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To cite this article: Betty Kwagala, Nina Randolph-Koranteng, Hanna Chidwick, Deborah Mensah, Lydia Osei, Stephen Ojiambo Wandera, Miriam Gesa Mutabazi, John Bosco Asimwe, Fred Ngabirano, Charles Lwanga & Lydia Kapiriri (2026) A risky coping strategy: a cross-sectional study on the prevalence and predictors of multiple sexual partnerships among adolescent girls and young women in artisanal mining in Uganda and Ghana during the COVID-19 lockdown, *Critical Public Health*, 36:1, 2627663, DOI: [10.1080/09581596.2026.2627663](https://doi.org/10.1080/09581596.2026.2627663)

To link to this article: <https://doi.org/10.1080/09581596.2026.2627663>



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Published online: 14 Feb 2026.



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A risky coping strategy: a cross-sectional study on the prevalence and predictors of multiple sexual partnerships among adolescent girls and young women in artisanal mining in Uganda and Ghana during the COVID-19 lockdown

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ABSTRACT

Artisanal and Small-Scale Mining (ASM) attracts some of the most vulnerable populations, including females who constitute close to half of the labor force. Among this group are adolescent girls and young women (AGYW) who, driven by poverty, engage in risky sexual behaviors that are detrimental to their health. The situation was dire during the COVID-19 lockdown. This paper examines the determinants of multiple sexual partnerships (MSPs) (operationally defined as two or more partners—serial or concurrent during the COVID-19 lockdown in the year preceding the study) among AGYW involved in gold ASM (ASGM). It is based on a cross-sectional survey of 1618 AGYW in ASGM communities in Uganda and Ghana. We used frequency distributions and Pearson's chi-squared tests for descriptive analysis and binary logistic regression to examine the determinants of MSPs. Results indicate that the prevalence of MSPs was 25% (29% for Ghana and 22% for Uganda). The odds of MSPs were higher among AGYW from Ghana, those who worked directly in the mines, worked during the lockdown, were underpaid, consumed alcohol/substances, and experienced sexual violence. The high prevalence of MSPs among AGYW in ASM requires targeted interventions, given its close association with health risks. Response requires integrated interventions addressing poverty through promotion of financial literacy and microfinance, promoting a safe work environment, addressing risky behaviors such as alcohol and substance misuse, plus gender norms and practices that degrade AGYW and negatively affect their well-being.

PLAIN LANGUAGE SUMMARY

Artisanal and Small-Scale Mining (ASM) often involves vulnerable groups, including women in sub-Saharan Africa. Adolescent girls and young women (AGYW) who work in ASM may engage in risky sexual behaviors detrimental to their health. This study examined factors contributing to multiple sexual partnerships (MSPs) among AGYW in gold ASM in Uganda and Ghana during the COVID-19 lockdown. We interviewed 1618 AGYW in mining communities. Results show that one in four AGYW had more than one partner. AGYW who were adults, Ghanaian, directly involved in mining work, underpaid, worked during a crisis, consumed alcohol or substances, and experienced sexual violence were more likely to engage with multiple sexual partners. Addressing poverty through financial literacy and microfinance programs, promoting safe work environments, addressing risky behaviors, and challenging cultural beliefs and practices that harm females are crucial responses to safeguard ASM AGYW's well-being. This study emphasizes the urgent need for tailored interventions to protect vulnerable AGYW from social and health risks associated with ASM involvement.


ARTICLE HISTORY

Received 17 November 2024
Accepted 25 January 2026

KEYWORDS

Multiple sexual partnerships; adolescent girls; young women; artisanal mining; COVID-19

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 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/09581596.2026.2627663>.

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Introduction

Multiple sexual partnerships (MSPs) are a major risk factor for sexually transmitted diseases, HIV inclusive. MSPs are defined as having more than one sexual partner over a period of time; in this case, during the 12 months preceding the study (Exavery et al., 2011; Mutinta, 2014). These could be serial, concurrent, or overlapping, which include polygamous relationships (Mutinta, 2014; Shelton, 2009). The widely held view in some African settings that men have limited sexual self-control often translates into cultural tolerance of MSPs among them. Paradoxically, MSPs among women are considered immoral (Bryceson et al., 2013; Mutinta, 2014; Shelton, 2009). Uganda and Ghana are no exceptions. While in many cultures and in Islam MSPs and polygyny by men are tolerated or promoted, they are discouraged and stigmatized among women. Christianity condemns infidelity and MSPs for both women and men. However, strict adherence is rare. Although some females engage in MSPs, it is done secretly, especially among those who are married (Aidoo, 2022; Barton & Wamai, 1994). Studies in Ghana indicate that polygamy contributes to MSPs among both genders (Van der Geugten et al., 2013). Artisanal and small-scale mining (ASM) communities create conducive socio-economic environments for MSPs (Bryceson et al., 2013). Ghana's mining, and the Artisanal and Small Scale Gold Mining (ASGM) sector in particular, is well established and has been in existence for a longer time in comparison to Uganda. Uganda's gold mining sector had been exclusively artisanal until recently. This could have a bearing on the behavioral tendencies of the participants (Fisher et al., 2020; Hilson, 2002).

In sub-Saharan Africa, impoverished rural communities increasingly engage in ASM as a source of income (Hilson et al., 2017; Hilson & Garforth, 2012; Kamlongera, 2011; Kounta et al., 2019). Mineral deposits attract highly mobile youthful migrants of diverse backgrounds, including Adolescent Girls and Young Women (AGYW) (Heemskerk, 2003; International Labour Organisation, 2007). Mining is a male-dominated sector, with a distinct gender division of labor in ASM where men engage in excavation and females in the less paying tasks such as carrying and processing work, usually under the supervision of male workers. Others participate in the service sector, cooking or selling food and other essential commodities (Bester, 2025; Doh et al., 2016; Serwajja & Mukwaya, 2020). Restrictive gender norms that evolved in the sector and the limited land rights hinder women's progress in the ASGM (Cholteeva, 2021; Doh et al., 2016; Muheki & Geenen, 2018; Serwajja & Mukwaya, 2020). Policy interventions addressing ASM work towards formalization, with limited or no gender equity considerations. Efforts towards formalization and licensing in both contexts hardly monitor the work environment and working conditions (Baddianaah, 2024; Muheki & Geenen, 2018). The majority of women who engage in ASM are poor and have multiple vulnerabilities that include sexual exploitation. They also engage in MSPs for financial gains (Arthur-Holmes et al., 2023; Bryceson et al., 2013; Hinton et al., 2003). The sexual relationships include monogamy, polygamy, and promiscuity. According to Bryceson et al. (2013), partnerships and unions in the ASM setting are considered amoral, often detached from contextual cultural values, commitments and expectations, or supervision by elders (Bryceson et al., 2013).

The demand and competition for young females in sexual relationships is high. In contexts of poverty and limited community leaders' influence, many young women engage in sex with multiple partners. For many AGYW in ASM, cohabitation and the semblance of marriage are quests for material security and physical protection. However, the relationships are temporary, rarely spanning a year. Often, the men desert the young women, since many ASM men are married and more committed to their wives in their places of origin (Bryceson et al., 2013). Hence, women in ASM settings may unknowingly engage in networks or relationships, which expose them to sexually transmitted infections (STIs). Many become single mothers upon separation, where time and economic resource commitments dedicated to childcare and support weaken their economic status (Bryceson et al., 2013; Hinton et al., 2003).

