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Exploring the perspectives of adolescents in high school in Northern Ghana on barriers to accessing substance use services

Dennis Bomansang Daliri[1], Richard Dei-Asamoa[2,*], Nancy Abagye[3], Daniel Adjei[4], Agani Afaya[5], Moses Abangba Amoah[6], Caleb Otu-Ansah[7], Emmanuel Azusong[8], Joseph Kabena Nyamison[4], Josephine Agyeiwaa Stiles Darko[2], Norbert Mantu Kipo[7], Akwasi Osei[4] and Pinaman Appau[9]

*Correspondence:
Richard Dei-Asamoa
richardasamoa@ymail.com
[1]Presbyterian Psychiatric Hospital, Bolgatanga, Ghana
[2]Department of Psychiatry, Korle-bu Teaching Hospital, Accra, Ghana
[3]Department of Midwifery, School of Nursing and Midwifery, University of Ghana, Legon, Ghana
[4]Pantang Hospital, Accra, Ghana
[5]Department of Nursing, School of Nursing and Midwifery, University of Health and Allied Health Sciences, Ho, Ghana
[6]Nurses'Training College, Bolgatanga, Ghana
[7]Department of Psychiatry, Komfo Anokye Teaching hospital, Kumasi, Ghana
[8]Accra Psychiatric Hospital, Accra, Ghana
[9]Mental Health Authority, Accra, Ghana

Abstract

Background Adolescent substance use is a rising public health concern in Ghana, with limited evidence on youth perspectives regarding service availability and access.

Objectives This study explores the adolescents' perspectives on the barriers to accessing substance use services in Northern Ghana.

Design A qualitative exploratory design was employed.

Setting This study was conducted in public senior high school in the Bolgatanga Municipality of the Upper East Region of Ghana.

Participants Fifteen students aged 12 to 19 years were purposively selected with diversity in age, sex, religion, and residency status.

Data collection Data were collected through in-depth interviews and analyzed thematically using Braun and Clarke's framework. Trustworthiness was ensured through member checking, peer debriefing, and audit trails.

Results The study identified several barriers grouped under four themes as follows: stigma, fear and confidentiality concerns, accessibility and affordability challenges, service relevance and adolescent-focused, and peer factors.

Conclusion This study found that adolescents in Northern Ghana face significant barriers to substance abuse service use, shaped by four key themes: stigma and confidentiality concerns, accessibility and affordability challenges, lack of adolescent-friendly services, and peer influence. These barriers, rooted in systemic, structural, and sociocultural contexts, foster mistrust, limit access, and discourage help-seeking. Addressing them requires adolescent-responsive interventions that prioritize confidentiality, affordability, accessibility, and supportive care aligned with young people's lived experiences.

Keywords Adolescents, Substance use, Service access, Stigma, Qualitative study

1 Introduction

Substance use and related disorders are major mental health concerns globally [1]. They present an even greater challenge among adolescents. The developing brain of adolescents tends to be susceptible to the effects of psychoactive substances [2]. This increases the risk of dependence, harmful use, and other mental and physical health challenges among adolescents who use substances [3]. In addition to these factors substance use among adolescents is associated with adverse psychosocial consequences, including risky sexual behaviours and increased rates of school dropout [4]. In the long run, substance use disorders are also associated with increased morbidity and mortality [5, 6] .

Evidence from around the world shows an increasing rate of substance use among adolescents. Globally, it is estimated that about 13 million adolescents use psychoactive substances [7]. This trend has also been observed in sub-Saharan African populations. The estimated prevalence of substance abuse among adolescents in sub-Saharan Africa (SSA) stands at 15%, with an estimated 23% prevalence of alcohol use [8]. The prevalence of substance use among adolescents aged 10–17 years in Ghana is estimated to be 12.3%, marginally higher than the estimated prevalence of 10% for the West African subregion [8, 9].

