


Correlates of internalizing and externalizing problems among school-going young adolescents in Sub-Saharan Africa

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Funding information

UNICEF

Abstract

Mental health in adolescence is important for health and well-being throughout the life course, but evidence from Sub-Saharan Africa is sparse. This study aimed to assess the correlates of internalizing, externalizing and cumulative problems among early adolescents. This study used cross-sectional survey data from 3516 school-going adolescents in Ouagadougou, Burkina Faso; Addis Ababa, Ethiopia and Dar es Salaam, Tanzania. We used a 25-item Strengths and Difficulties Questionnaire to measure internalizing, externalizing and cumulative problems. We carried out multi-variable linear regression analyses with the estimation of adjusted mean differences and 95% confidence intervals, to determine the factors associated with internalizing, externalizing and cumulative problems. Overall, 1 in 8 adolescents had internalizing problems, while 1 in 10 had externalizing problems. In two sites, having friends was related to lower internalizing problems, while repeating a grade, physical fights and household food insecurity were related to greater internalizing problems. Household food insecurity and involvement in physical fights were associated with greater externalizing problems across sites, while repeating a grade was linked with greater externalizing problems in two sites. Having a caring adult in school was associated with fewer externalizing problems across sites, while having friends was associated with fewer externalizing problems in two sites. Overall, having friends was related to

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fewer cumulative problems, while physical fights and household food insecurity were related to higher cumulative problems. School-based mental health and food programs may be useful in addressing social-emotional problems among school-aged adolescents in Burkina Faso, Ethiopia and Tanzania.

KEYWORDS

adolescents, externalizing problems, internalizing problems, mental health, schools, Sub-Saharan Africa

1 | INTRODUCTION

One in seven adolescents (10–19 year-olds) suffers from mental health issues globally (World Health Organization [WHO], 2020). Disorders such as depression, anxiety and conduct problems are among the leading causes of illness and disability, while suicide is the fourth leading cause of death among adolescents 15–19 years of age (Reiner et al., 2019). Neglecting mental health conditions negatively impact adolescents' quality of life, and ability to perform academically and interact with each other in social settings. These consequences can extend into adulthood, affecting both physical health and mental health (Benton et al., 2021; Willner et al., 2016).

Internalizing and externalizing problems have been associated with the occurrence of psychiatric symptoms in adolescence (Achenbach et al., 2016). In general, externalized problems are considered uncontrolled behaviours manifesting in outward actions towards the external environment and include aggression, opposition, hyperactivity-impulsivity, anti-social behaviours and conduct problems (Beauchaine & Hinshaw, 2016). Internalized problems tend to be covert, representing an inner-directed pattern of behaviour, and are usually characterised by depression, anxiety, somatic complaints, post-traumatic stress, obsessive-compulsive disorder and negative self-thoughts (Reynolds, 1992). In addition, internalizing and externalizing problems can and often co-occur throughout development, including adolescence, suggesting that different psychopathological problems co-occur at the same time (Caspi & Moffitt, 2018).

Several factors contribute to internalizing and externalizing problems among adolescents, including personal, parental, school, health and diet-related factors. Adolescents' mental health problems are distributed differently by sex (Achenbach et al., 2016; Havewala et al., 2021; Rose & Rudolph, 2006). More often than not, females have internalizing problems, whereas males have more externalizing and co-occurring problems (Achenbach et al., 2016). Furthermore, in a study of younger adolescents in Brazil, those who were ever involved in paid work were four times more likely to have internalizing problems than those who were never involved in paid work. In contrast, involvement in paid work was not associated with externalizing problems or co-occurrence of internalizing and externalizing problems (Bordin et al., 2013).

Key messages

- Both 'internalizing' and 'externalizing' refer to broad categories of behavioural, emotional and social problems.
- The African Research, Implementation Science and Education Network developed a school-based Adolescent Health and Nutrition Study in African countries to fill knowledge gaps about young adolescents' behavioral and social-emotional problems.
- Having a caring adult, and having friends were associated with lower internalizing and externalizing problems, and repeating a grade, household food insecurity and physical confrontation were associated with greater internalizing and externalizing problems.
- Findings from this study may help countries focus their resources and efforts on areas of the greatest potential for improving mental health for adolescents.

Growing evidence indicates that early family socio-economic adversity, such as poverty, low parental education, being raised by a single parent and high financial stress, may increase depression, anxiety and hostility in parents, which in turn may increase internalizing and externalizing problems among adolescents. In early adolescence, the warm, supportive and responsive nature of parents is associated with better adjustment for adolescents (Achenbach et al., 2016; Benton et al., 2021). Adolescents with less parental support and responsiveness are more likely to exhibit externalizing and internalizing problems throughout their adolescence. Several studies have shown that various kinds of parenting (such as support, proactive, punitive and psychological control) contribute to adolescents' aggression and rule-breaking (Achenbach et al., 2016; Arim et al., 2011; Van Heel et al., 2019). Besides its effects on parenting, family socio-economic adversity has been found to be associated with externalizing problems, but not with internalizing problems among adolescents (Achenbach et al., 2016).

Studies examining the association between peer support and internalizing and externalizing problems among adolescents report conflicting results (Demaray & Malecki, 2002; Kendrick et al., 2012; Licitra-Kleckler & Waas, 1993; Rueger et al., 2010; Windle, 1992).

Rueger et al. (2010), for instance, found that perceived peer social support was associated with lower levels of depression and anxiety in approximately 600 adolescents in the United States. Additionally, this study found that greater classmate support was a significant predictor of decreased internalizing problems among boys, but not among girls. However, Windle (1992) found that the support of friends was not associated with depression in approximately 1000 high school students in the United States. Similarly, Kendrick et al. (2012) found that increased support from friends was linked to reduced bullying perpetration for boys, but not for girls. However, other studies have found positive associations between peer support and conduct problems in boys, but not in girls (Licitra-Kleckler & Waas, 1993).

Numerous cross-sectional studies and a small number of longitudinal studies suggest an association between social media use and internalizing problems (Jelenchick et al., 2013; McCrae et al., 2017; Primack et al., 2009; Riehm et al., 2019; Zink et al., 2019) and externalizing problems, such as bullying and attention deficit disorder (Ra et al., 2018; Toseeb & Inkster, 2015). Studies have also demonstrated that educational attainment relates to mental health (social causation) as well as mental health problems influencing educational attainment (social selection). A meta-analysis of 17 cross-sectional and longitudinal studies showed early school dropout is related to substance abuse, depression and externalizing problems (Esch et al., 2014). A study in Belgium found that adolescents retained in secondary schools were more likely to break the rules and display deviant behaviour than their promoted counterparts (Demanet & Van Houtte, 2013). In addition, negative teacher-adolescent relationships are related to internalizing (Marmorstein & Iacono, 2004; Suldo et al., 2009) and externalizing problems in adolescents (Georgiou & Symeou, 2018; Smokowski et al., 2013). Supportive teachers are linked with improvements in internalizing and externalizing symptoms (Arim et al., 2011; Lau et al., 2021), while poor school engagement, large school size and high teacher turnover are all linked with increased internalizing and externalizing problems (García-Carrión et al., 2019; Klinck et al., 2019; Männikkö et al., 2020; Pérez-Marfil et al., 2020; Rasic et al., 2011; Smokowski et al., 2016).

