

RESEARCH ARTICLE

Transactional sex among women in Sub-Saharan Africa: A systematic review and meta-analysis

Gedefaye Nibret Mihretie^{1*}, Bekalu Getnet Kassa¹, Alemu Degu Ayele¹, Tewachew Mucbe Liyeh², Habtamu Gebrehana Belay¹, Agernesh Dereje Miskr¹, Binyam Minuye², Melkalem Mamuye Azanaw³, Mulugeta Dile Worke¹

1 Department of Midwifery, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia, **2** School of Public health at University of Technology Sydney, Sydney, Australia, **3** Department of Social and Public Health, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia

* gedefayen@gmail.com



OPEN ACCESS

Citation: Mihretie GN, Kassa BG, Ayele AD, Liyeh TM, Belay HG, Miskr AD, et al. (2023)

Transactional sex among women in Sub-Saharan Africa: A systematic review and meta-analysis. *PLoS ONE* 18(6): e0286850. <https://doi.org/10.1371/journal.pone.0286850>

Editor: Felix Bongomin, Gulu University, UGANDA

Received: April 20, 2022

Accepted: May 24, 2023

Published: June 8, 2023

Peer Review History: PLOS recognizes the benefits of transparency in the peer review process; therefore, we enable the publication of all of the content of peer review and author responses alongside final, published articles. The editorial history of this article is available here: <https://doi.org/10.1371/journal.pone.0286850>

Copyright: © 2023 Mihretie et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All available data are found in the paper.

Funding: The authors received no specific funding for this work.

Abstract

Introduction

Transactional sex is casual sex between two people to receive material incentives in exchange for sexual favors. Transactional sex is associated with negative consequences, which increase the risk of sexually transmitted diseases, including HIV/AIDS, unintended pregnancy, unsafe abortion, and physiological trauma. In Sub-Saharan Africa, several primary studies have been conducted in various countries to examine the prevalence and associated factors of transactional sex among women. These studies had great discrepancies and inconsistent results. Hence, this systematic review and meta-analysis aimed to synthesize the pooled prevalence of the practice of transactional sex among women and its associated factors in Sub-Saharan Africa.

Method

Data source: PubMed, Google Scholar, HINARI, the Cochrane Library, and grey literature were searched from March 6 to April 24, 2022, and included studies conducted from 2000 to 2022. The pooled prevalence of transactional sex and associated factors was estimated using Random Effect Model. Stata (version 16.0) was used to analyze the data. The I-squared statistic, a funnel plot, and Egger's test were used to check for heterogeneity and publication bias, respectively. A subgroup analysis was done based on the study years, source of data, sample sizes, and geographical location.

Results

The pooled prevalence of transactional sex among women in Sub-Saharan Africa was 12.55% (9.59%–15.52%). Early sexual debut (OR = 2.58, 95% CI: 1.56, 4.27), substance abuse (OR = 4.62, 95% CI: 2.62, 8.08), history of sexual experience (OR = 4.87, 95% CI: 2.37, 10.02), physical violence abuse (OR = 6.70, 95% CI: 3.32, 13.53), orphanhood (OR = 2.10, 95% CI: 1.27, 3.47), and sexual violence abuse (OR = 3.76, 95% CI: 1.08, 13.05) were significantly associated with transactional sex.

Competing interests: The authors have declared that no competing interests exist.

Abbreviations: DHS, Demography and Health Survey; TS, Transactional Sex.

Conclusion

The prevalence of transactional sex among women in sub-Saharan Africa was high. Alcohol consumption, substance abuse, early sex debuts, having a history of sexual experiences, physical violence, and sexual violence increased the practice of transactional sex.

Introduction

Transactional sex is defined as a sexual act (s) that is structured by the implicit assumption that sex is exchanged for a variety of instrumental supports such as educational expenses, transportation, a place to sleep, clothing, material items, or money. It reveals that socio-economic factors have a great role in establishing exchange-based sexual relationships in many countries with high HIV prevalence. Commonly, in many countries, men provide and women receive material rewards [1, 2].

Globally, an estimated 36.7 million individuals worldwide were infected with the Human Immunodeficiency Virus (HIV) epidemic. Young people in sub-Saharan Africa (SSA) are more threatened by the HIV epidemic than young people elsewhere. In total, there were 2.1 million new HIV infections worldwide, with 1.1 million occurring in sub-Saharan Africa [3]. HIV infection deaths mainly affect the young and productive segments of the community. Among newly infected people in SSA, 40% belong to the age group of 15–24 years, and more than 60% of these infections occurred among young girls [4].

Significant proportions of females have multiple concurrent sexual relationships and engage in risky sex. Because of their risky sexual *practices*, the girls and their sexual partners, including schoolmates, are at risk of HIV infection and other sexually transmitted infections (STIs) [5, 6]. Among HIV-infected young people in the world, 63% lived in sub-Saharan Africa, and among these, 59% were female. Unprotected sex also puts women at risk of unintended pregnancy, which leads to unsafe abortions [7, 8]. Sex motivated by financial gain is a serious public health issue, particularly in sub-Saharan Africa [9].

Assessing transactional relationships is still an important aspect of HIV prevention initiatives [10]. Individual behaviours that harm people's chances of acquiring sexually transmitted diseases (STDs) and unwanted pregnancies were identified. Among these identified risk behaviours, transactional sex (sex in exchange for money, gifts, benefits, or other monetary rewards) is the main one [11]. The infection rate of STIs, including HIV, among young women aged 15 to 24 years old, is greater than that of young males (3.6 to 1 ratio) [12]. Early sexual activity, early pregnancy, unsafe abortions, and the increase in HIV infections have become major concerns in sub-Saharan Africa [13]. Unwanted pregnancy is the cause of school dropout in girls. School dropout is an additional barrier that women, severely handicapped by parenthood, must face to overcome the longer-term impacts of childbearing [14]. Transactional sex involves engaging in sex for money or gifts in order to increase one's long-term life chances [15, 16].

In sub-Saharan Africa, cultural and social norms, gender inequality, and harmful traditional *practices*, combined with a lack of access to reproductive health services, a high unemployment rate, and young females from lower-income families, expose young people to a variety of social and economic challenges and encourage them to engage in transactional sex [17, 18].

Transactional sex occurred at a rate of 2% in Niger, 14% in Benin, 14% in Kenya, 27% in Zambia, 31% in Uganda, 5% in Cameroon, and 85–90% in Uganda among sexually active girls who reported ever engaging in sexual relations in exchange for money or gifts in the last 12 months [15, 19–23]. Transactional sex is associated with [HIV risk](#) factors or behaviours

including alcohol use [24], sexual or physical violence or abuse [25], inconsistent condom use [26] and multiple partners [27].

In Sub-Saharan Africa, several primary studies have been conducted in various countries to examine the prevalence and associated factors of transactional sex among women. These studies had great discrepancies and inconsistent results across countries. Hence, this systematic review and meta-analysis aimed to synthesise the pooled prevalence of the *practice* of transactional sex among women and its associated factors in sub-Saharan Africa.

Methods

Study design and settings

This meta-analysis and systematic review were carried out in Sub-Saharan African countries (Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon Cape Verde, Chad, Central African Republic, Comoros, Congo, Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Western Sahara, Zambia, Zimbabwe). The International Prospective Register of Systematic Reviews has included this review in the protocol (CRD42022323168).

Data source and search strategy

This review and meta-analysis were developed based on the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) guidelines [28]. Studies on transactional were identified through an online search of PubMed, HINARI, Google Scholar, the Cochrane Library, and grey literature. Articles were searched from March 6, 2022, to April 24, 2022 ([S1 File](#)).

Eligibility criteria (“PPECOLD”). Population (P): The study participants were women aged between 10 and 55 in sub-Saharan Africa. The included studies were from all socioeconomic statuses, all ethnic groups, and all languages but reported in the English language. Women who had casual sex with men in exchange for money, materials, or any benefits in exchange for sexual favours within the past 12 months.

Publication year (P): We planned to investigate the cumulative prevalence of transactional sex and its determinants from the beginning of the Millennium Development Goals in 2000 until the end of our data search in 2022 (January 1, 2000, to March 28, 2022).

Exposure (E): factors associated with transactional sex and at least two times reported as significant factors (socio-demographics such as age and educational status), participants' having not either one or both parents, alcohol use, substance abuse, an early sex debut, history of sexual experiences, physical violence, and sexual violence ([Table 1](#)).

Comparison (C): The reported reference groups for each determinant factor in each respective study, such as substance abuse participants versus those who did not abuse.

Outcome measurement (O): The magnitude and associated factors of transactional sex.

Language (L): All included studies were reported in the English language.

Design (D): case-control and cross-sectional studies were assessed.

Exclusion criteria: citations without full texts, duplicate studies, anonymous reports, case reports, and qualitative studies were excluded.

Screening and data extraction

This study includes both published and unpublished articles on the magnitude of transactional sex and associated factors among women in Sub-Saharan Africa. All search articles were

Table 1. Population exposure comparison and outcome variable (PECO) summary table.

Population	Exposure	Comparison		Outcomes
Women	Orphanhood	Women have neither one nor both parents	Women have both parents*	Transactional sex among women
Women	Age	Women age ≥ 18 years	Women age < 18 years*	Transactional sex among women
Women	Educational status	women have formal education	Participants have no formal education*	Transactional sex among women
Women	Alcohol use	Alcohol user	Non-alcohol user*	Transactional sex among women
Women	Substance abuse	Substance abuser(chat chewing, cocaine, cigarette smoking, morphine, shisha) women	Non-users*	Transactional sex among women
Women	Early sex debut	Women aged less than 16 years	Woman's age greater than or equal to 17 years*	Transactional sex among women
Women	Having a history of sexual experiences	Women who had a sexual history before they engaged in transactional sex	Women who had no sexual history before they engaged in transactional sex*	Transactional sex among women
Women	Physical violence	Women who had a history of physical violence before engaging in transactional sex	Women who did not have a history of physical violence before engaging in transactional sex*	Transactional sex among women
Women	Sexual violence	Women who had a history of sexual violence before engaging in transactional sex	Women who did not have a history of sexual violence before engaging in transactional sex*	Transactional sex among women

* = Reference Group

<https://doi.org/10.1371/journal.pone.0286850.t001>

exported to the Endnote X7 reference manager software, and duplicated articles were excluded. The articles were screened and assessed after carefully reading the titles and abstracts by nine authors (GNM, BGK, ADA, TML, HGB, ADM, BM, MMA, and MDA) independently. The full text of the studies was further evaluated based on objectives, methods, population, and outcomes. Disagreements between authors were resolved through discussion and consensus based on quality assessment tool.

Following the selection of eligible studies, the authors independently extracted all necessary data using a standardized data extraction form. This form includes the primary author, study year, year of publication, study setting, sample size, study design, prevalence, and each specific factor associated with transactional sex. Selected variables had at least two or more studies reporting them as significant factors.

