

Determinants of Flourishing, Moderate, and Languishing Patterns of Positive Mental Health Among In-school Adolescents in Ibadan Metropolis

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Research Article

Keywords: positive mental health, flourishing, languishing, adolescents, mental health-promoting knowledge, Ibadan, Nigeria

Posted Date: September 22nd, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11102883/v1>

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Additional Declarations: The authors declare no competing interests.

Abstract

Background

Positive mental health is a distinct dimension of adolescent health that includes emotional, psychological, and social well-being. Evidence on flourishing, moderate mental health, and languishing among Nigerian in-school adolescents remains limited.

Aim

This study assessed the distribution and correlates of flourishing, moderate, and languishing patterns of positive mental health among in-school adolescents in Ibadan Metropolis, Nigeria.

Methods

A cross-sectional study was conducted among 385 adolescents aged 10–19 years in seven public secondary schools selected through multistage sampling. Data were collected with a self-administered questionnaire containing adapted Mental Health-Promoting Knowledge Scale items, positive mental health practice items, and the Mental Health Continuum-Short Form. Knowledge was scored from the raw 1–5 agreement scale using Bloom's cut-off, practices were categorized after 0–4 recoding using Bloom's cut-off, and positive mental health patterns were classified using MHC-SF criteria. Descriptive statistics, chi-square tests, linear-by-linear trend tests, sparse-cell Monte Carlo checks, and multinomial logistic regression were applied at $p < .05$.

Results

The mean age was 14.24 $\pm$ 1.60 years, and 61.8% of respondents were female. Flourishing was observed in 60.5%, moderate mental health in 31.2%, and languishing in 8.3%. Knowledge levels were good in 44.4%, moderate in 39.2%, and poor in 16.4%, while practice levels were good in 33.8%, moderate in 44.2%, and poor in 22.1%. Sex, class, class level, family financial situation, knowledge, and practices were statistically associated with positive mental health patterns. In the multinomial model with flourishing as the reference outcome, moderate and good knowledge, moderate and good practices, high-income household status, female sex, and senior secondary class level showed significant adjusted associations with positive mental health category membership.

Conclusion

Most respondents were flourishing, but nearly four in ten were not. Positive mental health knowledge and routine health-promoting practices showed strong graded associations with flourishing, moderate

mental health, and languishing. School-based programmes in Ibadan should combine positive mental health literacy with practical routines that support connectedness, coping, self-care, achievement, and supportive school environments.

Introduction

Positive mental health is increasingly recognized as a central component of adolescent health rather than a simple absence of mental illness. It refers to emotional well-being, positive psychological functioning, and social functioning, and is commonly described through a continuum that includes flourishing, moderate mental health, and languishing (Keyes, 2002, 2006; Vaingankar et al., 2022). In this framework, flourishing reflects frequent positive emotion and functioning, languishing reflects low well-being, and moderate mental health captures the large group between these two states. This distinction is important because adolescents may have low positive functioning even without a diagnosed mental disorder, while others may show strengths that remain invisible when research focuses only on symptoms.

Adolescence is a developmental period in which identity formation, peer relationships, academic transitions, family expectations, and future orientation become especially salient. School attendance gives adolescents access to social networks, learning opportunities, adult supervision, and health-promoting routines, but schools may also be places where academic strain, peer comparison, and material inequality are expressed. Recent studies using the Mental Health Continuum-Short Form and related well-being measures show that flourishing and languishing vary across countries, school contexts, sex, socioeconomic position, and age or grade level (Campbell et al., 2021; Chan et al., 2022; Dierckens et al., 2020; Fukuya et al., 2025; Skrzypiec et al., 2024; Yoon et al., 2022).

African evidence on positive mental health among adolescents is growing but remains limited compared with the evidence on depression, anxiety, psychological distress, and other illness-oriented outcomes. In Nigeria, recent evidence from Osun State found that a minority of adolescents were flourishing and that household food security and parental wealth were associated with adolescent mental well-being (Folorunso et al., 2026). Evidence from Ghana also suggests that social capital, connection, and belonging are related to youth well-being and Mental Health Continuum domains (Addae, 2020; Kabir et al., 2021). These findings point toward the importance of social and material contexts, but they do not fully describe how knowledge and everyday practices align with flourishing, moderate mental health, and languishing among Nigerian in-school adolescents.

Positive mental health knowledge is conceptually different from knowledge about mental illness. The Mental Health-Promoting Knowledge Scale was developed to assess adolescents' understanding of factors that support good mental health, including autonomy, competence, relatedness, self-respect, mastery, and belonging (Bjornsen et al., 2017, 2024). These elements overlap with Self-Determination Theory, which emphasizes autonomy, competence, and relatedness as core psychological needs (Deci & Ryan, 2000). International evidence indicates that positive mental health-promoting knowledge is related

to positive mental health among adolescents, although comparable Nigerian studies remain scarce (Nobre et al., 2022).

Positive mental health practices are also relevant because knowledge may not translate into routine behavior unless adolescents have supportive families, schools, peers, and communities. Practices such as connectedness, meaningful activity, achievement, self-care, mindfulness, relaxation, communication, coping, and physical activity have been linked with adolescent well-being in international studies (Bromley et al., 2024; Hertz et al., 2022; Wray et al., 2022). The present study therefore assessed the distribution and correlates of flourishing, moderate, and languishing patterns of positive mental health among in-school adolescents in Ibadan Metropolis, with specific attention to sociodemographic characteristics, knowledge of positive mental health, and positive mental health practices.

