

# Prevalence and Factors Associated with Major Depression Among Female Sex Workers in Post-Conflict Gulu District: A Cross-Sectional Study

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## Research article

**Keywords:** depression, female sex workers, Gulu district, post-conflict setting

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# **Prevalence and factors associated with major depression among female sex workers in post-conflict Gulu district: a Cross-Sectional Study**

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## Abstract

**Background:** Depression is the world's leading cause of disability and a major contributor to the overall global burden of disease. Female sex workers operating in conflict-affected settings could be more prone to depression, yet the prevalence and factors associated with depression among this special population remain inadequately addressed. This study thus aimed to determine the prevalence and factors associated with major depression among female sex workers in post-conflict Gulu district.

**Methods:** This cross-sectional study was conducted among 300 randomly selected female sex workers in Gulu district between March and June 2020. Possible factors associated with depression were assessed using pre-tested semi-structured questionnaire and participants assessed for major depression using Mini-International Neuropsychiatric Interview (MINI) version 7.0.0. We utilized STATA 14.0 for univariate, bivariate and multivariate data analyses.

**Results:** The mean age of study participants was 26.4 years (SD  $\pm$  6), 57.7% attained primary education, 51.7% never married and 42.1% were living with HIV. Almost half (47.7%) of the participants had major depression, of whom half (50.4%) had severe depression and one-third (34.3%) had suicidal ideation. At multivariate level, factors that showed positive association with major depression were: psychological stressor (aOR = 11.0, 95%CI: 5.77-20.86), living with HIV (aOR= 2.32, 95%CI: 1.29-4.15), being verbally abused (aOR = 2.27, 95%CI: 1.26-4.07), and being 30+ years of age (aOR = 1.95, 95%CI: 1.05-3.61). Meanwhile, factors that showed negative association with major depression were: providing sexual services at client's place (aOR=0.46, 95%CI: 0.24-0.91), using modern family planning method (aOR=0.47, 95%CI: 0.25-0.87), and daily intake of alcohol (aOR=0.50, 95%CI: 0.28-0.88).

**Conclusion:** The findings underscore the high prevalence of major depression among female sex workers driven by psychological stress, living with HIV/AIDs, being verbally abused by clients and being 30+years of age. The high prevalence of major depression has important public health ramifications at individual and societal levels and requires urgent attention of all stakeholders.

**Key words:** depression, female sex workers, Gulu district, post-conflict setting

## Background

Depression is the world's leading cause of disability and a major contributor to the overall global burden of disease affecting more than 300 million people (1). Major depression (MD) can cause profound disability and death through suicide as well as through causing or worsening pre-existing physical illnesses (2). Globally, the disease burden from depression accounts for 32.4% of years lived with disability and 13.0% of disability-adjusted life-years (3). Annually, the costs per case of depression (in terms of treatment, morbidity and mortality) is in the range of £3500-£6600. The biggest portion of the costs is due to loss of productivity (4). Depression shows a bi-directional relationship with physical illnesses. Indeed, depression can increase one's risk for acquiring physical illnesses like HIV infections and contribute to physical injury like self-harms and motor accidents. Conversely, suffering from physical illnesses, especially the chronic diseases such as diabetes mellitus and HIV can increase one's risk of acquiring depressive disorders (5).

There are several known risk factors for major depression (MD) in the general population including biological factors such as chronic physical illness, experience of traumatic life events like rape, loss of loved ones, social adversity like extreme poverty and demographic factor for example being female (6)(7). Among FSWs, risk factors for depression include: experience of sexual, physical or psychological violence and the psychological and physical burden of sex work itself (8). In addition, many FSWs are exposed to alcohol and illicit drug use (9) which may cause physical illnesses and/or problem that eventually lead to development of MD (10).

Suffering from MD can lead to serious negative health and socioeconomic impacts on the affected individuals, families and society. Among sex workers, depressive symptoms can reduce one's level of sexual satisfaction (11). Yet the use of anti-depressants can further lead to development or worsening of sexual dysfunction (12). Additionally, untreated MD in FSWs can impede the progress made towards prevention of HIV, other sexually transmitted infections (STIs), and unwanted pregnancies since FSWs with MD are less likely to use condoms during sexual intercourse (13). Moreover, among the HIV positive FSWs, MD can lead to poor adherence to antiretroviral therapy (ART), unsuppressed viral load and subsequent transmission of HIV infection to their clients and children (14). Moreover, HIV-negative FSWs with MD have diminished ability to negotiate for safer sex with their partners and can easily become victim of sexual violence like rape and other risky sexual behaviours (15).

