experiencing material disadvantage may also experience other forms of adversity that have a stronger association with

psychological distress. Once these psychosocial factors were included in the model, food insecurity and housing conditions contributed little additional explanatory value. However, the notable, significant associations with the reversed code for the ACEs measure ($\beta = -.616$, $p < .001$) and with resilience ($\beta = -.158$, $p < .001$) indicate that psychosocial factors and resources might have a stronger impact on psychological distress in the model. The relatively stronger contribution of ACEs compared with food insecurity and housing conditions suggests that previous adverse experiences may be more closely related to current psychological distress among these learners. The significant association with resilience also indicates that psychosocial resources may have an important role in explaining differences in psychological distress. This pattern is particularly important when interpreted through the SDH framework. The theory does not suggest that every social determinant will independently predict a health outcome after statistical adjustment. Rather, social determinants are embedded within interconnected social and psychosocial conditions. In the present study, the disappearance of the independent associations of food insecurity and housing conditions after the inclusion of ACEs and resilience suggests that the relationship between material conditions and psychological distress may be closely connected with other forms of adversity and protective resources. Thus, the non-significant regression findings are themselves an

important result because they show that the relationship between socioeconomic conditions and psychological distress is more complex than a simple direct relationship. The findings suggest that addressing psychological distress among these learners may require attention to the psychosocial circumstances that accompany material disadvantage rather than assuming that improving food or housing conditions alone will directly reduce distress. These results are generally compatible with the SDH theory, suggesting that an individual's psychological well-being is influenced by a variety of interconnected social and psychosocial factors, and at the same time showing that the effect of material disadvantage on distress might operate through different routes.

The findings are highly meaningful for policy and intervention. According to the SDH model, efforts to address adolescents' mental well-being should take into account not only psychological interventions but also the social and environmental contexts in which they occur (WHO, 2008). The present findings strengthen this position by showing that psychological distress should be addressed through interventions that recognise the interconnected nature of material and psychosocial determinants. Given the high prevalence and bivariate association between food insecurity and housing condition and psychological distress, these continue to matter despite their lack of independence as

determinants of psychological well-being. Schools should provide basic mental health screening, counselling, and referral for learners experiencing psychological distress, particularly those affected by childhood adversity. Since resilience was also significantly related to psychological distress, schools can include activities that build coping skills, social support, and positive relationships. Food and housing problems should also be considered when identifying learners who may need additional support. The provision of school meals can ensure better access to food and improve cognitive and emotional well-being (Ravi et al., 2025). Meanwhile, Sequeira et al. (2022) pointed to the deficiencies in services for adolescent mental health in sub-Saharan Africa, which include a lack of specialisation and poor integration of mental health into the overall social policies. Consistent with the SDH framework, such interventions should therefore not focus only on individual psychological symptoms but should also consider food access, household living conditions, family adversity, and resilience resources within the learners' broader social environment.

One limitation of this study is that only children and adolescents who attend school were included. Those who are not in school may have more problems with food, housing, and other basic needs. Since they were not included, the findings may not show the situation of the most vulnerable children. Future

studies should also include children and adolescents who are out of school.

Conclusion

This study has found that food insecurity, housing conditions, and psychological distress are interrelated social and psychological factors affecting school-going children and adolescents in selected provinces of South Africa. A high prevalence of food insecurity, vulnerability, and psychological distress was noted among the respondents. While food insecurity and housing were found to be significantly related to psychological distress, both these relationships were relatively weak. They failed to show statistical significance when controlling for sociodemographic and psychosocial variables. These results indicate that psychological well-being depends on many interrelated social and psychosocial factors and not on food insecurity or housing factors alone. In line with the Social Determinants of Health conceptual model, psychological distress cannot be viewed simply as an individual psychological issue but also in the context of the social and environmental factors affecting young people. The study provides further evidence on the factors associated with psychological distress among school-going children and adolescents in South Africa by examining food insecurity, housing, and psychosocial factors in a single analysis. However, the findings do not demonstrate the effectiveness of an integrated approach or establish that

such an approach would improve well-being. However, the study's results should be considered in light of several limitations. Firstly, the cross-sectional design of the study makes it difficult to establish a cause-and-effect relationship, since it can only permit assessment of associations at one point in time. Secondly, although some standardised psychometric tools were employed when appropriate, the tools used to measure food insecurity and housing conditions might not capture the multidimensional nature of households' socioeconomic vulnerability. Lastly, the study included only school-going children and adolescents in selected provinces in South Africa; hence, the results cannot be generalised to non-school-going children or to other provinces of South Africa.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Expansion and improvement of nutrition programmes within schools: Government agencies and educational bodies must improve current nutrition feeding programmes to guarantee that there is consistent access to nutritionally adequate meals, especially for students from food-insecure homes. The provision of nutritious food should be included to support