Methods

Study Design

A descriptive cross-sectional design was used. The design was appropriate for estimating the distribution of positive mental health patterns and examining statistical associations between positive mental health categories and selected explanatory variables at one point in time.

Study Area

The study was conducted in seven public secondary schools in Ibadan Metropolis, Oyo State, Nigeria. Ibadan is a large urban centre with public secondary schools serving adolescents from diverse socioeconomic, religious, and family backgrounds.

Study Population

The study population comprised in-school adolescents aged 10–19 years enrolled in selected public secondary schools in Ibadan Metropolis during the 2025 academic session. Eligible respondents were adolescents within the age range who were enrolled in the selected schools, were willing to participate under the approved consent procedure, and could read and understand English. Adolescents who were unable to complete the questionnaire because of language or cognitive barriers were excluded.

Sample Size and Sampling Technique

The minimum sample size was calculated using the Kish (1965) formula for single-proportion studies, as described by Daniel and Cross (2018) with a 5% margin of error and 10% allowance for non-response, yielding a target sample of 396 (Table 1). $n = Z^2pq / d^2$

where n is the minimum sample size, Z is the standard normal deviate at 95% confidence (1.96), p is the estimated proportion of the characteristic of interest, q = 1 - p, and d is the precision level set at 0.05. Using p = 0.372 from Olowe et al. (2025), q = 0.628. Therefore, $n = (1.96)^2 \times 0.372 \times 0.628 / (0.05)^2 = 359$. To accommodate potential non-response, 10% of the calculated sample (approximately 37) was added, giving a target sample size of 396. A total of 385 completed questionnaires were available for analysis, representing 97.2% of the target sample. A multistage sampling procedure was applied. Public secondary schools were grouped by educational zones, school lists were obtained, selected schools were chosen by simple random sampling, and students were selected proportionately across schools and classes.

Table 1
Proportionate Sampling Allocation across Selected Schools

S/N	Selected school	School population	Proportionate calculation	Sample allocation
1	Army Day High School	1,012	$(1,012 / 6,766) \times 396$	59
2	St. Luke's Grammar School	1,050	$(1,050 / 6,766) \times 396$	61
3	Bishop Philips Academy School I	1,100	$(1,100 / 6,766) \times 396$	64
4	Urban Day Grammar School I	600	$(600 / 6,766) \times 396$	35
5	Alarere Community High School	1,200	$(1,200 / 6,766) \times 396$	70
6	Ansarudeen School - Liberty Road	704	$(704 / 6,766) \times 396$	41
7	Oke-Bola Comprehensive High School	1,100	$(1,100 / 6,766) \times 396$	64
Total		6,766		396
<i>Note. Target sample size was 396. The final valid analytical sample was 385 because of incomplete and incorrectly filled questionnaire.</i>				

Instrument and Measures

Data were collected using a semi-structured, self-administered questionnaire. The questionnaire included sociodemographic characteristics, adapted Mental Health-Promoting Knowledge Scale items, positive mental health practice items, and the Mental Health Continuum-Short Form. Content validity was supported through expert review in the Department of Health Promotion and Education, University of Ibadan. A pilot study among 37 in-school adolescents outside the main study area yielded a Cronbach's alpha coefficient of 0.96 for the instrument package.

Knowledge of positive mental health was assessed using 10 adapted MHPK items rated on a 1–5 agreement scale, from totally disagree to fully agree. The raw Likert score was summed across the 10 items and categorized using Bloom's cut-off: poor knowledge (< 60%), moderate knowledge (60–79%), and good knowledge ($\geq$ 80%). This scoring approach preserved the raw response scale and avoided inconsistent binary collapsing.

Positive mental health practices were measured across nine domains: connectedness, values, achievement, self-care, present-moment awareness, relaxation, communication, coping, and physical activity. Items were rated from never to always. For category scoring, responses were recoded from 0 to 4 and summed, then classified using Bloom's cut-off as poor (< 60%), moderate (60–79%), or good ($\geq$ 80%).

Positive mental health patterns were measured with the Mental Health Continuum-Short Form. The 14 items were recoded from 0 to 5 and classified using standard continuum criteria. Flourishing required at least one emotional well-being item and at least six positive-functioning items scored almost every day or every day. Languishing required at least one emotional well-being item and at least six positive-functioning items scored never or once/twice. Respondents who met neither criterion were classified as having moderate mental health.

Data Management and Statistical Analysis

Data were checked and analysed from the raw data file. Descriptive statistics were used to summarize sociodemographic characteristics, item responses, positive mental health patterns, knowledge levels, and practice levels. For adjusted analysis, family financial situation was also collapsed into low/average-income (very poor, poor, or average) and high-income (above average or wealthy) groups to improve model stability. Chi-square tests of independence examined associations between categorical variables and positive mental health patterns. Cramer's V was used to describe association strength. Where expected cell counts were sparse, Monte Carlo p-values were estimated as sensitivity checks. Linear-by-linear trend tests were used for ordered knowledge and practice categories. Multinomial logistic regression was fitted with flourishing as the reference outcome and poor knowledge, poor practice, male sex, junior secondary school, Christian religion, monogamous family setting, and low/average-income group as reference categories. Results are presented as adjusted odds ratios with 95% confidence intervals. Because the study was cross-sectional, findings are interpreted as associations.