Given the risks and adverse outcomes associated with substance use in this population, efforts must be made to provide adequate and effective healthcare services aimed at preventing substance abuse, as well as managing substance use disorders in adolescents. The World Health Organization (WHO) reports that only 1 in 7 people with substance use disorders receive treatment, indicating a treatment gap of more than 80% [10]. In SSA, the treatment gap for substance use disorders is estimated at about 87% [11]. While efforts are put into providing these services, it is important to understand the factors that limit availability and access to the services. It is noted that barriers such as financial challenges, stigma, and lack of awareness hamper access to mental health services in Ghana [12].

Although some studies have been conducted to identify these barriers, they have mostly been quantitative studies, involving Western populations [13]. While they provide some data, they do not address in-depth views of young people regarding substance use and associated factors, especially within the West African and Ghanaian context. Therefore, little is known about the perspectives of adolescents regarding the barriers to substance use services in Ghana. This presents a critical gap in knowledge that needs to be bridged to develop and deploy interventions that effectively remediate the rising trend of substance abuse in this population. Also, in encouraging adolescents to use the available substances abuse services, it is imperative to seek their views of these services and the challenges they face in accessing them. This will influence policy in addressing their challenges, to make the service attractive enough in an attempt to curb the menace.

This study employs a qualitative approach to understanding the perspectives of adolescents in terms of barriers that they face in accessing substance use services. It therefore provides evidence of the challenges and barriers young people face in accessing appropriate healthcare services targeted at preventing or managing substance abuse and associated disorders. In this regard, it provides valuable information to address challenges with access to the available mental healthcare interventions for substance abuse among adolescents. Findings from the study will also serve as a guide for future policies and

interventions, to ensure that the services within these interventions are readily available and accessible to the target population.

2 Method

2.1 Study design

This study employed a qualitative exploratory design to gain an in-depth understanding of the perspectives of adolescents regarding substance use services and the barriers they face in accessing such services. Qualitative research is particularly well-suited for exploring lived experiences, contextual realities, and meanings attributed to phenomena by participants, especially in understudied settings such as adolescent substance use in the Bolgatanga Municipality [14] .

2.2 Strengths and limitations

- Qualitative approach allowed for in-depth exploration of barriers adolescents face in accessing substance use services.
- Demographic diversity captures wider range of experiences and perspectives.
- Limited generalizability of qualitative study approach.
- Prevalence of identified barriers were not established.

2.3 Study setting

The research was conducted in a public senior high school located in the Bolgatanga Municipality of the Upper East Region of Ghana. This region is predominantly rural, characterised by limited access to specialised healthcare services, including adolescent-friendly mental health and substance use interventions. The focus of this study was on adolescents hence a mixed senior high school was purposively selected because its student population is drawn from diverse ethnic, religious, and socio-economic backgrounds. This ensured that adolescents with diverse sociodemographic characteristics were selected .

2.4 Study population and sampling strategy

The study targeted senior high school students aged between 12 and 19 years. Participants were eligible if they were currently enrolled in the selected school, provided consent or assent (for those under 18), and had parental or guardian consent where necessary.

A purposive sampling technique was used to select diverse participants in this study. Adolescents are often reluctant to discuss sensitive issues such as substance use and help-seeking due to stigma and fear of disclosure; therefore, purposive sampling made it possible to identify students who were both willing and able to articulate their perspectives. By intentionally selecting senior high school students from different year groups, genders, and socioeconomic backgrounds, the study was able to capture a wide range of perspectives that reflect the heterogeneity of adolescent experiences within the Northern Ghanaian context.

The sampling procedure began with engagement of the school authorities, who facilitated access to eligible students after the study objectives were explained. Information sheets and consent forms were distributed to students and, where necessary, to their parents or guardians for approval. Once consent or assent was obtained, the researcher

worked with a school liaison to identify potential participants across the different year groups to ensure diversity in experiences. Students who expressed interest were then screened for eligibility, after which purposive sampling was applied to select those who could provide rich and relevant insights into the phenomenon under study. Recruitment continued in parallel with data collection until the fifteenth interview, when data saturation was reached, indicating that further interviews would not yield new themes or perspectives.

