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Predictors of unintended pregnancy among adolescent schoolgirls during the COVID-19-induced school closures: The case of rural and underserved communities in Ghana

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Abstract

In Ghana, unintended pregnancies account for one in three births and are associated with adverse maternal and child health outcomes—a problem that appears to have worsened during the COVID-19 lockdown and school closures. Hence, this study examines unintended pregnancy and its predictors among adolescent schoolgirls within the context of COVID-19-induced school closures in rural and underserved communities in Ejisu municipality in Ghana. The sample comprised 310 adolescent girls aged 13–19 years who had a pregnancy during the COVID-19 lockdown. Data were collected using a structured questionnaire, and both bivariate and multivariate regression techniques were used to analyze the data. Of the total respondents, 227 (73.2%) had unintended pregnancies during the COVID-19 lockdown. The majority, 234 (75.5%), were aged between 16 and 19 years, 275 (88.7%) lived in rural areas, and 126 (40.6%) lived with only their mothers. Regression results demonstrated that girls who lacked knowledge of contraception (crude odds ratio = 0.691, 95% confidence interval [CI] = [0.479, 0.581]) and sex education (crude odds ratio = 0.209, 95% CI = [0.121, 0.362]), had multiple sex partners (adjusted odds ratio = 1.382, 95% CI = [0.289, 0.921]), and lived with only their mothers during the COVID-19 lockdown

were more likely to experience unintended pregnancy than their counterparts. Awareness of the predicting factors identified in this study can guide parental roles in reducing the likelihood of their children being lured sexually or victimized during disruptive occurrences like COVID-19-induced school closures.

Keywords: Unintended pregnancy; Adolescent girls; COVID-19; Rural and underserved communities; Ghana

1. Introduction

The outbreak of COVID-19 and its impacts on various aspects of life, including social, economic, cultural, educational, and health, continue to be felt around the world. One such impact is adolescent pregnancy (Okalo *et al.*, 2023). As defined by the United Nations Children's Fund (UNICEF), adolescent (or teenage) pregnancy generally refers to conceiving by girls between the ages of 13 and 19. In developing countries, an estimated 21 million adolescent girls aged between 13 and 19 years get pregnant while approximately 16 million give birth every year (Darroch *et al.*, 2016; UNICEF, 2018). A more concerning fact is that adolescent pregnancy is predicted to increase by 2030, with higher rates in sub-Saharan African (SSA) countries (Worldatlas, 2017). In the specific case of Ghana, estimates suggest that, in 2012 alone, 14% of adolescent girls in the country started childbearing, with approximately 11% live birth rate (Ghana Statistical Service [GSS] *et al.*, 2018).

Adolescence, defined by the ages of 13–19, is a distinct period in a person's life, forming a bridge between childhood and early adulthood. Ghana has a young population (United Nations Population Fund [UNPF], 2023). Currently, about 6.9 million Ghanaians are adolescents, representing about 22% of the total population of nearly 31 million (Amoah-Saah & Akosah, 2024; UNPF, 2023). Between 2016 and 2020, Ghana recorded 542,131 pregnancies among adolescent girls aged 15–19 years and 13,444 pregnancies among young adolescents aged 10–14 years (UNPF, 2023). A pooled analysis of national surveys estimated the prevalence of adolescent pregnancy in Ghana at 15.4%, with rural areas showing a higher prevalence (19.5%) compared to urban areas (10.6%), with some of the pregnancies being completely unintended (Mohammed, 2023).

An unintended pregnancy can be defined as a pregnancy that is either unwanted or mistimed (Nyarko, 2019). Although some adolescent pregnancies may be desired, estimates suggest that nearly 50% are not (Sully *et al.*, 2020). Global statistics revealed that about 85 million pregnancies were unintended in 2012 alone, of which 50% ended in unsafe abortion (Sedgh *et al.*, 2014). While the incidence of unintended pregnancy has declined globally over the last few years, its rate remains high in developing countries, including SSA (Okalo *et al.*, 2023). In Ghana, it has been discovered that around 37% of all pregnancies were unintended in 2018, which comprises 23% mistimed and 14% unwanted pregnancies (Nyarko, 2019).

Unintended pregnancy among adolescent girls is already high in Ghana even before the COVID-19 pandemic (Nyarko, 2019). In rural and underserved communities (RUCs) where child marriage and adolescent pregnancy are most prevalent, a higher rate of out-of-school girls, poor educational outcomes, economic poverty, and other cultural factors are among the leading predictors (Ampiah *et al.*, 2019; Dubik *et al.*, 2022). For instance, Dubik *et al.* (2022) found that parents' desire for grandchildren, multiple sexual partners, and poverty contribute to adolescent pregnancy in the rural communities in Ghana.

The COVID-19 pandemic could cause unprecedented harm to children, particularly girls, and put their lives at risk. Existing evidence already indicates gender-specific effects of school closures and lockdown during the COVID-19 pandemic (The Lancet Child Adolescent Health, 2020; UNICEF, 2022). Girls are particularly recognized as a vulnerable group during the COVID-19 pandemic (Hall *et al.*, 2020). For instance, estimates from World Vision Ghana (2020) indicate that in the Krachi West District, COVID-19 led to a nine-fold increase in adolescent pregnancies. Between March and May 2020, 51 girls were reported pregnant, compared to only six cases in all of 2018 (Baker, 2020). There are also concerns that school closures during the COVID-19 pandemic may exacerbate gender gaps in education and girl empowerment, dampening any progress made in Ghana (The Lancet Child Adolescent Health, 2020). Similarly, it is argued that most girls might not return to school due to spikes in adolescent pregnancies and other sexual and reproductive health (SRH) risks (Baker, 2020; Selbervik, 2020). The pandemic-induced closure of schools, isolation from school support networks, and rising poverty could worsen issues Ghana

was already struggling to address (Addae, 2021; The Lancet Child Adolescent Health, 2020; UNICEF, 2022).

The exacerbation of the adolescent pregnancy problem during the COVID-19 pandemic appears to be part of the vicious cycle affecting developing countries, such as Ghana, driven chiefly by income loss among poor populations. This financial strain has indeed taken a greater toll on low-income families. For instance, a decrease in household income can increase the likelihood of early marriage, especially in countries where bride price is usually exercised (UNICEF, 2018). This can, in turn, result in unintended pregnancies among adolescent girls. Also, apart from income constraints, the pandemic may affect access to and use of contraception, which can result in unintended pregnancy and unsafe abortions (Kumar & Singh, 2022). Similarly, the pandemic-induced worries may lead to a change in behavior against birth control measures, especially among adolescent girls who suffer from social disparities.