Ethical Considerations

Ethical approval

was obtained from the Oyo State Ministry of Health Research Ethics Committee with registration number NHREC/OYOSHRIEC/10/11/22. Permission to conduct the study was obtained through the relevant

school authorities. Participation was voluntary and followed the consent procedures approved for the study.

Results

Sociodemographic Characteristics

A total of 385 in-school adolescents were included in the analysis. The mean age was 14.24 +/- 1.60 years. More than half were aged 11–14 years (56.9%), and 61.8% were female (Table 2). Respondents were distributed across junior and senior secondary classes, with the highest proportions in JSS3 (26.5%) and SSS1 (25.5%). Christians and Muslims were nearly equally represented. Most respondents came from monogamous families (84.9%), and family financial situation was most commonly average (59.5%) or above average (26.5%).

Table 2
Sociodemographic Characteristics of Respondents (N = 385)

Characteristic	Category	n (%) or mean (SD)
Age group	11–14 years	219 (56.9)
	15–19 years	166 (43.1)
Sex	Male	147 (38.2)
	Female	238 (61.8)
Class	JSS1	18 (4.7)
	JSS2	32 (8.3)
	JSS3	102 (26.5)
	SSS1	98 (25.5)
	SSS2	74 (19.2)
	SSS3	61 (15.8)
Religion	Christian	196 (50.9)
	Muslim	189 (49.1)
Family setting	Monogamous	327 (84.9)
	Polygamous	58 (15.1)
Family financial situation	Very poor	8 (2.1)
	Poor	31 (8.1)
	Average	229 (59.5)
	Above average	102 (26.5)
	Wealthy	15 (3.9)
Income group	Low/average-income	268 (69.6)
	High-income	117 (30.4)

Knowledge of positive mental health

Knowledge of positive mental health was generally favourable across several domains, particularly school achievement, social connectedness, personal values, self-confidence, and decision-making. The highest proportion of correct responses was recorded for the statement that doing well in school and feeling proud of one's progress can improve mental strength (86.0%), followed by the importance of feeling accepted by friends and the school community for emotional well-being (80.5%). Similarly, 78.7% correctly recognised the importance of understanding and maintaining one's values and self-respect,

while 73.5% correctly identified self-confidence as helpful in facing challenges and 71.9% recognised autonomous decision-making as an indicator of positive functioning.

However, notable knowledge gaps were observed in areas directly related to self-regulation and healthy mental health behaviours. Only 60.8% correctly recognised the importance of remaining calm and solving problems during difficult situations as a way of managing stress, while 64.4% correctly identified the ability to control harmful behaviours as self-control. The lowest level of correct knowledge concerned the reverse-worded statement on sleep, with only 26.0% giving the correct response that regular and adequate sleep is important for mental alertness. Similarly, only 23.9% correctly rejected the idea that allowing negative thoughts to control one's actions represents emotional strength, and 22.1% correctly rejected the belief that a person's worth depends only on achievement or success.

Practices of positive mental health

Positive mental health practices were generally common among the adolescents, particularly those related to achievement, values, self-care, connectedness, and physical activity. The most frequently reported practice was engaging in activities that made respondents feel proud or accomplished, with 83.3% reporting that they did this often or always. Similarly, 79.8% reported often or always taking part in activities that reflected their values and what was important to them, while 78.1% reported regularly practising self-care. Social connectedness was also relatively common, with 74.6% indicating that they often or always made time to talk or spend time with friends, classmates, or family.

Other positive mental health practices were reported less consistently. Approximately 74.0% of respondents reported often or always engaging in physical activity, while 70.7% reported regularly practising coping skills to manage stress or difficult situations. Attention to the present moment was also relatively common, with 70.9% reporting that they often or always tried to remain present rather than worry excessively.

The least consistently practised domains were relaxation and open emotional communication. Although 62.3% reported often or always making time to relax and rest their mind and body, 37.6% did so only sometimes, rarely, or never. Similarly, 67.6% reported often or always talking openly with close friends or family about their feelings and thoughts, leaving approximately one-third who did so less consistently.

Positive Mental Health Pattern

The MHC-SF findings indicated generally favourable positive mental health experiences among the adolescents, particularly in relation to happiness, interest in life, managing daily responsibilities, personality acceptance, personal growth, and meaning in life. The most frequently experienced indicator was being good at managing daily responsibilities, with 68.8% reporting this almost every day or every day. This was followed by interest in life (71.4%), happiness (73.0%), and liking most parts of one's personality (70.9%). Similarly, 67.0% reported experiencing life as having direction or meaning almost every day or every day, while 67.0% reported having experiences that helped them grow and become a better person.

Several indicators of social and psychological wellbeing were also positively endorsed, although less strongly. Approximately 54.5% of adolescents reported almost every day or every day that they had something important to contribute to society, while 53.3% reported feeling that they belonged to a community. Similarly, 50.8% frequently experienced warm and trusting relationships, and 60.8% reported confidence in expressing their ideas and opinions. These findings suggest that, beyond individual happiness and self-evaluation, many adolescents also experienced elements of social contribution, belonging, interpersonal relationships, and psychological functioning.