Quality assessment. The scientific strength and quality of each study were assessed by using the Newcastle-Ottawa Scale quality assessment tool [29]. All authors independently, using the assessment tool, weighted the qualities of each original study. An assessment that scores 50% or above was included for analysis (≥ 5 out of 10). Score differences between the investigators were managed by taking the average score of their quality evaluation outcomes (S2 File).

Publication bias and heterogeneity. Comprehensive searches (database and manual searches) were used to minimise the risk of bias. The authors' cooperative work was also crucial in reducing bias, selecting articles based on clear objectives and eligibility criteria. A visual inspection of the funnel plot graph and Egger's tests at a 5% significant level were done to assess the presence of publication bias [30, 31]. Point estimation and subgroup analysis were used to analyse the random variations among the primary studies. I-squared statistics with corresponding p-values were used to assess heterogeneity across and within studies.

Statistical analysis and data presentation. We used Microsoft Excel for data entry and STATA-16 software for analysis. The random-effects model (DerSimonian-Laird method) was considered to assess for variations between the studies. the data was summarised by pooled prevalence and odd ratio. The results were presented using texts, tables, and forest plots with measures of effect and a 95% confidence interval.

Results

Study selection

Four thousand one hundred seventy-five primary studies were identified by using the major medical and health electronic databases and registers. The seven studies were from other relevant sources. From the 4182 identified studies, 1124 were excluded after reviewing their titles due to duplication, whereas 2827 articles were allowed further screening. Of the remaining 231 articles, 199 were excluded due to a non-targeted population, an inconsistent study report, the outcome of interest not being reported, the unavailability of full text, and inconsistency with the predetermined inclusion criteria for the review. Finally, 32 studies were used for the systematic review and meta-analysis, with a total population of 108,075 (Fig 1).

Characteristics of the included studies

All 32 eligible studies were reported in English. The sample size ranges from 204 in Nigeria [32] to 8984 in Malawi [33]. Based on the geographical location, three studies were from Ethiopia [10, 34, 35], three studies were from Uganda [36–38], one was from Liberia [39], three were from South Africa [40–42], four were from Nigeria [32, 43–45], one was from Cameroon [46], two were from Malawi [33, 44], two studies were from Kenya [44, 47] and one study was from each country (Zambia, Zimbabwe, Benin, Burkina Faso, Central Africa Republic(CAR), Chad, Guinea, Niger, and Togo) [44]. The included studies dealt with practises of transactional sex among women and associated factors in sub-Saharan African Countries [10, 32–47] (Table 2).

The magnitude of transactional sex

The pooled prevalence of transactional sex among women in Sub-Saharan African countries was 12.55% (95%CI: 9.59%, 15.52%) (Fig 2).

Heterogeneity and publication bias

This study had heterogeneity ($I^2 = 99.60\%$, $P \leq 0.001$). Publication biases were examined by using both funnel plots and Egger's regression test. The results of funnel plots showed an asymmetric shape, which indicates the presence of publication bias (Fig 3A). Egger's regression test also showed the presence of publication bias across studies (p-value < 0.001). The nonparametric trim and fill analyses were done after examining the publication bias. Trimming and filling analysis was used to fill in 16 missing studies in the funnel plot to correct the publication bias. After imputed 16 studies from 32 observed studies, the pooled prevalence was 4.93% (95% CI: 1.82%–8.03%) using the random effect model (Fig 3B).

Sensitivity analysis

To determine the potential source of heterogeneity seen among the eligible studies, the authors did a sensitivity analysis. The sensitivity analysis result indicated that the source of heterogeneity did not depend on a particular study (Fig 4).

Subgroup analysis

Subgroup analysis was done based on publication years, the number of sample sizes, the source of the data, and the geographical location. Based on publication year, the lowest prevalence was from 2000 to 2005 years (4.34%, 95% CI: 3.16%, 5.51%), and the highest prevalence was from 2011 to 2015 years (32.77%, 95% CI: 5.00%, 60.54%) (Fig 5). The studies with less than

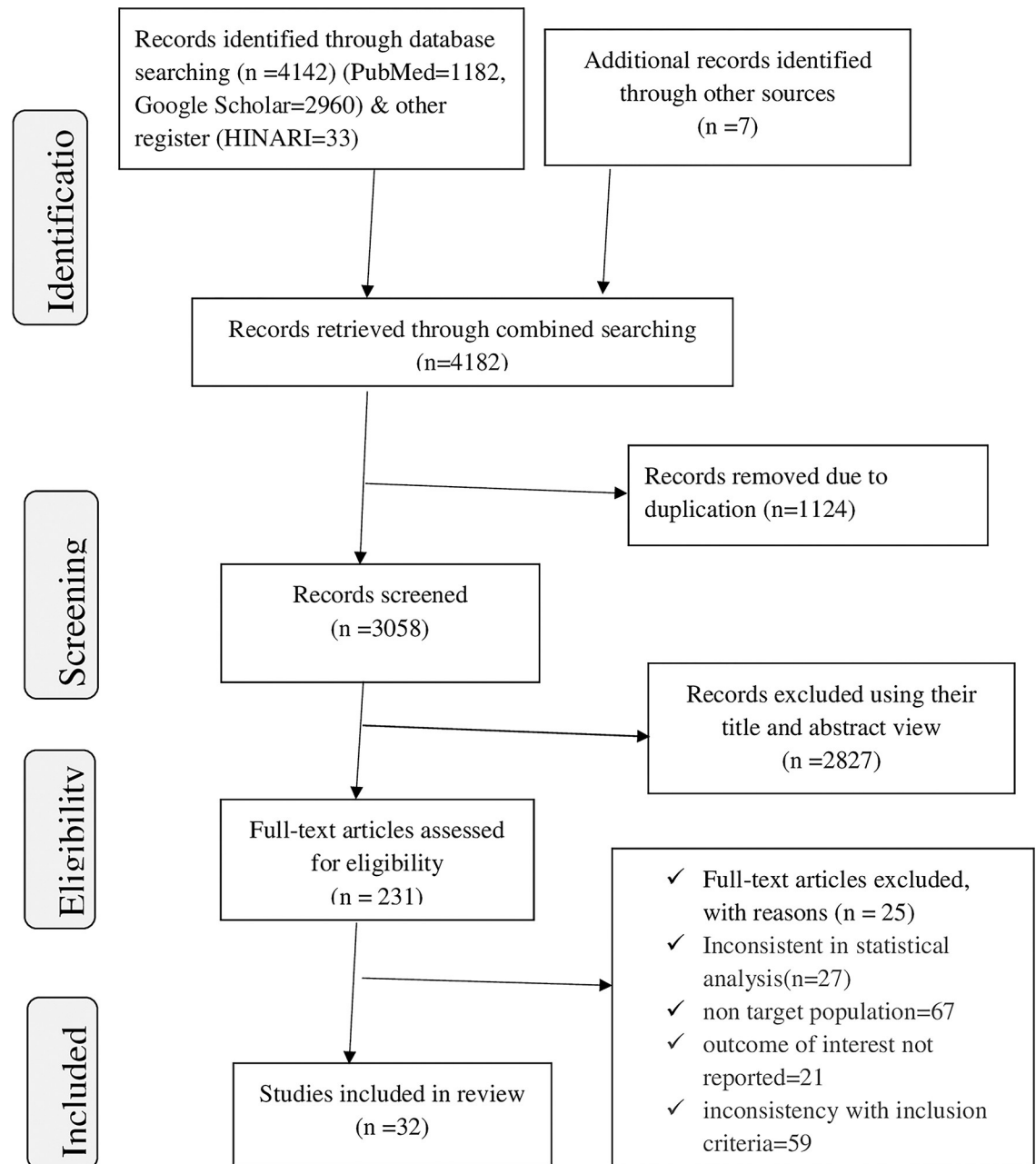


Fig 1. PRISMA flow chart revealing study selection for systematic review and meta-analysis of prevalence and associated factors of transactional sex among women in Sub-Saharan Africa.

<https://doi.org/10.1371/journal.pone.0286850.g001>

3000 sample sizes have the highest pooled prevalence of transactional sex (18.41%, 95% CI: 12.82%–24.00%) (Fig 6). The highest pooled prevalence of transactional sex was found in studies conducted in a single study area (21.02%, 95% CI: 9.59%–15.52%), and the lowest pooled prevalence was found in studies using Demography and Health Survey (DHS) data (4.34%, 95% CI: 3.16%–5.51%) (Fig 7). According to the geographical region classification, East Africa had the highest prevalence (15.57%, 95% CI: 11.38%, 19.75%) (Fig 8).

Table 2. Characteristics of included studies reporting the magnitude and associated factors of transactional sex among women in Sub-Saharan Africa, 2000 to 2022.

First Author & Year of publication	Country	Study design	Woman's age	Reference period	Sample size	Prevalence	Outcome measurement
Kassa AW et al. (2018)	Ethiopia	Cross-sectional	17–19 old years	TS within the last 12 months	726	17.6%	Magnitude & associated factors of transactional sex
Dana LM et al. (2019)	Ethiopia	Cross-sectional	15–24 year old	TS within the last 12 months	634	11.5%	Transactional sex and HIV risks
Stamatakis C. et al. (2021)	Uganda	National survey	13–24 years old	TS within the last 12 months	1515	14.2%	Regional heterogeneity and associated with transactional sex
Okigbo CC et al. (2014)	Liberia	Cross-sectional	13–24 years old	TS within the last 12 months	493	72.0%	Magnitude and risk factors of transactional sex
Duby Z et al. (2021)	South Africa	Cross-sectional	13–24 years old	TS within the last 12 months	4399	12.1%	Motivations for Engaging in Transactional Sex
Ajayi AI et al. (2019)	Nigeria	cross-sectional	14–25 years old	TS within the last 12 months	630	17.9%	The magnitude and associated factors of transactional sex
Ranganathan M et al. (2016)	South Africa	Cross-sectional	15–24 year old	TS within the last 12 months	693	14.0%	Transactional sex prevalence, mediators, and association with HIV infection
Akoku DA et al. (2018)	Cameron	Cross-sectional	21–49-year-olds	TS within the last 12 months	506	14.9%	Socio-economic vulnerabilities and HIV: Drivers of transactional sex
Choudhry V et al. (2014)	Uganda	cross-sectional	13–20 year old	TS within the last 12 months	867	25.0%	Giving or Receiving Something for Sex
Gichane MW et al. (2022)	Malawi	Cross-sectional	≥21 years old females	TS within the last 12 months	920	22.0%	Individual and Relationship-Level Correlates of Transactional Sex
Animasahun VJ et al. (2019)	Nigeria	cross-sectional	15–49-year-olds	TS within the last 12 months	204	7.4%	Transactional Sex among Women Accessing Antiretroviral Treatment
Chatterji M et al. (2005)	Kenya	DHS data extraction	15–49 years old	TS within the last 12 months	6612	6.7%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Zambia	DHS data extraction	15–49 years old	TS within the last 12 months	7128	11.0%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Zimbabwe	DHS data extraction	15–49 years old	TS within the last 4 weeks	4920	3.6%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Benin	DHS data extraction	15–49 years old	TS within the last 12 months	4951	3.7%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Burkinafaso	DHS data extraction	15–49 years old	TS within the last 12 months	5610	1.8%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	CAR	DHS data extraction	15–49 years old	TS Within the last 4 weeks	5342	3.8%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Chad	DHS data extraction	15–49 years old	TS within the last 12 months	6593	2.5%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Guinea	DHS data extraction	15–49 years old	TS within the last 12 months	6135	3.7%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Malawi	DHS data extraction	15–49 years old	TS within the last 12 months	8984	6.5%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Niger	DHS data extraction	15–49 years old	TS within the last 12 months	6621	1.6%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Nigeria	DHS data extraction	15–49 years old	TS within the last 12 months	6871	5.5%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Chatterji M et al. (2005)	Togo	DHS data extraction	15–49 years old	TS within the last 12 months	7787	2.4%	The Factors Influencing Transactional Sex in 12 Sub-Saharan African Countries
Biddlecom AE et al. (2007)	Malawi	National surveys	15–49 years old	TS within the last 12 months	1830	7.5%	Prevalence and meanings of exchange of money or gifts for sex in sub-Saharan Africa
Biddlecom AE et al. (2007)	Burkina Faso	National surveys	15–49 years old	TS within the last 12 months	2547	11.2%	Prevalence and meanings of exchange of money or gifts for sex in 4 sub-Saharan Africa
Biddlecom AE et al. (2007)	Ghana	National surveys	12–19 years old	TS within the last 12 months	2111	7.2%	Prevalence and meanings of exchange of money or gifts for sex in 4 sub-Saharan Africa