To combat the COVID-19 outbreak, countries around the globe took pragmatic measures, including the closure of schools (Addae, 2021; UNICEF, 2020). In Ghana, schools were closed for nearly a year (GSS, 2021). The consequences of the pandemic-induced school closures are that many functions performed by schools were compromised, exposing learners to potential social vices such as increased transactional sex, early marriages, and deepened adolescent pregnancies, as reported during the Ebola cases in Sierra Leone (Bah, 2014; Gettleman, 2014). Although the Ghana government implements policies to promote the educational well-being of students during the pandemic, the impacts of this policy response to school closures can be devastating, particularly for poor adolescent girls. Moreover, staying out of school can increase the exposure of adolescent girls to sexual activity or debuting sex arising from increased proximity and association among young people (Eduful & Eduful, 2022), which leads to the precipitation of physical contact of a sexual nature. As a result, the occurrence of unintended pregnancies, unsafe abortions, and maternal and infant mortality is increased.

Furthermore, the fear of contracting the COVID-19 virus at healthcare facilities may have also contributed to reduced use of contraceptives and other sexual and reproductive healthcare services. This is strongly supported by the previous study on the Ebola crisis in some African countries, where the use of condoms and other contraceptives considerably declined, causing a significant increase in unintended pregnancies among adolescent girls (Gettleman, 2014).

Adolescent pregnancy (either intended or not) is linked to higher risks of maternal problems (Cook & Cameron, 2017). Adolescent (or teenage) mothers usually suffer from complications such as unsafe abortions, hypertensive ailments, and urinary tract infections (Asare *et al.*, 2019). Other risks include instrument delivery (i.e., cesarean section), poor nutrition, and anemia (World Health Organization, 2016). Compared to their peers who delayed childbearing, teenage or adolescent mothers are more likely to experience poor educational outcomes and long-term poverty. As adults, they often face continued economic hardship. Their children, in turn, may also exhibit behavioral problems and face disadvantages in health and education. As indicated by Cook & Cameron (2017), the cycle of ten continues, with children of teenage mothers more likely to become teenage parents themselves.

Given the long-term impact of unintended adolescent pregnancy, this study investigates its predictors during the COVID-19 pandemic, focusing on adolescent girls in RUCs in Ghana. Notably, existing evidence on this issue in Ghana is largely limited to policy reports. The few empirical studies available are primarily descriptive (Okine & Dako-Gyeke, 2020; Addae, 2021). Thus, the policy relevance of this study cannot be overemphasized. Indeed, it is possible that many adolescent students, particularly girls, did not return to school after the pandemic, due to increased economic poverty and associated adolescent pregnancy issues. Moreover, evidence from previous pandemics in SSA revealed possible lasting adverse effects on adolescents, including widening inequality gaps in education and health outcomes, which may have detrimental consequences for adulthood. The findings of this study aim to inform policy for adolescent girls in Ghana as they recover from the socioeconomic shocks induced by the pandemic.

1.1. Literature review

This study relies on Bronfenbrenner's (1995) ecological systems theory to explain the proposed relationships. The theory provides explanations for the interaction and interdependencies that exist between people in a given environment (Johnson & Puplampu, 2008). Consequently, other researchers employed this theory to explain adolescent pregnancy among Portuguese adolescents (Araújo Pedrosa *et al.*, 2011). Among factors influencing adolescent pregnancy, the proponents of the theory give particular attention to sociodemographic characteristics, familial, and relational factors that could explain adolescent pregnancy. According to the theory, human capital is influenced by the relationships among different situations and bigger systems in which these situations are rooted (Salazar *et al.*, 2009). In addition, the theory postulates that an ecosystem comprises five interrelated systems, namely micro, meso, exo, macro, and chronosystem (Bronfenbrenner, 1979). The interactions

among these systems, the theory asserts, can impact the lives of adolescent students, particularly girls, in any given environment.

The applicability of the ecological systems theory to the current study is based on the fact that there are several interrelated factors influencing teenage pregnancies among adolescent girls in RUCs in Ghana (Okine & Dako-Gyeke, 2020). These communities are often underprivileged with heightened economic poverty, which could result in social vices, such as increased transactional sex, early marriages, and amplified adolescent pregnancies (Coast *et al.*, 2018). Teenage girls from socioeconomically disadvantaged families may not return to school, and hence, the prevalence of early marriage and adolescent pregnancies post-COVID-19 is a serious issue that needs an empirical investigation.

Empirically, a growing body of research has been conducted on COVID-19 and its impact on socioeconomic outcomes in both the global North and South. In the case of the global North, McCool-Myers *et al.* (2022) found that the COVID-19 crisis hindered access to contraceptive services in Georgia, USA, especially for people in rural areas. Those identified as engaging in homosexual behavior were likely to report experiencing negative judgments, discrimination, or confusion related to their sexual and reproductive health needs. About 21% of the study's respondents reported sexual abuse, which increased unplanned pregnancies. In addition, 45% of respondents reported income loss, while 16% reported loss of health insurance. The authors observed that approximately 18% reported having negative sexual experiences during the pandemic. In the global South, particularly in Jordan, Muhaidat *et al.* (2020) conducted a cross-sectional survey to investigate the accessibility of reproductive healthcare and the well-being of expectant mothers during the COVID-19 pandemic. Results showed a significant increase in the percentage of Jordanian pregnant women who did not receive sexual and reproductive healthcare services during the lockdown period, despite serious underlying medical conditions or complications that call for close antenatal attention.

Across SSA, Murewanhema (2021) found an indirect long-term effect of the pandemic on the vulnerability of young women to human immunodeficiency virus (HIV) infection through increased sexual activity. The author further predicted a possible increase in HIV-related deaths of over 500,000 in the region.

Talbot *et al.* (2023) also conducted an investigative study to determine the impact of COVID-19 on the prevalence of adolescent pregnancy among schoolgirls in Namibia. Based on a sample of 794 adolescent girls, the authors found that the pandemic constrained teenage girls' access to contraceptive services, thereby increasing the rates of unintended pregnancies during the pandemic. Furthermore, Musa *et al.* (2021) discovered that the closure of schools during the pandemic substantially increased the prevalence of early marriage in Nigeria. The study further reported that the pandemic negatively impacted government programs aimed at curbing early marriage in the country.

In addition, Shikuku *et al.* (2021) utilized data from the Kenya Health Information System for four months during the COVID-19 pandemic to investigate how the pandemic impacted sexual and reproductive health. Results showed that the pandemic exacerbated teenage pregnancy, as well as maternal and infant mortality in Kenya. Zulaika *et al.* (2022) also attempted to study the impact of COVID-19 on unintended pregnancy of teenagers, as well as school dropout in Kenya. Using a sample of 910 secondary school girls and employing a causal-comparative technique, the authors observed that the risk of getting pregnant during COVID-19 doubled among teen girls.