Sexually active adolescents face increased vulnerability to STIs during the transition to adulthood (Cowan & Pettifor, 2009). The risky sexual behaviors among young women, such as MSP and transactional sex, are influenced by various economic and social vulnerabilities (Fox et al., 2016). These include household poverty, food insecurity (Gafos et al., 2020), lack of educational opportunities or school dropout

(Kilburn et al., 2018; Moore et al., 2007; Pettifor et al., 2008; Ranganathan et al., 2017; Singh et al., 2011; Stoner et al., 2017), gender inequality (Jewkes et al., 2010), and gender-based violence whose psycho-social impacts include MSPs (Li et al., 2014; Maganja et al., 2007; Wamoyi et al., 2016). In sub-Saharan Africa, early sexual debut, adolescent pregnancies, unsafe abortions, and the escalating prevalence of HIV infections are persistent sexual and reproductive health (SRH) challenges (Silberschmidt & Rasch, 2001). Sexual and gender-based violence, alcohol consumption, cross-generational sex, and MSPs are some of the risk factors that expose young women to SRH challenges (Mampane, 2018).

According to Sarkar et al. (2008), minors 10–7 years old are vulnerable to MSPs and sexual and gender-based violence (Sarkar et al., 2008). An early sex debut and peer pressure are important risk factors for MSPs (Baba-Djara et al., 2013; Mampane, 2018; Stoebenau et al., 2013). In the ASM sector, women in low-paying positions also engage in sexual acts to secure their jobs or obtain a promotion. Girls and women are also threatened with death if they refuse men's sexual advances (Lauwo, 2018; Mwapu et al., 2016; Pillinger, 2022).

The COVID-19 pandemic and the ensuing stringent control measures exacerbated conditions that contribute to AGYW's vulnerability to SRH challenges. In both Uganda and Ghana, school closure, lack of income, and limited social control contributed to risky behaviors and poor decision-making on the part of caregivers and young people, which increased in teenage pregnancies and early marriages. The most affected were the most vulnerable sections of the population. In both countries, the reduction or loss of incomes and inability to meet basic needs such as food led adolescent girls, including children, and young women to engage in risky or exploitative work, some of which involved sexual harassment, transactional sex, and multiple sexual partnerships. Gender-based violence increased significantly (Meherali et al., 2021; Nuwematsiko et al., 2022; Owusu-Addo et al., 2023; Sserwanja et al., 2021). Other factors that contributed to risky behaviors during the COVID-19 lockdown included living in unsafe neighborhoods, not living with parents, parental neglect, gender norms that devalue females, peer influence, and pornography (Owusu-Addo et al., 2023). Studies show variations in impact. While in some cases individuals and couples adhered to expected norms of fidelity, owing to economic challenges, some women engaged in transactional and multiple sexual relations (Mancuso et al., 2023). This study examined factors associated with MSPs among AGYW in the ASGM sector during the COVID-19 pandemic. The analysis is essential for designing appropriate targeted interventions to improve their resilience concerning SRH during crises (Figure 1).

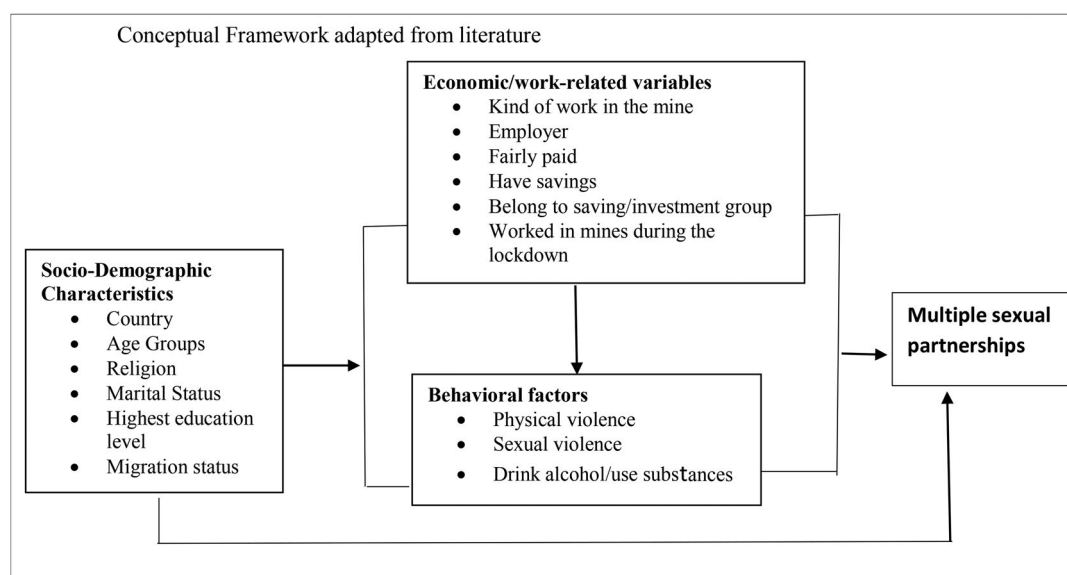


Figure 1. Presents the conceptual framework used for this paper. The sociodemographic variables influence the economic or work related and the behavioral variables. The economic or work-related variables are likely to influence behavioral variables. The three sets of independent variables are likely to be associated with MSPs.

Methods

Study design

This paper is based on a cross-sectional household survey under the title “Economic and Health Impact and the Resilience of Last-Mile Populations in Artisanal and Small- Scale Mining Unplanned Settlements in Sub-Saharan Africa before, during and after COVID-19: The case of Ghana and Uganda”. The survey was conducted among AGYW working in ASGM in Uganda and Ghana. Data collection took place between March and May 2023.

Study sites

Data were collected in ASGM communities of Bamboi and Banda Nkwanta (Savannah Region) and Chingakrom (Bono East Region) of Ghana and Busia and Namayingo districts (Eastern Region) and Kassanda and Mubende districts (Central Region) of Uganda. While ASGM is a recent phenomenon in Uganda, Ghana is among the countries with the longest history of ASGM in sub-Saharan Africa. The choice of the sites in each country was based on the existence of ASGM activities and the feasibility of implementing the study, including security. All locations selected in Ghana and Uganda are rural and remote, dependent on subsistence agriculture, with the exception of Busia, a border district where some cross-border trade takes place. Both Busia and Namayingo had fishing activities, but fishing in Lake Victoria was banned. In Ghana, the Savannah Region is located in the dry savannah grasslands, while the Bono has a mixture of forest and agricultural land. The houses in the settlements were quite scattered, depending on the population densities of the settings. However, there were dense settlement concentrations around the actual mines. These included permanent and temporary structures. ASGM activities have resulted in the development of small rural trading centers that supply basic services and entertainment for ASM workers.

