REPRODUCTIVE HEALTH SERVICE UTILIZATION AND BURDEN OF PROBLEMS AMONG WOMEN WITH DISABILITIES IN SIDAMA REGION, ETHIOPIA

BY

ZELALEM TENAW BOGALE

DISSERTATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (PHD) IN PUBLIC HEALTH HAWASSA UNIVERSITY, ETHIOPIA

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HAWASSA UNIVERSITY, COLLEGE OF MEDICINE AND HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH

REPRODUCTIVE HEALTH SERVICE UTILIZATION AND BURDEN OF PROBLEMS AMONG WOMEN WITH DISABILITIES IN SIDAMA REGION, ETHIOPIA

A DISSERTATION SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH OF HAWASSA UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (PhD) IN PUBLIC HEALTH.

BY

ZELALEM TENAW BOGALE

SUPERVISORS:

Primary Supervisor: Achamyelesh Gebretsadik (PhD, Associate Professor)

Co-Supervisor: Taye Gari (PhD, Associate Professor)

MAY, 2024

HAWASSA, ETHIOPIA

Declaration

I hereby declare that this PhD dissertation is my original work and has not been presented for a degree in any other university, and all sources of material used for this dissertation have been duly acknowledged.

Name: _____

Signature: _____

Date: _____

ADVISORS' APPROVAL SHEET

SCHOOL OF GRADUATE STUDIES

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(Submission sheet -1)

This is to certify that the dissertation entitled **"Reproductive Health Service Utilization and Burden of Problems Among Women With Disabilities in Sidama Region, Ethiopia"** submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy (PhD) with specialization in public health, the Graduate Program of the Department/School of public health, and has been carried out Zelalem Tenaw Bogale ID. No. PhD PUHeR/0006/13, under my/our supervision. Therefore, I/we recommend that the student has fulfilled the requirements and hence hereby can submit the dissertation to the school.

Achamyelesh Gebretsadik (PhD) _____ _____

Name of major advisor Signature Date

Taye Gari (PhD) _____ _____

Name of co-advisor Signature Date

SCHOOL OF PUBLIC HEALTH

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(Submission sheet -2)

DISSERTATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (PHD) IN PUBLIC HEALTH HAWASSA UNIVERSITY, ETHIOPIA

BY

ZELALEM TENAW BOGALE

SCHOOL OF PUBLIC HEALTH, HAWASSA UNIVERSITY

APPROVED BY THE EXAMINING BOARD

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Primary supervisor Date

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Secondary supervisor Date

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External examiner Date

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Internal examiner Date

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Internal examiner Date

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LIST OF ORIGINAL PAPERS

The following Roman number referenced papers are the original papers of this dissertation.

I. Tenaw Z, Gari T, Gebretsadik A.2023. Contraceptive use among reproductive-age females with disabilities in central Sidama National Regional State, Ethiopia: a multilevel analysis. *PeerJ* 11: e15354. https://pubmed.ncbi.nlm.nih.gov/37197581/

II. Tenaw Z, Gari T, Gebretsadik A. Unintended pregnancy and its associated factors among women with disabilities in central Sidama National Regional State, Ethiopia: a multilevel analysis. BMC pregnancy and childbirth. 2023;23(1):1-6. https://pubmed.ncbi.nlm.nih.gov/37460959/

III. Tenaw Z, Gari T, Gebretsadik A. Sexual violence and associated factors among reproductive-age females with disabilities in central Sidama National Regional State, Ethiopia: a multilevel analysis. BMC women's health. 2023;23(1):353. https://pubmed.ncbi.nlm.nih.gov/37403083/

SCIENTIFIC CONFERENCE PRESENTATIONS

1. Delivered an oral presentation at "The 5th Annual Reproductive Health Conference: Advancing Adolescents and Youth Sexual and Reproductive Health and Rights: Bridging the Gaps" (refer to the certificate in the appendices for verification).
2. Presented a poster at "The 5th Annual Reproductive Health Conference: Advancing Adolescents and Youth Sexual and Reproductive Health and Rights: Bridging the Gaps" (refer to the certificate provided in the appendices for verification).
3. Delivered an oral presentation at the scientific conference hosted by the School of Public Health in conjunction with the SENUPH II project, held at the College of Medicine in Hawassa, Sidama Region, Ethiopia (refer to the certificate in the appendices for details).