In Ghana, Owusu-Addo *et al.* (2023) analyzed factors that could have influenced sexual abuse during the COVID-19 period. Using a sample of 853 teenage girls aged between 13 and 19 years, results showed that the prevalence of sexual abuse was relatively heightened during the disruptive period, estimated at 32.5%. Similarly, Biney *et al.* (2023) investigated the relationship between COVID-19-induced lockdown and contraception behavior among emerging adults (i.e., those between 19 and 24 years old). The authors used a purposive sampling technique to select participants from several public universities in Accra. Their findings revealed that modern contraceptives, especially male condoms, were used during the lockdown period, but were generally obtained before the lockdown started. Furthermore, the authors noted that traditional methods were complementary. In addition, Koka *et al.* (2024) investigated the impact of COVID-19-induced lockdown on the health of mothers and children in Ghana. The authors focused on the Krobo Odumase and Ayawaso Wuogon districts. Employing a mixed-method approach, the results showed that treatment-seeking behavior for tuberculosis, Malaria, and HIV infections experienced a significant reduction. The authors noted the findings could be attributed partly to the fact that people exhibited worries since those illnesses have symptoms similar to those of COVID-19.

Although several studies have been conducted on the impact of the COVID-19 pandemic on sexual and reproductive health in Ghana, they primarily use descriptive analysis and tend to focus on data from urban communities in Ghana, while paying little attention to

the rural settings. Notably, one study conducted before the onset of COVID-19 by Krugu *et al.* (2017) focused on rural communities, where the authors showed that rural girls' motivation for sexual relationships is mostly "beyond love" but driven by economic factors. The current study also found that the COVID-19 pandemic may exacerbate such motivation. Again, much attention is devoted to the use of contraceptives among growing adults during the pandemic-induced lockdown.

Thus, in this study, we attempt to bridge the literature gap by utilizing the ecological systems theory to explore the impact of the COVID-19 pandemic on unintended pregnancy among adolescent schoolgirls in selected RUCs in the Ejisu Municipal District in Ghana.

2. Data and methods

2.1. Study setting

This study was conducted in the Ejisu Municipal Assembly, one of the 43 local government areas in the Ashanti Region, Ghana. Previously, it was part of the broader Ejisu-Juaben Municipal. However, a separation in 2018 led to the formation of the Ejisu Municipal Assembly. It is located in the central part of the Ashanti Region with Ejisu as its capital town (Figure 1). It is considered a municipality with significant rural areas, which make up 69.8% of its settlements (GSS, 2024; Owusu-Addo *et al.*, 2016). The five urban centers in the district only account for 30.2% of the total population (GSS, 2024).

The Ejisu-Juaben Municipal in the Ashanti Region was selected for this study because available data showed that cases of adolescent pregnancies were relatively high in the area (Mensah, 2021; Owusu-Addo *et al.*, 2016). Specifically, a study by Owusu-Addo *et al.* (2016) in the Ejisu Municipal Assembly that explored sexual and reproductive health experiences of adolescents found that about 58% of the 481 adolescent girls recruited in the study had been pregnant, while 37% had engaged in abortions. In addition, Ejisu Municipality was one of the local government areas highly impacted by COVID-19 and was affected by the lockdowns announced by the government, along with the Kumasi Metropolis. As a result, the schools in the municipality experienced an extended period of lockdowns between March 2020 and January 2021 (Ministry of Education, 2020).

2.2. Study design

To achieve the objective of this study, an institutional cross-sectional study design was used to gather information from adolescent girls who became pregnant during the COVID-19 pandemic in the Ejisu Municipal Assembly. An institutional cross-sectional design refers to a research design that collects data from a sample population at a single point in time (Seboka *et al.*, 2021). This type of research design enables data collection from participants at a specific institution, such as a school or a specialized hospital. The data collection employed both quantitative and qualitative approaches, in which the quantitative data were collected before or concurrently with the qualitative data, thus making the research design tend toward explanatory mixed methods (Creswell & Creswell, 2017).

2.3. Participants and sampling

The study's population includes adolescent girls aged 13–19 years who became pregnant during the COVID-19-induced school closures in the Ejisu Municipal Assembly. A stratified purposive sampling was used (Ames *et al.*, 2019; Nyimbili & Nyimbili, 2024; Patton, 2014; Rai & Thapa, 2015). This approach enables researchers to obtain information from participants by dividing the target population into subgroups, i.e., strata (Owusu-Addo *et al.*, 2023; Patton, 2014). In other words, the stratified purposive sampling ensures good representation from the different subgroups (i.e., in- and out-of-school adolescents) within our target population, leading to a more inclusive and balanced view on the impact of COVID-19-induced school closures on adolescent pregnancy in the Ejisu Municipal Assembly (Campbell *et al.*, 2020; Knotters & Brus, 2013; Neyman, 1992).

A total of 310 participants were recruited for the study, comprising 84 adolescent girls from the school settings and 226 adolescents from the hospital settings. Those from the school settings were selected from four community-based senior high schools (SHS) with urban to rural characteristics, including Achinakrom SHS, Bonwire Senior High Technical (STHS), Ejisuman SHS, and Onwe Community SHS, whereas the 226 adolescent mothers from the hospital settings were selected from the Ejisu government, Living Waters, and the Onwe government hospitals when they were accessing maternal health services. In both settings, the specific participants were recruited from girls who were available on the dates of data collection in the study sites. The survey was administered between April and July 2022, when schools had reopened and were in session, and hospitals were operating as usual.

For girls recruited from school settings, permission was obtained from school authorities to conduct the interviews during break periods to prevent disrupting their lessons. For girls recruited from hospital settings, after obtaining permission from hospital administrators, nurses helped select participants who attended the ante- and post-natal services and gave them a brief explanation of the study. Within the ante- and post-natal units, the interviews were performed in discreet, secure settings.

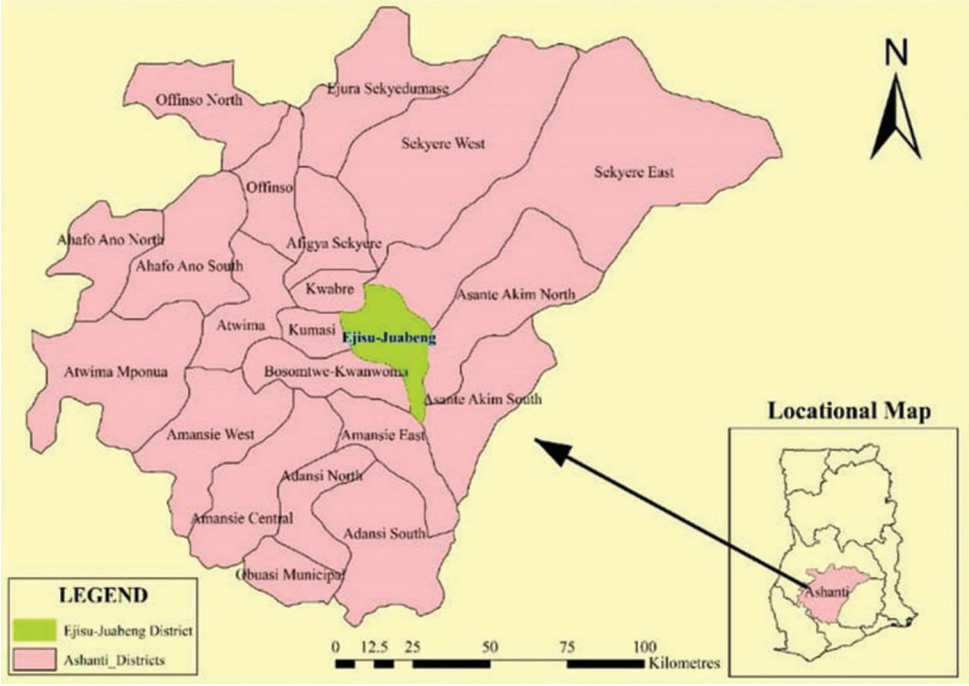

Figure 1. Ejisu-Juaben Municipal Assembly in the Ashanti Region
Source: Adapted from Asibey *et al.*, 2019.