(Continued)

Table 2. (Continued)

First Author & Year of publication	Country	Study design	Woman's age	Reference period	Sample size	Prevalence	Outcome measurement
Biddlecom AE et al. (2007)	Uganda	National surveys	12–19 years old	TS within the last 12 months	2354	9.2%	Prevalence and meanings of exchange of money or gifts for sex in 4 sub-Saharan Africa
Alamirew Z et al. (2013)	Ethiopia	Cross-sectional	12–19 years old	TS within the last 12 months	790	27.8%	Prevalence and correlates of exchanging sex for money (gift)
Chiang L et al. (2021)	Uganda	Cross-sectional	12–19 years old	TS within the last 12 months	1795	14.8%	Sexual risk behaviors, mental health outcomes and associated with childhood transactional sex
Ige OS et al. (2021)	Nigeria	cross-sectional	15–49-year-olds	TS within the last 12 months	239	23.85%	Drivers of transactional sexual relationships
Becker ML et al. (2018)	Kenya	Cross-sectional	18–24 years old	TS within the last 12 months	1299	13.6%	HIV Prevalence, Young Women Engaged in Sex Work, Transactional Sex, and Casual Sex
Magni S et al. (2015)	South Africa	National survey	16–55-year-olds	TS within the last 12 months	5969	6.3%	Alcohol Use and Transactional Sex

TS = transactional sex

<https://doi.org/10.1371/journal.pone.0286850.t002>

Factors associated with transactional sex

Nine associated variables were extracted from the primary articles. However, only eight variables were associated with transactional sex. As for educational status, participants' having neither one nor both parents, alcohol use, substance abuse, an early sex debut, a history of sexual experiences, physical violence, and sexual violence were significantly associated with transactional sex. Age of participants greater than 18 years (OR = 1.71, 95% CI, 0.52, 5.62) was not associated with transactional sex by meta-analysis (Fig 9).

Education status was significantly associated with transactional sex [10, 39]. Participants who completed primary school and above (OR = 0.48, 95% CI, 0.27, 0.691) were inversely associated with transactional sex as compared to women who did not complete primary school. The heterogeneity test indicated $I^2 = 0.00\%$, $P = 0.92$. Four studies showed that participants who drank/used alcohol were a significant predictor of TS [40, 42, 43, 46].

Study participants who had used alcohol 2.04 times (OR = 2.04, 95% CI, 1.36, 3.05) more likely to *practice* transactional sex than women who did not use alcohol. The heterogeneity test showed that I^2 value of 64.41%, $P = 0.04$. Orphanhood (participants' have neither one nor both parents) [34, 36] made twice more likely have transactional sex as compared to women who had both parents (OR = 2.10 95% CI, 1.27, 3.47). The heterogeneity test revealed that I^2 value of 0.00%, $P = 0.40$ (Fig 9).

Early sexual debut was significantly associated with TS [36, 39]. Participants who had had their first sexual intercourse before or at the age of 16 years were 2.58 times (OR = 2.58, 95% CI, 1.56, 4.27) more likely to have TS as compared to participants who had first sexual intercourse after 16 or later years. The heterogeneity test indicated $I^2 = 0.00\%$, $P = 0.88$. Participants who had a history of sexual experience two and more years before the engagement of TS were 4.87 times more likely to practise transactional sex than women who had no history of sex before the engagement of TS (OR = 4.87, 95% CI, 2.37, 10.02) [39, 46]. The heterogeneity test indicated that I^2 value of 54.26%, $P = 0.14$ (Fig 9).

Women who had used substances (chat chewing, cocaine, heroin, morphine) were associated with TS [10, 34, 35, 43]. Study participants who had used substances were 4.62 times (OR = 4.62, 95%CI, 2.64, 8.08) more likely to have transactional sex than women who did not use substances. The heterogeneity test showed an I^2 value of 64.31%, $P = 0.04$. Women who had a history of physical violence were 6 times (OR = 6.70, 95% CI, 3.22, 13.53) [36, 37] more likely to practice transactional sex than women who did not have physical violence. The

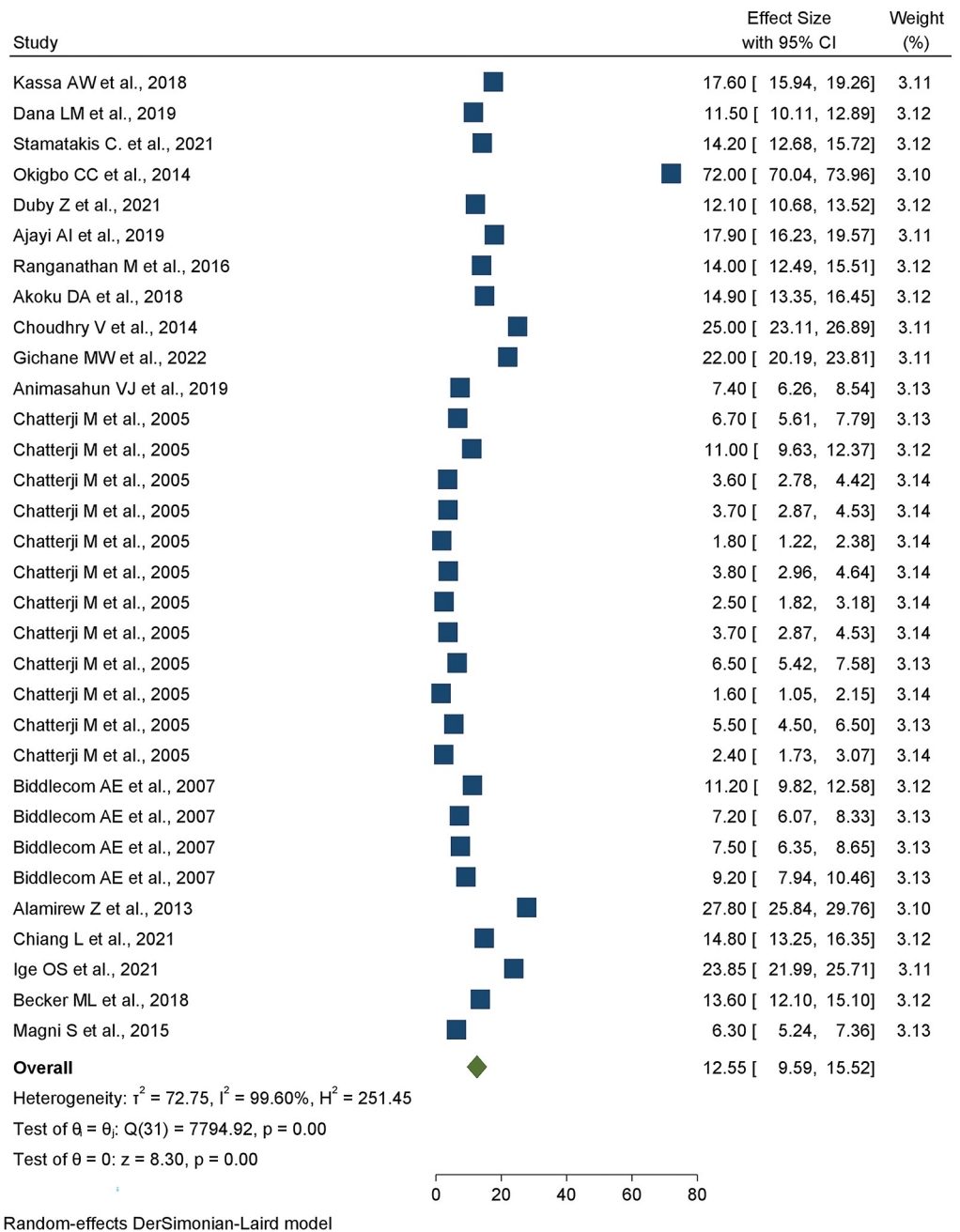


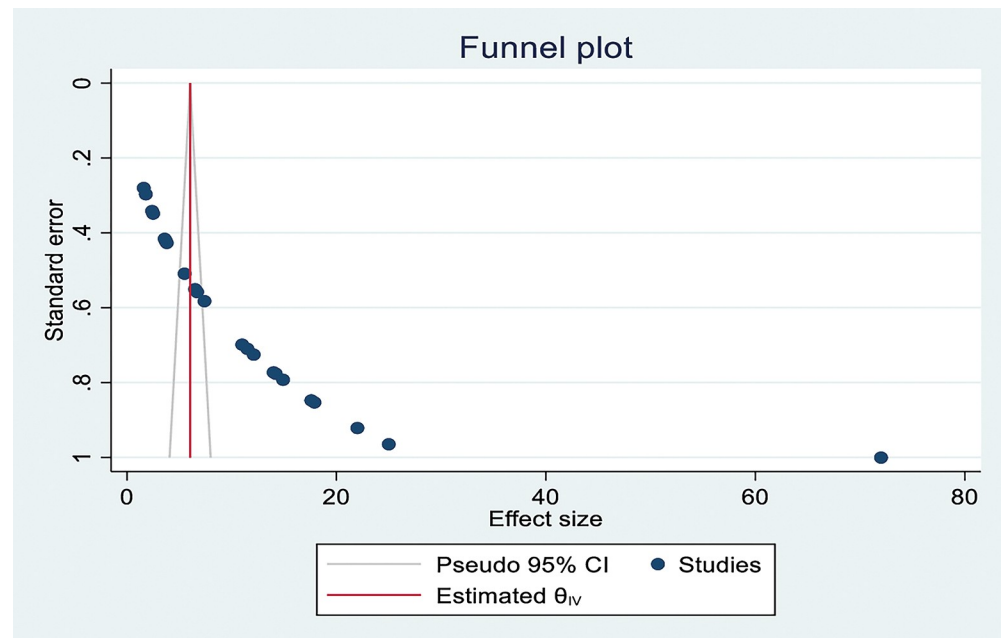
Fig 2. Forest plot of the pooled prevalence of practices of transactional sex among women in Sub-Saharan countries.