People living in conflict-affected settings are more prone to MD resulting from their experience of traumatic life events and the negative socioeconomic circumstances due to conflict (16)(17). The risk of MD could be worst for FSWs in Uganda because in the country, sex work is an illegal and prosecutable crime. Additionally, sex workers are not legally protected like people in recognized employments (18). The illegal nature of sex work along the intolerable culture and religious beliefs in the country could easily lead to high level of stigma, GBV and depression among FSWs. Primary prevention of depression is not feasible but secondary prevention through early diagnosis and management can be cost-saving. Secondary prevention of depression can only be possible if we can reduce cases of undiagnosed and under treated MD (19). Moreover, when treated promptly and effectively, many of the negative effects of depression on the lives and work of FSWs can be averted. Therefore, our study was aimed at determining the prevalence and factors associated with MD among FSWs in post-conflict Gulu district so as to generate information necessary to inform appropriate interventions to reduce the burden of MD among FSWs.

## **Methods**

### **Study setting**

The study was conducted in Gulu, a district in Northern Uganda, an area that severely suffered from more than 20 years of the Lord's Resistant Army (LRA) rebellion between 1986 and 2007. Since the end of the war, the district has been under peace recovery program that has been rather slow and without meaningful economic resettlement package to the individuals and families affected by the conflict leaving many individuals including the FSWs struggling for survival. More than 80% of the inhabitants of the district practice subsistence farming (20). Gulu district has an estimated 1425 FSWs (21), majority of whom work and live within Gulu municipality. Unpublished program data show that more than 1300 fully mapped-out FSWs receive either HIV treatment or HIV preventive services from TASO Gulu.

### **Study design and population**

We conducted a cross-sectional study among 300 active adult FSWs aged 18+ years and operating within Gulu district.

### **Sample size and sampling**

Data were collected among 300 FSWs between March and June 2020. The sample size was determined using the Cochran [1963,1975] (22) formula:  $n_0 = Z^2pq/e^2$ . At 95% confidence level, 5% precision level, and when the proportion of FSWs in Uganda with depressive symptoms is 27% (23), the calculated sample size was 303. However, we adjusted the sample size by 20% to cater for mobility (10%) and non-response (10%), the adjusted sample size became 380. The participants were selected using simple random sampling since their up to date details (database) were available from the key populated program data at TASO Gulu. However, the database was rapidly updated with the help of peers of FSWs before sampling so that new arrivals were included.

### **Data collection**

Data on the independent variables like socio-demographic characteristics, socio-economic characteristics, sexual and reproductive health characteristics, condom use, alcohol and other illicit drug use were collected through face-to-face interviews using the pre-tested semi-structured questionnaire with imbedded MINI 7.00 developed in English language and translated into Acholi language (Luo) which is the predominantly spoken language in Gulu district. Data were collected by the first author and a trained female research assistant in either Acholi or English language as guided by participant's literacy level and preference.

### **Data management and statistical analysis**

Data collected were entered and cleaned in EPI INFO 7 and then exported to STATA 14.0 for analysis. The diagnosis of MD, the dependent variable, was made using MINI 7.0.0, a tool based on DSM-5 diagnostic criteria (24). Diagnosis of MD was made when a participant had at least 2 weeks of persistent depressed mood and/or hopelessness, plus additional symptoms from MD diagnostic criterion A, for a total of 5 of the 9 DSM-5 criteria for MD (25). In addition, the symptoms of MD must have caused significant distress or problem and significantly altered ones behaviour and/or functionality. As guided by previous study, MD was classified based on severity

as; mild if there were only 5 symptoms (the minimum needed for diagnosis of MD), moderate if there were 6-7 symptoms, and severe if there were 8-9 symptoms (26). Univariate analyses were described using either frequencies with their corresponding proportions for categorical variables or means with corresponding standard deviations for continuous variables. Bivariate analysis was conducted using simple logistic regression. Results of bivariate analyses were described using unadjusted odd ratios (uOR) with corresponding confidence intervals and *p-values*. Independent variables with a  $p < 0.20$  were included in the multivariable analysis which was conducted using multivariate logistic regression with backward elimination until a final “best fit” model was derived. Prior to fitting the multivariable logistic regression model, eligible variables were checked for multicollinearity. When two variables showed multicollinearity ( $r \geq 0.4$ ), only one of them was included in the model. All eligible independent variables were entered at the beginning step of model building. Then, to avoid the model being over fitted, all non-significant variables were removed in a stepwise manner until only significant variables were left. The key outputs from multivariable analyses were adjusted odd ratio (aOR) with their corresponding 95% confidence intervals (CI) and *p-values*. Predictors from multivariate analyses whose CI did not include the null value (1.0) were considered statistically significant.