Studies investigating the relationship between diet quality or dietary patterns and depression and anxiety are limited with mixed results. An Australian cross-sectional study found that 10- to 14-year-olds consuming diets containing low adherence to the Australian Dietary Guidelines had an increased risk of self-reported symptomatic depression (Jacka et al., 2010). However, McMartin and others (2012) did not find an association between diet quality and diagnoses of internalizing problems in Canadian children and adolescents. Similarly, eating snacks or animal foods was associated with higher odds of anxiety among Chinese adolescents, while dietary quality, variety and sufficiency were negatively associated with anxiety among Canadian adolescents, with the results being stronger for girls than for boys.

In Sub-Saharan Africa (SSA), 42% of the population is under the age of 15 (United Nations, 2015). One in 7 children and adolescents

in SSA countries is estimated to have substantial mental health difficulties, with 1 in 10 (9.5%) having a specific psychiatric disorder (Jörns-Presentati et al., 2021). More than half of all mental health disorders begin by the age of 14, and more than three-quarters start before the age of 24 (WHO, 2020). According to a systematic review of studies involving 97,616 adolescents in SSA countries, emotional and behavioural problems are prevalent in 40.8% of adolescents, anxiety disorders are prevalent in 29.8%, depression is prevalent in 26.9% and suicidal thoughts are prevalent in 20.8% (Jörns-Presentati et al., 2021). In the African Research, Implementation Science, and Education (ARISE) Network's cross-sectional study of 7662 adolescents from eight sites in six countries, including Tanzania and Ethiopia, the prevalence of depressive symptoms in the past week ranged between 21.1% and 31.5%, while suicidal behaviour over the last 12 months ranged between 1.2% and 12.4% (Nyundo et al., 2020). Although understanding internalizing and externalizing problems among adolescents has implications for clinical practice, and early prevention efforts, few studies have simultaneously examined factors related to these problems at different levels (e.g., individual, family, school, health and diet) in adolescents (Achenbach et al., 2016). In addition, most of the evidence on internalizing and externalizing problems in adolescents treats these two domains as independent rather than as reflecting the influence of a common underlying factor that might increase vulnerability to both domains of psychopathology over time (Cosgrove et al., 2011). Furthermore, most of the epidemiological evidence regarding internalizing and externalizing problems of adolescents focuses on older adolescents and comes from high-income countries, which makes it less generalisable to low-income countries (Achenbach et al., 2016).

In this context, we examined the burden of and factors associated with internalizing, externalizing and co-occurring problems in school-going adolescents aged 10–15 years in three countries in SSA.

2 | METHODS

2.1 | Study setting and study design

We used a school-based, cross-sectional survey among adolescents from three SSA countries for this study. This survey was conducted by ARISE Network (Shinde et al., 2022) to understand the nutritional and health situations of younger adolescents (10–15 years) in school.

Study participants came from three cities, including Ouagadougou in Burkina Faso, Addis Ababa in Ethiopia and Dar es Salaam in Tanzania. The presence of ARISE Network partners, local research capacity, existing infrastructure and connections with schools and government departments led us to select these sites. A multi-stage cluster random sampling design was used to select schools and adolescents within each school. We provide an overview of each country's sampling strategy below. The design and sampling strategy for this multi-country study are further described elsewhere (Shinde et al., 2022).

2.2 | Settings and sampling procedures

2.2.1 | Burkina Faso

The country is located in West Africa, and 50% of its population is under 15 years of age (UN, 2022). The study was conducted in Ouagadougou, the capital city of Burkina Faso, which is divided into five arrondissements: Baskuy, Nongr-Massom, Boulmiougou, Bogodogo and Sig-Nonghin. To select schools and adolescents in five arrondissements of Ouagadougou, we employed a two-stage sampling process. Out of 251 secondary schools available in the 5 arrondissements, 22 were selected at random. Using proportionate representative sampling, 1059 adolescents were recruited from 22 schools. The sample was drawn based on the student's registration details, including their name, age, sex and grade.

2.2.2 | Ethiopia

Ethiopia has 114 million people, and more than 40% of them are under 15 years of age (UN, 2022). We conducted the study in 20 public primary schools in Addis Ababa, the capital of Ethiopia. The city is divided into 10 boroughs. From each of Addis Ababa's 10 boroughs, we randomly selected 2 schools. From each school, we randomly selected 60 adolescent boys and girls (15 per grade) in Grades 5 to 8. As a result, we surveyed 1200 adolescents in Ethiopia. To sample students, we used their registration details, including their name, age and sex.

2.2.3 | Tanzania

In Tanzania, more than 44% of the population is under 15 years of age (UN, 2022). This cross-sectional survey was conducted in Dar es Salaam, which is divided into five administrative districts: Kinondoni, Ilala, Temeke, Ubungo and Kigamboni. Using a random selection method, 20 public primary schools, 4 in each district, were selected. We randomly selected 60 boys and girls from Grades 4 to 6 from each school, totalling 1257.

2.3 | Data collection

Adolescents were interviewed face-to-face in each country using a computer-assisted standardised questionnaire in a local language, such as French in Burkina Faso, Amharic in Ethiopia and Swahili in Tanzania. The questionnaire was adapted from the Global School-based Health Survey (GSHS) questionnaire (WHO, 2019) and the ARISE Network Adolescent Health Study Questionnaire (Darling et al., 2020), which was used in nine communities across seven countries, including Burkina Faso, Ethiopia and Tanzania. On average, each interview took 60 min to complete, with data collection taking place between March and December 2020.

2.4 | Measures

2.4.1 | Dependent variables

We examined three dependent variables: internalizing problems, externalizing problems and cumulative or total problems. These variables were assessed using a 25-item version of the adolescent's Strength and Difficulty Questionnaire (SDQ) without impact supplement or follow-up questions (Goodman, 2001). The 25 items in the SDQ are divided into five subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour. There are three response options for each item in the questionnaire: 'not true', 'somewhat true' or 'definitely true'. When all five items are answered, the total score for each subscale ranges from 0 to 10. The emotional and peer relationship problem subscales were combined to create the internalizing problems score, ranging from 0 to 20. The sum of conduct and hyperactivity subscales generated create the externalizing problems score, ranging from 0 to 20. Adding the scores for internalizing and externalizing problems provided the overall difficulties score, ranging from 0 to 40. The total score of 10 or more on each subscale indicates internalizing and externalizing problems, while the presence of both problems indicates the co-occurrence of problems.