A total of fifteen (15) students participated in the study, comprising both males and females from different academic levels which was defined by data saturation; the point at which no new information emerges [15].

2.5 Data collection instrument

The study utilized a semi-structured in-depth interview guide as its primary data collection instrument *(Supplementary file 1)* was designed by the researchers through extensive literature review on the topic and consultations with school counselors. This interview guide was specifically designed to explore adolescents' perceptions on substance abuse, factors influencing the utilization of substance abuse services in the municipality and recommendations for improving the utilization. It began with a demographic section that gathered background information, including participants' age, gender, current grade level, and boarding status. This was then followed by the the semi-structured in-depth interviews which explored barriers to accessing substance abuse services, and gathered suggestions on how to make these services more appealing and accessible to adolescents.

2.6 Data collection procedures

From March to April 2025, the first author, a male psychiatrist with experience in qualitative research and data collection conducted in-depth interviews of individual participants in a quiet, private setting within the school premises after regular class hours. Prior to this, the interview guide was piloted with two students after which flaws were corrected, but results were not included in the final analysis. All interviews were conducted in English, the school's medium of instruction, and each lasted approximately 30 to 45 minutes. During the interviews, open-ended questions were asked, and probes were used to elicit further responses. Sufficient time was given to the participants for them to comprehensively express their perceptions about mental illness. Iterative questioning was used to obtain clarity of ambiguous responses. The participants gave permission for the interviews to be audio-taped and field notes taken. Data collection was carried out until no new information was obtained, with saturation reached after the fifteenth interview. Participants were purposively drawn from different years of study to ensure that the views of each cohort were adequately represented prior to confirming saturation. No participant was interviewed more than once.

2.7 Ethical considerations

For students aged 18 years and above, written informed consent was obtained after explaining the study's purpose, procedures, risks, and benefits in clear and simple language. For those younger than 18 years, parental or guardian consent was first sought through letters sent to parents/guardians, accompanied by information sheets explaining

the study in detail. Only students whose parents/guardians gave written consent were approached. In addition, assent was obtained from the adolescents themselves to ensure that their participation was voluntary and based on understanding. During this process, students were informed that participation was not mandatory, that they could decline or withdraw at any time, and that their decision would not affect their schooling or relationship with teachers or peers. To ensure confidentiality, each participant was assigned a unique identification code (P001…P015), and no identifiable personal information was recorded.

2.8 Patients and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

2.9 Data management and analysis

Interviews were transcribed verbatim and checked for accuracy. Transcripts were analysed thematically using Braunand Clarke's [16] six-step framework, which includes familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and writing the report. Coding was conducted manually and iteratively by the first author to capture emerging patterns and relationships. Themes were developed inductively from the data, supported by illustrative quotations from participants. The audio recordings, transcripts and other annonymised data collected were stored on a password protected computer with access only to the researchers. The report of the results followed the COREQ checklist [17]. *See supplementary file 2.*

2.10 Trustworthiness

To ensure the trustworthiness of the study, the framework of credibility, dependability, confirmability, and transferability as proposed by Lincoln and Guba [18] was applied. Confirmability was ensured through member checking by returning the transcripts to participants to ensure that their statements were accurately presented. Transferability was ensured by providing sufficient details about the study setting, sample features, and processes. Peer debriefing and strict adherence to verbatim transcriptions ensured dependability. To ensure credibility the researchers had a prolonged engagement with the students in order to build rapport and trust, thereby fostering open and honest discussions during the interviews. This reduce the likelihood of socially desirable responses and ensured that the adolescents' perspectives were authentically captured.