It is imperative to note that a sample size of 310 is sufficient to obtain a 5% margin of error and a 95% confidence level for such studies, as reflected in previous studies (Cohen, 1998; Dell *et al.*, 2002; Singh & Masuku, 2014), which assumes an indeterminate population or one that could be up to 100,000 adolescent girls from both school and hospital settings.

In addition, for the qualitative component, other interviews were conducted on head teachers, teachers, parents, and community opinion leaders to capture a broader perspective on the factors accounting for adolescent pregnancy during the pandemic-induced school closures, as well as information relating to community girls who became pregnant within the period.

Before the study, permission in writing was requested and delivered by the research assistants to the management and/or authorities in each of the four community-based SHSs (Achinakrom SHS, Bonwire STHS, Ejisuman SHS, and Onwe Community SHS) as well as the three antenatal hospitals (Ejisu government, Living Waters, and the Onwe government hospitals). Upon delivering the letters, contact numbers were exchanged, and subsequent telephone calls were made to each institution to confirm their decision, as well as the time and date for the interviews. Accordingly, and in line with the previous studies (Agyapong *et al.*, 2024a, 2024b; Gyesaw & Ankomah, 2013; Krugu *et al.*, 2017; Owusu-Addo *et al.*, 2016), approval or consent was given verbally through telephone calls and personal visits to some proximate institutions.

2.4. Data collection procedure

A structured questionnaire and interview guide were used to collect data between April and July 2022. These instruments align with previous literature on adolescent sexual and reproductive health (McCool-Myers *et al.*, 2022; Nyarko, 2019). The questionnaire was administered through face-to-face interaction by five female research assistants who were recruited and trained for this purpose. The purpose was to create a conducive atmosphere for the female participants to be able to talk and express their sexual health experiences freely. The questionnaire was designed in English and administered in either English or Twi (a local Akan language), depending on the language the participants preferred, allowing them to express themselves freely. Nearly 50% of the participants completed the questionnaires themselves, while the remainder were completed with the assistance of the research assistants. Similarly, the interview guide was developed in English and translated into Twi for respondents. In all cases involving the interview guide, the research assistants recorded the responses from the respondents who spoke either English or the local dialect.

The translation of the approach and content of the questionnaire and interview responses into the local

dialect was part of the interviewers' training, where the team discussed and reached a common ground on specific words, phrases, and jargon for capturing consistent and uniform data. The questionnaire was pretested in the Juaben District Assembly, an adjoining district, where the adolescents have similar characteristics to those in the study area. The questionnaire was revised with the necessary corrections from the pretesting and field reviews before the main data collection campaign. The final revised questionnaire was then employed during the exercise, with each session lasting at least 40 minutes during the administration.

2.5. Data analysis, measures, and ethical considerations

The Statistical Package for Social Sciences (SPSS 26.0, IBM, United States) was used for the statistical analyses of the quantitative data. Both bivariate and multivariate regression techniques with adjusted odds ratio (AOR) were employed. Qualitative data were analyzed using a content analysis approach. The data were also analyzed using a simultaneous approach to ensure consistency in the findings (Creswell & Creswell, 2017).

In this study, the dependent variable is unintended adolescent pregnancy. In assessing whether an adolescent pregnancy was intended or unintended, we used a binary item with a "yes" or "no" response. In this case, participants were asked to indicate if the pregnancy was intended, aligned with previous studies (Ameyaw *et al.*, 2019; Okalo *et al.*, 2023; Wasswa *et al.*, 2020).

The study also controlled for sociodemographic characteristics, including age (in years), educational level, marital status, relationship with parents, fathers' and mothers' educational level, living arrangements, residence locality, as well as disability status and participation in girls' clubs or parties.

Regarding the qualitative analysis, the interviews were audio-recorded with the participants' permission. All recorded interviews were subsequently transcribed and saved on a personal computer. To ascertain privacy and confidentiality, the transcriptions used pseudonyms instead of the participants' original names. In addition, to ensure credibility, member checking and peer briefing were employed, as performed in the previous study (Okine & Dako-Gyeke, 2020). Subsequently, the transcribed interviews were numbered and matched to the participants appropriately.

Given the sensitive nature of the subject matter, we maintained the highest ethical standards in this research as is typically required of such studies. Thus, the participants were regularly notified and reminded about the sensitive nature of the subject being discussed. Aligned with proper research ethics, enumerators provided a brief background, highlighting participants' rights to choose whether or not to participate in the survey before the interviews commenced. Similarly, they were informed about their right not to respond to any question they felt uncomfortable answering. As a result, the average response rate to the questions is 93%. Safety protocols were duly upheld as data were collected face-to-face amidst the persistence of COVID-19. Complete anonymity and confidentiality were promised, tailored to the selection of interview sites and the data analysis.

3. Results

3.1. Quantitative results

As shown in Table 1, a total of 310 adolescent girls were surveyed in this study. The majority of the adolescent girls (73.2%) had unintended pregnancies during the COVID-19-induced school closures, whereas 83 girls (26.8%) had intended pregnancies. Regarding age, about 75.5% of the adolescent girls were between the ages of 16 and 19 years, while 24.5% were in their early adolescent stage (13–15 years). Also, a majority of the adolescent girls (75.2%) were in SHS, while the rest (24.8%) were in junior high school (JHS). Also, only 24.5% of the respondents were married. Concerning residence locality, more than two-thirds of the surveyed adolescent girls (88.7%) were living in rural areas.

Regarding sexual and reproductive health-related issues, 25.8% of adolescent girls reported having multiple partners during the COVID-19-induced school closure. About 73.5% of girls did not receive any form of sex education during the pandemic, while 74.2% did not have better knowledge about the use of contraception. In addition, a large majority of the surveyed adolescent girls (88.7%) reported having difficulty in discussing family planning-related matters with their parents or guardians. Therefore, it is not surprising that about 81.7% of adolescent girls who did not receive sex education during the pandemic indicated that their pregnancies were unintended. Similarly, 69.8% of those girls who could not freely discuss family planning-related issues with their parents had unintended pregnancies. A large number of those adolescent girls who did not know about contraception (63.9%) or did not think one-time sex could end in pregnancy revealed having unintended pregnancies during the period.

> I got pregnant after sleeping with him just once during the COVID-19 lockdown and school closures. Though it was not our intention, I refused to abort it as he [the boyfriend] suggested.