2.4.2 | Correlates

A range of correlates has been included in the regression analyses based on the literature (e.g., Achenbach et al., 2016; Benton et al., 2021; García-Carrión et al., 2019; Georgiou & Symeou, 2018), researcher experience and the availability of data (Shinde et al., 2022), including socio-demographic characteristics, parental characteristics, access to social networks and technologies, health behaviour and diet and school-related factors.

Socio-demographic correlates included age, sex, involvement in paid work, number of siblings, household-wealth index and food insecurity. We constructed a household wealth index based on factor analysis of the ownership of various assets, such as electricity, radio, television, mobile phone, refrigerator, washing machine, computer, photo camera, DVD/CD player, bed, mattress, table, chair, cabinet, bicycle, motorcycle, motor scooter, car/truck and solar panel. To classify adolescents into wealth quintiles, the first factor derived from the analysis was used (Rutstein & Johnson, 2004). A single measure of household food insecurity was derived from the Household Hunger Scale of Food and Nutritional Technical Assistance III Project (Ballard et al., 2011) to assess whether there was no food of any kind in the household due to a lack of resources to get food in the past month. The responses were recorded as 'yes' and 'no'. The parental-level correlates included whether parents are alive, and maternal education and occupation.

Closed-ended questions were used to assess factors associated with education, social behaviour and social network and media. School-related factors included grade repetition since Grade 1 (yes/no), and access to a caring adult in school when needed to resolve personal problems (yes/no); measures of social behaviour included assessing whether adolescents ever engaged in physical fights (yes/no), and access to social networks and technology was assessed by the number of male and female friends, access to a computer, laptop or tablet (yes/no), access to own or someone else's mobile phone (yes/no) and access to the Internet (yes/no).

We also applied the Global Diet Quality Score (GDQS) methodology to measure diet quality using the consumption of healthy and unhealthy foods over the previous week (Bromage et al., 2021). Foods were classified as healthy and unhealthy. The healthy food groups included (1) dark leafy green vegetables, (2) cruciferous vegetables, (3) deep orange vegetables, (4) deep orange fruits, (5) deep orange tubers, (6) other vegetables, (7) citrus fruits, (8) other fruits, (9) legumes, (10) nuts and seeds, (11) poultry, (12) fish, (13) whole grains, (14) liquid oils, (15) low-fat dairy and (16) eggs. The unhealthy food groups included (1) white roots and tubers, (2) red meat, (3) processed meat, (4) refined grains and baked goods, (5) sugar-sweetened beverages, (6) sweets and ice cream, (7) high-fat dairy, (8) juices and (9) fried foods. The GDQS questionnaire had the following response options for each item: 'never', 'once/week', '2–4 times/week', '5–7 times/week' or 'once/day'. Scores in healthy food groups range from 0 to 32, with a higher score indicating a healthier diet. Scores in unhealthy food groups range from 0 to 17, with a higher score indicating an unhealthier diet.

2.5 | Statistical analyses

Sample characteristics were described using proportions for categorical variables as well as means and standard deviations for continuous variables. Country-wise univariate and multi-variable linear regression analyses were used to report unadjusted and adjusted mean differences (aMD) with 95% confidence intervals (CIs) in the mental health-dependent variables as a function of correlates. First, univariate models examined the associations between internalizing, externalizing and cumulative problems. Variables associated with the dependent variables in univariate analysis to a significance level of $p < 0.20$ were then retained for multi-variable models (Heinze et al., 2018). Both univariate and multi-variable models were adjusted for within-school clustering. We accounted for missing covariate data with the missing indicator method (Groenwold et al., 2012). Covariates with missing values were replaced with one value (i.e., '9') and included in the crude and multi-variable models as one of the categories of the variable. Despite sex-segregated crude and multi-variable analyses for all dependent variables, we did not observe significantly different correlations for boys and girls and therefore presented combined results. Analyses were conducted in STATA software version 15.

3 | RESULTS

Data from 3516 adolescents who participated in the survey from three countries were analysed. The socio-demographic characteristics of adolescents are described in Table 1. The overall study sample consisted of 45.5% of girls, with percentages ranging from 43.1% in Ouagadougou to 47.8% in Dar es Salaam. Adolescents had an overall mean age (\pm standard deviation) of 12.5 ± 1.4 years. The mean age by site ranged from a high of 13.5 ± 1.2 years in Ouagadougou to a low of 11.6 ± 1.2 years in Dar es Salaam. Access to a computer, mobile phone and Internet, engagement in paid work, grade repetition and involvement in physical fights varied across sites. Overall, 12.6% of participants had internalizing problems, and 9.2% had externalizing problems, with Burkina Faso having the highest burden (23.4% and 13.7%) and Ethiopia having the lowest (5.8% and 6.8%). The mean internalizing and externalizing problems score by site ranged from a high of 6.9 ± 3.4 and 5.6 ± 3.3 in Ouagadougou to a low of 4.1 ± 2.9 and 4.2 ± 3.1 in Addis Ababa, respectively. For the combined sample of three countries, Cronbach's α for the SDQ total was 0.78, while it was 0.65 and 0.66 for the internalizing and externalizing scores, respectively.

Unadjusted bivariate associations between internalizing, externalizing and co-occurring problems scores and correlates are summarised in Supporting Information: Tables 1–3. The multi-variable regression results examining the associations between the internalizing problems score and correlates are presented in Table 2. Adjusting for several socio-demographic, educational and parental factors, social behaviour and diet practice, being a female was associated with a lower internalizing problems score in Ouagadougou (aMD -1.87 ; 95% CI: $-2.40, -1.34$) and Addis Ababa (aMD -0.52 ; 95% CI: $-0.93, -0.12$). Paid work was associated with a greater internalizing problems score only in Addis Ababa (aMD 0.87 ; 95% CI: $0.09, 1.66$). Not having both parents alive was associated with a higher internalizing problems score in Ouagadougou (aMD 4.39 ; 95% CI: $1.19, 7.60$). In Addis Ababa, adolescents of unemployed mothers (aMD -0.53 ; 95% CI: $-1.01, -0.05$) had a fewer internalizing problems score than adolescents of mothers with government jobs. Having male, female or both male and female friends were associated with a fewer internalizing problems score in Addis Ababa and Ouagadougou. In Addis Ababa, Internet access was associated with a lower internalizing problems score (aMD -0.91 ; 95% CI: $-1.79, -0.03$), while grade retention was associated with a higher internalizing problems score in Addis Ababa and Dar es Salaam. Access to a caring adult in school was associated with a lower internalizing problems score in Dar es Salaam (aMD -0.50 ; 95% CI: $-0.88, -0.13$). Engaging in fights was associated with a higher internalizing problems score in Ouagadougou and Addis Ababa. Household food insecurity was associated with a higher internalizing problems score in Addis Ababa (aMD 1.88 ; 95% CI: $1.20, 2.56$) and Dar es Salaam (aMD 1.53 ; 95% CI: $1.01, 2.04$). Healthy food consumption was associated with a higher internalizing problems score in Ouagadougou, and with a lower internalizing problems score in Dar es Salaam, though the magnitudes of the associations were