Sample size

The survey involved 1618 AGYW aged 10–24 years, who either worked directly in the mines and or provided services to ASM workers in the selected ASGM communities. Working directly in the mines includes ferrying the ore from the pits to the processing areas, sometimes collecting leftover stones, taking it for grinding, washing the ore, using mercury to extract the gold, and buying gold (usually as an employee). Services provided include catering, sale of foodstuffs and other supplies, and entertainment that included working in bars within the mining areas. The sample size was determined using Yamane’s (1973) formula, which is applied when the population size is known, taking into consideration the design effect of 2 and anticipated response rate of 98%. In terms of population, the estimated number of women in the ASM in Uganda and Ghana ranges from 40,000 to 50,000. N in this case was 40,000 (cognizant of the fact that some of the females are older). The level of confidence is 95%, and the error was set at 5% ($e=0.05$). The calculated sample size of 396 multiplied by the design effect of 2 generates a sample size of 792.

$$\text{Yamane: } n = N / (1 + Ne^2)$$

$$n = 40000 / (1 + 100)$$

$$n = 396 * 2$$

$$n = 792$$

After adjusting for the anticipated a response rate of 98%, the final (minimum) sample size for each country was 808.

The total samples were proportionately divided between the two selected subregions of each country. The actual number of respondents interviewed is 1,610, 1.6% higher than 1,584.

Data collection

Data were collected by young women (to match the target respondents) using the digital KoBo Collect tool, which works effectively in remote areas with limited internet connectivity. Priority was given to

research assistants from the local districts who understood the contexts, had experience in data collection, had attained a degree or diploma from an institution of higher learning, and could speak the local languages. The research data collection teams were trained in primary data collection, the technicalities of digital data collection, and research ethics. Survey data were collected between March and May 2023. We used the Demographic and Health Survey (DHS) women's validated questionnaire to extract questions addressing sexual partnerships, transactional sex and key background characteristics. These validated tools have been used internationally over the last 20 years with limited adjustments. Please see the Uganda and Ghanaian demographic and health survey reports (Ghana Statistical Service (GSS), 2015; UBOS and ICF, 2018).

Interviews were conducted at the household level. Local guides worked in partnership with local leaders to list households with the eligible respondents. The local guides assisted the research assistants to locate the prospective participants. All households eligible with AGYW were considered and one AGYW was interviewed per household. This contributed to the ease of sharing sensitive issues. In case of multiple eligible participants, we used simple random sampling to select the respondent. In order to ensure privacy, interviews were conducted in a private place. Participants were interviewed by young female research assistants who spoke the relevant local languages and were trained in ethical approaches to conducting research on sensitive issues. The consent document as well as the questionnaire had statements explaining the procedures, the relevance of the questions, with emphasis on voluntary participation and assurance of confidentiality. In the survey tool, the introduction of the section that addressed sensitive questions such as MSP included an explanation of the sensitivity of the issues to be addressed and seeking the voluntary consent of the participant to continue with the interview. Questions were asked in a non-judgmental manner. To ensure comprehension, the survey questionnaire was translated into and conducted in the relevant local languages.

Variables and measurements

The dependent variable MSPs, respondents who had ever had sex were asked to state the total number of sexual partners they had serially or concurrently during the COVID-19 lockdown (UBOS and ICF, 2018; Uganda Bureau of Statistics, 2023)—Ghana March to July 2020 and Uganda between March 2020 and January 2022. The variable was coded as a binary outcome where responses with “0 to 1 partner” were coded as 0 no multiple sexual partners, and “2 or more partners” as 1—more than one partner or multiple sexual partnerships.

Independent variables included: country of study, age, religion, marital status, migration status, and education level. Work related variables included the kind of work in the mine categorized as a binary variable depending on the kind of work the participant did most of the time. “Works directly in the mines” included respondents who engaged in manual work carrying soil from the pits, processing and purchasing gold. Participants who spent most of their time providing services to ASGM workers including cooking, selling snacks, drinks, among other services, were categorized in “services and others”. In order to assess “perceived fairness of payments,” respondents were asked whether they were fairly paid/ or whether the earnings were fair. Responses were categorized as “yes”, “no”, or “don't know”. The categories “no” and “don't know” were merged into one category to generate a dichotomous variable. We considered the type of employer, whether the respondent had savings, membership of a saving/investment group, whether the respondent worked in mines during the COVID-19 lockdown, alcohol/substance use, experience of physical violence, sexual violence by any perpetrator in the past year, and transactional sex. In addition to the descriptive results, [Table 1](#) also details the categories of the independent variables.

Data analysis

Data were analyzed using Stata statistical software version 17. Analysis involved frequency distributions to describe the characteristics of the respondents, bivariate (Chi-squared tests) to establish whether a relationship between the dependent variable and each independent variable exists and to identify variables for inclusion in the final model. A binary logistic regression model was fitted to isolate the net

Table 1. Background characteristics and the percentage of respondents who reported having had sex during COVID-19 lock down of 2020 to 2022.

Variable	% of respondents	Frequency	% More than one partner	p-value
Country				0.001
Uganda	50.1	810	21.7	
Ghana	49.9	808	28.7	
Age groups				0.000
Less than 18years	27.3	441	12.2	
18+ years	72.7	1,177	30.1	
Religion				0.237
Catholic	25.5	413	23.0	
Anglican	10.4	168	20.8	
Other christians	43.0	696	26.6	
Muslim	21.1	341	27.3	
Marital status				0.000
Single never married	63.4	1,026	19.9	
Married	16.9	274	23.0	
Cohabiting	12.7	206	48.5	
Previously married	6.9	112	36.6	
Migration status				0.974
Migrated	63.6	1,030	25.2	
Not migrated	36.4	588	25.2	
Highest education level				0.277
None	18.8	304	27.3	
Primary	45.2	731	26.1	
Secondary+	36.0	560	23.0	
Kind of work in the mine				0.000
Directly work in the mine	35.9	581	31.5	
Services & others	64.1	1,037	21.7	
Employer				0.027
Self employed	30.6	495	26.7	
Employed	61.4	993	25.6	
Parents	5.9	96	12.5	
Others	2.1	34	29.4	
Fairly paid				0.000
Yes	44.2	715	20.4	
No/Don't know	55.8	903	29.0	
Has savings				0.606
No	43.8	708	25.9	
Yes	56.2	910	24.7	
Belong to saving/investment group				0.178
No	81.6	1,321	24.5	
Yes	18.4	297	28.3	
Worked in mines during COVID-19				0.000
No	49.1	795	17.2	
Yes	50.9	823	32.9	
Drink alcohol/use substances				0.000
No	84.0	1,369	22.7	
Yes	16.0	249	38.8	
Physical violence during COVID-19 lockdown				0.007
Never experience violence	86.8	1404	24.1	
Experience violence	13.2	214	32.7	
Sexual violence during COVID-19 lockdown				0.000
Not experienced	91.7	1,484	23.2	
Experienced	8.3	134	47.8	
Monthly earnings (in USD)				0.428
Less than 70\$	44.6	722	25.2	
More than 70\$	44.9	727	26.1	
Not earning, unspecified	10.4	169	21.3	
Total	100.0	1,618	27.6	

effect of each independent variable on the dependent (MSPs) among AGYW. The results are reported at 95% confidence intervals. Regarding the diagnostic tests, the Variance Inflation Factor (VIF) was used to test for multicollinearity and the Hosmer-lemeshow test for the goodness of fit. The model is correctly specified if p is not significant—when the expected data mirrors the observed, the model is deemed to be correctly specified (Hosmer et al., 2013).