<https://doi.org/10.1371/journal.pone.0286850.g002>

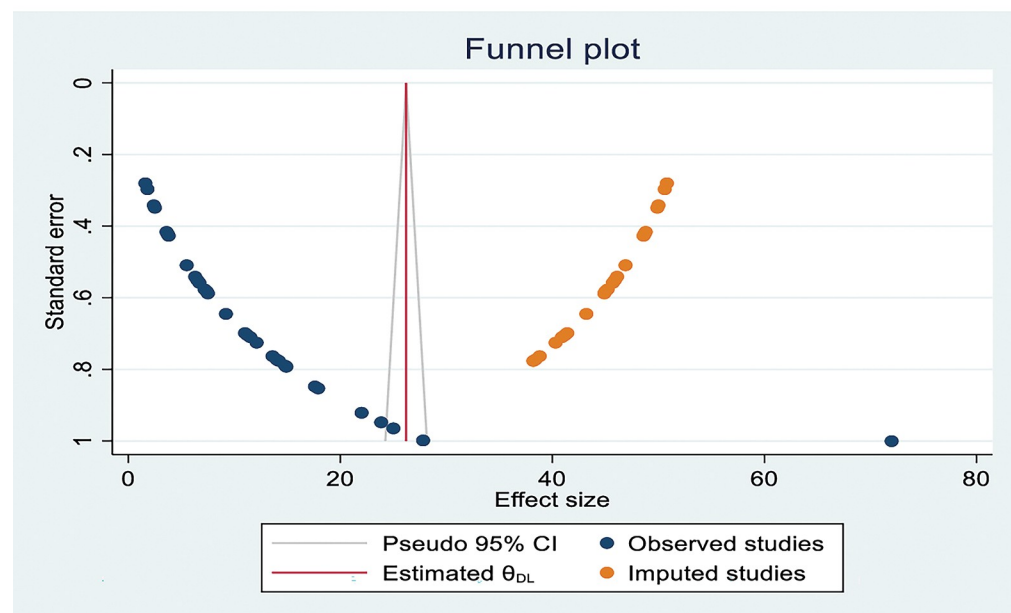
heterogeneity test showed an I^2 value of 0.00%, $P = 0.83$. Sexual violence were a determinant factor for transactional sex (OR = 3.76, 95% CI, 1.08, 13.05) [36, 39]. The heterogeneity test was I^2 , 64.31%, and $p = 0.04$ [36, 39] (Fig 9).

Discussion

This systematic review and meta-analysis aimed to synthesize the pooled prevalence of transactional sex and its associated factors among women in sub-Saharan Africa. Thirty-two studies



a: Funnel plot for assessing publication bias of the prevalence of transactional sex among women in Sub-Saharan Countries.



b: Result of trim and fill analysis for adjusting publication bias of the 48 studies

Fig 3. a: Funnel plot for assessing publication bias of the prevalence of transactional sex among women in Sub-Saharan Countries. b: Result of trim and fill analysis for adjusting publication bias of the 48 studies.

<https://doi.org/10.1371/journal.pone.0286850.g003>

with 108,075 study participants were included and analysed in this review and meta-analysis. Included studies were conducted between January 1, 2000, and March 28, 2022. The pooled prevalence of transactional sex among women in Sub-Saharan Africa was 12.55% (95% CI: 9.59%, 15.52%). Our findings are comparable to those from a study by Krisch, M., et al. in high-income countries [48]. This finding is also comparable to the study conducted by Dunkle, K.L., et al. on African American women [49]. However, this finding was lower than the

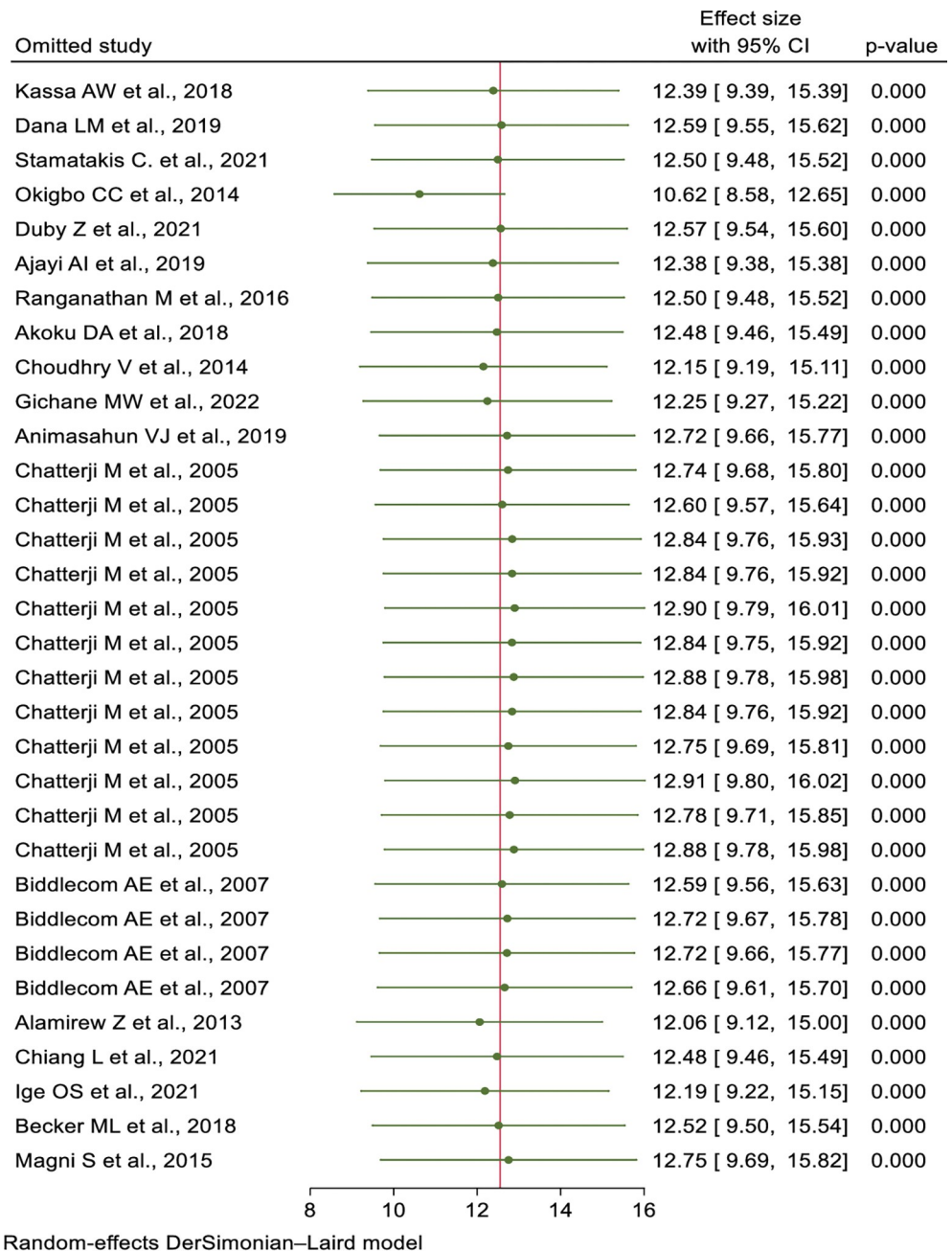


Fig 4. Sensitivity analyses for the prevalence of transactional sex and associated factors among women in Sub-Saharan Africa.

<https://doi.org/10.1371/journal.pone.0286850.g004>

following primary studies conducted before 2000 in Sub-Saharan Africa (Cameroon [50], Malawi [51], and Tanzania [52]).

Women in Nigeria, 18% [51]; in Kenya, 78% [53]; in Canada, 7% [54]; In Sweden, 1.5% [55]; in America, 57% [56], and in Norway, 1.4% [57] have ever exchanged sex for money, gifts, or favours. This variation might be due to the difference in the study period, sociodemographic characteristics, socio-economic development variation, geographical area, the definition of transactional sex, and the source of the studied data. In addition, the comparative studies were primary research.

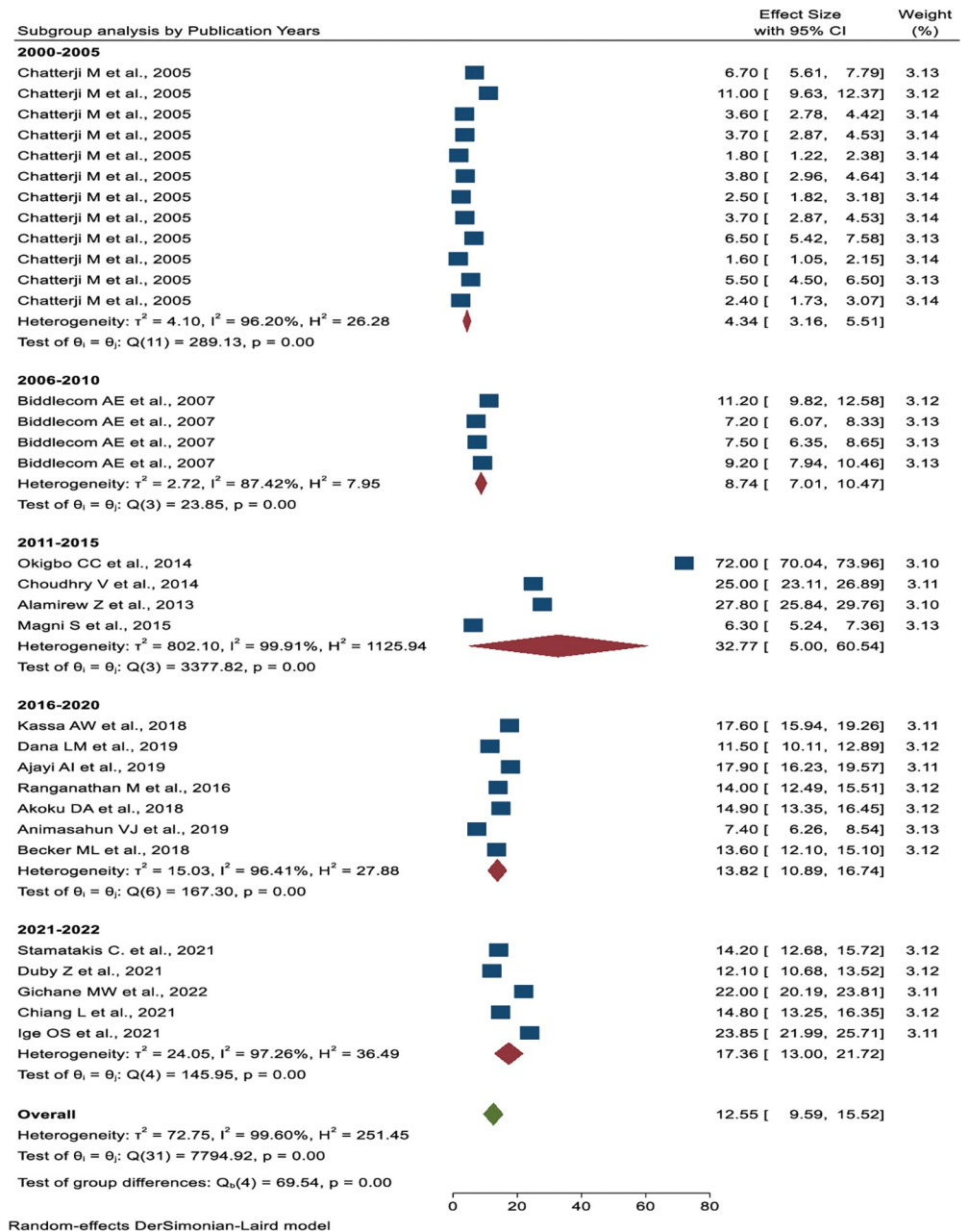


Fig 5. Subgroup analysis of the pooled prevalence of transactional sex among women based on the study period in Sub-Saharan Africa.