Regression diagnostics tests were conducted after fitting the multivariate logistic regression model. The model was checked for outliers and influential points using the predicted residuals. The predictive power of the model was also investigated using the sensitivity and specificity analyses. The Hosmer-Lemeshow's goodness-of-fit test was also performed to ascertain how the model was fitting the data without omitting important variables that could cause bias in the model. Finally, link test was performed to check if the model was well specified without over or under parameterization.

## Results

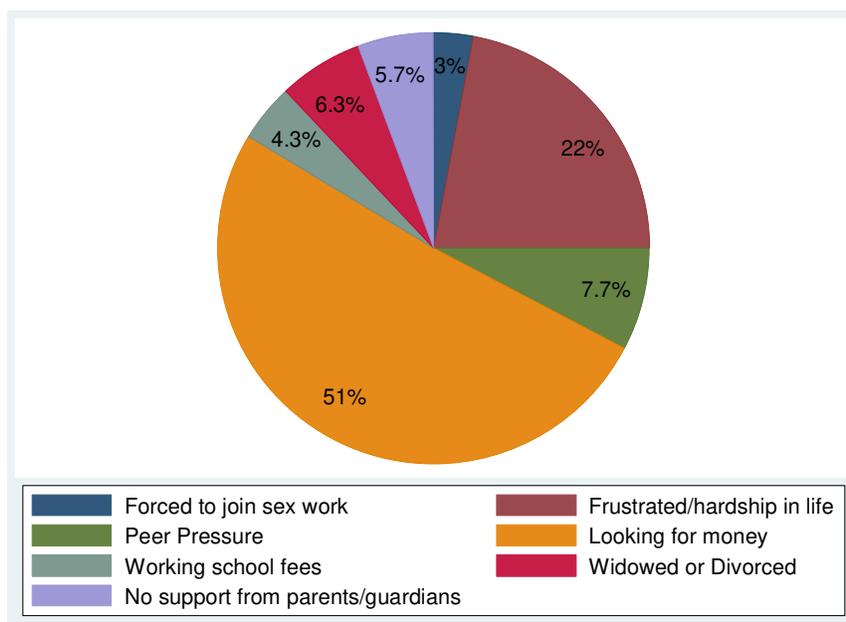
### Participants and participants demographic characteristics

Out of the 380 participants sampled, 302 were successfully traced, accounting for 79.5% of the sample size (380). Among the 302 successfully traced, 300 participants were enrolled into the study while two (02) refused to consent for the study. The mean age of the participants was 26.4 years (SD  $\pm$  6, Range = 18-50), more than two-thirds (68.3%) of the participants were below 30 years of age, 57.7% attained only primary education, 51.7% were never married and one-fifths (26.7%) were divorced. Majority of the participants resided within Gulu (99.4%), in urban setting (90.7%), were Catholic (60.7%), and originated from Gulu district (48.7%) (*Table 1*).

Characteristic	Number	Percentage (%)
Age (years)		
<30	205	68.3
$\geq$ 30	95	31.7
Education Level		
None	13	4.3
Primary education	173	57.7
O-level education	94	31.3
A-level and above	20	6.7
Origin		
Gulu District	146	48.7
Other District within Northern Uganda	125	41.6
Outside Northern Uganda	29	9.7
Residence		
Gulu District	298	99.4
Other District within Northern Uganda	1	0.3
Outside Northern Uganda	1	0.3
Location of residence		
Urban	272	90.7
Rural	28	9.3
Marital Status		
Never married	157	51.7
Cohabiting	37	12.3
Married	6	2.0
Divorced	80	26.7
Widowed	22	7.3
Religion		
None	18	6.0
Catholic	182	60.7
Protestant	48	16.0
Born Again	34	11.3
Muslim	16	5.3
Others	2	0.7

## Reasons for joining sex work

Majority of the participants (89.7%) mentioned poverty-related reasons as their main driving force for joining sex work of whom 51% joined sex work to earn money for survival, 22% were frustrated by financial hardship, 6.3% join sex work because of widowhood or divorce that had robbed them of financial support from their husbands, 5.7% stated that their parents/guardians were not supportive, and 4.3% join sex work in order to look for school fees (*Figure 1*).



**Figure 1: Showing reasons for joining sex work among FSWs operating in Gulu district**

## Prevalence of MD among FSWs

In this study, the prevalence of MD among the FSWs stood at 47.7%. Majority of the participants with MD (50.4%) had severe depression (8-9 symptoms) and 40.6% had moderate depression (6-7 symptoms). Meanwhile, the rest of the participants with MD (9.1%) had mild depression (the bare minimum of 5 symptoms). The commonest symptoms of MD were: feeling consistently depressed (62.3%), anhedonia (59.7%) and being without energy (53%). Meanwhile, the least common presenting symptoms of MD was feeling suicidal (16.4%). However, when considering only participants with MD, one-third (34.3%) of FSWs presented with suicidal ideation.