Ethical considerations

Ethical clearance was obtained from the three relevant countries: in Uganda, The AIDS Support Organization-2022-169 and registration by the Uganda National Council for Science and Technology, UNCST—SS149ES; in Ghana—the University of Ghana Ethics Committee for the Humanities (ECH109/22-23); and in Canada, McMaster University Research Ethics Board (MREB#: 6257). Additional clearances were obtained at the district/subnational level, the community, the village and household levels. Voluntary informed consent was obtained from the adult respondents and assent from minors after seeking consent from their caregivers. Working minors who lived alone were treated as emancipated minors. An interview of a minor would only take place when both the minor and the caregiver agree to participate in the study. However, there were no cases of refusals. Ethical clearance was obtained shortly after the COVID-19 lockdown and Ebola epidemics. Hence, verbal rather than written consent was approved by the ethics review committees. This was part of the standard operating procedures for approval of research in the relevant period. In all study settings, research teams had contacts of probation and social welfare officers and helpline information in case the respondents needed help. Participants were assured of confidentiality. The study adheres to the Helsinki Declaration.

Results

One in four (25%) AGYW engaged in multiple sexual partnerships during the COVID-19 lockdown (see Figure 2).

The results in Table 1 show that country representation was about half for each country. The majority of respondents were adults aged 18 to 24 years (73%), Christians (79%), never married (63%), migrants (64%), with primary or no formal education (64%), and operating in service provision (64%). Over half (61%) were employees, not fairly paid (56%), had savings (56%), did not belong to a savings group (82%), and worked during the lockdown (51%). Sixteen percent (16%) drank alcohol/substances, 13% experienced physical violence, 8% sexual violence, and 55% earned less than US\$70 on a monthly basis.

At bivariate level of analysis, MSPs were associated with country of residence, age, marital status, work done in the mines, employer, fairness of payment, whether the respondent worked during the lockdown, consumes alcohol or substances, experienced physical violence, and sexual violence. MSPs were higher in Ghana (29%), among adults (30%), those who cohabited (49%), worked directly in the mines (32%), employed by others (relatives and partner) (29%), not fairly paid (29%), worked during the lockdown (33%), consumed alcohol or substances (39%), experienced physical violence (33%), and experienced sexual violence (48%) (see Table 1, columns 4 and 5).

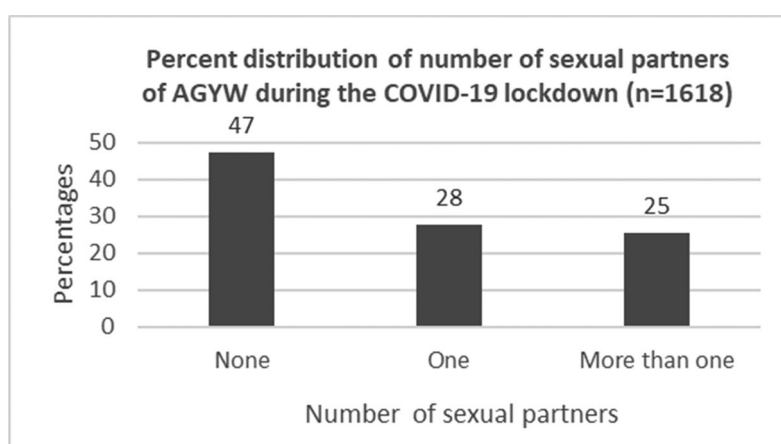


Figure 2. Percent distribution of the number of sexual partners of AGYW during the COVID-19 lockdown.

Table 2. Determinants of MSPs among AGYW in mining communities.

Independent factors	Adjusted odds ratio	Confidence intervals
Country (RC=Uganda)		
Ghana	1.81***	[1.32–2.49]
Age (RC=less than 18years)		
18+ years	2.77***	[1.95–3.93]
Current marital status (RC=single never married)		
Currently married or cohabiting	1.57**	[1.19–2.08]
Previously married (separated, divorced or widowed)	1.86**	[1.17–2.98]
Work done in the mines (RC=processing and sales)		
Services and others	0.72*	[0.56–0.93]
Whether fairly paid (RC=yes)		
No	1.64***	[1.27–2.13]
Worked during the lock (RC=No)		
Yes	2.14***	[1.65–2.77]
Consumes alcohol and or substances (RC=No)		
Yes	1.85***	[1.35–2.53]
Sexual violence (RC=Did not experience sexual violence)		
Experienced violence	2.80***	[1.77–4.41]
Observations	1.618	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$ RC=Reference Category.

The model adjusted for religion, level of education, type of employer, whether the respondent had savings and physical violence, which were not significantly associated with MSPs.

Determinants of MSPs

A binary logistic regression model was fitted to establish the determinants of MSPs among AGYW in ASGM. Independent factors that had a p value of 0.05 or less were included in the final model. Respondents' level of education and religion were included in the model despite the high p values because of their potential importance in determining sexual behavior in the two countries. The results are presented in Table 2.

Regarding the diagnostic test of the model, results show that the final model was correctly specified (see Appendix Table A1). In this case, the data suggest that the expected data mirror the observed data ($p=0.402$). Before fitting the model, a multicollinearity test among independent variables was conducted, and none of the VIF values was above 2.2 (see appendix Table A2).

MSPs were significantly associated with country of residence, marital status, work done in the mines, fairness of payments, whether the respondent worked during the COVID-19 lockdown, alcohol/substance use, and sexual violence. Compared with respondents from Uganda, the odds of MSPs were higher in Ghana (AOR = 1.81; CI 1.32–2.49). The odds of reporting MSPs were higher among adult respondents (18–24years) compared with minors (AOR = 2.77; CI 1.95–3.93); married or cohabiting (AOR = 1.57; CI 1.19–2.08) and previously married (AOR = 1.86; CI 1.17–2.98) compared with those that were not yet married; and respondents who reported that they were not fairly paid compared with those who were not fairly paid (AOR = 1.64; CI 1.27–2.13). Compared with respondents who did not work during the COVID-19 lockdown, the odds of MSPs were higher among those who worked (AOR = 2.14; CI 1.65–2.77). The odds of MSPs were higher among respondents who consumed alcohol/substances compared with those who did not (AOR = 1.85; CI 1.35–2.53); and those who experienced sexual violence compared to those that did not (AOR = 2.80; CI 1.77–4.41). The odds of MSPs were lower among respondents who provided services to ASGM workers compared with those who worked directly in the ASGM (AOR = 0.72; CI 0.56–0.93).

Discussion

The prevalence of MSPs among AGYW in ASGM during the COVID-19 lockdown (25%) was high compared to 3%–5% of their counterparts in the general population in Uganda and 3% in Ghana among AGYW age 15–24 in non-COVID-19 times (Ghana Statistical Service (GSS) & ICF, 2024; Uganda Bureau of Statistics, 2023). The AGYW's involvement with multiple sexual partners is linked to a work environment that encourages exchange or sexual favors for work or income in contexts of extreme poverty exacerbated by the reduction or lack of incomes during the COVID-19 lockdown (Nuwematsiko et al., 2022; Owusu-Addo et al., 2023; Serwajja & Mukwaya, 2020). The high prevalence could also be prompted by the migratory nature of the ASGM population, where the AGYW usually find other partners in order to

cope with the work and mining community environment (Bryceson et al., 2013). The higher odds of MSPs among AGYW in the Ghanaian ASGM sector could be attributed to the longer existence of the ASGM sector, where sexual relations that are inclusive of multiple sexual partnerships with ASGM workers are established (Arthur-Holmes et al., 2025; Kangmennaang et al., 2019; Mbeve & Ngwenya, 2022) and the fact that the majority are migrants (72% of the AGYW ASGM workers in Ghana, compared to 55% in Uganda are migrants), with limited support systems especially during the COVID-19 lockdowns. Since finding work that could sustain them was challenging; AGYW had to engage with MSP for survival (Desmond et al., 2005). Together with gender related vulnerabilities, these factors contribute to the higher odds of multiple sexual partners (Bryceson et al., 2013; Heemskerk, 2003).