TABLE 1 Socio-demographic and distribution of independent variables, by site.

| Characteristics | Ouagadougou, Burkina Faso (n = 1059) | Addis Ababa, Ethiopia (n = 1200) | Dar es Salaam, Tanzania (n = 1257) |
|--|--------------------------------------|----------------------------------|------------------------------------|
| Socio-demographics | | | |
| Boys (%) | 43.1 | 45.3 | 47.8 |
| Age (mean ± SD) | 13.51 ± 1.21 | 12.57 ± 1.16 | 11.64 ± 1.21 |
| Age group (%) | | | |
| 10–12 | 22.2 | 44.7 | 75.5 |
| 13–15 | 77.8 | 55.3 | 24.5 |
| Engaged in paid work in the last 12 months (%) | 21.9 | 4.8 | 3.3 |
| Household characteristics | | | |
| Parents alive (%) | | | |
| Both parents alive | 94.4 | 85.6 | 89.0 |
| Mother or father alive | 5.2 | 13.5 | 10.2 |
| Both parents not alive | 0.4 | 0.9 | 0.8 |
| Mother/female guardian's education (%) | | | |
| No formal schooling | 29.4 | 18.8 | 2.6 |
| Schooling | 35.9 | 56.8 | 49.4 |
| College or technical | 7.5 | 5.5 | 5.8 |
| Mother not alive | 1.1 | 0.7 | 2.5 |
| Don't know | 26.1 | 9.7 | 27.9 |
| Missing | - | 8.5 | 11.8 |
| Mother's occupation (%) | | | |
| Government job | 10.0 | 18.7 | 2.6 |
| Other job | 32.9 | 23.6 | 46.7 |
| Homemaker | 31.9 | 32.6 | 29.5 |
| Unemployed | 1.1 | 3.8 | 1.7 |
| Mother not alive | 1.1 | 0.7 | 2.5 |
| Don't know | 11.1 | 12.1 | 5.2 |
| Missing | 11.9 | 8.5 | 11.8 |
| Number of siblings (%) | | | |
| No siblings | 1.7 | 12.1 | 16.5 |
| 1 or 2 siblings | 30.4 | 52.0 | 50.1 |
| 3 or more | 67.9 | 35.8 | 32.7 |
| Missing | - | 0.1 | 0.7 |
| Social networks and media | | | |
| Have friends (%) | | | |
| No friends | 5.0 | 4.7 | 4.2 |
| Only male friends | 21.3 | 25.7 | 22.3 |
| Only female friends | 30.9 | 29.3 | 26.3 |
| Both male and female friends | 42.8 | 40.3 | 47.2 |

TABLE 1 (Continued)

| Characteristics | Ouagadougou, Burkina Faso (n = 1059) | Addis Ababa, Ethiopia (n = 1200) | Dar es Salaam, Tanzania (n = 1257) |
|---|--------------------------------------|----------------------------------|------------------------------------|
| Access to a computer/laptop/tablet (%) | 18.0 | 14.5 | 10.1 |
| Access to a mobile phone (%) | 69.7 | 79.6 | 55.7 |
| Access to Internet (%) | 12.4 | 3.5 | 2.8 |
| Education | | | |
| Repeated grade at least once since Grade 1 (%) | 32.7 | 15.6 | 21.3 |
| Access to a caring adult in school (%) | 63.7 | 76.0 | 69.9 |
| Health behaviour | | | |
| Ever involved in physical fights (%) | 63.8 | 73.6 | 73.6 |
| Diet | | | |
| Household food insecurity (%) | 7.9 | 6.4 | 13.3 |
| Consumption of healthy foods (mean ± SD; range: 0–32) | 8.30 ± 4.02 | 8.81 ± 2.86 | 10.49 ± 3.76 |
| Consumption of unhealthy foods (mean ± SD; range: 0–17) | 12.93 ± 2.24 | 11.73 ± 1.71 | 10.97 ± 2.30 |

very small. Consuming more unhealthy foods was associated with a higher internalizing problems score in Addis Ababa.

Table 3 presents multi-variable-adjusted associations between externalizing problems and independent correlates by sites. In Addis Ababa, adolescents with a single parent alive, compared to adolescents with both parents alive, were more likely to experience externalizing problems (aMD 0.82; 95% CI: 0.30, 1.34). In Ouagadougou, having mothers in private jobs was associated with a higher externalizing problems score. In comparison to adolescents with no friends, adolescents with female friends or both male and female friends in Ouagadougou and Addis Ababa had a lower externalizing problems score. In Dar es Salaam, having access to a mobile phone (aMD 0.52; 95% CI: 0.19, 0.85) and in Ouagadougou, having access to the Internet (aMD 0.81; 95% CI: 0.19, 1.42) were associated with a higher externalizing problems score. In Addis Ababa and Dar es Salaam, grade retention was associated with a higher externalizing problems score, while having a caring adult at school was associated with a lower externalizing problems score in all sites. Physical fights and household food insecurity were associated with a higher externalizing problems score across the sites. Consuming more healthy food items was associated with a lower externalizing problems score in Dar es Salaam (aMD -0.07; 95% CI: -0.11, -0.03), while consuming more unhealthy food items was associated with a higher externalizing problems score in Addis Ababa (aMD 0.18; 95% CI: 0.06, 0.29), and with a lower externalizing problems score in Ouagadougou (aMD -0.23; 95% CI: -0.32, -0.13); though the magnitudes of the associations were small.