Table 1. Sociodemographic and pregnancy-related information of respondents

Variable	*n* (%)	Pregnancy	
		Intended, *n* (%)	Unintended, *n* (%)
Pregnancy	310 (100)	83 (26.8)	227 (73.2)
Age			
13–15 (early adolescence)	76 (24.5)	21 (27.6)	55 (72.4)
16–19	234 (75.5)	83 (35.5)	151 (64.5)
Level of education			
JHS	77 (24.8)	1 (1.3)	76 (98.7)
SHS	233 (75.2)	82 (35.2)	151 (64.8)
Marital status			
Married	76 (24.5)	41 (53.9)	35 (46.1)
Not married	234 (75.5)	42 (17.9)	192 (82.1)
Residence locality			
Rural	275 (88.7)	83 (30.2)	192 (69.8)
Urban	35 (11.3)	0 (0.00)	35 (100%)
Father's educational level			
No formal education	81 (26.1)	15 (18.5)	66 (81.5)
Primary	42 (13.5)	22 (52.4)	20 (47.6)
JHS	35 (11.3)	9 (25.7)	26 (74.3)
SHS	119 (38.4)	41 (34.5)	78 (65.5)
Tertiary	33 (10.6)	14 (42.4)	19 (57.6)
Mother's educational level			
No formal education	81 (26.1)	28 (34.6)	53 (65.4)
Primary	116 (37.4)	83 (71.6)	33 (28.4)
JHS	35 (11.3)	10 (28.6)	25 (71.4)
SHS	33 (10.6)	8 (24.2)	25 (75.8)
Tertiary	45 (14.5)	12 (26.7)	33 (73.3)
Living arrangement			
Stay with both biological parents	110 (35.5)	42 (38.2)	68 (61.8)
With mother only	126 (40.6)	41 (32.5)	85 (67.5)
With foster parent	74 (23.9)	35 (47.3)	39 (52.7)
Relationship with parents			
Very close	41 (13.2)	29 (70.7)	12 (29.3)
Close	68 (21.9)	23 (33.8)	45 (66.2)
Moderate	161 (51.9)	42 (26.1)	119 (73.9)
None	40 (12.9)	22 (55.0)	18 (45.0)
Disability			
Yes	68 (21.9)	36 (52.9)	32 (47.1)
No	242 (78.1)	83 (34.3)	159 (65.7)
Multiple partners during COVID-19			
Yes	80 (25.8)	26 (32.5)	54 (67.5)
No	230 (74.2)	95 (41.3)	135 (58.7)
Sex education during COVID-19			
Yes	82 (26.5)	42 (51.2)	40 (48.8)
No	228 (73.5)	41 (18.3)	187 (81.7)
Freely discussed family planning-related issues with parents during COVID-19			
Yes	35 (11.3)	9 (25.7)	26 (74.3)
No	275 (88.7)	83 (30.2)	192 (69.8)
Knowledge about contraceptives			
Yes	80 (25.8)	37 (46.3)	43 (53.7)
No	230 (74.2)	83 (36.1)	147 (63.9)
Belong to any girls' club			
Yes	76 (24.5)	14 (18.4)	62 (81.6)
No	234 (75.5)	83 (35.5)	151 (64.5)

Source: Authors' calculation using field data.
Abbreviations: JHS: Junior high school; SHS: Senior high school.

> My mother was mad at me and sacked me from the house but I relocated to his mother's house and continued my education after childbirth. (Adolescent school girl, aged 13–19, SHS A)

Also, the results of the crude odds ratio (COR) as depicted in Table 2 showed that the significant predictors or determinants of unintended pregnancy among adolescent girls during the COVID-19-induced school closures are sex education received during COVID-19 pandemic (COR = 0.209, 95% CI = [0.121, 0.362]), knowledge about the use of contraception (COR = 0.691, 95% CI = [0.479, 0.581]), girls in their late adolescence (16–19 years) (COR = 0.036, 95% CI = [0.187, 0.945]), adolescent girls whose mothers had JHS education (COR = 1.284, 95% CI = [0.242, 0.837]), and adolescent girls living with their mothers only (single parenting) (COR = 1.354, 95% CI = [0.503, 0.985]). In particular, the results from the crude model suggest that girls with a better understanding of the use of contraceptives are 30.9% less likely to experience unintended pregnancy during the COVID-19 lockdown and school closures compared to those with insufficient knowledge about contraception. Similarly, the odds of getting an unintended pregnancy are lower for girls in their late adolescence (16–19 years) compared to girls in their early adolescence (13–15 years). With regards to the living arrangements, the results revealed that respondents who were living only with their mothers had a 35.4% higher risk of getting unwanted pregnancies than their counterparts living with both parents during the COVID-19-induced school closures.

Table 2. Predictors of unintended pregnancy relative to the reference category

Predictors	COR (CI)	AOR (CI)
Multiple partners during COVID-19		
No	1.000	1.000
Yes	0.894 (0.521, 1.356)	1.382 (0.289, 0.921)**
Sex education during COVID-19		
No	1.000	1.000
Yes	0.209 (0.121, 0.362)***	0.528 (0.296, 0.940)**
Freely discussed family planning-related issues with parents during COVID-19		
No	1.000	1.000
Yes	0.522 (0.344, 1.389)	0.668 (0.456, 2.058)
Knowledge about contraceptives		
No	1.000	1.000
Yes	0.691 (0.479, 0.581)***	0.128 (0.687, 1.849)
Age		
13–15 (early adolescence)	1.000	1.000
16–19	0.036 (0.187, 0.945)**	0.137 (0.356, 1.784)
Level of education		
JHS	1.000	1.000
SHS	0.598 (0.154, 1.866)	0.456 (0.122, 1.454)
Marital status		
Married	1.000	1.000
Not married	1.254 (0.054, 4.517)	1.456 (0.215, 0.655)***
Residence locality		
Urban	1.000	1.000
Rural	0.247 (0.124, 1.668)	0.476 (0.422, 0.858)***
Father's educational level		
No formal education	1.000	1.000
Primary	1.034 (0.106, 7.021)	1.327 (0.215, 6.346)
JHS	0.770 (0.666, 2.654)	0.877 (0.512, 1.435)
SHS	2.098 (0.441, 7.414)	0.450 (0.548, 8.125)
Tertiary	2.056 (1.454, 6.546)	2.144 (1.330, 4.359)
Mother's educational level		
No formal education	1.000	1.000
Primary	0.585 (0.785, 5.151)	0.502 (0.349, 1.665)
JHS	1.458 (0.672, 3.231)	1.720 (0.632, 3.740)
SHS	1.284 (0.242, 0.837)**	1.575 (0.331, 5.154)
Tertiary	0.496 (0.188, 2.680)	1.125 (0.532, 3.248)
Living arrangement		
Stay with both biological parents	1.000	1.000
With mother only	1.354 (0.503, 0.985)***	1.020 (0.055, 1.155)
With father only	0.402 (0.114, 2.401)	0.556 (0.022, 1.289)
With foster parent	1.488 (0.177, 1.654)	2.022 (0.189, 2.335)
Relationship with parents		
Very close	1.000	1.000
Close	0.781 (0.085, 1.022)	0.155 (0.870, 2.356)
Moderate	0.474 (0.011, 1.322)	0.450 (1.541, 14.894)
None	0.177 (0.266, 4.014)	0.879 (0.556, 8.418)
Disability		
No	1.000	1.000
Yes	0.711 (0.021, 1.369)	2.414 (0.798, 2.986)
Belong to any girls' club		
No	1.000	1.000
Yes	1.748 (0.028, 7.633)	0.643 (0.477, 3.187)

Notes: ***, **, and * indicate that the coefficients are significant at 1%, 5%, and 10% level of error, respectively.
Abbreviations: AOR: Adjusted odds ratio; CI: Confidence interval; COR: Crude odds ratio; JHS: Junior high school; SHS: Senior high school.