With respect to age, the reduced odds of MSPs among young adolescents is a positive finding. The higher odds of MSPs by adults rather than minors point to the fact that engagement in such activities comes with cumulative experience. Adulthood status, and the limited control by elders provide room for MSPs among young women (Bryceson et al., 2013). Our findings differ from studies which found that a young age increased the odds of MSPs (Sarkar et al., 2008; Vasilenko & Lanza, 2014).

The odds of MSPs were higher among currently married, cohabiting or previously married relative to single AGYW. This finding is surprising, but it relates to the fluidity and unions in the ASM sector. For previously married AGYWs, MSPs could be a result of social stigma and the burden of single parenthood that comes with the termination of unions. Commitment to one partner could be a challenge, especially if the AGYW have dependent children. As observed in the Tanzanian ASGM context, in this case too, it appears marriages are becoming amoral and detached from contextual cultural values (Bryceson et al., 2013; Van der Geugten et al., 2013). Cohabitation without formal commitment nurtures relationships with limited trust, providing room for MSPs in the hope of finding a committed partner (Wagner, 2019). MSPs among persons in union presents higher risks for STIs, given the wider sexual networks (Nabukenya et al., 2020). Shunning of MSPs among single AGYW should be encouraged.

The results show that MSPs were more likely to take place among AGYW who directly participate in ore processing work. Sexual relations with male miners are usually a condition to directly participate in mining work. Several studies observe that women who work directly in the mines are at risk of being coerced into sexual activities in exchange for opportunities to work, or access finances from men (Arthur-Holmes et al., 2025; Meherali et al., 2021; Serwajja & Mukwaya, 2020). In DR Congo, women were sexually exploited in order to be allowed to work in mining areas (Mwapu et al., 2016). AGYW who engage in this laborious, less paid hazardous work are usually in very difficult economic situations, which makes them vulnerable to coerced or voluntary MSPs in order to supplement work or supplement their incomes. Relatedly, the higher odds of MSPs among those who worked during the lockdown highlight the pressure exerted upon AGYW for individual and family survival (Arthur-Holmes et al., 2023; Hinton et al., 2003). The situation during the lockdown was dire since avenues for survival were limited. Similar observations concerning the impact of the pandemic were made elsewhere in Uganda and Ghana (Nuwematsiko et al., 2022; Owusu-Addo et al., 2023; Sserwanja et al., 2021). As noted elsewhere, the AGYW could have engaged in MSPs in exchange for employment, securing jobs, or for purposes of promotion. This form of sexual exploitation is often coercive (Lauwo, 2018; Mwapu et al., 2016; Pillinger, 2022). The higher likelihood of MSPs among AGYW who reported that they were not fairly paid are associated with pressure to work or earn to supplement their low incomes. MSPs could be a survival strategy (Arthur-Holmes et al., 2023).

Alcohol and substance use significantly increased the odds of MSP. Alcohol and substance misuse not only contribute to morbidity and mortality (Kuteesa et al., 2020) but are also key risk factors for risky sexual behaviors (Martins-Fonteyn et al., 2017). Some studies observed a decline in alcohol and substance use during the COVID-19 lockdown owing to limited access and or inability to meet socially for purposes of alcohol and substance use. However, for those who could access alcohol and substances, the amounts consumed increased (Namiiro et al., 2025). This was the case with the AGYW. Alcohol and substance use are enmeshed with ASGM work, entertainment and MSPs (Heise, 2012; Testa & Livingston, 2009). The higher odds of MSPs among AGYW who consumed alcohol and substances are attributed to the permissiveness that is prevalent in the ASGM sector, with the absence or limited presence of or effective influence of elders (Bryceson et al., 2013). Alcohol and substance use compromise rational decision making, leading to irrational, risky behavior and increased vulnerability to sexual victimization (Ouoba et al., 2024; Senkhane, 2016).

Sexual violence is a significant risk factor for MSPs. Sexual and gender based violence increased during the COVID-19 lockdown (Arthur-Holmes et al., 2025; Meherali et al., 2021; Owusu-Addo et al., 2023; Sserwanja et al., 2021). For the AGYW in ASGM, MSPs could be a result of a history of sexual violence in the formative years and/or recent occurrences. Sexual violence is among the significant vulnerabilities of AGYW who work in the ASGM sector, which increased during the COVID-19 lockdown. It is likely to be a push factor for affected AGYW to seek other relationships (Li et al., 2014; Luster & Small, 1997; Maganja et al., 2007; Wamoyi et al., 2016). Conversely, with MSPs, the odds of encountering a violent partner in high.

Findings of the study are based on a robust sample that includes two countries in sub Saharan Africa that still grapple with a high prevalence of STIs. The paper fills an important gap in knowledge, especially for Uganda, where the mining sector is relatively new. The paper addresses a vulnerable population whose findings are essential in improving this population's well-being by informing policy and programming. The findings are useful and can inform the design of tailored SRH and health promotion interventions in the study contexts.

Limitations of the study

This was a cross sectional study which could not determine causal relationships or completely rule out social desirability, since at the time of data collection, the team did not stay long enough to observe the social processes. This was mitigated through training matching the interviewer and respondent by age, hiring interviewers who were experienced in conducting research on sensitive matters, training them in ethical approaches to conducting research on sensitive issues, and informing participants about the voluntary nature of their participation and assuring them of confidentiality. The question addressing MSPs did not specify whether the relationships were concurrent or serial. Assessment of alcohol and substance use did not include quantities or how often the user got intoxicated. Nevertheless, our results highlight key risk factors that should be considered for targeted interventions to improve the well-being of AGYW in ASGM.

Conclusion

There is a high MSPs prevalence of MSPs, whose determinants include country of residence, marital status, type of work done in the mines, fairness of payments, work status during the lockdown, alcohol and substance use, and sexual violence. The risk of MSPs was significantly higher among AGYW in ASGM communities in Ghana, who worked directly in the mines, worked during the COVID-19 lockdown, were underpaid, consumed alcohol and/or substances, and experienced sexual violence. Considering these risk factors, engaging in MSPs by AGYW in the mining sector, especially those who participate in the manual processing of the ore and sales, is not a matter of habit but rather economic/survival related desperation and vulnerability resulting from sexual violence, compounded by risky behaviors such as alcohol and or substance use. In short, it is a cycle of psycho-socio and economic vulnerabilities and risky coping strategies in times of crises. Response requires integrated interventions addressing poverty through financial literacy programs, development of business skills and provision of startup or booster capital and vocational training (Kyeyune & Ntayi, 2025). Interventions should emphasize promotion of a safe work environment, addressing risky behaviors such as alcohol and substance misuse, plus gender norms and practices that degrade AGYW and negatively impact their wellbeing and undermine their resilience in times of crises.