However, the distribution also shows that positive mental health was not uniformly experienced across all domains. Indicators relating to social integration and social wellbeing generally had lower daily or near-daily endorsement than the more individual-level indicators. For example, only 44.0% reported almost every day or every day that people are basically good, while 51.0% reported that society is a good or better place for all people and 50.7% reported that society makes sense to them.

Categorization of Variables

As seen in Table 3, flourishing was observed in 233 respondents (60.5%), moderate mental health in 120 (31.2%), and languishing in 32 (8.3%). Knowledge levels were good in 171 respondents (44.4%), moderate in 151 (39.2%), and poor in 63 (16.4%). Positive mental health practice levels were moderate in 170 respondents (44.2%), good in 130 (33.8%), and poor in 85 (22.1%).

Table 3
Distribution of Positive Mental Health Patterns, Knowledge, and Practice Levels

Variable	Category	n	%	95% CI
Positive mental health pattern	Flourishing	233	60.5	55.6–65.3
	Moderate mental health	120	31.2	26.7–36.0
	Languishing	32	8.3	5.9–11.5
Knowledge of positive mental health	Poor	63	16.4	13.0–20.4
	Moderate	151	39.2	34.5–44.2
	Good	171	44.4	39.5–49.4
Positive mental health practices	Poor	85	22.1	18.2–26.5
	Moderate	170	44.2	39.3–49.1
	Good	130	33.8	29.2–38.6

Bivariate Associations

As seen in Table 4, Sex, class, class level, family financial situation, income group, knowledge level, and practice level were statistically associated with positive mental health patterns. Sparse-cell checks

supported caution when interpreting the full class and five-level financial situation tables, but Monte Carlo p-values remained statistically significant for both variables.

Table 4
Positive Mental Health Patterns by Significant Sociodemographic Characteristics

Characteristic	Category	n	Flourishing n (%)	Moderate n (%)	Languishing n (%)	p
Sex	Male	147	79 (53.7)	58 (39.5)	10 (6.8)	.021
Sex	Female	238	154 (64.7)	62 (26.1)	22 (9.2)	
Class level	Junior secondary school	152	101 (66.4)	29 (19.1)	22 (14.5)	< .001
Class level	Senior secondary school	233	132 (56.7)	91 (39.1)	10 (4.3)	
Income group	Low/average-income	268	150 (56.0)	91 (34.0)	27 (10.1)	.014
Income group	High-income	117	83 (70.9)	29 (24.8)	5 (4.3)	
Class	JSS1	18	5 (27.8)	11 (61.1)	2 (11.1)	< .001
Class	JSS2	32	24 (75.0)	4 (12.5)	4 (12.5)	
Class	JSS3	102	72 (70.6)	14 (13.7)	16 (15.7)	
Class	SSS1	98	56 (57.1)	40 (40.8)	2 (2.0)	
Class	SSS2	74	40 (54.1)	28 (37.8)	6 (8.1)	
Class	SSS3	61	36 (59.0)	23 (37.7)	2 (3.3)	
Financial situation	Very poor	8	4 (50.0)	3 (37.5)	1 (12.5)	< .001
Financial situation	Poor	31	8 (25.8)	15 (48.4)	8 (25.8)	
Financial situation	Average	229	138 (60.3)	73 (31.9)	18 (7.9)	
Financial situation	Above Average	102	75 (73.5)	22 (21.6)	5 (4.9)	
Financial situation	Wealthy	15	8 (53.3)	7 (46.7)	0 (0.0)	

Note. Percentages are row percentages. The full class and five-level financial situation tables contained sparse expected cells; Monte Carlo p-values remained statistically significant.

Table 5 depict that knowledge level showed a graded association with positive mental health pattern (chi-square = 64.40, df = 4, $p < .001$; Cramer's $V = .289$). Flourishing was 22.2% among respondents with poor knowledge, 60.3% among those with moderate knowledge, and 74.9% among those with good knowledge.

Table 5
Association Test Summary for Sociodemographic Characteristics

Variable	Chi-square	df	p	Cramer's V	Sparse-cell note
Age group	4.64	2	.098	0.110	
Sex	7.70	2	.021	0.141	
Class	44.27	10	< .001	0.240	2 cells < 5; Monte Carlo $p < .001$
Class level	24.71	2	< .001	0.253	
Religion	0.10	2	.949	0.017	
Family setting	1.41	2	.495	0.060	1 cells < 5; Monte Carlo $p .511$
Financial situation	30.88	8	< .001	0.200	6 cells < 5; Monte Carlo $p < .001$
Income group	8.51	2	.014	0.149	

As seen in Table 6, practice level showed an even stronger graded association (chi-square = 101.11, df = 4, $p < .001$; Cramer's $V = .362$). Flourishing was 22.4% among respondents with poor practice, 58.8% among those with moderate practice, and 87.7% among those with good practice.

Table 6
Positive Mental Health Patterns by Knowledge and Practice Levels

Variable	Category	n	Flourishing n (%)	Moderate n (%)	Languishing n (%)	p
Knowledge	Poor	63	14 (22.2)	33 (52.4)	16 (25.4)	< .001
Knowledge	Moderate	151	91 (60.3)	53 (35.1)	7 (4.6)	
Knowledge	Good	171	128 (74.9)	34 (19.9)	9 (5.3)	
Practice	Poor	85	19 (22.4)	46 (54.1)	20 (23.5)	< .001
Practice	Moderate	170	100 (58.8)	60 (35.3)	10 (5.9)	
Practice	Good	130	114 (87.7)	14 (10.8)	2 (1.5)	
Note. Percentages are row percentages. Knowledge trend chi-square = 49.17, p < .001; practice trend chi-square = 91.64, p < .001.						