We further examined multi-variable-adjusted associations between cumulative problems and the independent correlates by sites (Table 4). Female adolescents in Ouagadougou were more likely to have lower cumulative problems when compared with male adolescents (aMD -1.92; 95% CI: -2.75, -1.09). In Addis Ababa,

adolescents with a single parent alive had a greater total problems score than adolescents with both parents alive (aMD 1.22; 97% CI: 0.38, 2.05). Across the sites, having friends, especially both male and female friends, was associated with a lower total problems score. Mobile phone access was linked with a greater total problems score in Dar es Salaam (aMD 0.70; 95% CI: 0.12, 1.27). Repeating a grade was associated with a higher total problems score than not repeating a grade in Addis Ababa (aMD 1.20; 95% CI: 0.43, 1.98); and Dar es Salaam (aMD 1.53; 95% CI: 0.80, 2.25). In Addis Ababa and Dar es Salaam, adolescents who had access to a caring adult at school were more likely to have a lower total problems score compared to those who did not have such access. Physical fights and food insecurity were related to a greater total problems score across sites. Healthy food consumption was associated with a lower total problems score in Dar es Salaam (aMD -0.12; 95% CI: -0.20, -0.05) and with a higher score in Ouagadougou (aMD 0.11; 95% CI: 0.03, 0.20), though the magnitude of associations was marginal. Consumption of unhealthy food items was associated with a higher total problems score in Addis Ababa (aMD 0.32; 95% CI: 0.15, 0.50) and a lower score in Ouagadougou (aMD -0.30; 95% CI: -0.45, -0.14).

4 | DISCUSSION

This study examined the correlates of internalizing problems, externalizing problems and co-occurring problems among school-going adolescents in three urban settings in SSA. Overall, 1 in 8 adolescents reported experiencing internalizing problems, and 1 in 10 reported experiencing externalizing problems. The findings of this study suggest that having friends, and having access to a caring adult in school were related to a lower internalizing, externalizing and cumulative problems score while repeating a grade, physical

TABLE 2 Multi-variate analysis of independent variables and internalizing problems, by site.

| Variable | Ouagadougou, Burkina Faso (n = 1059) ^a | Addis Ababa, Ethiopia (n = 1200) ^a | Dar es Salaam, Tanzania (n = 1257) ^a |
|---|---|---|---|
| Sex (Ref: boys) | | | |
| Girls | -1.87 (-2.40, -1.34) ^{***} | -0.52 (-0.93, -0.12) ^{**} | -0.35 (-0.77, 0.06) |
| Age (Ref: 11–12) | | | |
| 13–15 | 0.26 (-0.23, 0.76) | 0.09 (-0.22, 0.42) | -0.09 (-0.51, 0.32) |
| Engaged in paid work (Ref: no) | 0.23 (-0.28, 0.74) | 0.87 (0.09, 1.66) ^{**} | 0.72 (-0.23, 1.68) |
| Household wealth quintile (Ref: first quintile) | | | |
| Second | 0.49 (-0.18, 1.16) | -0.52 (-0.95, -0.09) ^{**} | -0.10 (-0.58, 0.37) |
| Third | 0.50 (-0.19, 1.20) | -0.74 (-1.22, -0.26) ^{**} | -0.32 (-0.81, 0.16) |
| Fourth | 0.44 (-0.28, 1.16) | -0.25 (-0.82, 0.32) | 0.22 (-0.29, 0.75) |
| Fifth | 0.49 (-0.21, 1.19) | 0.26 (-0.46, 0.99) | -0.15 (-0.91, 0.60) |
| Parents alive (Ref: both parents alive) | | | |
| Father or mother alive | 0.38 (-0.50, 1.28) | 0.40 (-0.06, 0.88) | 0.53 (-0.04, 1.10) |
| Both not alive | 4.39 (1.19, 7.60) ^{**} | -0.65 (-2.60, 1.30) | 0.67 (-1.23, 2.57) |
| Mother/female guardian's education (Ref: no formal schooling) | | | |
| Schooling | 0.02 (-0.51, 0.55) | 0.24 (-0.19, 0.69) | -0.51 (-1.60, 0.57) |
| College or technical | -0.01 (-1.02, 0.99) | -0.14 (-0.98, 0.68) | 0.77 (-0.52, 2.07) |
| Mother's occupation (Ref: government job) | | | |
| Other job | 0.16 (-0.60, 0.94) | -0.41 (-0.91, 0.08) | 0.07 (-1.04, 1.19) |
| Homemaker | 1.00 (-1.06, 3.07) | 0.72 (-0.17, 1.62) | 0.004 (-1.69, 1.70) |
| Unemployed | 0.01 (-0.77, 0.79) | -0.53 (-1.01, -0.05) ^{**} | 0.49 (-0.64, 1.62) |
| Number of siblings (Ref: no siblings) | | | |
| 1 or 2 siblings | -0.28 (-1.85, 1.28) | -0.34 (-0.85, 0.17) | 0.09 (-0.39, 0.57) |
| 3 or more | 0.05 (-1.49, 1.59) | -0.33 (-0.88, 0.21) | 0.49 (-0.02, 1.01) |
| Friends (Ref: no friends) | | | |
| Only male friends | -1.16 (-2.14, -0.16) ^{**} | -1.37 (-2.17, -0.57) ^{***} | -0.21 (-1.12, 0.69) |
| Only female friends | -1.56 (-2.58, -0.54) ^{**} | -1.63 (-2.50, -0.77) ^{***} | -0.65 (-1.60, 0.30) |
| Both male and female friends | -1.15 (-2.10, -0.20) ^{**} | -1.36 (-2.15, -0.57) ^{***} | -0.77 (-1.65, 0.11) |
| Access to a mobile phone (Ref: no) | -0.19 (-0.65, 0.27) | -0.22 (-0.63, 0.18) | 0.18 (-0.16, 0.52) |
| Access to Internet (Ref: no) | -0.55 (-1.20, 0.10) | -0.91 (-1.79, -0.03) ^{**} | 0.79 (-0.24, 1.84) |
| Repeated grade (Ref: never) | -0.44 (-0.88, 0.007) | 0.55 (0.10, 0.98) ^{**} | 0.77 (0.34, 1.20) ^{***} |
| Access to a caring adult in school (Ref: no) | 0.03 (-0.40, 0.47) | -0.38 (-0.79, 0.02) | -0.50 (-0.88, -0.13) ^{**} |
| Ever engaged in fights (Ref: no) | 0.91 (0.49, 1.34) ^{***} | 0.54 (0.16, 0.92) ^{**} | 0.33 (-0.05, 0.72) |
| Household food insecurity (Ref: no) | 0.69 (-0.06, 1.46) | 1.88 (1.20, 2.56) ^{***} | 1.53 (1.01, 2.04) ^{***} |
| Consumed healthy foods | 0.07 (0.02, 0.13) ^{**} | -0.03 (-0.09, 0.03) | -0.05 (-0.09, -0.006) ^{**} |
| Consumed unhealthy foods | -0.07 (-0.17, 0.02) | 0.14 (0.04, 0.25) ^{**} | 0.02–0.05, 0.10) |

^aAdjusted for participant sex and age, engagement in paid work, household wealth quintile, parents alive, mother's education and occupation, number of siblings, number of friends, access to a mobile phone, access to the Internet, grade repetition, access to a caring adult in school, ever engaged in fights, household food insecurity, consumption of healthy and unhealthy foods and school-level clustering.