## Factors associated with MD among FSWs

Results from bivariate analysis showed that several factors were significantly associated with MD. Factors like being psychologically stressed ( $p < 0.001$ ), living with HIV/AIDS ( $p < 0.001$ ), numbers of previous pregnancies ( $p < 0.001$ ), age ( $p < 0.01$ ), being verbally abused by client ( $p < 0.01$ ), being physically abused by client ( $p = 0.02$ ), and being raped by client ( $p < 0.05$ ) all showed significant positive association with MD. Meanwhile, daily intake of alcohol ( $p = 0.01$ ) and consistent use of condom ( $p = 0.04$ ) both showed statistically significant negative association with MD.

In the multivariate logistic regression model, several factors including duration of sex work, income level, and condom use were controlled for. The results revealed that being psychologically

stressed (aOR=11.0, 95%CI: 5.77-20.86), living with HIV/AIDS (aOR=2.32, 95%CI: 1.29-4.15), being verbally abused by the clients (aOR=2.27, 95%CI: 1.26-4.07), and being 30+ years of age (aOR=1.95, 95%CI: 1.05-3.61) all had significant positive association with MD. Conversely, providing sexual services at clients' places (aOR=0.46, 95%CI: 0.24-0.91), use of modern family planning method (aOR=0.47, 95%CI: 0.25-0.87), and daily intake of alcohol (aOR=0.50, 95%CI: 0.28-0.88) all showed significant negative association with MD (*Table 2*).

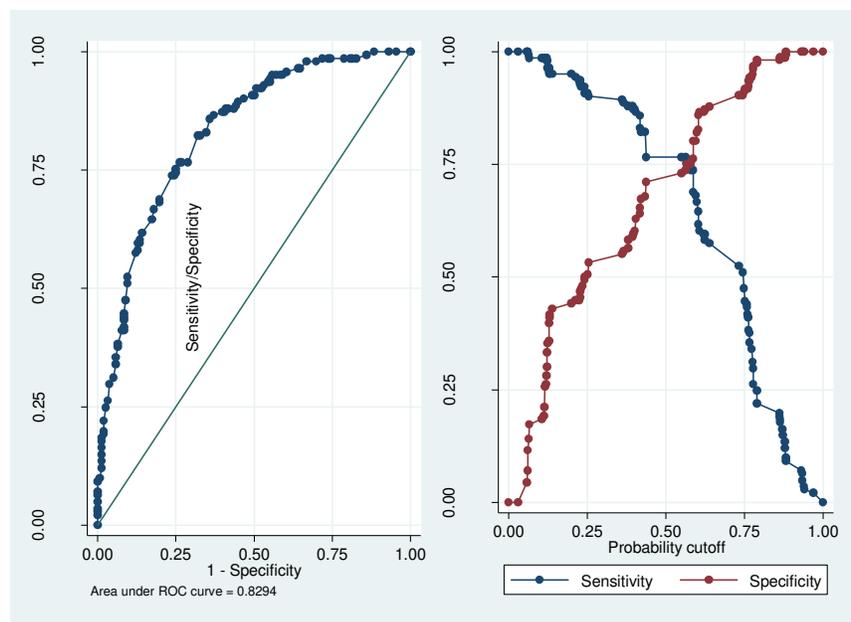
Factor	Major Depression		Unadjusted OR (95%CI)	Adjusted OR (95%CI)
	Present N (%)	Absent N (%)	Model I	Model II
<b>Age (years)</b>				
<30	85(41.5)	120(58.5)	1.00	1.00
≥30	58(61.1)	37(38.9)	2.21(1.35-3.64) **	1.95(1.05-3.61) *
<b>Parity</b>				
0-1	46(36.8)	79(63.2)	1.00	--
2	37(47.4)	41(52.6)	1.55(0.87-2.75)	--
3+	60(61.9)	37(38.1)	2.78(1.61-4.82) ***	--
<b>Current use of FP</b>				
No	59(51.8)	55(48.2)	1.00	1.00
Yes	84(45.2)	102(54.8)	0.77(0.48-1.22)	0.47(0.25-0.87) *
<b>Consistently used condom with clients</b>				
No	57(55.8)	45(44.2)	1.00	--
Yes	86(43.4)	112(56.6)	0.61(0.42-0.98) *	--
<b>Verbally abused</b>				
No	57(39.6)	87(60.4)	1.00	1.00
Yes	86(55.1)	70(44.9)	1.88(1.18-2.97) **	2.27(1.26-4.07) **
<b>Physically abused</b>				
No	64(41.3)	91(58.7)	1.00	--
Yes	79(54.5)	66(45.6)	1.70(1.08-2.69) *	--
<b>Raped by client</b>				
No	106(44.7)	131(55.2)	1.00	--
Yes	37(58.7)	26(41.3)	1.76(1.001-3.08) *	--
<b>Sexual services at client's place</b>				
No	47(56.0)	37(44.0)	1.00	1.00
Yes	96(44.4)	120(55.6)	0.63(0.38-1.05)  *	0.46(0.24-0.91) *