Multinomial Logistic Regression

As seen in Table 7, the multinomial logistic regression model converged and was statistically significant (LR chi-square = 159.88, df = 20, $p < .001$; McFadden pseudo $R^2 = 0.238$; AIC = 557.13; classification accuracy = 73.2%). With flourishing as the reference outcome, moderate and good knowledge, moderate and good practices, high-income household status, female sex, and senior secondary class level showed significant adjusted associations with membership in positive mental health categories.

Table 7
Significant Adjusted Multinomial Logistic Regression Results

Outcome compared with flourishing	Covariate	AOR	95% CI	p
Languishing	Knowledge Moderate	0.170	0.052–0.555	.003
Languishing	Knowledge Good	0.275	0.085–0.887	.031
Languishing	Practice Moderate	0.102	0.037–0.281	< .001
Languishing	Practice Good	0.026	0.005–0.140	< .001
Languishing	High-income	0.317	0.102–0.983	.047
Moderate	Knowledge Moderate	0.258	0.112–0.591	.001
Moderate	Knowledge Good	0.238	0.099–0.576	.001
Moderate	Practice Moderate	0.360	0.182–0.711	.003
Moderate	Practice Good	0.081	0.034–0.196	< .001
Moderate	Female	0.528	0.311–0.898	.018
Moderate	Senior secondary school	2.847	1.458–5.556	.002
<i>Note. AOR = adjusted odds ratio; CI = confidence interval. Reference categories: flourishing outcome, poor knowledge, poor practice, male sex, junior secondary school, Christian religion, monogamous family setting, and low/average-income group. Only statistically significant adjusted associations are displayed.</i>				

Discussion

Distribution of Positive Mental Health Patterns, Knowledge, and Practice Levels among In-school Adolescents

The present study found that 60.5% of in-school adolescents were flourishing, 31.2% had moderate mental health, and 8.3% were languishing. This distribution indicates that most respondents reported frequent emotional, psychological, and social well-being, but a substantial minority remained outside the flourishing range. The flourishing prevalence was higher than the 30.8% reported among adolescents in

Osun State, Nigeria, where 59.4% were mildly flourishing and 9.8% were languishing, but the languishing proportion was closely comparable (Folorunso et al., 2026). It was also higher than the 27.6% flourishing and lower than the 20.2% languishing reported in a Japanese adolescent MHC-SF validation study (Fukuya et al., 2025), while being close to the global non-lockdown adolescent pattern in which over half of students were flourishing and fewer than 10% were languishing (Skrzypiec et al., 2024). These similarities support Keyes' view that flourishing, moderate mental health, and languishing are distinguishable states rather than simple opposites of mental disorder. In Ibadan, school attendance, peer interaction, family embeddedness, and communal school life may be observed alongside relatively high flourishing, while the moderate and languishing groups identify adolescents for whom universal mental health promotion remains important.

The present study found that knowledge levels were good among 44.4%, moderate among 39.2%, and poor among 16.4% of respondents. This suggests that many adolescents endorsed concepts such as autonomy, competence, belonging, self-care, values, and achievement as relevant to positive mental health. Direct African studies using the MHPK-10 among adolescents remain limited, so comparison must be cautious. In Portugal, adolescents showed high MHPK-10 scores and positive mental health-promoting knowledge was positively correlated with positive mental health (Nobre et al., 2022). The present findings are also consistent with the MHPK-10 theoretical foundation, which links knowledge of autonomy, relatedness, and competence to adolescent mental health promotion (Bjornsen et al., 2017, 2024). The implication is for school health programmes in Ibadan to move beyond awareness of mental illness and explicitly teach the knowledge base for flourishing.

The present study found that positive mental health practices were moderate among 44.2%, good among 33.8%, and poor among 22.1% of adolescents. This means that many respondents reported some regular engagement in connectedness, values-based activity, achievement, self-care, mindfulness, relaxation, open communication, coping, and physical activity, but only about one-third reached the good-practice category. African evidence directly using this exact practice index is limited. However, Ghanaian evidence showed that social capital and family or school belonging were related to adolescent wellbeing (Addae, 2020), and Ghanaian youth data linked connection with emotional, social, and psychological well-being on the Mental Health Continuum (Kabir et al., 2021). In Australia, social connectedness and mindfulness were positively associated with early adolescent wellbeing, while physical activity and social connectedness remained important in wellbeing models (Bromley et al., 2024). These comparisons suggest that PMH practices are context-sensitive but conceptually consistent across settings.

Association between Sociodemographic Characteristics and Positive Mental Health Patterns

The present study found that sex was statistically associated with positive mental health patterns. Females had a higher flourishing proportion than males (64.7% vs. 53.7%), while males were more concentrated in the moderate mental health category (39.5% vs. 26.1%). In the adjusted model, female

sex showed lower odds of moderate mental health rather than flourishing. This pattern is similar to the Osun State Nigerian study, where female adolescents had a higher proportion of flourishing mental wellbeing than males (Folorunso et al., 2026). It contrasts with large cross-national evidence showing that adolescent girls often report poorer mental health and lower wellbeing than boys, especially in high-income settings (Campbell et al., 2021; Skrzypiec et al., 2024). The difference may reflect measurement, cultural expectations, school context, and the way girls in Ibadan may engage with social relationships, communication, and help-oriented practices. It also shows why sex differences should not be treated as universal; the group with the less favorable pattern can vary by setting, age, and the wellbeing dimension measured.