<https://doi.org/10.1371/journal.pone.0286850.g005>

Studies conducted from 2000 to 2005, observed the lowest pooled prevalence of transactional sex (4.34%), whereas the highest prevalence was found from 2011 to 2015 (32.77%). This difference might be due to the publication year, the study population, or the sample size. The studies were conducted from 2000 to 2005, and the source of the data was the demography and health survey [44]. It had a large sample size, and the study population was women between the ages of 15 and 49. In contrast to other categories of the year of publication, studies from 2011 to 2015 [35, 37, 39, 42] were conducted in a single area with a relatively small sample size, and the study population was mostly young women.

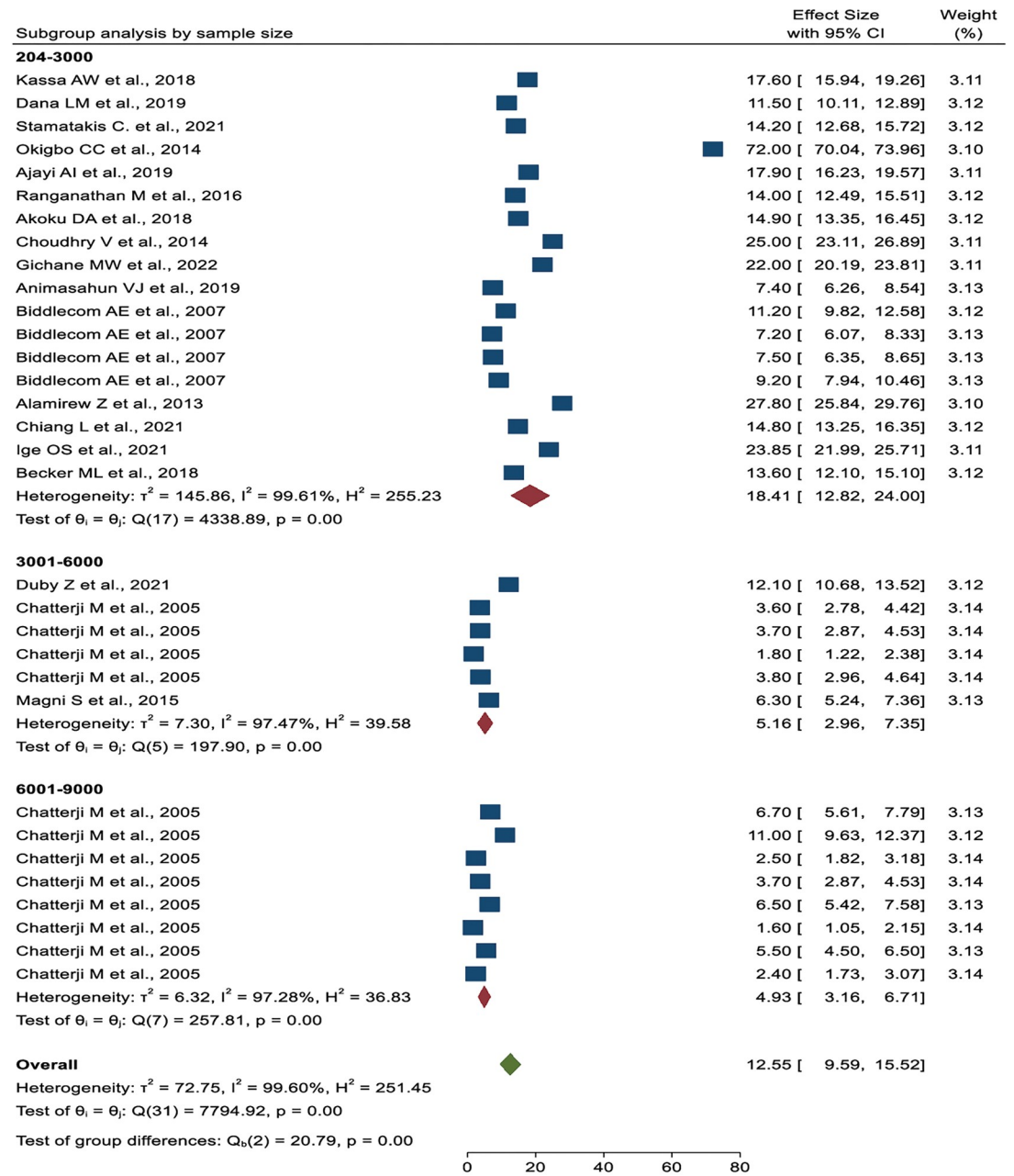


Fig 6. Subgroup analysis of the pooled prevalence of transactional sex among women based on the sample size in Sub-Saharan Africa.

<https://doi.org/10.1371/journal.pone.0286850.g006>

Studies conducted with a sample size of less than 3,000 had the highest pooled prevalence of transactional sex (18.41%). In this subgroup, the study population was young and adolescent women, and they were studied in a single specific area with a small sample size. This finding was in line with the study done in China (16.5%) [58]. In contrast, a sample size greater than 6,000 had the lowest prevalence (4.93%). In terms of data source, studies conducted in a single specific area had the highest pooled prevalence of transactional sex (21.02%), while studies with large amounts of DHS data had the lowest (4.34%).

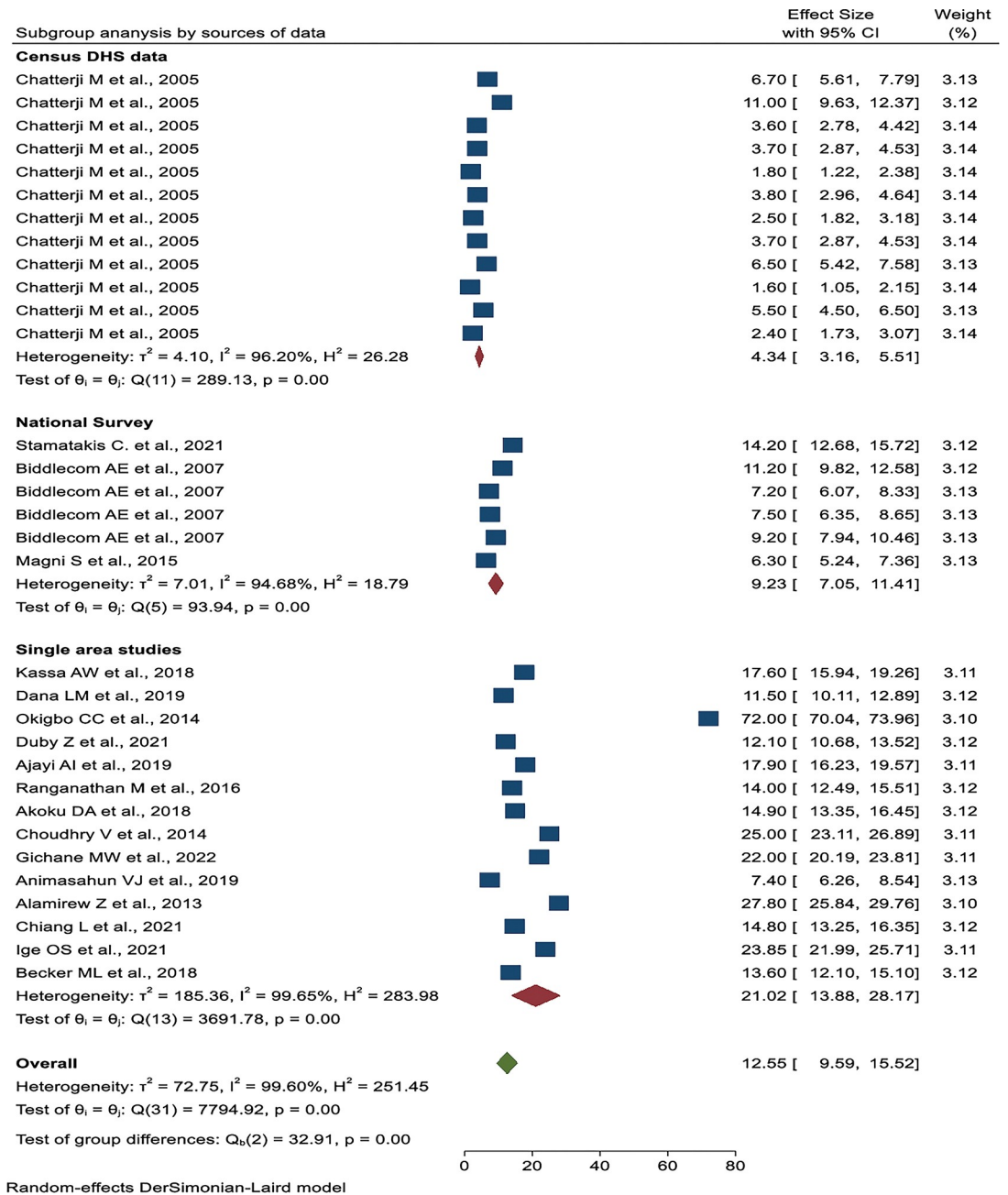


Fig 7. Subgroup analysis of the pooled prevalence of transactional sex among women based on the source of data in Sub-Saharan Africa.

<https://doi.org/10.1371/journal.pone.0286850.g007>

East Africa has the greatest prevalence of transactional sex (15.57%) as compared to the other regions of sub-Saharan Africa (Central Africa, South Africa, and West Africa). Central Africa has the lowest prevalence (7.01%). This might be due to the limited number of primary studies in this region.