HIV Status				
HIV-Négative	65(37.6)	108(62.4)	1.00	1.00
HIV-Positive	78(61.9)	48(38.1)	2.70(1.68-4.33) ***	2.32(1.29-4.15) **
Feeling stressed				
No	18(16.1)	94(83.9)	1.00	1.00
Yes	125(66.5)	63(33.5)	10.4(5.75-18.66) ***	11.00(5.77-20.86) ***
Alcohol intake				
None or occasional	73(55.7)	58(44.3)	1.00	1.00
Always	68(40.7)	98(59.3)	0.55(0.34-0.87) **	0.50(0.28-0.88) *

|\*| = 0.05 < p < 0.2, \* = p < 0.05, \*\* = p < 0.01, \*\*\* = p < 0.001

### Model Checking and Post Estimation Tests

The model was assessed for outliers, influential points, sensitivity, specificity, specification error and goodness-of-fit. The model performed very well across all above the regression diagnostic tests: graph of predicted residual showed that all the points lie between -3 and +3 meaning that there were no outliers and the points were evenly distributed across the central lines of residual equal to zero implying that the model fitted the data points well. Secondly, from the Linktest, the P-values associated with Hatsq ( $p=0.62$ ) was not significant at 95% CI. This implies that there was no specification error and the model was well specified. Thirdly, the model fitted the data well since the observed and expected cell frequencies in the model were generally in good agreement with each other and the Hosmer-Lemeshow  $\chi^2(8) = 3.74$ ,  $p = 0.88$  showed that the model had an excellent goodness-of-fit outcome since the P-value was very large. Lastly, the area under ROC curve was 0.83 and the sensitivity and specificity lines in the model intersect above 0.75. This showed that the model had very high predictive power (*figure 2*).



**Figure 2: Showing area under ROC curve and predictive power of the regression model**

## Discussion

The prevalence of MD among FSWs in post-conflict Gulu district was 47.7%. This is well above the prevalence of MD in the general population of Gulu district (24.7%), among women in the district (29.2%) (27), among the FSWs in Southern India (29%) (28) and China (31%) (29), and the estimated global prevalence of depression (10.8%) in conflict-affected settings (30). However, the current finding is comparable with the prevalence of depression among men who have sex with men (46.3%) in the neighboring Tanzania (31) and conflict-affected South Sudan (50%) (16). Majority of the cases of MD had either severe (50.4%) or moderate depression (40.5%). Studies that classify MD based on severity using numbers of depressive symptoms based on DSM-5 diagnostic criteria are extremely rare. One similar study, a national survey in the US, reported that similar proportion of Americans with MD had severe (49.5%) [8-9 symptoms] and moderate depression (39.7%) [6-7 symptoms] (26). The high proportion of FSWs suffering with moderate-to-severe depression (89.2%) implies that majority of FSWs with MD in the district require treatment for their depression as guided by previous recommendation (30). Moreover, urgent interventions are needed to address the high prevalence of MD among FSWs since up to one-third (34.3%) of the FSWs with MD had suicidal ideation which pose serious risk to their lives.

At multivariate level, several factors were found to have significant positive association with MD. Verbal abuse of FSWs by their clients significantly increased MD in our study. Similar findings of increase risk of depression as a result of verbal abuse were reported among FSWs in Southern India (28) and among transgender population of Latina in Los Angeles (32). Likewise, living with HIV significantly increased MD among participants. Previous study noted that HIV significantly increase the risk of MD and that relationship between HIV and MD is mediated through more than 10 risk factors for depression (33). Additionally, being 30+ years of age (older age) was found to significantly increase MD. This finding is in agreement with previous researches that reported age dependent increase in the prevalence of MD in conflict-affected settings (6) (30). However, it is worth noting that in the general population, the prevalence of depression does not differ with age (34). This implies that any intervention to address MD prevention, treatment and rehabilitation should target the older FSWs especially those aged 30 years and above.