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Ethics approval

The study was approved by the research ethics committees in three countries – Uganda (The AIDS Support Organization-2022-169 and registered by the Uganda National Council for Science and Technology, UNCST – SS149ES); Ghana, (University of Ghana Ethics Committee for the Humanities (ECH109/22-23)); and, Canada (McMaster University Research Ethics Board, MREB #6257).

Consent for publication

All authors approved the final version to be published.

Consent to participate

All participation was voluntary and all participants provided informed consent.

Disclosure statement

The authors have no conflicts of interest to disclose.

Funding

This work was supported by the International Development Research Centre under Project Number 110012. It is funded under Women's Health and Economic Empowerment for a COVID-19 Recovery that is Inclusive, Sustainable and Equitable (Women RISE), an initiative of Canada's International Development Research Centre, the Canadian Institutes of Health Research and the Social Sciences and Humanities Research Council.

Data availability statement

All relevant data are included in the files of this manuscript.

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References

- Aidoo, A. A. (2022). Women in the History and Culture of Ghana. *Contemporary Journal of African Studies*, 9(2), 187–213.
- Arthur-Holmes, F., Busia, K. A., Amponsah, E. B., & Mengba, J. D. (2025). Sexual and gender-based violence in artisanal and small-scale mining in Ghana: Implications for African women's socioeconomic empowerment and well-being. *The Extractive Industries and Society*, 23, 101635. <https://doi.org/10.1016/j.exis.2025.101635>
- Arthur-Holmes, F., Yeboah, T., & Busia, K. A. (2023). Dimensions of women's mobility, livelihoods and vulnerability in artisanal and small-scale mining-induced local economy. *Journal of Rural Studies*, 101, 103061. <https://doi.org/10.1016/j.jrurstud.2023.103061>
- Baba-Djara, M., Brennan, A., Corneliess, C., Agyarko-Poku, T., Akuoko, K., Opoku, K. B., & Beard, J. (2013). Using what you have to get what you want": Vulnerability to HIV and prevention needs of female post-secondary students engaged in transactional sex in Kumasi, Ghana A qualitative study. Centre for Global Health and Development, Boston University. USA and Kwame, Ghana, Nkrumah University of Science and Technology Kumasi.
- Baddianaah, I. (2024). "If you don't go to site, they call you a lazy person": Drivers of women's participation in artisanal and small-scale mining: The case of rural northern Ghana. *Resources Policy*, 98, 105327. <https://doi.org/10.1016/j.resourpol.2024.105327>
- Barton, T. G., & Wamai, G. (1994). Equity and Vulnerability: A situation analysis of women, adolescents, and children in Uganda.
- Bester, V. (2025). Delving deeper into the World of Women in Artisanal Mining. In *The Untold Story of Zama Zama Miners in South Africa: Unearthing Hope*. (pp. 69–85): Springer. https://doi.org/10.1007/978-3-031-82783-9_5
- Bryceson, D. F., Jönsson, J. B., & Verbrugge, H. (2013). Prostitution or partnership? Wifetypes in Tanzanian artisanal gold-mining settlements. *The Journal of Modern African Studies*, 51(1), 33–56. <https://doi.org/10.1017/s0022278x12000547>
- Cholteeva, Y. (2021). *Man's World: Are women in artisanal mining still a 'Bad Omen'*. Mining Technology.
- Cowan, F., & Pettifor, A. (2009). HIV in adolescents in sub-Saharan Africa. *Current Opinion in HIV and AIDS*, 4(4), 288–293. <https://doi.org/10.1097/COH.0b013e32832c7d10>
- Desmond, N., Allen, C. F., Clift, S., Justine, B., Mzugu, J., Plummer, M. L., Watson-Jones, D., & Ross, D. A. (2005). A typology of groups at risk of HIV/STI in a gold mining town in north-western Tanzania. *Social Science & Medicine* (1982), 60(8), 1739–1749. <https://doi.org/10.1016/j.socscimed.2004.08.027>
- Doh, D., Bortei-DokuAryeetey, E., Ahadzie, W., & Lawson, E. T. (2016). Girls in mining in Ghana: Surviving without flourishing. Centre Soc Policy Stud Tech Pub Ser (Vol. 2, pp. 1–59).
- Exavery, A., Lutambi, A. M., Mubyazi, G. M., Kweka, K., Mbaruku, G., & Masanja, H. (2011). Multiple sexual partners and condom use among 10-19 year-olds in four districts in Tanzania: What do we learn? *BMC Public Health*, 11(1), 490. <https://doi.org/10.1186/1471-2458-11-490>
- Fisher, E., D'Angelo, L., Twongyirwe, R., & van de Camp, E. (2020). Uganda: Gold as a (trans) national treasure. In *Global Gold Production Touching Ground: Expansion, Informalization, and Technological Innovation*. (pp. 225–244). Springer.
- Fox, L., Senbet, L. W., & Simbanegavi, W. (2016). Youth employment in Sub-Saharan Africa: Challenges, constraints and opportunities. *Journal of African Economies*, 25(suppl 1), i3–i15. <https://doi.org/10.1093/jae/ejv027>
- Gafos, M., Beattie, T., Stoebenau, K., Baron, D., Weiner, R., Wamoyi, J., ... Kapiga, S. (2020). Preventing HIV among young people in Southern and Eastern Africa.
- Ghana Statistical Service (GSS) and ICF. (2024). Ghana demographic and health survey 2022. Retrieved from Accra <https://dhsprogram.com/pubs/pdf/FR387/FR387.pdf>
- Ghana Statistical Service (GSS). (2015). *Ghana Demographic and Health Survey 2014*. Retrieved from Rockville, Maryland, USA. <https://dhsprogram.com/pubs/pdf/FR307/FR307.pdf>
- Heemskerk, M. (2003). Self-employment and poverty alleviation: Women's work in artisanal gold mines. *Human Organization*, 62(1), 62–73. <https://doi.org/10.17730/humo.62.1.5pv74nj41xdexd8>
- Heise, L. L. (2012). Determinants of partner violence in low and middle-income countries: Exploring variation in individual and population-level risk, School of Hygiene & Tropical Medicine, London.
- Hilson, G. (2002). Harvesting mineral riches: 1000 years of gold mining in Ghana. *Resources Policy*, 28(1-2), 13–26. [https://doi.org/10.1016/s0301-4207\(03\)00002-3](https://doi.org/10.1016/s0301-4207(03)00002-3)
- Hilson, G., & Garforth, C. (2012). 'Agricultural poverty'and the expansion of artisanal mining in Sub-Saharan Africa: Experiences from Southwest Mali and Southeast Ghana. *Population Research and Policy Review*, 31(3), 435–464. <https://doi.org/10.1007/s11113-012-9229-6>
- Hilson, G., Hilson, A., Maconachie, R., McQuilken, J., & Goumandakoye, H. (2017). Artisanal and small-scale mining (ASM) in sub-Saharan Africa: Re-conceptualizing formalization and 'illegal'activity. *Geoforum*, 83, 80–90. <https://doi.org/10.1016/j.geoforum.2017.05.004>
- Hinton, J., Veiga, M. M., & Beinhoff, C. (2003). Women and artisanal mining: Gender roles and the road ahead. In *The Socio-Economic Impacts of Artisanal and Small-Scale Mining in Developing Countries* (pp. 149–188). Swets Publishers, Netherlands.
- Hosmer, D. W., Jr, Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression*. John Wiley & Sons.