Among nine associated variables, eight variables were associated with the transactional sex among women in this meta-analysis. However, one variable (participants' age) was not associated with transactional sex. The odds of transactional sex were higher in participants who had

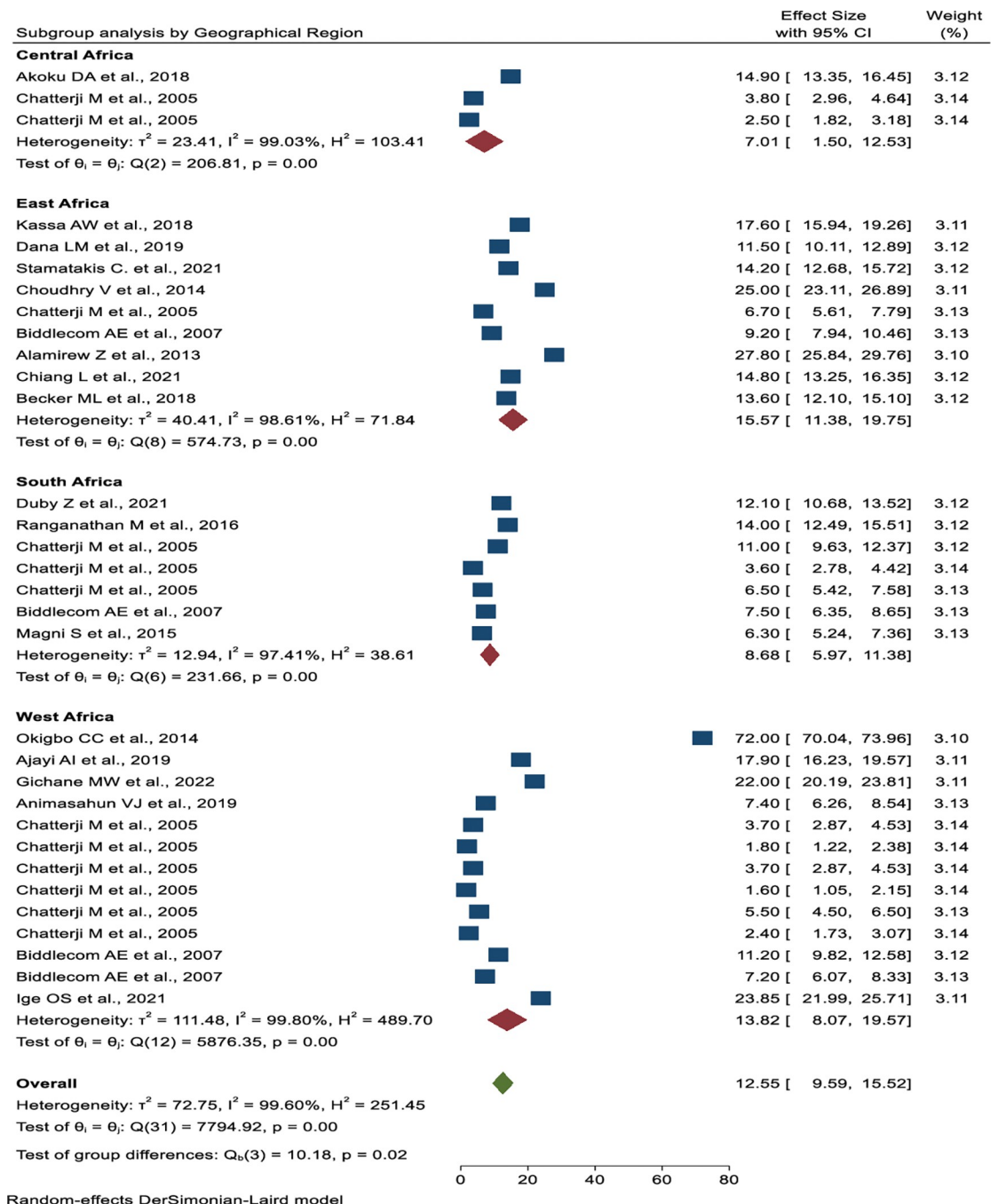


Fig 8. Subgroup analysis of the pooled prevalence of transactional sex among women based on the geographical area in Sub-Saharan Africa.

<https://doi.org/10.1371/journal.pone.0286850.g008>

used alcohol as compared with participants who did not use alcohol. Some studies showed that alcohol consumption affected people’s ability to feel sexual stimulation. Evidence showed that alcohol using women were more likely to engage in sexual activities, have numerous sexual partners, and engage in sex trading [59, 60]. Another study revealed that alcohol users are more likely than the general population to engage in risky sexual behaviours [61]. Other studies showed that, in females, drinking alcohol raises testosterone levels, which increase women’s

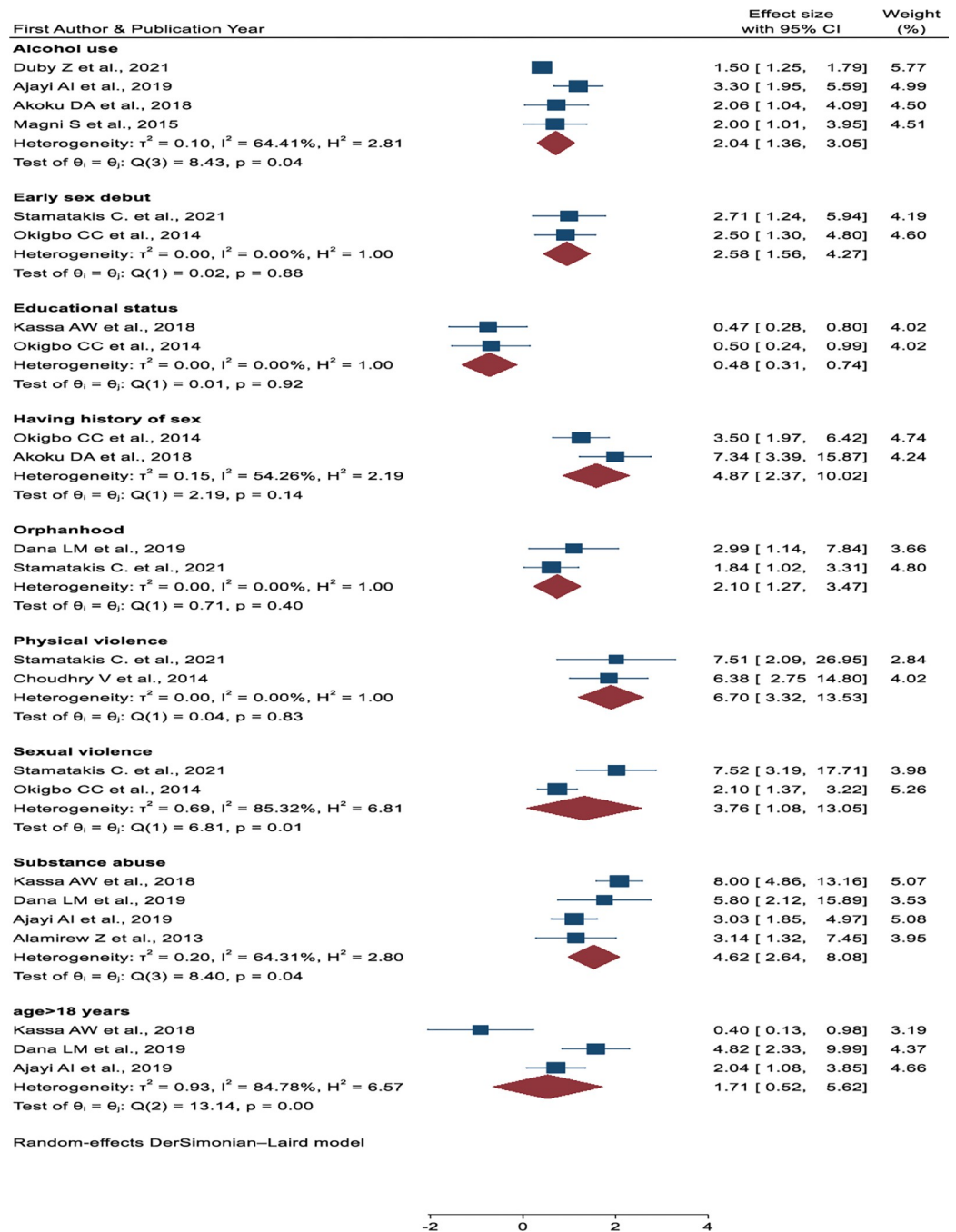


Fig 9. Forest plot of the association between educational status, orphanhood, participants' age, alcohol use, substance abuse, having a history of sexual experience, early sex debut with, physical violence, and sexual violence with transactional sex among women in Sub-Saharan Africa.

<https://doi.org/10.1371/journal.pone.0286850.g009>

sexual desire [62–64]. It might be one of the reasons why women report having higher sexual desire after drinking.

Women who had an early sexual debut (first sexual initiation before the age of 16) were significantly associated with the practice of transactional sex as compared to women who had their first sexual intercourse after 16 years. Evidence shows that young women who

participated in early sexual debuts had an informal exchange of money or material items [65]. Early sexual debut has been associated with multiple sexual partners, an increased risk of unwanted pregnancy, and a higher risk of sexually transmitted illnesses. This might lead to women being exchanged for sex for money. Evidence indicated that the early sexual debut had been highly associated with selling sex [57, 66].

The educational status of the participants was found to be inversely associated with transactional sex practices. The women's educational level, having completed primary school and above made them less likely to engage in transactional sex as compared to women who had not completed primary school or had non-formal education. This could be because as women's educational levels increase, they might become more aware of the negative consequences of transactional sex.

Women who had previously engaged in sexual intercourse before giving or receiving money for sex were four times more likely to participate in transactional sex than those who had never done so. Sexual risk behaviours, especially in early adolescence, raise the chance of a variety of unfavourable health consequences as well as psychopathologies, such as increased substance use and depression.

Exposure to physical violence was associated with increased odds of practicing transactional sex. Women who had been exposed to physical violence were nearly seven times more likely to engage in exchange sex as compared to women who had no history of physical violence. As the study showed, physical violence against young women is a form of childhood trauma that is associated with negative mental and physical health outcomes, including an increased likelihood of engaging in risky sexual behaviour [67].

Sexually violent women were more likely to have transactional sex than non-violent women. Sexual violence against women is veiled in stigma and concealment, and it is fueled by damaging social norms and gender inequalities. Sexual violence includes incest, rape, and sexual violence in the context of dating or intimate relationships, sexual exploitation, internet sexual abuse, and non-contact sexual abuse. This leads to risky sexual behaviour in women and the life experiences of street women in the city. The study revealed that sexual violence has been increasing the exchange of sex [68].

Women who had substance abuse problems (Khat chew, morphine, heroin, cocaine, and shisha abusers) were four times more likely to engage in sexual activity in exchange for sex than non-abusers. Researchers discovered that using substances regularly increased the chance of sex and the number of sex partners. Women who use cocaine, prescription drugs (such as opiates and stimulants), and other illegal substances have higher sexual risk behaviours [69–72]. There is a need to escape psychological trauma, and the stresses of daily life are referred to as substance addiction. As a result, some people may start engaging in high-risk sexual behaviours including unprotected intercourse, which can lead to unintended pregnancy or sexually transmitted diseases [73].