The present study found that class and class level were statistically associated with positive mental health patterns. JSS2 and JSS3 students had relatively high flourishing proportions, JSS1 had the lowest flourishing proportion, and senior secondary students were more concentrated in the moderate mental health category than junior secondary students. Because the six-class table contained sparse expected cells, the class-level finding provides the cleaner interpretation: senior secondary school status corresponded with higher odds of moderate mental health rather than flourishing in the adjusted model. A Nigerian Osun State study found no significant junior-senior difference among in-school adolescents, although senior students showed a numerically higher flourishing proportion (Folorunso et al., 2026). Internationally, adolescent wellbeing often varies across school years as academic demands, examination pressure, identity formation, and peer comparison become more salient (Nobre et al., 2022; Yoon et al., 2022). In Ibadan, senior students may experience greater pressure from certification examinations, future uncertainty, and household expectations, which may place them in a moderate rather than flourishing range without necessarily corresponding with languishing.

The present study found that family financial situation was statistically associated with positive mental health patterns, and the collapsed income group also showed a significant association. Adolescents from high-income households had more flourishing and less languishing than those from low or average-income households. This finding agrees with Nigerian evidence from Osun State, where parental wealth and household food security were associated with adolescent mental wellbeing, and food-secure households showed markedly higher odds of flourishing (Folorunso et al., 2026). It also aligns with Ghanaian evidence that socioeconomic status was related to adolescent happiness and life satisfaction through familial social capital (Addae, 2020). Non-African evidence from the Health Behaviour in School-aged Children study also shows that socioeconomic inequality is related to adolescent mental wellbeing, although the direction and magnitude vary by national inequality context (Dierckens et al., 2020). In Ibadan, household finances may be linked with school materials, nutrition, transport, privacy, and less stress exposure. Because the design is cross-sectional, the finding is interpreted as socioeconomic patterning rather than economic causation.

Association between Knowledge of Positive Mental Health and Positive Mental Health Patterns

The present study found a statistically significant association between knowledge of positive mental health and positive mental health patterns. Flourishing was lowest among adolescents with poor knowledge, higher among those with moderate knowledge, and highest among those with good knowledge. Languishing was most common in the poor-knowledge group and much lower in the moderate and good knowledge groups. Direct Nigerian or African studies using the MHPK-10 with MHC-SF categories are scarce, so comparable African evidence is limited. The closest African evidence is broader wellbeing work showing that connectedness, belonging, and social resources are linked with youth wellbeing in Ghana (Addae, 2020; Kabir et al., 2021). Internationally, Portuguese adolescents with higher MHPK-10 scores also showed higher positive mental health, although the association was reported as correlational rather than categorical (Nobre et al., 2022). Theoretically, this finding fits the MHPK-10's emphasis on autonomy, relatedness, and competence and Keyes' complete-state model, because adolescents who understand what sustains positive functioning may also report more frequent experiences of meaning, belonging, and self-acceptance. The implication is that PMH knowledge should be treated as a health-promotion resource in schools, not merely as an adjunct to mental illness literacy.

Association between Positive Mental Health Practices and Positive Mental Health Patterns

The present study found a statistically significant association between positive mental health practices and positive mental health patterns. Flourishing was 22.4% among adolescents with poor practice, 58.8% among those with moderate practice, and 87.7% among those with good practice, while languishing was 23.5%, 5.9%, and 1.5%, respectively. This graded pattern suggests that everyday health-promoting practices were observed alongside more favorable positive mental health states. Direct African studies using the same nine-practice index are limited, but Ghanaian evidence links connection and caring with MHC well-being domains, and school or family belonging with adolescent wellbeing (Addae, 2020; Kabir et al., 2021). Internationally, early adolescent evidence from Australia shows that social connectedness and mindfulness are positively associated with wellbeing, and physical activity and social connectedness remain important in wellbeing models (Bromley et al., 2024). During COVID-19 disruptions, adolescent connectedness with school and family was also favorably related to mental health indicators (Hertz et al., 2022; Skrzypiec et al., 2024). Contextually, the strongest practice pattern in Ibadan may reflect the social ecology of school, family, peers, and faith communities. Public health programmes should therefore combine individual coping skills with supportive school climates and opportunities for meaningful participation.

Multinomial Logistic Regression

The present study found that, in the multinomial logistic regression model with flourishing as the reference outcome, knowledge, practice, sex, class level, and household income retained statistically significant adjusted associations. Adolescents with moderate knowledge and good knowledge showed lower odds of languishing rather than flourishing, compared with those with poor knowledge. Moderate and good knowledge likewise showed lower odds of moderate mental health rather than flourishing. This

corresponds with Nobre et al. (2022), who reported that positive mental health-promoting knowledge was positively related to PMH among adolescents. The association may reflect better recognition of autonomy, values, self-respect, belonging, coping, and achievement as components of mental health, without implying causality.