In the AOR model (Table 2), the results indicate that adolescent girls who received sex education during the COVID-19 pandemic had a 47.2% lower risk of getting unintended pregnancy due to the COVID-19 lockdown and school closures compared to girls who did not receive such adolescent and reproductive health education (AOR = 0.528, 95% CI = [0.296, 0.940]). The results also showed that the odds of experiencing unintended pregnancy are approximately 38.2% higher for an adolescent girl with multiple sex partners during the COVID-19 lockdown and school closures compared to those with a single partner (AOR = 1.382, 95% CI = [0.289, 0.921]). The narrative of a girl in one of the hospitals mentioned that:

> Sometimes I visited my female friends. Other times, I visited my boyfriends who were also in town, even though they were far from my area. Yes, we did it [had sex] many times without the knowledge of my parents. I will say that each time, I was able to convince my mother, I went to their houses. (Adolescent school girl aged 16–19, Hospital C)

Furthermore, adolescent girls who were not married were 45.6% more likely to experience an unintended pregnancy than those who were married (AOR = 1.456, 95% CI = [0.215, 0.655]). Likewise, the results in this study revealed that the residence locality of girls was a significant predictor of unintended pregnancy among the respondents (AOR = 0.476, 95% CI = [0.422, 0.858]). More specifically, adolescent girls in urban areas had a 52.4% lower risk of experiencing unintended pregnancy during COVID-19 compared to girls in RUCs. In other words, the odds of experiencing an unintended pregnancy are higher for respondents in rural and underserved areas compared to their urban counterparts.

3.2. Qualitative results

The qualitative interviews generally support the findings that adolescent girls were at a higher risk of unintended pregnancy during COVID-19-induced school closures in the study area. In analyzing the evidence from the interviews, three key themes emerged, including proximity and association (Eduful & Eduful, 2021), precipitation of physical contact of a sexual nature, and failed attempts at preventing pregnancy and abortion. The evidence suggests that the pandemic and its resulting school closures made them vulnerable to the possibility of getting pregnant and subsequent delivery.

3.2.1. Proximity and association

The data show that school closures created an opportunity for adolescent girls to be closer to their male partners, which may not be the case if they were in school. The continued stay at home made them bored, and hence led them to escape the supervision of both parents and teachers and be closer to their partners. Once they became proximate, it was natural for them to start associating through verbal and non-verbal means, which possibly led to sexual advances.

> Yes, COVID-19 school closures and lockdown made it easy for me to visit some people that I would not have been able to visit if I were in school… I went home during the pandemic and got fed up staying at home. Because of that I started making things up to convince my mother to allow me to visit some friends. (Adolescent girl aged 16–19, SHS D)
>
> COVID-19 and the closure of schools actually exposed me [to reunite with old friends because the break was so long]… Most of the time I was telling my mother some lies. I was giving her excuses that would make her allow me to hang out… (Adolescent school girl aged 13-19, SHS B)

3.2.2. Precipitation of physical contact of a sexual nature

Once the adolescent became proximate and began to associate, our data suggest that it was within such moments that a precipitated physical contact of a sexual nature occurred. On occasion, such contacts may have been fueled by the watching of pornographic materials. Thus, among the victims of unintended adolescent pregnancy during the COVID-19 pandemic, staying at home and in the same community with their sexual partners precipitated such physical contact. In some cases, once the initial hurdle of physical contact or actual sex had been crossed, they tend to have sex multiple times in their subsequent meetings, thus making the act no longer unintentional, as shown in both the quantitative and qualitative data.

> Okay, so what happened was that honestly, before the lockdown or COVID-19 outbreak, I was already dating… while I was back home during the pandemic, I always go to his house to have fun. My mother always came back home in the evening around 5 pm, so I made sure I returned before her. So, I enjoyed myself during COVID-19. (Final-year girl, SHS A)

Watching of pornography too. Yes, it really got the better of me during the lockdown and school closures. One of my friends had a lot of them on her phone and she got pregnant eventually too. (Adolescent girl aged 16–19, Hospital B)

> …and I got pregnant but fortunately for me, we were still staying at home during the lockdown and school closures. When school reopened, I couldn't come early because I was about to be delivered. So, when I came back to school later, I told my friends that I was ill… Now I have a son who is being taken care of by my grandmother but nobody in the school knows about it. Considering my age, nobody can imagine it either. (19-year-old girl, SHS C)

3.2.3. Failed attempts at preventing pregnancy and abortion

In addition, the in-depth interviews indicate that some adolescent girls attempted abortion upon realizing they were pregnant. When asked if they tried to avoid pregnancy during sex, some noted that they attempted to prevent it by utilizing various birth control measures, but realized later it did not work, or may have worked, but subsequent times they had sex without the control might have led to the pregnancy.

> He didn't have a job and I also wanted to continue my education at the university level. So, he went to the pharmacy and bought [name withheld] which is a very powerful drug for abortion. But what makes me sad is that after he put me through severe pains and emotional trauma, he ended the relationship. (Adolescent girl aged 16–19, Hospital C)
>
> He was always giving me a lot of pills to take before sex. I realized that we were abusing it because we didn't follow the dosage. I also realized that it was affecting my menstrual cycle negatively. Anytime I refused to take the medicine, he abused me verbally. There was a time he threatened to slap me if I didn't take the pills. After doing all these, I still got pregnant. (Adolescent girl, out-of-school)
>
> Because of the lockdown and how it affects movement in this area, we couldn't get Postinor 2 to buy …We had money but the chemist said the shop was out of stock and he couldn't go to Kumasi to buy some because of the lockdown. So, we were using the withdrawal method but it obviously didn't help. (17-year-old girl, SHS B)

The above narrations are suggestive that the school closures made it possible for students to reach out to persons they could not initially meet because they were in school. In addition, most adolescent girls who were either dating or not before COVID-19 became vulnerable within such spaces of proximity and association, leading to physical contact with the consequences of engaging in actual sex with their partners during the lockdown and school closures. Once they were unsuccessful in preventing the pregnancies or causing an abortion, they had no choice but to carry the pregnancy to term. These responses generally conform to the quantitative findings, where only 26.8% of the sampled participants indicated that they got pregnant intentionally, compared to 73.2% who got pregnant unintentionally or accidentally.