3 Results

In all, 15 adolescents were engaged in this study. Table 1 presents the sociodemographic distribution of a sample of 15 high school students. The sex distribution reveals a near-equal representation, with 53.3% males and 46.7% females. The majority (46.7%) of participants were aged between 15 and 17 years. In terms of religious affiliation, most students identified as Christians (66.7%), with Muslims making up 20.0% and those adhering to traditional or other faiths accounting for 13.3%. Participants were fairly distributed across the three grade levels of Senior High School (SHS). SHS 2 had the largest

Table 1 Sociodemographic characteristics of participants

Variables	Category	Frequency (*n*)	Percentage (%)
Sex	Male	8	53.3
	Female	7	46.7
Age group (years)	12–14	3	20.0
	15–17	7	46.7
	> 18	5	33.3
Religion	Christianity	10	66.7
	Islam	3	20.0
	Traditional/other	2	13.3
Grade/form	SHS 1 (First year)	5	33.3
	SHS 2 (Second year)	6	40.0
	SHS 3 (Third year)	4	26.7
Residence status	Boarding	11	73.3
	Day	4	26.7

Table 2 Showing resuts from the thematic analysis

Theme	Subtheme
Stigma, fear, and confidentiality concerns	1. Lack of trust 2. Fear of punishment 3. Fear of stigma
Accessibility and affordability challenges	1. High cost of service 2. Long distance
Service relevance and adolescent friendliness	1. Poor timing and inconvenient scheduling 2. Lack of adolescent-centred service
Peer influence	1. Teasing by friends 2. Social isolation

representation (40.0%), followed by SHS 1 (33.3%) and SHS 3 (26.7%). Finally, 73.3% of the students were boarders.

Table 2 below shows the results of the thematic analysis with four major themes emerging as barriers adolescents face in accessing substance use services: (1) stigma, fear, and confidentiality concerns, (2) accessibility and affordability challenges, (3) service relevance and adolescent friendliness, and (4) peer influence. These themes represent deeply intertwined structural and psychosocial dynamics that shape how adolescents interact or choose not to interact with available substance use services.

3.1 Theme one: stigma, fear, and confidentiality concerns

Adolescents expressed considerable hesitation in seeking help for substance use due to fear of stigma, confidentiality concerns and lack of trust in institutional actors. The perceived risks of being labelled or punished overshadowed the potential benefits of accessing services.

3.1.1 Lack of trust

Students who participated in this study indicated that teachers and health workers, though present and sometimes involved in drug education, were not seen as trustworthy or confidential sources of help. Students feared their issues might not be kept private or could be used against them.

"Even though our school counsellor says she can help, but most of us don't trust that it will remain confidential. It could get back to our parents or teachers." (15-year-old male student).

"If I tell a teacher I use drugs, they might report me instead of helping me. So, I just keep quiet." (17-year-old male student).

3.1.2 Fear of punishment

Adolescents reported that the fear of disclosing their substance use behaviour to their teachers could result in punitive consequences if confidentiality and trust are breached. *"In our school, if they find out you're using drugs, you can be suspended or even expelled. So people just hide it." (13-year-old female student).*

"They say come forward for help, but then they punish you. That's why nobody talks." (19-year-old male student).

3.1.3 Fear of stigma

Students also described a deep fear of being stigmatised by peers, school staff, and community members if they admitted to using substances or sought support.

"People will start calling you a 'junkie' or 'spoiled child' once they find out. It's better to stay silent." (18-year-old male student).

"They look at you differently, like you are not normal. That's why most of us won't ask for help." (16-year-old female student).

3.2 Theme two: accessibility and affordability challenges

Barriers related to financial limitations and geographical location significantly restricted access to appropriate services, particularly for students from rural or low-income backgrounds. Many students from these contexts faced challenges in affording transportation costs, consultation fees, and medication, which created delays or even deterred them from seeking care altogether. Additionally, students residing in remote areas often had to travel long distances to reach mental health facilities or specialized services, further compounding the financial strain and logistical burden. These limitations not only reduced their likelihood of accessing timely and quality mental health support but also contributed to widening disparities in service utilization compared to their urban or financially advantaged peers.