** $p \leq 0.05$; *** $p < 0.001$.

TABLE 3 Multi-variate analysis of independent variables and externalizing problems, by site.

| Variable | Ouagadougou, Burkina Faso (n = 1059) ^a | Addis Ababa, Ethiopia (n = 1200) ^a | Dar es Salaam, Tanzania (n = 1257) ^a |
|---|---|---|---|
| Sex (Ref: boys) | | | |
| Girls | 0.01 (-0.47, 0.50) | -0.15 (-0.59, 0.29) | -0.04 (-0.44, 0.36) |
| Age (Ref: 11-12) | | | |
| 13-15 | -0.04 (-0.52, 0.43) | 0.12 (-0.23, 0.48) | -0.13 (-0.54, 0.26) |
| Engaged in paid work (Ref: no) | -0.37 (-0.86, 0.11) | -0.17 (-1.03, 0.68) | 0.24 (-0.67, 1.16) |
| Household wealth quintile (Ref: first quintile) | | | |
| Second | -0.49 (-1.13, 0.13) | 0.18 (-0.28, 0.65) | -0.17 (-0.63, 0.29) |
| Third | -0.39 (-1.06, 0.26) | 0.04 (-0.48, 0.56) | -0.34 (-0.82, 0.12) |
| Fourth | 0.01 (-0.67, 0.70) | 0.14 (-0.47, 0.77) | -0.17 (-0.69, 0.33) |
| Fifth | -0.27 (-0.93, 0.39) | 0.70 (-0.08, 1.49) | -0.21 (-0.93, 0.52) |
| Parents alive (Ref: both parents alive) | | | |
| Father or mother alive | 0.11 (-0.74, 0.95) | 0.82 (0.30, 1.34)** | 0.09 (-0.45, 0.64) |
| Both not alive | 0.56 (-2.46, 3.59) | 0.07 (-2.05, 2.20) | 0.21 (-1.62, 2.04) |
| Mother/female guardian's education (Ref: no formal schooling) | | | |
| Schooling | 0.25 (-0.24, 0.75) | 0.26 (-0.21, 0.74) | -0.64 (-1.68, 0.40) |
| College or technical | 0.86 (-0.07, 1.80) | 0.19 (-0.71, 1.09) | -0.06 (-1.18, 1.31) |
| Mother's occupation (Ref: government job) | | | |
| Other job | 0.75 (0.01, 1.48)** | 0.04 (-0.51, 0.59) | -0.16 (-1.23, 0.91) |
| Homemaker | -1.24 (-3.20, 0.71) | 0.64 (-0.33, 1.62) | -0.77 (-2.41, 0.85) |
| Unemployed | 0.56 (-0.17, 1.31) | -0.13 (-0.66, 0.38) | -0.04 (-1.14, 1.05) |
| Friends (Ref: no friends) | | | |
| Only male friends | -0.64 (-1.58, 0.28) | -0.83 (-1.71, 0.04) | -0.15 (-1.01, 0.71) |
| Only female friends | -1.17 (-2.13, -0.21)** | -1.42 (-2.35, -0.48)** | -0.31 (-1.22, 0.59) |
| Both male and female friends | -1.04 (-1.94, -0.14)** | -0.86 (-1.72, 0.02)** | -0.79 (-1.63, 0.05) |
| Access to a mobile phone (Ref: no) | -0.05 (-0.49, 0.38) | 0.35 (-0.08, 0.80) | 0.52 (0.19, 0.85)** |
| Access to Internet (Ref: no) | 0.81 (0.19, 1.42)** | -0.44 (-1.30, 0.51) | 0.09 (-0.91, 1.09) |
| Repeated grade (Ref: never) | 0.26 (-0.15, 0.68) | 0.65 (0.17, 1.14)** | 0.73 (0.31, 1.15)** |
| Access to a caring adult in school (Ref: no) | -0.41 (-0.83, -0.03)** | -0.52 (-0.97, -0.08)** | -0.91 (-1.28, -0.55)** |
| Ever engaged in physical fights (Ref: no) | 1.30 (0.89, 1.70)** | 0.90 (0.48, 1.32)** | 0.98 (0.61, 1.35)** |
| Household food insecurity (Ref: no) | 0.85 (0.13, 1.58)** | 1.27 (0.52, 2.01)** | 0.63 (0.14, 1.12)** |
| Consumed healthy foods | 0.04 (-0.01, 0.09) | 0.02 (-0.04, 0.09) | -0.07 (-0.11, -0.03)** |
| Consumed unhealthy foods | -0.23 (-0.32, -0.13)** | 0.18 (0.06, 0.29)** | -0.01 (-0.08, 0.06) |

^aAdjusted for participant sex and age, engagement in paid work, household wealth quintile, parents alive, mother's education and occupation, number of friends, access to a mobile phone, access to the Internet, ever repeated grades, access to a caring adult in school, ever engaged in fights, household food insecurity, consumption of healthy and unhealthy foods and school-level clustering.

** $p \leq 0.05$; *** $p < 0.001$.

TABLE 4 Multi-variate analysis of independent variables and cumulative difficulties, by site.