Women who had neither one nor both parents were two times more likely to *practice* transactional sex as compared to women who had both parents. The reason is probably that the parents might serve as teachers and role models for their children, and the children would understand what is good and bad about transactional sex.

Strengths and limitations of the study

This meta-analysis and systematic review were based on a thorough search, and studies were independently screened and extracted, which reduced the possibility of publication bias. All sections of the manuscript were written based on the PRISMA guidelines, and the quality of each study was assessed using the Newcastle-Ottawa Scale quality assessment tool. Although

we found many studies to assess the magnitude of transactional sex in Sub-Saharan Africa, we could not get studies from all countries, which might affect its representativeness. The original studies were self-reported (which might be underreported due to social desirability bias), so the pooled prevalence might be greater than this figure.

Conclusions and recommendations

The prevalence of transactional sex among women in Sub-Saharan Africa was high. Alcohol consumption, substance abuse, early sex debuts, having a history of sexual experiences, physical violence, and sexual violence increased the practice of transactional sex. Whereas education levels greater than primary school and above reduce the practice of sex for exchange money.

Supporting information

S1 Checklist. PRISMA 2020 checklist.
(DOCX)

S1 File. A searching strategy for the prevalence of transactional sex and associated factors among women in Sub-Saharan Africa, 2022.
(DOCX)

S2 File. Newcastle-Ottawa Quality Assessment Scale for cross-sectional studies to assess for prevalence and associated factors of transactional sex among women in Sub-Saharan Africa, 2022.
(DOCX)

Acknowledgments

We would like to thank all the primary research authors and publishers.

Author Contributions

Conceptualization: Gedefaye Nibret Mihretie, Alemu Degu Ayele, Agernesh Dereje Miskr, Melkalem Mamuye Azanaw, Mulugeta Dile Worke.

Data curation: Gedefaye Nibret Mihretie, Alemu Degu Ayele, Tewachew Muche Liyeh, Agernesh Dereje Miskr, Binyam Minuye, Melkalem Mamuye Azanaw, Mulugeta Dile Worke.

Formal analysis: Gedefaye Nibret Mihretie, Binyam Minuye, Melkalem Mamuye Azanaw, Mulugeta Dile Worke.

Funding acquisition: Gedefaye Nibret Mihretie.

Investigation: Gedefaye Nibret Mihretie, Alemu Degu Ayele, Tewachew Muche Liyeh, Habtamu Gebrehana Belay, Agernesh Dereje Miskr, Mulugeta Dile Worke.

Methodology: Gedefaye Nibret Mihretie, Alemu Degu Ayele, Agernesh Dereje Miskr, Binyam Minuye, Melkalem Mamuye Azanaw.

Project administration: Gedefaye Nibret Mihretie, Bekalu Getnet Kassa, Habtamu Gebrehana Belay, Agernesh Dereje Miskr, Binyam Minuye.

Resources: Gedefaye Nibret Mihretie, Bekalu Getnet Kassa, Alemu Degu Ayele, Tewachew Muche Liyeh, Agernesh Dereje Miskr, Binyam Minuye, Melkalem Mamuye Azanaw.

Software: Gedefaye Nibret Mihretie, Alemu Degu Ayele, Habtamu Gebrehana Belay, Binyam Minuye, Melkalem Mamuye Azanaw.

Supervision: Gedefaye Nibret Mihretie, Bekalu Getnet Kassa, Tewachew Muche Liyeh, Habtamu Gebrehana Belay, Agernesh Dereje Miskr, Melkalem Mamuye Azanaw, Mulugeta Dile Worke.

Validation: Gedefaye Nibret Mihretie, Mulugeta Dile Worke.

Visualization: Gedefaye Nibret Mihretie, Tewachew Muche Liyeh, Habtamu Gebrehana Belay.

Writing – original draft: Gedefaye Nibret Mihretie, Tewachew Muche Liyeh, Habtamu Gebrehana Belay, Agernesh Dereje Miskr, Mulugeta Dile Worke.

Writing – review & editing: Gedefaye Nibret Mihretie, Tewachew Muche Liyeh, Habtamu Gebrehana Belay, Mulugeta Dile Worke.

References

1. Jewkes R., et al., Transactional relationships and sex with a woman in prostitution: prevalence and patterns in a representative sample of South African men. *BMC public health*, 2012. 12(1): p. 1–10.
2. Stoebenau K., et al., More than just talk: the framing of transactional sex and its implications for vulnerability to HIV in Lesotho, Madagascar and South Africa. *Globalization and health*, 2011. 7(1): p. 1–15. <https://doi.org/10.1186/1744-8603-7-34> PMID: 21961516
3. Aarø L.E., et al., Promoting sexual and reproductive health among adolescents in southern and eastern Africa (PREPARE): project design and conceptual framework. *BMC Public Health*, 2014. 14(1): p. 1–18. <https://doi.org/10.1186/1471-2458-14-54> PMID: 24438582
4. Jahagirdar D., et al., Incidence of HIV in Sub-Saharan Africa, 2000–2015: The interplay between social determinants and behavioral risk factors. *AIDS and Behavior*, 2021. 25(2): p. 145–154. <https://doi.org/10.1007/s10461-021-03279-9> PMID: 34089423
5. Mugisha F. and Zulu E., The influence of alcohol, drugs and substance abuse on sexual relationships and perception of risk to HIV infection among adolescents in the informal settlements of Nairobi. *Journal of Youth Studies*, 2004. 7(3): p. 279–293.
6. Njue C., Voeten H.A., and Remes P., Porn video shows, local brew, and transactional sex: HIV risk among youth in Kisumu, Kenya. *BMC public health*, 2011. 11(1): p. 1–7. <https://doi.org/10.1186/1471-2458-11-635> PMID: 21824393
7. HIV/AIDS., J.U.N.P.o. and W.H. Organization, AIDS epidemic update, December 2006. 2007: World Health Organization.
8. Shah I. and Ahman E., Age patterns of unsafe abortion in developing country regions. *Reproductive health matters*, 2004. 12(sup24): p. 9–17. [https://doi.org/10.1016/s0968-8080\(04\)24002-2](https://doi.org/10.1016/s0968-8080(04)24002-2) PMID: 15938153
9. Gregson S., et al., Sexual mixing patterns and sex-differentials in teenage exposure to HIV infection in rural Zimbabwe. *The Lancet*, 2002. 359(9321): p. 1896–1903. [https://doi.org/10.1016/S0140-6736\(02\)08780-9](https://doi.org/10.1016/S0140-6736(02)08780-9) PMID: 12057552
10. Kassa A., Ayele B., and Nikus M., Magnitude and Associated Factors of Transactional Sex among High School Students in Debre Markos Town, Northwest Ethiopia. *J AIDS Clin Res*, 2018. 9(768): p. 2.
11. Sonkin B. and Hinde A., Defining risky sexual behaviour in the UK: a latent class approach. 2007.
12. FHI U., Youth Net Assessment Team Assessment of youth reproductive health programs in Ethiopia 2012. Addis Ababa, Ethiopia.
13. Silberschmidt M. and Rasch V., Adolescent girls, illegal abortions and “sugar-daddies” in Dar es Salaam: vulnerable victims and active social agents. *Social science & medicine*, 2001. 52(12): p. 1815–1826.
14. Sobngwi-Tambekou J.L., et al., Teenage childbearing and school dropout in a sample of 18,791 single mothers in Cameroon. *Reproductive Health*, 2022. 19(1): p. 1–9.
15. Chatterji M., et al., The factors influencing transactional sex among young men and women in 12 sub-Saharan African countries. Report prepared for USAID by Futures Group in collaboration with the Centre for Development and Population Activities (CEDPA) and Research Triangle Institute (RTI). Contract no. HRN-C-00-00-00006-00, 2004.

16. Moore A.M., Biddlecom A.E., and Zulu E.M., 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*, 2007. 11(3): p. 44. PMID: [18458736](#)
17. Donenberg G.R., et al., Tracing the roots of early sexual debut among adolescents in psychiatric care. *Journal of the American Academy of Child & Adolescent Psychiatry*, 2003. 42(5): p. 594–608.
18. Federal H. and Prevention A., Control Office: Report on progress towards implementation of the UN Declaration of Commitment on HIV/AIDS. Federal Democratic Republic of Ethiopia, 2010.
19. Luke N. and Kurz K., Cross-generational and transactional sexual relations in sub-Saharan Africa. Washington, DC: International Center for Research on Women (ICRW), 2002.
20. NELSON N., HIV and AIDS in Africa by DOUGLAS WEBB. London, Pluto Press, and David Phillip Publishers and University Of Natal Press, South Africa, 1997. Pp. 258, Hb.£ 35.00 Pb.£ 13.99. *The Journal of Modern African Studies*, 1998. 36(3): p. 509–545.
21. Weiss E., Shelan D., and Gupta G.R., Vulnerability and opportunity: Adolescents and HIV/AIDS in the developing world; findings from the women and AIDS Research Program. International Center for Research on Women. ICRW Reports and Publications, 1996: p. 1.
22. Konde-Lule J.K., Sewankambo N., and Morris M., Adolescent sexual networking and HIV transmission in rural Uganda. *Health Transition Review*, 1997: p. 89–100. PMID: [10184747](#)
23. Nyanzi S., Pool R., and Kinsman J., The negotiation of sexual relationships among school pupils in south-western Uganda. *AIDS care*, 2001. 13(1): p. 83–98. <https://doi.org/10.1080/09540120020018206> PMID: [11177467](#)
24. Choudhry V., et al., Patterns of alcohol consumption and risky sexual behavior: a cross-sectional study among Ugandan university students. *BMC public health*, 2014. 14: p. 1–11. <https://doi.org/10.1186/1471-2458-14-1>
25. Zembe Y.Z., et al., Intimate partner violence, relationship power inequity and the role of sexual and social risk factors in the production of violence among young women who have multiple sexual partners in a peri-urban setting in South Africa. *PLoS one*, 2015. 10(11): p. e0139430. <https://doi.org/10.1371/journal.pone.0139430> PMID: [26599394](#)
26. Luke N., et al., Social exchange and sexual behavior in young women's premarital relationships in Kenya. *Journal of Marriage and Family*, 2011. 73(5): p. 1048–1064. <https://doi.org/10.1111/j.1741-3737.2011.00863.x> PMID: [22180665](#)
27. Phillips-Howard P.A., et al., Menstrual needs and associations with sexual and reproductive risks in rural Kenyan females: a cross-sectional behavioral survey linked with HIV prevalence. *Journal of Women's Health*, 2015. 24(10): p. 801–811. <https://doi.org/10.1089/jwh.2014.5031> PMID: [26296186](#)
28. Liberati A., et al., The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *Journal of clinical epidemiology*, 2009. 62(10): p. e1–e34. <https://doi.org/10.1016/j.jclinepi.2009.06.006> PMID: [19631507](#)
29. Shea B., et al., The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomized studies in meta-analysis bias and confounding Newcastle-Ottawa Scale. 2020.
30. Sterne J.A. and Egger M., Funnel plots for detecting bias in meta-analysis: guidelines on choice of axis. *Journal of clinical epidemiology*, 2001. 54(10): p. 1046–1055. [https://doi.org/10.1016/s0895-4356\(01\)00377-8](https://doi.org/10.1016/s0895-4356(01)00377-8) PMID: [11576817](#)
31. Egger M., et al., Bias in meta-analysis detected by a simple, graphical test. *Bmj*, 1997. 315(7109): p. 629–634. <https://doi.org/10.1136/bmj.315.7109.629> PMID: [9310563](#)
32. Animasahun V.J., Sholeye O.O., and Oyewole B.K., Transactional Sex Among Women Accessing Antiretroviral Care in Sagamu, Nigeria: A Descriptive Survey. *International Quarterly of Community Health Education*, 2019. 39(4): p. 225–231. <https://doi.org/10.1177/0272684X18821303> PMID: [30590981](#)
33. Gichane M.W., et al., Individual and Relationship-Level Correlates of Transactional Sex Among Adolescent Girls and Young Women in Malawi: A Multilevel Analysis. *AIDS and Behavior*, 2022. 26(3): p. 822–832. <https://doi.org/10.1007/s10461-021-03442-2> PMID: [34426863](#)
34. Dana L.M., Adinew Y.M., and Sisay M.M., Transactional sex and HIV risk among adolescent school girls in Ethiopia: Mixed method study. *BioMed Research International*, 2019. 2019. <https://doi.org/10.1155/2019/4523475> PMID: [31346517](#)
35. Alamirew Z., et al., Prevalence and correlates of exchanging sex for money (gift) among private college students in BahirDar city, Northwest Ethiopia. *Clin Medi Res*, 2013. 2(6): p. 126–134.
36. Stamatakis C., et al., Regional heterogeneity in violence and individual characteristics associated with recent transactional sex among Ugandan girls and young women: A national and regional analysis of data from the Violence Against Children and Youth Survey. *PLoS one*, 2021. 16(9): p. e0257030. <https://doi.org/10.1371/journal.pone.0257030> PMID: [34473803](#)