4. Discussion

Given that adolescent pregnancy could have long-term impacts on the lives of adolescent mothers as well as their children who can potentially become adolescent parents themselves in the future (Baker, 2020; Cook & Cameron, 2017; The Lancet Child Adolescent Health, 2020; World Vision Ghana, 2020), this study investigated the predictors of unintended adolescent pregnancy during the COVID-19 pandemic, focusing on adolescent girls in RUCs in Ghana. The findings indicate that a large majority of girls (73.2%) had unintended pregnancies during the COVID-19-induced school closures, whereas 83 girls (26.8%) had intended pregnancies. More specifically, whereas more than half of the sampled rural girls (69.8%) had unintended pregnancies relative to 30.2% who had intended pregnancies, all urban girls (100%) reported that their pregnancies were unintended or accidental. This outcome is consistent with existing studies that argued that there is a high tendency for adolescent girls who are in or out of school to report a pregnancy as unintended (Mena-Meléndez, 2022; Ajayi *et al.*, 2021; Israel *et al.*, 2019). This is largely because such girls, particularly in-school girls, intend to further their education. Also, the higher proportion of unintended pregnancy among urban girls is in line with the study of Mena-Meléndez (2022), who found that rural women have lower odds of experiencing an unintended pregnancy and a pregnancy termination than urban women in Latin America and the Caribbean. The author argues that urban women claimed to have an understanding and good knowledge regarding contraceptive usage and, as a result, engage in multiple sexual activities. This tends to expose them to higher odds of experiencing unintended pregnancies compared to their rural counterparts. It is worth noting, however, that our findings are contrary to other researchers (Sutton *et al.*, 2019; Ikamari *et al.*, 2013) who discovered that the odds of unintended pregnancy are higher among women (or girls) who resided in rural areas compared to their urban counterparts. It can, therefore, be deduced that the extant literature on adolescent pregnancy and\or unintended pregnancy is yet to establish a universal consensus on whether rural girls have higher odds of experiencing unintended pregnancy than urban girls or vice versa.

Our findings further showed that over two-thirds of the respondents (88.7%) lived in RUCs, suggesting that the COVID-19 lockdown and school closures disproportionately exposed adolescent girls in RUCs to unintended pregnancy. This is consistent with the claims by ecological systems theory that there exist some interrelated factors influencing teenage pregnancies among adolescent girls in RUCs (Coast *et al.*, 2018; Okine & Dako-Gyeke, 2020). These communities, according to the theory, are often underprivileged with heightened economic poverty, which could result in potential social vices and other health risk behaviours such as increased transactional sex, early marriages, and amplified teenage pregnancies (Coast *et al.*, 2018). Adolescent girls from socioeconomically disadvantaged families may never return to school, and hence, the prevalence of early marriage and teenage pregnancies during the COVID-19 pandemic was bound to be huge, as discovered in this study. Likewise, our findings indicate that 73.5% of the girls did not receive any form of sex education during the pandemic. An estimated 74.2% did not have sufficient knowledge about contraception. Overall, evidence from this study revealed that unintended

pregnancies increased during the COVID-19 lockdown and school closures in Ejisu Municipality in Ghana.

Remarkably, our results showed that a large majority of girls (88.7%) do not have the freedom to discuss family planning-related matters with their parents and other family members. This could stem from the fact that most parents, especially in rural communities, tend not to discuss issues related to sexual and reproductive health with their children. Yet, both boys and girls continue to associate and intermingle with each other and, in some cases, experiment with pre-conceived ideas picked from the media and other fora, leading to early sex debuting. Therefore, we argue that early sex debuting in rural communities tends to be influenced by personal experimentations, societal and cultural conventions, rather than by parents' guidance (Mark & Wu, 2022). Indeed, strengthening parent-adolescent communication can raise awareness of contraception and good sexual and reproductive health practices among adolescents.

In addition, findings from the crude model showed that the odds of experiencing unintended pregnancy during the COVID-19 lockdown and school closures were lower for girls in their late adolescence (16–19 years), compared to those in their early adolescence (13–15 years). The findings suggest that, as early as 13 years of age, most girls in Ghana began childbearing. The COVID-19-induced school closures and the isolation of students from school support networks, as well as the associated rising poverty levels, escalated the adolescent pregnancy issues that Ghana has been struggling to address over the years. Even before the outbreak of the COVID-19 pandemic, teenage pregnancy had been high in Ghana (Addae, 2021). This finding corroborates the findings from GSS *et al.* (2014), which suggest that about 14% of adolescent girls aged 15 years and below started conceiving and childbearing, with approximately 11% live birth rate in Ghana. It is also consistent with Dubik *et al.*'s (2022) conclusions that poverty and parents' desire for grandchildren are the leading causes of teenage pregnancy in Ghana, especially in RUCs. As earlier discovered by Molla *et al.* (2022), the COVID-19 pandemic exacerbated the already difficult economic situation that poor Ghanaian families were facing, thus increasing the adolescent girls' vulnerability to unintended pregnancies during the COVID-19 lockdown and school closures. Previously, estimates by UNICEF (2018) also found that reduced household income increases the likelihood of early marriage by about 3%, especially in countries where bride price is a common practice.

Moreover, our results indicate that girls with a better understanding of the use of contraception are 30.9% less likely to experience unintended teenage pregnancy during the pandemic-induced school closures compared to those without access to contraceptives. This is consistent with Kumar & Singh's (2022) findings that the pandemic constrained most women's access to sexual and reproductive health services, including contraception. This, in turn, led to an increase in unintended pregnancies and unsafe abortions. Within this context, a finding by Biney *et al.* (2023) suggests that, although modern contraception, such as male and female condoms, was used during the COVID-19 lockdown and schools' closure, they were obtained before the lockdown. Again, the findings from the current study indicate that girls who were living with single parents, in particular, with their mothers only, had a 35.4% higher risk of getting an unwanted pregnancy than their counterparts living with both parents during COVID-19. One possible explanation could be that single mothers could be socioeconomically disadvantaged, thus pushing their adolescent daughters into early sex debut or marketable sexual activity. However, this can result in unintended pregnancies among these girls, especially in the absence of proper sex education and parent-adolescent communication.

Indeed, our findings from the adjusted model showed that adolescent girls who received sex education during the COVID-19 pandemic had a 47.2% lower risk of experiencing unintended pregnancy compared to girls who did not receive such adolescent and reproductive health education. This means that effective sex education could provide useful guidance to girls on possible ways to avoid unwanted pregnancies (Okalo *et al.*, 2023; Owusu-Addo *et al.*, 2023). However, as indicated earlier, in most families in Ghana, similar to other developing countries, girls usually have difficulties discussing sexual and reproductive health issues with their parents or guardians (Mark & Wu, 2022; Owusu-Addo *et al.*, 2023).