| Variable | Ouagadougou, Burkina Faso (n = 1059) ^a | Addis Ababa, Ethiopia (n = 1200) ^a | Dar es Salaam, Tanzania (n = 1257) ^a |
|---|--|--|--|
| Sex (Ref: boys) | | | |
| Girls | -1.92 (-2.75, -1.09)*** | -0.67 (-1.39, 0.03) | -0.40 (-1.09, 0.29) |
| Age (Ref: 11–12) | | | |
| 13–15 | 0.22 (-0.56, 1.02) | 0.22 (-0.34, 0.80) | -0.23 (-0.93, 0.46) |
| Engaged in paid work (Ref: no) | -0.10 (-0.92, 0.70) | 0.73 (-0.64, 2.11) | 0.91 (-0.69, 2.51) |
| Household wealth quintile (Ref: first quintile) | | | |
| Second | -0.01 (-1.05, 1.07) | -0.32 (-1.08, 0.42) | -0.28 (-1.09, 0.52) |
| Third | 0.11 (-0.99, 1.22) | -0.69 (-1.53, 0.14) | -0.67 (-1.48, 0.15) |
| Fourth | 0.45 (-0.68, 1.60) | -0.10 (-1.10, 0.90) | 0.07 (-0.82, 0.96) |
| Fifth | 0.20 (-0.91, 1.31) | 0.97 (-0.30, 2.24) | -0.36 (-1.64, 0.90) |
| Parents alive (Ref: both parents alive) | | | |
| Father or mother alive | 0.47 (-0.93, 1.89) | 1.22 (0.38, 2.05)** | 0.63 (-0.32, 1.59) |
| Both not alive | 4.96 (-0.09, 10.02) | -0.65 (-4.06, 2.75) | 0.89 (-2.29, 4.07) |
| Mother/female guardian's education (Ref: no formal schooling) | | | |
| Schooling | 0.30 (-0.53, 1.14) | 0.50 (-0.26, 1.27) | -1.15 (-2.96, 0.65) |
| College or technical | 0.78 (-0.80, 2.37) | 0.02 (-1.43, 1.47) | 0.85 (-1.31, 3.02) |
| Mother's occupation (Ref: government job) | | | |
| Other job | 0.91 (-0.31, 2.13) | -0.34 (-1.22, 0.53) | -0.04 (-1.90, 1.83) |
| Homemaker | -0.18 (-3.44, 3.08) | 1.33 (-0.24, 2.91) | -0.73 (-3.57, 2.10) |
| Unemployed | 0.59 (-0.64, 1.83) | -0.64 (-1.49, 0.18) | 0.48 (-1.41, 2.37) |
| Number of siblings (Ref: no siblings) | | | |
| 1 or 2 siblings | -0.67 (-3.14, 1.80) | -0.40 (-1.30, 0.50) | -0.19 (-0.99, 0.61) |
| 3 or more | -0.17 (-2.61, 2.26) | -0.54 (-1.50, 0.41) | 0.52 (-0.33, 1.39) |
| Friends (Ref: no friends) | | | |
| Only male friends | -1.79 (-3.35, -0.23)** | -2.18 (-3.58, -0.77)** | -0.36 (-1.88, 1.15) |
| Only female friends | -2.76 (-4.37, -1.16)*** | -3.02 (-4.52, -1.51)*** | -0.98 (-2.57, 0.60) |
| Both male and female friends | -2.20 (-3.70, -0.70)** | -2.19 (-3.57, -0.81)** | -1.56 (-3.04, -0.09)** |
| Access to a mobile phone (Ref: no) | -0.26 (-0.99, 0.47) | 0.11 (-0.59, 0.83) | 0.70 (0.12, 1.27)** |
| Access to Internet (Ref: no) | 0.18 (-0.84, 1.22) | -1.32 (-2.86, 0.21) | 0.84 (-0.89, 2.58) |
| Repeated grade (Ref: never) | -0.16 (-0.86, 0.53) | 1.20 (0.43, 1.98)** | 1.53 (0.80, 2.25)*** |
| Access to caring adult in school (Ref: no) | -0.37 (-1.07, 0.32) | -0.92 (-1.64, -0.20)** | -1.42 (-2.05, -0.79)*** |
| Ever involved in fights (Ref: no) | 2.21 (1.54, 2.88)*** | 1.46 (0.79, 2.12)*** | 1.30 (0.65, 1.95)*** |
| Household food insecurity (Ref: no) | 1.55 (0.34, 2.76)** | 3.15 (1.97, 4.34)*** | 2.17 (1.32, 3.03)*** |
| Consumed healthy food items in last week | 0.11 (0.02, 0.20)** | -0.007 (-0.11, 0.10) | -0.12 (-0.20, -0.05)*** |
| Consumed unhealthy food items in last week | -0.30 (-0.46, -0.14)*** | 0.32 (0.15, 0.50)*** | 0.01 (-0.11, 0.15) |

^aAdjusted for participant sex and age, engagement in paid work, household wealth quintile, parents alive, mother's education and occupation, number of siblings, number of friends, access to a mobile, access to the Internet, ever repeated grades, access to a caring adult in school, ever engaged in fights, household food insecurity, consumption of healthy and unhealthy foods and school-level clustering.

** $p \leq 0.05$; *** $p < 0.001$.

confrontation and household food insecurity were related to a greater internalizing, externalizing and cumulative difficulties score. Eating healthy or unhealthy foods was related to internalizing, externalizing and cumulative difficulties scores in either direction.

Substantial evidence suggests that internalizing problems are more common among girls and externalizing problems more among boys (Schäfer et al., 2017). However, in this study, we observed that girls had a lower internalized problem score than boys in Ouagadougou and Addis Ababa, and had a lower cumulative difficulties score in Ouagadougou. Girls in Dar es Salaam also had a lower internalizing problems score than boys, but the difference was not statistically significant. Sex differences in the scale of individual internalizing problems may be concealed due to the combination of two different subscales into one. We also found that engaging in paid activities was associated with increased internalizing problems score, although this was not consistent across sites.

In this study, we found that adolescents of unemployed mothers had a lower internalizing problems score in Addis Ababa, and adolescents of mothers working outside of the government sector had a higher externalizing problems score in Ouagadougou. While not consistent across sites, we also found that adolescents with a single parent or both parents deceased had greater internalizing, externalizing and cumulative problems scores than adolescents with both parents alive. A family is a key adolescent microsystem, and negative processes in this domain can negatively affect adolescents (Achenbach et al., 2016). Several studies from high-income countries suggest that low parental education, high parental unemployment rates and low socio-economic status of the household can negatively affect adolescent development and negatively affect adolescents' mental and behavioural health (Achenbach et al., 2016).

Our study found that having friends was a correlate of lower internalizing, externalizing and cumulative problems scores in Ouagadougou and Addis Ababa, although, the associations did not reach statistical significance in Dar es Salaam. The majority of empirical studies examining the role of peers in emotional and behavioural functioning have examined friendships between same-sex individuals and show gender differences in the emotional processes involved in forming relationships with friends (Havewala et al., 2021; Otis, 2017; Rose & Rudolph, 2006; Willner et al., 2016). Male friendship is characterised by acts of assistance, whereas female friendship involves emotional disclosures and support. For adolescents in our settings, networks of friends may be the primary source of social support; adolescents may be more willing to share their emotions with friends in the belief and expectation that they will be supported. Further research on understanding the pathways of how adolescent friendships foster social support and improve mental health functioning is warranted.

Access to the Internet and mobile phones varied between the sites in terms of their associations with dependent variables. Contrary to our results, numerous studies from high-income countries suggest that social media and technology use is associated with greater internalizing and externalizing problems in adolescence (Achenbach et al., 2016; Beeres et al., 2021; Männikkö et al., 2020; Reiner

et al., 2019). It would be impossible to ignore, however, the many potential benefits of using social media and technology, including exposure to current events, interpersonal connections and social support network development. The mixed results in our study and the simplicity of our social media use variables warrant further investigation of the mechanisms by which social media use is associated with mental health problems among adolescents in low-resource settings.