The present study found that positive mental health practices had the strongest adjusted associations. Compared with poor practice, moderate practice and good practice showed substantially lower odds of languishing rather than flourishing and moderate mental health rather than flourishing. This finding agrees with evidence that connectedness, mindfulness, physical activity, and other health-enhancing behaviours are related to adolescent wellbeing (Bromley et al., 2024; Hertz et al., 2022). The observed gradient may be explained by repeated engagement in behaviours that correspond with Keyes' emotional, social, and psychological well-being domains: positive relationships, purpose, mastery, coping, and self-care. The finding implies that school-based PMH promotion should not stop at classroom knowledge but should create routines, clubs, peer-support structures, physical activity opportunities, relaxation spaces, and communication norms that make positive practices easier to sustain.

The present study found that high-income household status showed lower odds of languishing rather than flourishing, female sex showed lower odds of moderate mental health rather than flourishing, and senior secondary class level showed higher odds of moderate mental health rather than flourishing. These results broadly align with Nigerian and Ghanaian evidence linking material resources, food security, family social capital, and school context with adolescent wellbeing (Addae, 2020; Folorunso et al., 2026). The senior class-level result may reflect educational pressure and transition demands, while the sex result may reflect different patterns of social connection or emotional expression in this sample. Because the study is cross-sectional, these covariates should be interpreted as adjusted correlates of membership in positive mental health categories. The public health implication is targeted but non-stigmatizing action: strengthen supports for lower-income households, provide additional support to senior students during examination periods, and design gender-responsive programmes based on local evidence rather than imported assumptions.

Strengths and Limitations

This study has several strengths. It focused on positive mental health as a distinct construct, used the MHC-SF classification to distinguish flourishing, moderate mental health, and languishing, and reanalysed the raw dataset to ensure that knowledge scoring matched the original Likert response structure. The analysis also included sparse-cell checks and adjusted multinomial logistic regression, which strengthened interpretation of bivariate and adjusted associations.

The findings are nevertheless interpreted with limitations in mind because this is a cross-sectional design which does not support causal inference or temporal ordering. The data were self-reported and may be subject to recall and social desirability bias. The study was limited to public secondary schools in Ibadan Metropolis, so findings may not generalize to out-of-school adolescents, private-school students, rural

adolescents, or adolescents in other Nigerian settings. Some bivariate tables, particularly the full class and five-level family financial situation tables, contained sparse expected cells; Monte Carlo checks were therefore used to support interpretation. Finally, directly comparable African studies on positive mental health knowledge and practice are limited, so some literature comparisons rely on closely aligned well-being constructs rather than identical measures.

Conclusion

This study found that flourishing was common among in-school adolescents in Ibadan Metropolis, but a substantial minority had moderate mental health or were languishing. Knowledge of positive mental health and positive mental health practices showed strong graded associations with positive mental health patterns. Sex, class level, and household income also showed important associations in the bivariate and adjusted analyses. These findings support the value of school-based mental health promotion that teaches adolescents what positive mental health means and creates practical opportunities for connectedness, coping, self-care, achievement, physical activity, and supportive communication.

Public health action should prioritize universal positive mental health promotion in schools while providing additional support for adolescents outside the flourishing range, students from lower-income households, and senior secondary students facing academic transition pressures. Future longitudinal and intervention studies are needed to clarify temporal relationships and to test whether school-based positive mental health literacy and practice programmes correspond with favorable changes in flourishing and languishing over time.

Declarations

Ethics approval: Ethical approval was obtained from the Oyo State Ministry of Health Research Ethics Committee with registration number NHREC/OYOSHRIEC/10/11/22.

Consent to participate: Participation was voluntary and followed the consent procedures approved for the study.

Funding: Funding information was not provided in the source materials.

Competing interests: Competing interest information was not provided in the source materials.

Data availability: Data availability statement to be supplied by the authors according to the target journal requirement.

Author contributions: Author contribution statement to be supplied by the authors according to the target journal requirement.