3.2.1 High cost of service

Participants explained that the financial burden of rehabilitation on their families was a major challenge since they knew their parents may not be able to afford treatment and transportation.

"My uncle had to pay a lot to take my cousin to a rehab centre in Kumasi. Most of us can't afford that." (18-year-old male student).

"Even going to the clinic costs money—transport, consultation, everything. Many parents won't pay for that." (19-year-old male student).

3.2.2 Long distance

Majority of the students intimated that living in remote areas served as a disadvantage to them since access tosubstance use service was only in the cities.

"There's nothing close by. You have to travel far, and not everyone has that chance." (14-year-old female student).

"Only people in big towns can get help. In villages like ours, we have nothing." (16-year-old male student).

3.3 Theme three: service relevance and adolescent-focused design

A prominent barrier to service utilization was the mismatch between the structure and delivery of existing substance use services and the unique needs and realities of adolescents. Participants described the services as poorly aligned with their daily schedules, emotional development, and social environments. The lack of youth-tailored approaches discouraged adolescents from perceiving such services as suitable or welcoming.

3.3.1 Poor timing and inconvenient scheduling

Participants noted that the timing of available interventions, such as occasional sensitization events or school-based outreach, did not align well with their academic or personal schedules. This limited engagement and resulted in poor uptake of potentially helpful resources.

"They organize talks during exams or right after classes when everyone is tired. So even if it's important, we don't really pay attention." (13-year-old female student).

"Sometimes the nurse comes when we are in class or during prep time, and you can't just leave to go talk to them." (17-year-old female student).

3.3.2 Lack of adolescent-centred services

Many of the students emphasized that the available services were not designed with adolescents in mind. The communication styles of service providers were often perceived as authoritarian, judgmental, or not age-appropriate. Adolescents did not feel comfortable disclosing sensitive information in these settings, and the clinical or adult-focused environments reinforced their discomfort.

"When you try to talk about drugs, they scold you instead of helping. It makes you shut down." (16-year-old female student).

"Most of the health people talk to us like we are bad children, not like someone who needs help. You don't feel safe opening up." (19-year-old male student).

3.4 Theme four: peer factors

Peer dynamics posed a significant barrier to help-seeking, as overt stigma such as teasing, ridicule, and negative labeling, alongside subtle forms of social exclusion, discouraged students from seeking professional support. These experiences fostered shame and fear of judgment, leading many to conceal their distress or adopt informal coping strategies. The strong influence of peer norms thus played a critical role in shaping attitudes towards help-seeking among adolescents, where peer acceptance remains highly valued.

3.4.1 Teasing by friends

Adolescents often avoided seeking mental health support due to fear of ridicule and negative labeling by peers, which fostered stigma and reinforced silence around their struggles. Given the heightened importance of peer approval during this developmental stage, the anticipation of mockery frequently outweighed the perceived benefits of professional help.

"If your friends find out you went to a counsellor, they'll laugh and call you weak." (15-year-old female).

"People tease you and say you're acting like an old man for looking for help." (12-year-old male student).

3.4.2 Social isolation

Fear of social isolation discouraged students from seeking support, as peer relationships were central to their identity and well-being. Concerns about losing friendships or social standing led many to conceal distress and rely on self-coping rather than risk rejection within their peer groups.

"You might lose your friends if they find out you're trying to stop using drugs. They won't want to be with you." (16-year-old male student).

"Nobody wants to be the odd one out. So even if you want help, you stay quiet." (19-year-old female students).

4 Discussion

The study sought to explored the barriers that adolescents face in accessing substance abuse services in Northern Ghana. The findings show that adolescents' engagement with such services is influenced by a multifaceted set of structural, social, and individual factors. Consistent with global and regional evidence, our results underscore that barriers are not merely a matter of service availability but are embedded within broader socio-cultural, economic, and institutional contexts that shape adolescent health-seeking behaviours. Four key themes emerged: stigma and fear, accessibility and affordability, service relevance and adolescent-friendliness, and peer influences which together provide a multifaceted understanding of why adolescents remain underserved despite increasing attention to adolescent health.