ABBREVIATIONS AND ACRONYMS

AIC: Akaike Information Criterion

ANC: Antenatal Care

AOR: Adjusted Odds Ratio

BIC: Bayesian Information Criterion

CBR: Community-Based Rehabilitation

CI: Confidence Interval

CSA: Central Statistical Agency

EDHS: Ethiopian Demographic Health Survey

FWDs: Female With Disabilities

HHS: Households

ICC: Intraclass Correlation

ICF: International Classification of Functioning

IRB: Institutional Review Board

KM: Kilometre

LMUP: London Measure of Unplanned Pregnancy

MOR: Median Odds Ratio

MSc: Master of Science

PCA: Principal Component Analysis

PhD: Doctor of Philosophy

PI: Principal Investigator

PWDs: People With Disabilities

RHS: Reproductive Health Services

RHSU: Reproductive Health Service Utilization

SNRS: Sidama National Regional State

UN: United Nations

USA: United States of America

VIF: Variance Inflation Factor

WHO: World Health Organization

WWDs: Women With Disabilities

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SUMMARY

Background: Women with disabilities are more likely to experience unintended pregnancy and sexual violence. However, there is no enough evidence about contraceptive utilization, unintended pregnancy, sexual violence and determinant factors among reproductive-age women with disabilities in Ethiopia. This knowledge gap is particularly pronounced in rural settings and among individuals with disabilities beyond the categories of the young, blind, and deaf. Additionally, the influence of contextual factors on these aspects remains inadequately explored. Therefore, this study aimed to assess reproductive health service utilization and burden of problems among women with disabilities in Central Sidama (Dale and Wonsho districts and Yirgalem city administration) Region, Ethiopia.

Methods: A community-based disability-specific house-to-house census was conducted from May 1-30, 2022, to determine the reproductive-age of women with disabilities. After the census, a cross-sectional study design was used from June 20 to July 15, 2022, to investigate reproductive health service utilization and burden of problems, and their determinants (Objectives I, II, and III).

The sample sizes were determined independently for each objective. Specifically, 620 reproductive-age females with disabilities participated in Objective I, 363 women with disabilities participated in Objective II, and 652 reproductive-age females with disabilities participated in Objective III. I allocated the sample size proportionally to the 30 randomly selected kebeles. A multi-stage stratified cluster sampling technique was used to select the study participants. Pretested structured and unstructured data collection tools were used, and face-to-face interview was conducted.

The data was collected using the Kobo Collect application version 2021.3.4. After collection, the data were imported into Stata version 16 for analysis. A descriptive and multilevel binary logistic regression analysis model was applied. Then, bi-variable multilevel logistic regression was done to identify eligible variables (P-value<0.20) for multivariable multilevel logistic regression analysis. A P-value of <0.05 and a 95% confidence level were used to determine statistical significance.

Results: Among reproductive-age females with disabilities, 27.3 % (95% CI: 23.8 %, 31.0 %) were current contraceptive users. Of the users, 82 (48.5%) used implants. The odds of contraceptive utilization is (AOR=9.03; 95% CI: 4.39, 18.6) times higher among reproductive-age women who have good contraceptive knowledge compared to their counterparts. Reproductive -age women with disabilities who have transport accessibility to health facilities

are (AOR=2.28; 95% CI: 1.32, 3.94) times more likely to use contraceptives compared to those who have no transport access to health facilities. Compared to young reproductive-age (15 to 24 years old) women with disabilities, those aged 25 to 34 years are (AOR=3.04; 95% CI: 1.53, 6.04) times higher odds of contraceptive utilization. Reproductive-age women with a hearing disability have (AOR = 0.38; 95% CI: 0.18, 0.79) lower chance of contraceptive utilization. Similarly, those with paralysis of the extremities (AOR = 0.06; 95% CI: 0.03, 0.12) demonstrate a lower chance of contraceptive utilization, while reproductive-age women using a wheelchair also showed (AOR = 0.10; 95% CI: 0.05, 0.22) lower chance of contraceptive utilization compared to reproductive-age women with vision disability (Objective I).