Similarly, we found that the odds of experiencing an unintended teenage pregnancy during the COVID-19 school closures were approximately 38.2% higher for girls with multiple sex partners compared to those with a single partner. This is likely because the adolescent girls gained more proximity and association with their male partners during school closures, leading to the precipitation of physical contact of a sexual nature. For instance, a participant mentioned that:

> Sometimes I visited my female friends during school closures. Other times, I visited my boyfriends who were also in town, even though they were far from my area. Yes, we did it [had sex] many times without the knowledge of my parents. I will say that each time, I was able to convince my mother, I went to their houses. (Adolescent girl, Hospital C)

Consistent with the quantitative results, our qualitative data revealed that COVID-19-induced school closures created opportunities for students to interact with individuals they previously could not access due to school attendance. This increased proximity and social interaction made many adolescent girls more vulnerable, leading to physical contact and, in some cases, sexual activity during the lockdown. These findings support the earlier idea that COVID-19-induced school closures led to a loss of school (parental/guardian) caring functions, exposing adolescents to potential social vices, including increased transactional sex, early marriages, and deepened teenage pregnancies as recorded during the Ebola cases in Sierra Leone (Bah, 2014; Gettleman, 2014). Our findings imply that staying out of school during the COVID-19 pandemic undoubtedly exposes adolescent girls to sexual activity or early debut of sex, which in turn increases unintended teenage pregnancies, unsafe abortions, and maternal and infant mortality.

Notably, the findings in this paper should be interpreted with some probable limitations. First, this paper utilized cross-sectional data and, therefore, does not establish a causal effect (Sandow *et al*., 2021; Sandow *et al*., 2022). Second, the analysis in this paper is based on data drawn from one local government area (municipality) in the Ashanti Region. As a result, while the findings in this study are useful, they cannot be generalized to the entire adolescent girl population in Ghana. Third, sexual activity and adolescent pregnancy are sensitive matters, and we cannot rule out the possibility of social desirability bias on the part of respondents. Fourth, as the length of the recall period can affect data accuracy, this study acknowledges recall bias as a potential limitation. Recall bias occurs when study participants inaccurately recall past events or miss certain details when reporting on them. According to Khare and Vedel (2019), recall bias (otherwise known as memory decay) is particularly common in retrospective studies where participants are asked to recall past exposures or experiences. Lastly, the study was unable to compare data from different times, spaces, or parental roles based on their attributes due to the lapse of time, which raises concerns about triangulation. Triangulation in research, often referred to as second-level triangulation, involves using multiple data sources, methods, theories, or enumerators to examine a research question, aiming to enhance the credibility and robustness of findings (Bans-Akutey & Tiimub, 2021; Donkoh & Mensah, 2023; Heale & Forbes, 2013). In other words, triangulation can help to explore and explain complex human behavior using a variety of methods to offer a more balanced explanation of a subject matter (Carter *et al*., 2014; Noble & Heale, 2019). Nevertheless, we employed "methodological triangulation" by combining qualitative and quantitative research methods and "investigator triangulation" through the use of multiple enumerators in data collection and several researchers in data analysis to minimize researcher bias. This, therefore, strengthens the validity and reliability of our findings, increasing the overall confidence in our inferences (Bans-Akutey & Tiimub, 2021; Biney *et al.*, 2023; Donkoh & Mensah, 2023).

Despite these limitations, our findings align with previous studies of unintended adolescent pregnancy and its predictors, as well as offering leads to parents in guiding their children to navigate this critical juncture of their lives. It should be underscored that though the COVID-19 school closures may have created proximate contextual relations with unintended sexual contingencies and concomitant pregnancies, adolescent pregnancy is not exclusive to the outbreak of a pandemic. Adolescents everywhere need trustworthy social support systems under close supervision, as well as the affection of parents and other immediate relations, to prepare themselves for taking parental roles of their own. This contributes to building much safer and stronger communities for all, bereft of the emotional turmoil that comes with an adolescent child falling prey to unintended pregnancy, particularly in contemporary African societies.

5. Conclusion

The overriding objective of this study was to examine unintended pregnancy and its predictors among adolescent schoolgirls within the context of COVID-19-induced school closures in RUCs in Ejisu Municipality in Ghana. Quantitative and qualitative data were collected in this district from adolescents, in-school and out-of-school, as well as head teachers, teachers, parents, and community opinion leaders. Both the quantitative and qualitative evidence point to the loss of school (parental/guardian) caring functions, exposing adolescents to potential social vices, including increased transactional sex, early marriages, and deepened unintended teenage pregnancies. While schools are supposed to enforce discipline and ensure good moral values among students (Lu *et al.*, 2022; Owusu-Addo *et al.*, 2023), COVID-19-induced school closures disrupted these functions. This emphasizes the need for alternative measures to ensure discipline among school children in the event of disruptions, such as COVID-19-induced school lockdowns. In addition, the findings showed that lack of sex education and inadequate understanding of contraception were significant predictors of unintended pregnancy during the COVID-19 era. The findings further showed that one of the important lessons learned from the COVID-19-induced school closures was the high rate of out-of-school adolescent girls, at least for those residing in RUCs. In

addition, the results of this study indicate that girls in their early adolescence (13–15 years) had a higher risk of unintended pregnancy compared to those in their late adolescence (16–19 years). Tied to the above observation, our findings also show that a lack of parent-adolescent communication drives unintended teenage pregnancy. This suggests that parents and guardians play an important role in safeguarding their children from bad influences and unwanted adolescent pregnancy. Prior evidence supported the fact that parental involvement in adolescent sexual and reproductive health-related matters is one of the key strategies to prevent unwanted adolescent pregnancy (Okalo *et al.*, 2023). For instance, parents usually serve as protectors of their children through proper supervision and guidance. Parents also perform a protective function by providing the basic needs of their children, thus making them less likely to be influenced by bad friends with cheap gifts and promises. Because of this, there is a need to strengthen and contextualize parental roles that support effective parenting practices to reduce children's vulnerability to bad influence and misconduct. Effective parenting can also create a conducive environment for children to discuss sex-related issues with their parents freely and to seek good counsel. Within that milieu of parental guidance, there will be little or no space for children to be lured sexually or victimized.

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Conflict of interest

The authors declare that they have no competing interests.

Author contributions

Conceptualization: All authors
Investigation: All authors
Methodology: All authors
Writing–original draft: All authors
Writing–review & editing: All authors

Ethics approval and consent to participate

The study's instruments were peer reviewed by the subject experts including academics and policy practitioners in both Ghana (Sunyani Technical University, Takoradi Technical University, and KNUST) and the USA (Chicago, IL; Towson, MD and Bensalem, PA). Aligned with proper research ethics, enumerators provided a brief background, highlighting participants' rights to choose whether or not to participate in the survey before the interviews commenced.

Consent for publication

All participants provided informed consent and consented to the publication of the findings obtained from this study on condition of anonymity which has been adhered to.

Availability of data

Data will be available from the corresponding author upon reasonable request.

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