Furthermore, some three factors showed negative association with MD. These factors include providing sexual services at the client's place, use of modern family planning method and daily intake of alcohol. Providing sexual services at clients' places significantly decreased MD among FSWs. To the best of our knowledge no previous study ever reported on the relation between MD and FSW's provision of sexual services at clients' places. However, a study in Canada found that compared to Brothels, FSWs providing sexual services in the outdoor spaces/public spaces and informal indoor spaces were at an increased risk of developing mental health problems (35). Therefore, we postulated that the negative association between MD and sex work at clients' places could be because sex work at clients' places decrease client perpetrated GBV (36) which is a risk factor for MD. However, there is need for further studies to understand the mechanisms through which provision of sexual services at the clients' places protect FSWs from MD. Secondly, use of modern family planning method decreased the odds of MD among FSWs. One similar finding showed that the use of contraception reduces the occurrence of depression among women (37). While other studies reported that hormonal contraceptives did not have any significant effect on occurrence of major depression (38) (39). Yet another study reported mixed outcomes depending on type of contraception (40). For this current study, we postulate that effective family planning method protects FSWs from the risk of unwanted pregnancies and the anxiety associated with

unwanted pregnancy especially when involved in condom-less sex with their clients. Lastly, daily intake of alcohol also reduced the odds of MDD in our study. It should be noted that there is a possibility of bi-directional relationship between MD and alcohol; either alcohol helped relieve depressive symptoms or because the factors surrounding alcohol intake like socializing make FSWs less likely to get MD. Our finding conflicts with previous finding showing alcohol as a risk factor for MD in the general population (27). However, two large longitudinal studies noted that daily intake of alcohol or alcohol use disorder did not have effect on the occurrence of MD (41) (42). Our finding may be explained by a study that indicated that drinking alcohol is a coping strategy for FSWs since they face several occupation risk of MD (43). It appears as if alcohol reduce the risk of MD, however, caution should be taken since alcohol use predisposes FSWs to condomless sex (44) to the extent of putting their sexual reproductive health at risk.

The very high prevalence of depression calls for the Ugandan government through the Ministry of Health and the district health officers and the development partners to put more resources to address the mental health needs of sex workers in post-conflict Gulu and the rest of conflict-affected settings in the countries. Secondly, in the light of the high prevalence of MD associated with risky sexual behaviour like condom-less sex and GBV, all stakeholders need to integrate mental health services for FSWs with other health care services that target HIV prevention among this most at risk population. This will help the country reduce new HIV infections and thus achieve the ambitious UNAIDS goals of ending HIV/AIDS by 2030. It was noted that HIV-positive FSWs were at increased odd of MD. Therefore, there should be a special program to provide HIV related counselling to this population in order to address HIV related factors that put HIV-positive FSWs at a higher risk of MD. Lastly, this study findings showed an unexpectedly negative association between daily alcohol intake and MD yet most previous evidences indicated that daily alcohol intake had positive association with MD. This contradiction needs clarification and calls for further studies using longitudinal studies to determine the causal relationship between MD and alcohol amongst this underserved population of key population especially in conflict-affected settings.

### **Strengths and limitations of the study**

Our study had several strengths: unlike most previous studies among FSWs which use non-randomized method of participants' selection, we utilized simple random sampling technique to select our sample. Thus, our sample was truly representative of the FSWs in post-conflict Gulu district. Secondly, the results from this study were derived from an optimal sample size of 300 FSWs that provided adequate power to detect statistical significance. Thirdly, unlike most previous studies which only screened for depressive symptoms, our study actually made diagnosis of MD based on DSM-5 using the MINI 7.00. Moreover, we were able to quantify the prevalence and severity of MD among FSWs in post-conflict Gulu district. Lastly, all the regression diagnostics tests showed that the multivariate logistic model performed very well in predicting factors associated with MD without failing any of the tests.

However, this study had limitations. The study was cross-sectional and only elicited association but not causations of MD with other factors. Secondly, the information collected may have be influenced by recall bias since FSWs were asked about their past. However, most of the information asked were for events within two weeks prior to data collection. Thus, the possibility for recall bias was reduced. Thirdly, some of the information implored, like those relating to sex work, were sensitive and difficult to respond to. However, the participants had friendly interview experience with the PI and the female research assistant who had developed close working

relationships with the FSWs while providing HIV care, treatment and prevention services to the FSWs in region. Therefore, chances of information bias were greatly reduced. Lastly, some possible factors associated with MD like coping strategy and perceived social support were not directly explored. However, most of the other important confounders were included in the data collection tool and adjusted for.

## **Conclusion**

The current study contributes new evidence toward understanding of the prevalence and factors associated with depression among FSWs in conflict-affected setting in a low-income context. This study underscores the high prevalence of major depression driven by multiple factors like the presence of psychosocial stressor, HIV infection, experiencing verbal abuse from clients and age. The high prevalence of major depression has serious and significant important public health ramifications at both the individual and societal levels.