In terms of school-related factors, we found that grade retention was associated with a higher internalizing, externalizing and cumulative difficulties score in Addis Ababa and Dar es Salaam. Grade retention has been shown to negatively influence social and emotional adjustment, but the evidence is inconsistent (Goos et al., 2021; Jimmerson, 2001; Wu et al., 2010). It is extremely difficult to make causal inferences about grade retention from cross-sectional data because pre-existing vulnerabilities, or the effects of grade retention, might cause social-behavioural problems. It is also possible that students who are retained in grades may not feel competent or supported by their social environment. Along this line, support from school staff may be relevant. In Dar es Salaam, access to caring adults in school was associated with a lower internalizing problems score, and across sites, it was associated with a lower externalizing and cumulative problems score.

Consistent with the literature, we found that adolescents from food-insecure households had higher internalizing, externalizing and cumulative problem scores than adolescents from food-secure households across sites. Hunger episodes experienced by adolescents as they grow older are linked to behavioural problems (Kimbrow & Denney, 2015; Slopen et al., 2010). For example, using nationally representative data from 6300 school-going children from the Early Childhood Longitudinal Study, Kimbro and Denney (2015) found negative impacts of food insecurity on teachers' reports of children's externalizing behaviours, self-control and interpersonal skills. We found mixed associations between a 'healthy' or 'unhealthy' diet and internalizing, externalizing and cumulative problems. Research on the relationship between overall diet quality and depression in adolescents also appears to show mixed results; though previous evidence is primarily from high-income countries (Jacka et al., 2010, 2013; Kohlboeck et al., 2012; Larson et al., 2017; McMartin et al., 2012; Naveed et al., 2020; Wiles et al., 2007). For example, an Australian cross-sectional study found that adolescents 10–14 years of age who consumed diets with low adherence to the Australian Dietary Guidelines were more likely to experience symptoms of depression (Jacka et al., 2010). In a cross-sectional study of UK adolescents from diverse ethnic and cultural backgrounds, higher intakes of unhealthy foods were associated with higher scores on the Strengths and Difficulties Questionnaire (Jacka et al., 2013). In contrast, no association between diet quality and internalizing problems was found in a cross-sectional study of adolescents in Canada (McMartin et al., 2012). Among children enrolled in the Avon Longitudinal Study of Parents and Children, a 'junk food' diet pattern at age 4.5 years was associated with increased hyperactivity at age 7, but not with conduct and peer problems (Wiles et al., 2007). In a German study,

diet quality was not significantly associated with conduct problems, hyperactivity or inattention in adolescents (Kohlboeck et al., 2012). The inconsistencies in findings from high-income countries and a lack of evidence from low-income countries call for more research.

Research studies on the association between violence and mental health problems suggest that adolescents who are victims of violence are at risk for developing internalizing problems, while adolescents who exhibit aggressive and violent behaviour are at risk for developing conduct problems (Achenbach et al., 2016; Havewala et al., 2021; Ingram et al., 2020). Consistent with the literature, we observed that adolescents involved in physical fights had higher internalizing and externalizing problems scores in Ouagadougou and Addis Ababa and higher cumulative difficulties scores across sites.

4.1 | Strengths and limitations

The study had several strengths. First, the study included a large sample of school-going adolescents covering three sites in SSA. Second, while most studies on adolescent mental health have been conducted on adolescents aged 15–19 years, this study focuses on younger adolescents between the ages of 10 and 15 years. Finally, our study identified the factors associated with internalizing and externalizing problems as well as cumulative difficulties. There were, however, some important limitations to the study. First, the sample only included school-going adolescents in urban cities, so the results may not be generalisable to the entire nation or region. Second, the results were derived from a cross-sectional study, which makes it difficult to establish the temporal relationship between correlates and dependent variables. Third, the self-report technique relied on adolescents' recollections of past events for a few non-validated questions in our context (e.g., involvement in physical fights, grade retention, paid work and household food insecurity), which might have introduced recall or social desirability bias. We minimised both biases by conducting all interviews one-on-one, standardised delivery of the questions and assuring participants that their responses would be anonymous. Four, we asked adolescents about household characteristics, and this might have its limitations because young adolescents often lack adequate information about their families. Finally, even though we adjusted extensively for covariates, residual confounding could not be ruled out due to the observational design. Future studies should therefore examine the same dependent variables of this study on a longitudinal sample of younger adolescents to understand the causal relationship between the variables. It is also necessary from an epidemiological perspective to study a sample of the adolescents that best represents the entire adolescent population.

5 | CONCLUSION

Adolescent emotional and behavioural problems can impact daily life, such as school attendance, ability to learn and social relationships and can persist into adulthood. This study is among the first to examine the burden of the factors associated with internalizing, externalizing

and cumulative problems in early adolescence in multiple SSA countries. Most of the factors associated with internalizing and externalizing problem scores in this study are modifiable and preventable through structural interventions that address social and economic inequalities in schools and communities, such as household food insecurity, exposure to violence and food intake. Considering the variety of risk and protective factors significantly associated with internalizing and externalizing problems in adolescents, there is a need for screening, early detection and preventive measures and support of internalizing and externalizing problems among younger school-going adolescents in these settings.

AUTHOR CONTRIBUTIONS

Sachin Shinde, and Wafaie W. Fawzi conceptualized the design of this study. Alain Vandormael, Amare W. Tadesse, Mary Mwanyika-Sando, led the data collection in respective countries. Sachin Shinde and Nandita Perumal analyzed and interpreted the results. Sachin Shinde prepared the draft manuscript. All authors reviewed the results and approved the final manuscript.

ACKNOWLEDGEMENTS

This study was funded by the United Nations Children's Fund, New York, USA. Wafaie W. Fawzi, Mary Mwanyika-Sando, Amare W. Tadesse, Till Baernighausen, Alain Vandormael, and Deepika Sharma designed the study and related material. Alain Vandormael, Amare W. Tadesse and Mary Mwanyika-Sando performed the research. Sachin Shinde performed the analysis and wrote the first draft of the manuscript. All authors reviewed and critically revised the manuscript, and have read and approved the final manuscript.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data described in the manuscript, code book and analytic code will be made available upon request pending application and approval by the study team.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Shinde, S., Perumal, N., Vandormael, A., Tadesse, A. W., Mwanyika-Sando, M., Baernighausen, T., Sharma, D., & Fawzi, W. W. (2023). Correlates of internalizing and externalizing problems among school-going young adolescents in Sub-Saharan Africa. *Maternal & Child Nutrition*, e13492. <https://doi.org/10.1111/mcn.13492>