The prevalence of current (most recent) unintended pregnancy among women with disabilities was 65.6% (95% CI: 60.4, 70.6). Compared with poor income tercile, women who have a middle-income tercile have (AOR = 2.07; 95% CI: 1.02, 4.20) times higher risk for unintended pregnancy. Women with disabilities who gave birth (AOR = 2.20; 95% CI: 1.21, 3.99) have a higher risk of unintended pregnancy compared to those who have not given birth. The risk of unintended pregnancy is (AOR = 0.26; 95% CI: 0.12, 0.57) lower among women with extremity paralysis compared with vision disability. Compared with rural resident women with urban residents have (AOR = 0.22; 95% CI: 0.12, 0.40) a lower risk of unintended pregnancy. Women with disabilities who drink alcohol have (AOR = 0.28; 95% CI: 0.11, 0.74) a lower risk of unintended pregnancy when compared with those who did not drink alcohol (Objective II).

On the other hand, the prevalence of lifetime sexual violence among reproductive-age females with disabilities was 59.8% (95% CI: 56, 63.56). Reproductive-age women with disabilities who reside in urban settings have (AOR = 0.51; 95% CI: 0.29, 0.88) a lower risk of sexual violence compared to their counterparts in rural settings. Compared with young (15 to 24 years old) reproductive-age women with disabilities, those aged 25 to 34 years have (AOR = 5.9; CI: 3.01, 11.6) times higher risk of sexual violence. Similarly, reproductive-age women with disabilities aged 35 to 49 years have (AOR = 3.47; CI: 1.48, 8.14) times higher risk of sexual violence. Reproductive-age women with disabilities having no sexuality information have (AOR = 11.3; CI: 6.24, 20.5) times higher risk of sexual violence compared to their counterparts who have sexuality information. and having hearing disabilities (AOR = 3.19; CI: 1.49, 6.83) were factors associated with sexual violence (Objective III).

Conclusion: This study revealed that the burden of unintended pregnancy and sexual violence among reproductive-age women with disabilities are high. Moreover, contraceptive utilization among reproductive-age females with disabilities is low. Contraceptive knowledge, age,

transport accessibility, and types of disability determine contraceptive utilization. On the other hand, parity, residency, income, alcohol utilization, and types of disability were the determinant risk factors of unintended pregnancy. Also, age, residency, sexuality information, and types of disability were the determinant factors of sexual violence. Therefore, it is essential to design and implement strategies for raising contraceptive awareness and incorporating at-home contraceptive provision strategies into health extension programs to enhance contraceptive utilization. Furthermore, strengthening education and information dissemination about contraceptive utilization, reproductive health problems and its prevention strategies in rural settings are vital to mitigate unintended pregnancy and sexual violence.

What is this dissertation about

This dissertation investigates the experiences of reproductive-age women with disabilities (WWDs) concerning their reproductive health services utilization and burden of problems. The primary focus is on assessing WWDs reproductive health service utilization (contraceptive utilization) and burden of problems (unintended pregnancy and sexual violence) and identifying factors at both individual and community levels that may be associated within the context of central Sidama Region, Ethiopia. In essence, the dissertation endeavours to address the following research questions:

What is the current status of contraceptive utilization among reproductive-age females with disabilities in central Sidama? (Objective 1, Paper I)

What is the current status of unintended pregnancy among reproductive-age WWDs in central Sidama? (Objective 2, Paper II)

What is the current status of sexual violence among reproductive-age females with disabilities in central Sidama? (Objective 3, Paper III)

Paper I: This paper aimed to determine the prevalence of contraceptive utilization and its individual and community-level associated factors among reproductive-age females with disabilities in Central Sidama National Regional State, Ethiopia. This paper used a multilevel analysis model to show different individual and community-level associated factors.