## **List of abbreviation**

AIDS: Acquired Immunodeficiency Syndrome, ART: Antiretroviral Therapy, aOR: Adjusted Odd Ratio, CI: Confidence Interval, DSM-5: Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition, FSW: Female Sex Worker, HIV: Human Immunodeficiency Virus, NGO: Non-Governmental Organization, MD: Major Depression, MINI: Mini-International Neuropsychiatric Interview, STI: Sexually Transmitted Infection, TASO: The AIDS Support Organization, UGX: Ugandan Shilling, uOR: Unadjusted Odd Ratio, UNAIDS: Joint United Nations Program on HIV and AIDS, WHO: World Health Organization

## **Ethics approval and consent to participate**

Approval to carry out this study was sought from the Makerere University School of Public Health Higher Degrees, Research and Ethics Committee. Written informed consent were provided by each consenting participant. The privacy and confidentiality of each individual participant was maintained throughout all the processes of participant's enrollment into the study and data collection. During data presentation, only aggregated figures, not individual information, were presented in order to maintain confidentiality. Likewise, all the participants who met the diagnostic criteria for major depression as per DSM-5 guideline were linked to the Psychiatric Clinic of Gulu Regional Referral Hospital for further management.

## **Consent for publication**

Not applicable

## **Availability of data and materials**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## **Competing interests**

The authors declare that they have no competing interests.

## **Authors' contributions**

OS conceived and designed the study, collected and entered data, conducted data analysis and wrote the first draft of the manuscript. NMT, RN and AC conceived the study, supported data analysis and interpretation of findings and critically reviewed the draft manuscript. All authors approved the manuscript for publication.

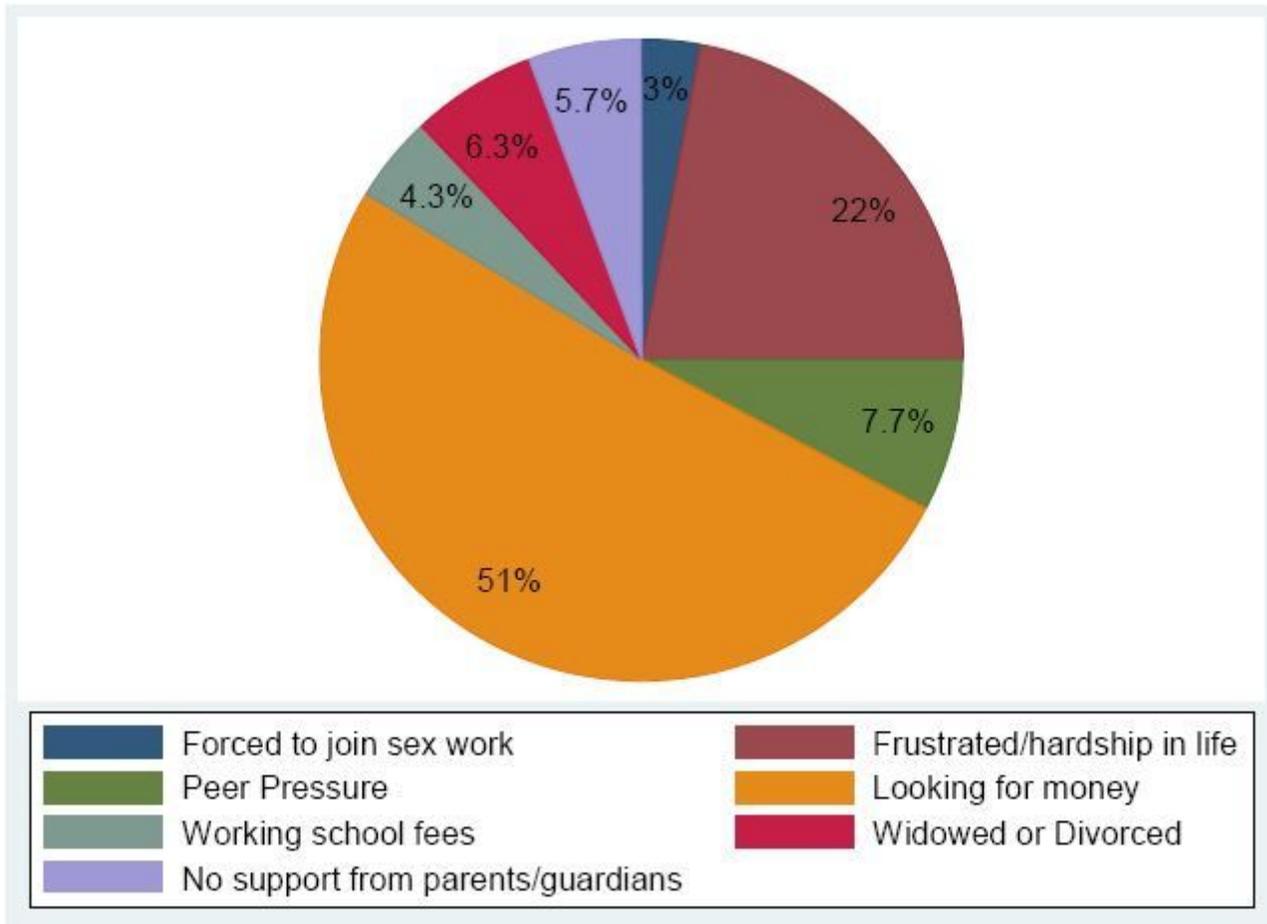
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# Figures