- their physical and psychological well-being.
2. Mental health screening at schools: Schools need to carry out psychological distress screening among the learners to identify individuals experiencing various conditions, including anxiety and depression, and then refer them for necessary services.
 3. Implementation of integrated social protection programmes: There is a need for adolescent well-being policies to be integrated in a multisectoral approach, which tackles issues of food insecurity, housing insecurity, poverty, and stressful situations in families concurrently.
 4. Improvements in housing conditions of vulnerable groups: The government and other stakeholders in the community need to prioritise programmes that aim at improving the living conditions of such vulnerable groups in recognition of the impact of such factors on adolescent psychological wellbeing.
 5. Longitudinal research and multidisciplinary research promotion: Any future research needs to be conducted using a longitudinal study design to determine the causal linkages.

6. Between socioeconomic deprivation and psychological distress. More research needs to focus on other socioeconomic indicators and also on intervention research.

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Disclosure and Conflict of Interest

The authors declare no conflicts of interest for this study. The research was conducted in the absence of any commercial or financial relationships.

References

- Adebayo-Oke, B. O., Omopo, O. E., & Oyetunji, Y. (2021). Investigation of the correlation between smoking behaviour, alcoholism, psychosis, educational status and aggression of local security operatives in Ibadan metropolis. *International Journal of Academic and Applied Research*, 5(10), 18–27. <https://doi.org/10.5281/zenodo.23093161>
- American Psychiatric Association. (2013). *The DSM-5 self-rated Level 1 cross-cutting symptom measure—Child age 11–17*. American Psychiatric Association. https://www.psychiatry.org/File%20Library/Psychiatrists/Practice/DSM/APA_DSM5_Level-1-Measure-Child-Age-11-to-17.pdf
- Bondarchuk, C. P., Lemon, T. L., Medina-Marino, A., Rousseau, E., Sindelo, S., Sibanda, N., Butler, L. M., Bekker, L.-G., Earnshaw, V. A., & Katz, I. T. (2024). Food insecurity and unemployment as mediators of the relationship between the COVID-19 pandemic and psychological well-being in young South Africans with HIV. *BMC Public Health*, 24(1), 2622. <https://doi.org/10.1186/s12889-024-19966-w>
- Bowen, S., Elliott, S., & Hardison-Moody, A. (2021). The structural roots of food insecurity: How racism is a fundamental cause of food insecurity. *Sociology Compass*, 15(7), e12846. <https://doi.org/10.1111/soc4.12846>
- Casey, E. G., & Winsler, A. (2025). Impacts of food insecurity on child development: Strengthening the role of childcare. *Nutrients*, 17(15), 2427. <https://doi.org/10.3390/nu17152427>
- Chambers, S., Machray, K., & Fergie, G. (2024). Food insecurity in children and young people in Scotland. *Proceedings of the Nutrition Society*, 83(3), 157–169. <https://doi.org/10.1017/S0029665124000090>
- Chatindiara, K., Marais, L., & Cloete, J. (2022). Housing and child health in South Africa: The value of longitudinal research. *International Journal of Environmental Research and Public Health*, 19(5), 2497. <https://doi.org/10.3390/ijerph19052497>
- Dlamini, S. N., Mtintsilana, A., Craig, A., Mapanga, W., & Norris, S. A. (2024). Food insecurity and coping strategies associate with higher risk of anxiety and depression among South African households with children. *Public Health Nutrition*, 27(1), e116. <https://doi.org/10.1017/S1368980024000879>