- International Labour Organisation. (2007). *Girls in mining: Research findings from Ghana, Niger, Peru, and United Republic of Tanzania*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/dgreports/gender/documents/publication/wcms_090521.pdf
- Jewkes, R. K., Dunkle, K., Nduna, M., & Shai, N. (2010). Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: A cohort study. *Lancet (London, England)*, 376(9734), 41–48. [https://doi.org/10.1016/S0140-6736\(10\)60548-X](https://doi.org/10.1016/S0140-6736(10)60548-X)
- Kamlongera, P. J. (2011). Making the poor ‘poorer’ or alleviating poverty? Artisanal mining livelihoods in rural Malawi. *Journal of International Development*, 23(8), 1128–1139. <https://doi.org/10.1002/jid.1836>
- Kangmennaang, J., Mkandawire, P., & Luginaah, I. (2019). Determinants of risky sexual behaviours among adolescents in Central African Republic, Eswatini and Ghana: Evidence from multi-indicator cluster surveys. *African Journal of AIDS Research: AJAR*, 18(1), 38–50. <https://doi.org/10.2989/16085906.2018.1552600>
- Kilburn, K., Ranganathan, M., Stoner, M. C. D., Hughes, J. P., MacPhail, C., Agyei, Y., Gómez-Olivé, F. X., Kahn, K., & Pettifor, A. (2018). Transactional sex and incident HIV infection in a cohort of young women from rural South Africa. *AIDS (London, England)*, 32(12), 1669–1677. <https://doi.org/10.1097/QAD.0000000000001866>
- Kounta, C. H., Sagaon-Teyssier, L., Balique, H., Diallo, F., Kalampalikis, N., Mora, M., Bourrelly, M., Suzan-Monti, M., Spire, B., & Keita, B. D. (2019). Sex work among female workers in the traditional mining sector in Mali-results from the ANRS-12339 Sanu Gundo cross-sectional study in 2015. *African Journal of AIDS Research: AJAR*, 18(3), 215–223. <https://doi.org/10.2989/16085906.2019.1653330>
- Kuteesa, M. O., Weiss, H. A., Cook, S., Seeley, J., Ssentongo, J. N., Kizindo, R., Ngonzi, P., Sewankambo, M., & Webb, E. L. (2020). Epidemiology of alcohol misuse and illicit drug use among young people aged 15–24 years in fishing communities in Uganda. *International Journal of Environmental Research and Public Health*, 17(7), 2401. <https://doi.org/10.3390/ijerph17072401>
- Kyeyune, G. N., & Ntayi, J. M. (2025). Empowering rural communities: The role of financial literacy and management in sustainable development. *Frontiers in Human Dynamics*, 6, 1424126. <https://doi.org/10.3389/fhumd.2024.1424126>
- Lauwo, S. (2018). Challenging masculinity in CSR disclosures: Silencing of women’s voices in Tanzania’s mining industry. *Journal of Business Ethics*, 149(3), 689–706. <https://doi.org/10.1007/s10551-016-3047-4>
- Li, Y., Marshall, C. M., Rees, H. C., Nunez, A., Ezeanolue, E. E., & Ehiri, J. E. (2014). Intimate partner violence and HIV infection among women: A systematic review and meta-analysis. *Journal of the International AIDS Society*, 17(1), 18845. <https://doi.org/10.7448/IAS.17.1.18845>
- Luster, T., & Small, S. A. (1997). Sexual abuse history and number of sex partners among female adolescents. *Family Planning Perspectives*, 29(5), 204–211.
- Maganja, R. K., Maman, S., Groves, A., & Mbwambo, J. K. (2007). Skinning the goat and pulling the load: Transactional sex among youth in Dar es Salaam, Tanzania. *AIDS Care*, 19(8), 974–981. <https://doi.org/10.1080/09540120701294286>
- Mampane, J. N. (2018). Exploring the “Blessed and Blessee” phenomenon: Young women, transactional sex, and HIV in rural South Africa. *Sage Open*, 8(4), 2158244018806343. <https://doi.org/10.1177/2158244018806343>
- Mancuso, N., Mathebula, F., Chitukuta, M., Matambanadzo, K. V., Tenza, S., Reddy, K., Nobula, L., Kemigisha, D., & Stoner, M. C. D. (2023). The impact of COVID-19 on sexual behavior, HIV prevention interest, general healthcare access, and other HIV risk factors among trial participants in Malawi, South Africa, Uganda, and Zimbabwe. *Frontiers in Reproductive Health*, 5, 1270419. <https://doi.org/10.3389/frph.2023.1270419>
- Martins-Fonteyn, E., Loquiha, O., Baltazar, C., Thapa, S., Boothe, M., Raimundo, I., Hens, N., Aerts, M., Meulemans, H., Degomme, O., & Wouters, E. (2017). Factors influencing risky sexual behaviour among Mozambican miners: A socio-epidemiological contribution for HIV prevention framework in Mozambique. *International Journal for Equity in Health*, 16(1), 179. <https://doi.org/10.1186/s12939-017-0674-z>
- Mbeve, O., & Ngwenya, L. N. (2022). The trajectories of refugee women from the Democratic Republic of Congo to South Africa; challenges and strengths. *International Journal of Migration and Border Studies*, 7(1), 1–17. <https://doi.org/10.1504/ijmbs.2022.121705>
- Meherali, S., Adewale, B., Ali, S., Kennedy, M., Salami, B. O., Richter, S., Okeke-Ihejirika, P. E., Ali, P., da Silva, K. L., Adjorlolo, S., Aziato, L., Kwankye, S. O., & Lassi, Z. (2021). Impact of the COVID-19 pandemic on adolescents’ sexual and reproductive health in low-and middle-income countries. *International Journal of Environmental Research and Public Health*, 18(24), 13221. <https://doi.org/10.3390/ijerph182413221>
- Moore, A. M., Biddlecom, A. E., & Zulu, E. M. (2007). Prevalence and meanings of exchange of money or gifts for sex in unmarried adolescent sexual relationships in sub-Saharan Africa. *African Journal of Reproductive Health*, 11(3), 44–61.
- Muheki, S., & Geenen, S. (2018). Women in (and out of) artisanal mining: Apposing policy and women’s lived experiences in Lujinji B and Wakayiba mines, Mubende, Uganda. Discussion Paper/University of Antwerp, Institute of Development Policy and Management; Université d’Anvers. Institut de politique et de gestion du développement.-Antwerp., 2002, currens.
- Mutinta, G. (2014). Multiple sexual partnerships and their underlying risk influences at the University of KwaZulu-Natal. *Journal of Human Ecology*, 46(2), 147–155. <https://doi.org/10.1080/09709274.2014.11906715>
- Mwapu, I., Hilhorst, D., Mashanda, M., Bahananga, M., & Mugenzi, R. (2016). Women engaging in transactional sex and working in prostitution: Practices and underlying factors of the sex trade in South Kivu, the Democratic Republic of Congo.