Paper II: This paper aimed to determine the prevalence of unintended pregnancy and its individual and community-level associated factors among reproductive-age WWDs in Central Sidama National Regional State, Ethiopia. This paper used a standard unintended pregnancy measurement tool, the London Measure of Unplanned Pregnancy (LMUP)) (1). The multilevel analysis model revealed different individual and community-level associated factors.

Paper III: This paper aimed to determine the prevalence of sexual violence and its individual and community-level associated factors among reproductive-age females with disabilities in Central Sidama National Regional State, Ethiopia. Sexual violence was measured using the WHO multi-country study measurement tool (2). Using a multilevel analysis model, this paper showed different individual and community-level associated factors.

In conclusion, this dissertation has elucidated various crucial aspects of reproductive service utilization and burden of problems among WWDs in Central Sidama Region, Ethiopia. Additionally, I have highlighted the impact of community-level factors on these issues.

1. INTRODUCTION

1.1.Background of study

1.1.1. Reproductive Health and Disability

According to the World Health Organization (WHO), reproductive health is "a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity" related to the reproductive processes, functions, and systems at all stages of life (3). Reproductive health helps people have healthy and satisfying lives, so great attention has been given to it in recent years (3, 4). It has three main components. These three primary components encompass the ability to have children, the regulation of fertility, and the enjoyment of sexual experiences (5). In my dissertation, I center my exploration on two key aspects: reproductive health service utilization, with a specific emphasis on contraceptive utilization, and burden of reproductive health problems, with a primary focus on sexual violence and unintended pregnancy. Assessing the utilization of reproductive health services (contraceptive utilization) and burden of problems (sexual violence and unintended pregnancy) among WWDs is very important. Since the definition of disability is not uniform from country to country (6), defining it is mandatory.

The definition of disability is not uniform from country to country, specifically in its meaning, scope, and severity (7, 8). To refine and improve the definition of disability took the world more than three decades (9). To develop plans and policies about disabilities, a standard definition is essential. Therefore, the International Classification of Functioning (ICF) of Disability and Health provides a framework to define disabilities (8). Based on the ICF framework, the World Health Organization defines disability as any impairment of a person's body function, structure, mental functioning, activity limitation, and participation restriction (environmental factors) (8, 10). As mentioned earlier, the definition of people with disabilities varies from country to country. In Ethiopia, disability was defined for the first time in 1971 as people who are unable to earn their livelihood due to physical or mental health and do not have any support from anyone, including the young and the old (11, 12). The definition was revised in 2008 to state that a disability is a physical, mental, or sensory impairment that impacts a person's daily activities and participation (13). Not only the definition but also the terminology is modified and changed occasionally. Before the 1970s, impairment and disability had been used interchangeably, but after the advocacy of a social model, impairment and disability were distinguished as impairment as a function of the body or mind and disability as an unwelcome

"outcome of an unfair relationship between people with impairments and the rest of society or culture" (14).

Addressing the sexual and reproductive health needs of individuals with disabilities has garnered attention. It has been recognized as a challenging issue for the global community since the 1994 conference on population and development. However, substantive interventions did not occur until 2015, when various strategies and plans were incorporated into the Sustainable Development Goals. (15, 16). The United Nations (UN) convention clearly states that PWDs have a right to get any medical and non-medical services (17, 18). In Ghana's health policies and reports, only 53% of the policies and reports considered or included people with disabilities (19). Even if the convention (Article 9) obligates to address the medical facilities and information accessibility for PWDs, they face many barriers to receiving health care services, such as social, attitudinal, cultural, informational, structural, and procedural barriers (18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29). Ethiopia's health service structure (the "three-tire system) includes primary (primary hospitals, health centres, and health posts), secondary (general hospitals that serve 1 to 1.5 million people), and tertiary (specialized hospitals that serve 3.5 to 5.0 million people) (30). Although all three tiers of the system provide reproductive health services, utilization is not satisfactory due to different barriers that result in reproductive health problems, which create double burdens for those with disabilities (31).