The findings in this study show that a key barrier to service utilization was the pervasive stigma associated with substance use and mental health among adolescents. Participants expressed significant mistrust in teachers and health professionals due to past breaches of confidentiality and a general fear of being judged or punished. In tightly-knit communities such as those in Bolgatanga, adolescents feared that their issues could become public knowledge, exposing them to ridicule or ostracism. This concern is consistent with broader literature indicating that stigma is a critical deterrent to help-seeking among youth globally [19]. In the Ghanaian context, such fears are compounded by punitive disciplinary cultures in schools and communities that often conflate substance use with moral failure rather than a health concern [20]. Rather than receiving compassionate, therapeutic support, adolescents anticipate punitive consequences such as expulsion from school or social isolation. This anticipation is grounded in real experiences and observations that promote behaviours and limit open engagement with services. Similar findings from South Africa and Uganda further substantiate the argument that fear of punishment remains a critical barrier to adolescent engagement with health services [21, 22]. There is therefore the need for teachers in the various senior high schools to be educated on the approach to handling adolescents with substance use challenges, emphasizing on the need to ensure confidentiality and stigma reduction.

Another major barrier is the unavailability and unaffordability of substance use treatment centres in the Bolgatanga municipality. While some services may be present within

the municipality, they remain inaccessible for adolescents residing in more rural outskirts. Transportation costs and long travel times contribute to these access challenges. Moreover, financial constraints, such as consultation fees and medication costs, deter adolescents from seeking care, particularly since most lack independent income. This finding concurs with findings by Abuosi and Anaba [23] in Ghana and Sidamo et al. [24] in Ethiopia, which identified physical and financial barriers as challenges to adolescent health service utilisation. The findings are further corroborated by McGranahan et al. [25] who emphasized that the urban-centralization of services limits access, especially for rural populations. This finding adds to the clarion call for decentralisation of mental health services, particularly substance use services, for easy accessibility for persons who require them, especially adolescents. It also brings to the fore the discussion of health insurance coverage for mental health conditions, including addiction services. This will relieve the financial burden and hence promote service utilisation [26, 27].

Adolescents criticized the organization and delivery of services, which they viewed as disconnected from their realities. For many, services operate during school hours, making them inaccessible without skipping classes, an option that may not be viable or permitted. This temporal misalignment reflects a failure in youth-centred service planning. In addition, adolescents often perceived existing services as unfriendly or even hostile. Reports of judgmental attitudes, lack of empathy, and dismissive treatment by health personnel discourage repeat visits and undermine trust in the system. This finding is corroborated by Daliri et al. [12] who identified that unhealthy attitudes of health personnel were repugnant to the utilisation of mental health services. This finding emphasizes the importance of adolescent-responsive services that are respectful, private, and participatory. Yet, the Ghanaian system, particularly in resource-limited northern settings, struggles to meet these criteria. As a result, adolescents feel alienated from services that are ostensibly designed to help them. There is the need for health workers to be trained in adolescent-friendly service provision to understand the unique needs of adolescents and be more welcoming rather than repulsive.

Peer dynamics also significantly shape adolescents' attitudes toward service use. The fear of being labelled as "weak" or "mad" by peers deters many from acknowledging their substance use problems or accessing help. In communal cultures where peer approval is highly valued, this risk of social marginalization weighs heavily on adolescents. Instead of functioning as sources of support, peer networks may become mechanisms of ridicule, reinforcing the silence and secrecy surrounding substance abuse. This phenomenon has also been observed in other African settings, such as Nigeria and Kenya [28, 29]. The absence of structured peer support groups or adolescent-focused outreach programs limits opportunities for positive peer influence, which has otherwise been shown to improve health service uptake [30].