**Figure 1**

Showing reasons for joining sex work among FSWs operating in Gulu district

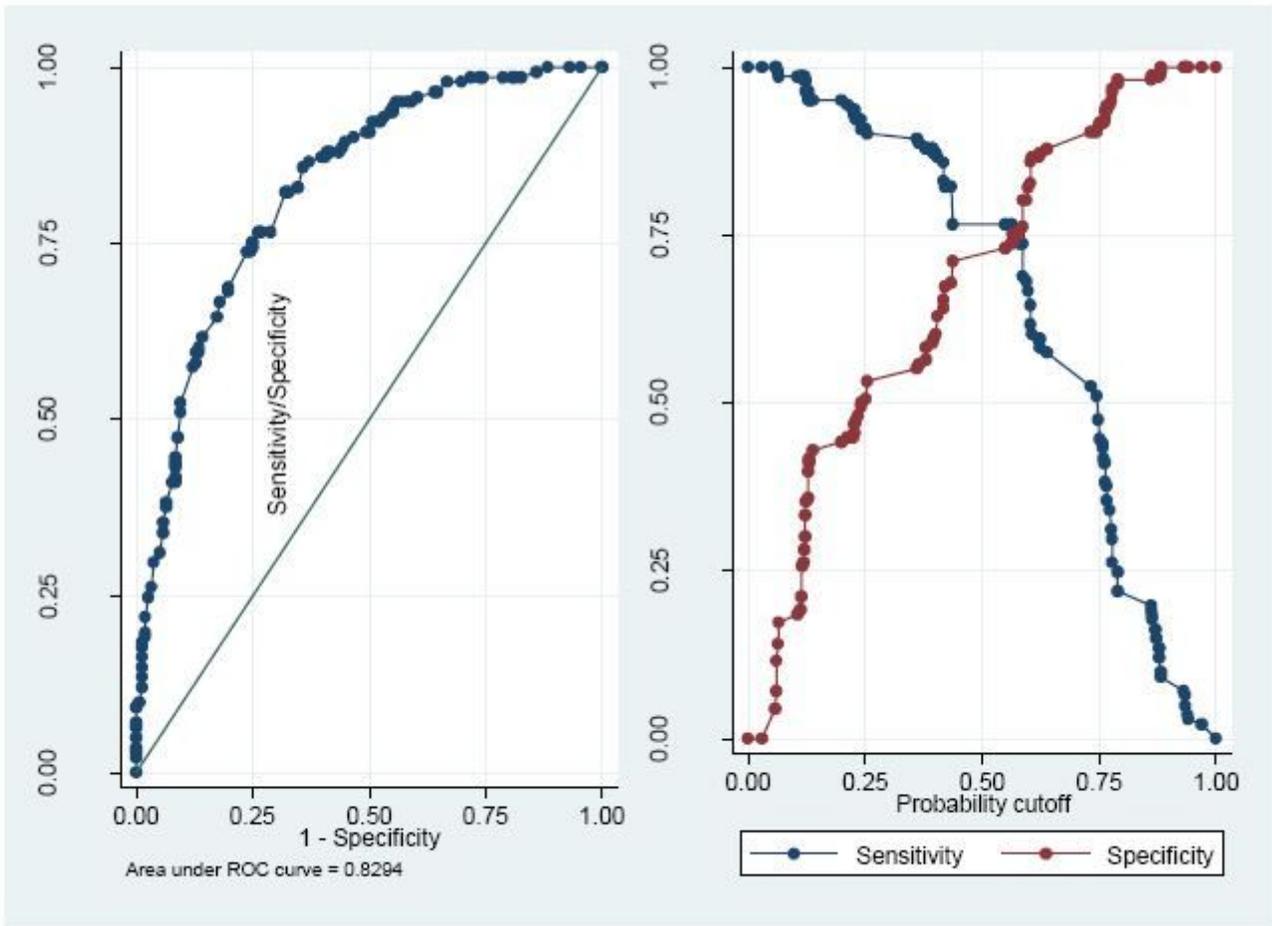


Figure 2

Showing area under ROC curve and predictive power of the regression model