37. Choudhry V., et al., Giving or receiving something for sex: a cross-sectional study of transactional sex among Ugandan university students. *PloS one*, 2014. 9(11): p. e112431. <https://doi.org/10.1371/journal.pone.0112431> PMID: 25386901
38. Chiang L., et al., Sexual risk behaviors, mental health outcomes and attitudes supportive of wife-beating associated with childhood transactional sex among adolescent girls and young women: Findings from the Uganda Violence Against Children Survey. *PLoS one*, 2021. 16(3): p. e0249064. <https://doi.org/10.1371/journal.pone.0249064> PMID: 33765005
39. Okigbo C.C., et al., Risk factors for transactional sex among young females in post-conflict Liberia. *African journal of reproductive health*, 2014. 18(3): p. 133–141. PMID: 25438518
40. Duby Z., et al., From Survival to Glamour: Motivations for Engaging in Transactional Sex and Relationships Among Adolescent Girls and Young Women in South Africa. *AIDS and Behavior*, 2021. 25(10): p. 3238–3254. <https://doi.org/10.1007/s10461-021-03291-z> PMID: 33950338
41. Ranganathan M., et al., Transactional sex among young women in rural South Africa: prevalence, mediators and association with HIV infection. *Journal of the international AIDS society*, 2016. 19(1): p. 20749. <https://doi.org/10.7448/IAS.19.1.20749> PMID: 27469061
42. Magni S., et al., Alcohol use and transactional sex among women in South Africa: results from a Nationally Representative Survey. *PLoS One*, 2015. 10(12): p. e0145326. <https://doi.org/10.1371/journal.pone.0145326> PMID: 26683812
43. Ajayi A.I. and Somefun O.D., Transactional sex among Nigerian university students: the role of family structure and family support. *PloS one*, 2019. 14(1): p. e0210349. <https://doi.org/10.1371/journal.pone.0210349> PMID: 30615697
44. Chatterji M., et al., The factors influencing transactional sex among young men and women in 12 sub-Saharan African countries. *Social biology*, 2005. 52(1–2): p. 56–72.
45. Ige O.S. and Solanke B.L., Drivers of transactional sexual relationships among students in a Nigerian University: implications for elimination of reproductive rights violation. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 2021. 10(1): p. 55–61.
46. Akoku D.A., et al., Socio-economic vulnerabilities and HIV: drivers of transactional sex among female bar workers in Yaounde, Cameroon. *PloS one*, 2018. 13(6): p. e0198853.
47. Becker M.L., et al., Vulnerabilities at first sex and their association with lifetime gender-based violence and HIV prevalence among adolescent girls and young women engaged in sex work, transactional sex, and casual sex in Kenya. *Journal of Acquired Immune Deficiency Syndromes (1999)*, 2018. 79(3): p. 296. <https://doi.org/10.1097/QAI.0000000000001826> PMID: 30113403
48. Krisch M., et al., Sex trade among youth: A global review of the prevalence, contexts and correlates of transactional sex among the general population of youth. *Adolescent Research Review*, 2019. 4(2): p. 115–134.
49. Dunkle K.L., et al., Economically motivated relationships and transactional sex among unmarried African American and white women: results from a US national telephone survey. *Public Health Reports*, 2010. 125(4_suppl): p. 90–100.
50. Meekers D. and Calves A.-E., Gender differentials in adolescent sexual activity and reproductive health risks in Cameroon. *African Journal of Reproductive Health*, 1999. 3(2): p. 51–67.
51. Weiss E W.D., Gupta GR. Vulnerability and Opportunity: Adolescents and HIV/AIDS in the Developing World; Conclusions and Recommendations. International Center for Research on Women. ICRW Reports and Publications. 1996 Jan 31:20.
52. Chambua S.E., et al., Facts about and images of teenage girls in Tanzania. 1994.
53. Nzyuko S., et al., Adolescent sexual behavior along the Trans-Africa Highway in Kenya. *AIDS (London, England)*, 1997. 11: p. S21–6. PMID: 9376097
54. Fredlund C., et al., Adolescents' lifetime experience of selling sex: Development over five years. *Journal of Child Sexual Abuse*, 2013. 22(3): p. 312–325. <https://doi.org/10.1080/10538712.2013.743950> PMID: 23590352
55. Svedin C.G. and Priebe G., Selling sex in a population-based study of high school seniors in Sweden: Demographic and psychosocial correlates. *Archives of Sexual Behavior*, 2007. 36(1): p. 21–32. <https://doi.org/10.1007/s10508-006-9083-x> PMID: 17187218
56. Curtis R., et al., The commercial sexual exploitation of children in New York City. New York: Center for Court Innovation, 2008.
57. Pedersen W. and Hegna K., Children and adolescents who sell sex: A community study. *Social Science & Medicine*, 2003. 56(1): p. 135–147. [https://doi.org/10.1016/s0277-9536\(02\)00015-1](https://doi.org/10.1016/s0277-9536(02)00015-1) PMID: 12435557

58. Lau J.T., et al., Prevalence and associated factors of condom use during commercial sex by female sex workers who were or were not injecting drug users in China. *Sexual health*, 2012. 9(4): p. 368–376. <https://doi.org/10.1071/SH11108> PMID: 22877597
59. Weinhardt L.S. and Carey M.P., Does alcohol lead to sexual risk behavior? Findings from event-level research. *Annual review of sex research*, 2000. 11(1): p. 125–157. PMID: 11351830
60. Shillington A.M., et al., Is there a relationship between “heavy drinking” and HIV high risk sexual behaviors among general population subjects? *International Journal of the Addictions*, 1995. 30(11): p. 1453–1478. <https://doi.org/10.3109/10826089509055842> PMID: 8530215
61. Scheidt D.M. and Windle M., The alcoholics in treatment HIV risk (ATRISK) study: gender, ethnic and geographic group comparisons. *Journal of studies on alcohol*, 1995. 56(3): p. 300–308. <https://doi.org/10.15288/jsa.1995.56.300> PMID: 7623469
62. Beckman L.J. and Ackerman K.T., Women, alcohol, and sexuality. *Recent developments in alcoholism*, 2002: p. 267–285.
63. Friedman R.S., et al., Automatic effects of alcohol cues on sexual attraction. *Addiction*, 2005. 100(5): p. 672–681. <https://doi.org/10.1111/j.1360-0443.2005.01056.x> PMID: 15847625
64. Wilson G.T. and Lawson D.M., Effects of alcohol on sexual arousal in women. *Journal of Abnormal Psychology*, 1976. 85(5): p. 489. <https://doi.org/10.1037//0021-843x.85.5.489> PMID: 965577
65. Hawkins K., Price N., and Mussá F., Milking the cow: Young women’s construction of identity and risk in age-disparate transactional sexual relationships in Maputo, Mozambique. *Global Public Health*, 2009. 4(2): p. 169–182. <https://doi.org/10.1080/17441690701589813> PMID: 19333807
66. Lavoie F., et al., Buying and selling sex in Québec adolescents: A study of risk and protective factors. *Archives of sexual behavior*, 2010. 39(5): p. 1147–1160.
67. Anda R.F., et al., The enduring effects of abuse and related adverse experiences in childhood. *European archives of psychiatry and clinical neuroscience*, 2006. 256(3): p. 174–186.
68. Shepp V., et al., Sexual assault survivors who exchange sex: identity, stigma, and informal responses from support providers. *Affilia*, 2020. 35(1): p. 105–128. <https://doi.org/10.1177/0886109919866161> PMID: 34219914
69. Palen L.-A., et al., Substance use and sexual risk behavior among South African eighth grade students. *Journal of Adolescent Health*, 2006. 39(5): p. 761–763. <https://doi.org/10.1016/j.jadohealth.2006.04.016> PMID: 17046518
70. Tapert S.F., et al., Adolescent substance use and sexual risk-taking behavior. *Journal of Adolescent Health*, 2001. 28(3): p. 181–189. [https://doi.org/10.1016/s1054-139x\(00\)00169-5](https://doi.org/10.1016/s1054-139x(00)00169-5) PMID: 11226840
71. Elkington K.S., Bauermeister J.A., and Zimmerman M.A., Psychological distress, substance use, and HIV/STI risk behaviors among youth. *Journal of youth and adolescence*, 2010. 39(5): p. 514–527. <https://doi.org/10.1007/s10964-010-9524-7> PMID: 20229264
72. Levine S.B. and Coupey S.M., Adolescent substance use, sexual behavior, and metropolitan status: is “urban” a risk factor? *Journal of adolescent health*, 2003. 32(5): p. 350–355. [https://doi.org/10.1016/s1054-139x\(03\)00016-8](https://doi.org/10.1016/s1054-139x(03)00016-8) PMID: 12729984
73. Hartman L.I., et al., Sexual addiction and substance addiction: Comparing sexual addiction treatment outcomes among clients with and without comorbid substance use disorders. *Sexual Addiction & Compulsivity*, 2012. 19(4): p. 284–309.