- Nabukenya, A. M., Nambuusi, A., & Matovu, J. K. (2020). Risk factors for HIV infection among married couples in Rakai, Uganda: A cross-sectional study. *BMC Infectious Diseases*, 20(1), 198. <https://doi.org/10.1186/s12879-020-4924-0>
- Namiiro, A. M., Audo, R., Nannungi, C. D., Pitua, I., Kiberu, D., Talemwa, P., Mujuni, E., Lwesabula, A., Ageimo, P., Khaukha, A. Z., Kuol, M. J., Egaru, L., Koire, M., & Ssewante, N. (2025). Effect of COVID-19 lockdown on alcohol consumption among the Youths in Kampala, Uganda. A Cross-Sectional Study. *Substance Abuse and Rehabilitation*, 16, 27–37. <https://doi.org/10.2147/SAR.S497582>
- Nuwematsiko, R., Nabiryo, M., Bomboka, J. B., Nalinya, S., Musoke, D., Okello, D., & Wanyenze, R. K. (2022). Unintended socio-economic and health consequences of COVID-19 among slum dwellers in Kampala, Uganda. *BMC Public Health*, 22(1), 88. <https://doi.org/10.1186/s12889-021-12453-6>
- Ouoba, Y., Belem, D., & Sossou, M. K. (2024). Environmental and socio-economic effects of industrial gold mining: Evidence from household data in Burkina Faso. *Natural Resources Forum*, 48(4), 1352–1370. <https://doi.org/10.1111/1477-8947.12373>
- Owusu-Addo, E., Owusu-Addo, S. B., Bennor, D. M., Mensah-Odum, N., Deliege, A., Bansal, A., Yoshikawa, M., & Odame, J. (2023). Prevalence and determinants of sexual abuse among adolescent girls during the COVID-19 lockdown and school closures in Ghana: A mixed method study. *Child Abuse & Neglect*, 135, 105997. <https://doi.org/10.1016/j.chiabu.2022.105997>
- Pettifor, A. E., Levandowski, B. A., MacPhail, C., Padian, N. S., Cohen, M. S., & Rees, H. V. (2008). Keep them in school: The importance of education as a protective factor against HIV infection among young South African women. *International Journal of Epidemiology*, 37(6), 1266–1273. <https://doi.org/10.1093/ije/dyn131>
- Pillinger, J. (2022). Risks of gender-based violence and harassment: Union responses in the mining.
- Ranganathan, M., MacPhail, C., Pettifor, A., Kahn, K., Khoza, N., Twine, R., Watts, C., & Heise, L. (2017). Young women's perceptions of transactional sex and sexual agency: A qualitative study in the context of rural South Africa. *BMC Public Health*, 17(1), 666. <https://doi.org/10.1186/s12889-017-4636-6>
- Sarkar, K., Bal, B., Mukherjee, R., Chakraborty, S., Saha, S., Ghosh, A., & Parsons, S. (2008). Sex-trafficking, violence, negotiating skill, and HIV infection in brothel-based sex workers of eastern India, adjoining Nepal, Bhutan, and Bangladesh. *Journal of Health, Population, and Nutrition*, 26(2), 223–231. <https://doi.org/10.1016/j.jinf.2005.11.009>
- Senkhane, M. (2016). Drilling under the influence: SHEQ. *Inside Mining*, 9(5), 28–29.
- Serwajja, E., & Mukwaya, P. I. (2020). Condemned to the periphery: The lived experiences of women in artisanal gold mining activities in Karamoja sub-region, Uganda. *The Extractive Industries and Society*, 7(4), 1511–1524. <https://doi.org/10.1016/j.exis.2020.09.009>
- Shelton, J. D. (2009). Why multiple sexual partners? *Lancet (London, England)*, 374(9687), 367–369. [https://doi.org/10.1016/S0140-6736\(09\)61399-4](https://doi.org/10.1016/S0140-6736(09)61399-4)
- Silberschmidt, M., & Rasch, V. (2001). Adolescent girls, illegal abortions and “sugar-daddies” in Dar es Salaam: Vulnerable victims and active social agents. *Social Science & Medicine* (1982), 52(12), 1815–1826. [https://doi.org/10.1016/s0277-9536\(00\)00299-9](https://doi.org/10.1016/s0277-9536(00)00299-9)
- Singh, K., Buckner, B., Tate, J., Ndubani, P., & Kamwanga, J. (2011). Age, poverty and alcohol use as HIV risk factors for women in Mongu, Zambia. *African Health Sciences*, 11(2), 204–210. <https://doi.org/10.1007/s10461-008-9505-y>
- Sserwanja, Q., Kawuki, J., & Kim, J. H. (2021). Increased child abuse in Uganda amidst COVID-19 pandemic. *Journal of Paediatrics and Child Health*, 57(2), 188–191. <https://doi.org/10.1111/jpc.15289>
- Stoebenau, K., Nair, R. C., Rambelosen, V., Rakotoarison, P. G., Razafintsalama, V., & Labonté, R. (2013). Consuming sex: The association between modern goods, lifestyles and sexual behaviour among youth in Madagascar. *Globalization and Health*, 9(1), 13. <https://doi.org/10.1186/1744-8603-9-13>
- Stoner, M. C. D., Pettifor, A., Edwards, J. K., Aiello, A. E., Halpern, C. T., Julien, A., Selin, A., Twine, R., Hughes, J. P., Wang, J., Agyei, Y., Gomez-Olive, F. X., Wagner, R. G., MacPhail, C., & Kahn, K. (2017). The effect of school attendance and school dropout on incident HIV and HSV-2 among young women in rural South Africa enrolled in HPTN 068. *AIDS (London, England)*, 31(15), 2127–2134. <https://doi.org/10.1097/QAD.0000000000001584>
- Testa, M., & Livingston, J. A. (2009). Alcohol consumption and women's vulnerability to sexual victimization: Can reducing women's drinking prevent rape? *Substance Use & Misuse*, 44(9-10), 1349–1376. <https://doi.org/10.1080/10826080902961468>
- Ubos and ICF. (2018). Uganda demographic and health survey 2016. Retrieved from Kampala.
- Uganda Bureau of Statistics. (2023). *Uganda Demographic and Health Survey 2022*. Retrieved from Kampala, Uganda. <https://www.ubos.org/wp-content/uploads/publications/UDHS-2022-Report.pdf>
- Van der Geugten, J., Van Meijel, B., De Vries, N. K., & Den Uyl, M. H. (2013). Virginity, sex, money and desire: Premarital sexual behaviour of youths in Bolgatanga municipality, Ghana. *African Journal of Reproductive Health*, 17(4), 93–106. <https://doi.org/10.1080/14681811.2014.968771>
- Vasilenko, S. A., & Lanza, S. T. (2014). Predictors of multiple sexual partners from adolescence through young adulthood. *The Journal of Adolescent Health: official Publication of the Society for Adolescent Medicine*, 55(4), 491–497. <https://doi.org/10.1016/j.jadohealth.2013.12.025>
- Wagner, B. G. (2019). Marriage, cohabitation, and sexual exclusivity: Unpacking the effect of marriage. *Social Forces; a Scientific Medium of Social Study and Interpretation*, 97(3), 1231–1256. <https://doi.org/10.1093/sf/soy082>
- Wamoyi, J., Stoebenau, K., Bobrova, N., Abramsky, T., & Watts, C. (2016). Transactional sex and risk for HIV infection in sub-Saharan Africa: A systematic review and meta-analysis. *Journal of the International AIDS Society*, 19(1), 20992. <https://doi.org/10.7448/IAS.19.1.20992>
- Yamane, T. (1973). *Statistics: An introductory analysis-3*.