References

1. Addae EA (2020) The mediating role of social capital in the relationship between socioeconomic status and adolescent wellbeing: Evidence from Ghana. *BMC Public Health* 20:20. <https://doi.org/10.1186/s12889-019-8142-x>
2. Bjornsen HN, Bjornebekk G, Brandmo C (2024) Schools as a source of mental health literacy: Adjusting and validating a mental health literacy scale. *Health Promot Pract* 25(3):498–507. <https://doi.org/10.1177/15248399231161090>
3. Bjornsen HN, Eilertsen MEB, Ringdal R, Espnes GA, Moksnes UK (2017) Positive mental health literacy: Development and validation of a measure among Norwegian adolescents. *BMC Public Health* 17:717. <https://doi.org/10.1186/s12889-017-4733-6>
4. Bromley K, Sacks DD, Boyes A, Driver C, Hermens DF (2024) Health enhancing behaviors in early adolescence: An investigation of nutrition, sleep, physical activity, mindfulness and social connectedness and their association with psychological distress and wellbeing. *Front Psychiatry* 15:1413268. <https://doi.org/10.3389/fpsyt.2024.1413268>
5. Campbell OLK, Bann D, Patalay P (2021) The gender gap in adolescent mental health: A cross-national investigation of 566,829 adolescents across 73 countries. *SSM - Popul Health* 13:100742. <https://doi.org/10.1016/j.ssmph.2021.100742>
6. Chan M-K, Furlong MJ, Nylund-Gibson K, Dowdy E (2022) Heterogeneity among moderate mental health students on the Mental Health Continuum-Short Form (MHC-SF). *School Mental Health* 14(2):416–430. <https://doi.org/10.1007/s12310-021-09476-0>
7. Daniel WW, Cross CL (2018) *Biostatistics: A foundation for analysis in the health sciences*, 11th edn. Wiley
8. Deci EL, Ryan RM (2000) The what and why of goal pursuits: Human needs and the self-determination of behavior. *Psychol Inq* 11(4):227–268. https://doi.org/10.1207/S15327965PLI1104_01
9. Dierckens M, Weinberg D, Huang Y, Elgar F, Moor I, Augustine L, Lyyra N, Deforche B, De Clercq B, Stevens GWJM, Currie C (2020) National-level wealth inequality and socioeconomic inequality in adolescent mental well-being: A time series analysis of 17 countries. *J Adolesc Health* 66(6):S21–S28. <https://doi.org/10.1016/j.jadohealth.2020.03.009>
10. Folorunso OE, Ojo TO, Akinsulore A, Inyangudo G (2026) Adolescent mental well-being and household food security: Insights from a cross-sectional study in Irewole local government area, Osun State, Nigeria. *BMC Public Health* 26:30. <https://doi.org/10.1186/s12889-025-25702-9>
11. Fukuya Y, Sakuma K, Nemoto T (2025) Psychometric evaluation of the Japanese version of the Mental Health Continuum-Short Form (MHC-SF) in adolescents. *Psychiatry Clin Neurosciences Rep* 4(2):e70129. <https://doi.org/10.1002/pcn5.70129>
12. Hertz MF, Kilmer G, Verlenden J, Liddon N, Rasberry CN, Barrios LC, Ethier KA (2022) Adolescent mental health, connectedness, and mode of school instruction during COVID-19. *J Adolesc Health*

- 70(1):57–63. <https://doi.org/10.1016/j.jadohealth.2021.10.021>
13. Kabir RS, Doku DT, Wium N (2021) Connection in youth development key to the Mental Health Continuum in Ghana: A structural equation model of thriving and flourishing indicators. *Front Psychol* 12:676376. <https://doi.org/10.3389/fpsyg.2021.676376>
 14. Kennes A, Peeters S, Janssens M, Reijnders J, Lataster J, Jacobs N (2020) Psychometric evaluation of the Mental Health Continuum-Short Form (MHC-SF) for Dutch adolescents. *J Child Fam stud* 29:3276–3286. <https://doi.org/10.1007/s10826-020-01803-4>
 15. Keyes CLM (2002) The mental health continuum: From languishing to flourishing in life. *J Health Soc Behav* 43(2):207–222. <https://doi.org/10.2307/3090197>
 16. Keyes CLM (2006) Mental health in adolescence: Is America's youth flourishing? *Am J Orthopsychiatry* 76(3):395–402. <https://doi.org/10.1037/0002-9432.76.3.395>
 17. Lamers SMA, Westerhof GJ, Bohlmeijer ET, ten Klooster PM, Keyes CLM (2011) Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF). *J Clin Psychol* 67(1):99–110. <https://doi.org/10.1002/jclp.20741>
 18. Olowe AO, Tshabalala AM, Bruce JC (2025) Self-reported knowledge, attitude and mental health status of in-school adolescents in Nigeria. *Afr J Prim Health Care Family Med* 17(1):a4858. <https://doi.org/10.4102/phcfm.v17i1.4858>
 19. Nobre J, Calha A, Luis H, Oliveira AP, Monteiro F, Ferre-Grau C, Sequeira C (2022) Mental health literacy and positive mental health in adolescents: A correlational study. *Int J Environ Res Public Health* 19(13):8165. <https://doi.org/10.3390/ijerph19138165>
 20. Skrzypiec G, Wyra M, Topcu-Uzer C, Sikorska I, Sandhu D, Romera EM, Olenik-Shemesh D, Nery M, Navarro-Rodriguez CD, Khlomov K, Kavuk-Kalender M, Heiman T, Guarini A, Didaskalou E, Cefai C, Brighi A, Bravo-Sanzana M, Bochaver A, Bauman S, Andreou E, Amri U (2024) A global study of the wellbeing of adolescent students during the COVID-19 2020 lockdown. *School Mental Health* 16:1120–1140. <https://doi.org/10.1007/s12310-024-09678-2>
 21. Vaingankar JA, Subramaniam M, Seow E, Chang S, Sambasivam R, Luo N, Verma S, Chong SA, van Dam RM (2022) Youth positive mental health concepts and definitions: A systematic review and qualitative synthesis. *Int J Environ Res Public Health* 19(18):11506. <https://doi.org/10.3390/ijerph191811506>
 22. Wray B, Grimes A, Eighmy K, Lightner J (2022) The relationship between social integration and physical activity, diet, and sleep among youths: Cross-sectional survey study. *JMIR Pediatr Parent* 5(4):e40354. <https://doi.org/10.2196/40354>
 23. Yoon Y, Eisenstadt M, Lereya ST, Deighton J (2022) Gender difference in the change of adolescents' mental health and subjective wellbeing trajectories. *European Child & Adolescent Psychiatry*. Advance online publication. <https://doi.org/10.1007/s00787-022-01961-4>