4.1 Limitations of the study

This study fills a critical gap in research as far as the Bolgatanga municipality is concerned, since this study, to the best of the knowledge of the authors is probably the first of its kind giving attention to adolescents on the subject matter. It is however, not without limitations, and findings should be interpreted within the context of its limitations. While efforts were made to ensure a diverse sample within the Bolgatanga Municipality, the findings may not be generalizable to adolescents in other parts of Ghana, especially

in more urbanized or ethnically different regions, where the socio-cultural dynamics and access to health services may vary significantly. Also, the qualitative nature of the study, though rich in depth and contextual understanding, limits the ability to quantify the prevalence of the identified barriers across the broader adolescent population. Future research incorporating mixed methods or longitudinal designs could help validate these findings and offer more generalizable conclusions.

4.2 Implications for practice

This study underscores the need for adolescent- centred, stigma-free, and confidential substance abuse services in the Bolgatanga Municipality. A key finding is the widespread mistrust adolescents have toward teachers and health providers due to fear of judgment and breaches of confidentiality. As a result, service providers must receive targeted training in adolescent-friendly, non-punitive communication and confidentiality to foster trust and engagement. Enhancing service relevance involves aligning service delivery with adolescents' schedules and preferences. This can be achieved by involving young people in the design and implementation of interventions to ensure responsiveness and contextual fit. Additionally, schools and community centres should offer safe, discreet spaces where adolescents can access support without stigma. Peer dynamics also play a critical role. Establishing peer-led education and support systems can counteract negative peer pressure and reduce stigma. These initiatives, when embedded in schools and community programs, can normalize help-seeking and foster supportive peer environments. Finally, a multi-sectoral approach involving education, health, and social welfare sectors is essential. Joint efforts should focus on developing integrated youth policies, investing in adolescent mental health, and improving monitoring systems. Collectively, these measures will promote greater utilization of services and support adolescent recovery and well-being in northern Ghana and similar contexts.

5 Conclusion

These results reflect a multifaceted crisis in adolescent substance abuse service delivery in the Bolgatanga Municipality, rooted in stigma, structural barriers, cultural attitudes, and inadequate service design. The convergence of fear, mistrust, and logistical inaccessibility paints a picture of disengagement rather than active utilization. Interventions must therefore be multi-pronged, addressing systemic issues such as cost and distance, reforming service delivery to prioritize adolescent-friendly models, and confronting stigma through community and peer-led sensitization. Policymakers and health professionals should adopt culturally competent, youth-participatory frameworks to bridge these gaps and enhance service responsiveness to adolescent needs.

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions
D.B.D. led the conceptualization and development of the topic and research questions, data collection and analysis.R.D.A. supported in data analysis and review of themes.E.A. was involved in manuscript writingN.A. was involved in manuscript writingJ.A.S.D was involved in manuscript writingC.O.A was involved in manuscript writingM.A. revised the manuscriptA.A. revised the manuscriptJ.K.N. revised the manuscriptN.M.K. revised the manuscriptD.A. supervised manuscript revisionsP.A supervised conceptualization of the study and data collectionA.O. supervised data collection and analysis.

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Data availability
Data for the study can be found in the study as excerpts. Full data will be available from the corresponding author upon reasonable request.

Declarations

Ethics approval and Consent to participate
Ethical approval for the study was obtained from the Committee on Human Research, Publication and Ethics of the Kwame Nkrumah University of Science and Technology with approval number CHRPE/AP/183/25. Written informed consent was obtained from all participants aged 18 years or older to participate in the study. For participants under 18 years, assent was obtained from them in conjunction with written parental or guardian consent.

Consent to publish
Written informed consent to publish was obtained from all participants aged 18 years or older. For participants under 18 years, assent was obtained from them in conjunction with written parental or guardian consent.

Competing interests
The authors declare no competing interests.

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