- Eicher-Miller, H., Graves, L. M., McGowan, B. S., Mayfield, B. J., Connolly, B. A., Stevens, W., & Abbott, A. (2023). A scoping review of household factors contributing to dietary quality and food security in low-income households with school-age children in the United States. *Advances in Nutrition*, 14(4), 914–945. <https://doi.org/10.1016/j.advnut.2023.05.006>
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245–258. [https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38(5), 581–586. <https://doi.org/10.1111/j.1469-7610.1997.tb01545.x>
- Hines, C. T., Markowitz, A. J., & Johnson, A. D. (2021). Food insecurity: What are its effects, why, and what can policy do about it? *Policy Insights from the Behavioural and Brain Sciences*, 8(2), 127–135. <https://doi.org/10.1177/23727322211032250>
- Kirkbride, J. B., Anglin, D. M., Colman, I., Dykxhoorn, J., Jones, P. B., Patalay, P., Pitman, A., Sonesson, E., Steare, T., Wright, T., & Griffiths, S. L. (2024). The social determinants of mental health and disorder: Evidence, prevention and recommendations. *World Psychiatry*, 23(1), 58–90. <https://doi.org/10.1002/wps.21160>
- Liebenberg, L., Ungar, M., & Van de Vijver, F. (2012). Validation of the Child and Youth Resilience Measure-28 (CYRM-28) among Canadian youth. *Research on Social Work Practice*, 22(2), 219–226. <https://doi.org/10.1177/1049731511428619>
- Marais, L., Sharp, C., Pappin, M., Lenka, M., Cloete, J., Skinner, D., & Serekoane, J. (2013). Housing conditions and mental health of orphans in South Africa. *Health & Place*, 24, 23–29. <https://doi.org/10.1016/j.healthplace.2013.08.004>
- McRell, A. S., Fram, M. S., & Frongillo, E. A. (2022). Adolescent-reported household food insecurity and adolescents' poor mental and physical health and food insufficiency in Kenya. *Current Developments in Nutrition*, 6(8), nzac117. <https://doi.org/10.1093/cdn/nzac117>

- Mkhize, S., Libhaber, E., Sewpaul, R., Reddy, P., & Baldwin-Ragaven, L. (2022). Child and adolescent food insecurity in South Africa: A household-level analysis of hunger. *PLOS ONE*, 17(12), e0278191. <https://doi.org/10.1371/journal.pone.0278191>
- Nenguda, R., & Scholes, M. (2022). Appreciating the resilience and stability found in heterogeneity: A South African perspective on urban household food security. *Frontiers in Sustainable Food Systems*, 6, 721849. <https://doi.org/10.3389/fsufs.2022.721849>
- Offor, D. O., & Omopo, O. E. (2025). Effects of stress inoculation training and cognitive behaviour therapy in enhancing conjugal bliss of women with childhood trauma in Lagos, Nigeria. *NIU Journal of Humanities*, 10(1), 125–136. <https://doi.org/10.58709/niujuhu.v10i1.2107>
- Ravi, R., Wilson, N., Ableman, E., Franklin, K. T., Resnick, D., Peltier, C., & Lax, Y. (2025). Feeding minds, building societies: The transformative power of universal school meals. *Journal of School Health*, 96(2), e70108. <https://doi.org/10.1111/josh.70108>
- Sequeira, M., Singh, S., Fernandes, L., Gaikwad, L., Gupta, D., Chibanda, D., & Nadkarni, A. (2022). Adolescent health series: The status of adolescent mental health research, practice and policy in sub-Saharan Africa: A narrative review. *Tropical Medicine & International Health*, 27(9), 758–766. <https://doi.org/10.1111/tmi.13802>
- Smith, L., López Sánchez, G. F., Oh, H., Rahmati, M., Tully, M. A., Yon, D. K., Butler, L., Barnett, Y., Ball, G., Shin, J. I., & Koyanagi, A. (2023). Association between food insecurity and depressive symptoms among adolescents aged 12–15 years from 22 low- and middle-income countries. *Psychiatry Research*, 328, 115485. <https://doi.org/10.1016/j.psychres.2023.115485>
- Tetteh, J., Ekem-Ferguson, G., Quarshie, E. N.-B., Dwomoh, D., Swaray, S. M., Otchi, E., Adomako, I., Quansah, H., & Yawson, A. E. (2024). Food insecurity and its impact on substance use and suicidal behaviours among school-going adolescents in Africa: Evidence from the Global School-Based Student Health Survey. *European Child & Adolescent Psychiatry*, 33(2), 467–480. <https://doi.org/10.1007/s00787-023-02168-x>
- World Health Organisation. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health: Final report of the Commission on Social Determinants of Health*. World Health Organisation. <https://www.who.int/publications/i/item/9789241563703>