1.2. Statement of the problem

Worldwide, more than one billion (15%) of the world's population are people with disabilities, and of these, 75–80% are from developing countries (32, 33). While the current prevalence of people with disabilities (PWDs) in Ethiopia is not known, the 2007 Ethiopian Population and Housing Census report indicated that the prevalence was 1.2% at the national level and 0.85% at the Sidama National Regional State level. (34). However, the World Health Organization (2011) estimated that 17.6 % of Ethiopians are living with disabilities (32). According to the Labour and Social Affairs Office report (2021) in the Sidama National Regional State (SNRS), there are an estimated 645,622 PWDs, of whom 150,430 are expected to be of reproductive-age using the 23.3% conversion factor for women of reproductive-age. This indicates that other than estimation, there is no latest data (census/survey) about the number of persons with disabilities including reproductive-age WWDs in the SNRS. However, based on the 2007 Ethiopian population and housing census report in Sidama Regional State, 1,530,351 people

were in the reproductive-age group. Of these, 13,068 (8,885 males and 4,183 females) were people with disabilities (34). Regarding residency, 87% (11, 418) were from rural settings (34).

Regarding reproductive health services utilization (contraceptive utilization), all individuals have the right to access and utilize appropriate reproductive health services to regulate their fertility, avoid unintended pregnancy, and enjoy sexual life (3). Still, reproductive-age WWDs were discriminated against and marginalized from different reproductive health services. This indicates that PWDs are less likely to access reproductive health services, including contraceptive services than people without disabilities (23, 35). Reproductive health service utilization is low in developing countries, including Ethiopia. In Ethiopia, the average prevalence of contraceptive service utilization among females with disabilities (FWDs) was 26%, which varied from 18% in Gondar city (36) to 34% in Arba Minch town (37). Previous studies have identified various associated factors. Marital status, age, types of disability, women's attitude toward contraceptive methods, knowledge about contraceptives, keeping of confidentiality and privacy by the health facility, having a good self-perception, the presence of contraceptive-providing nearby health facilities, and educational and economic status were identified as significantly associated factors with contraceptive service utilization among female PWDs (36, 37, 38, 39, 40).

In most developing countries, including Ethiopia, PWDs experience many rights violations, including sexual violence (41). About 50% of blind and deaf PWDs were raped by their relatives (40).

Women with disabilities have a strong desire to have as many children as they can support. However, due to economic and social insecurity and fear of stigma, they could not attain their sexual and reproductive health goals and were prone to sexual and reproductive health problems (42). Unintended pregnancy is one of the common problems, which makes them doubly burdened with their disability. The prevalence of unintended pregnancy among PWDs in Bahirdar was 15.4%(43) and 67% in Addis Ababa, Ethiopia (40).

Due to inadequate data (prevalence and incidence), measuring the burden of reproductive health problems among reproductive-age WWDs is difficult (44). Although it is challenging to measure reproductive health problems, they have many short- and long-term health, social, and economic effects (45). The effects are on production, earnings, and household health.

The physical and mental effects of sexual violence on the victim, especially for people with disabilities, are the worst (46, 47). It leads the victims to risky behaviours like smoking, alcohol drinking, and drug use (48). Other than physical and mental health effects, sexual violence may predispose the victim to an unintended pregnancy. Due to the unintended pregnancy, they may also face many short- and long-term problems; they may go to unsafe abortion services to terminate the pregnancy, and finally, they may lose their lives due to the complications of unsafe abortion (49).

Although there is a feasibility problem, different strategies and interventions, like community-based rehabilitation (CBR) (50, 51), educational interventions and knowledge enhancement interventions (52), were designed and implemented to alleviate reproductive health problems. However, the implementation of rehabilitation policies in different African countries like South Africa, Malawi, and Sudan is low (53).

Therefore, this study aimed to assess the prevalence and determinant factors (at individual and community level) of reproductive health services utilization and burdens of problems among WWDs living in urban and rural settings.

1.3.Rational for this study

My motivation for researching contraceptive utilization, unintended pregnancy and sexual violence is rooted in my personal experience. I have extensive experience as a lead trainer and mentor in reproductive health services and problems. I have observed that many PWDs are suffering from reproductive health problems like unintended pregnancy, unwanted children, and sexual violence. Due to these problems, PWDs have been facing many challenges and have spent their lives begging around the roads and churches with their unintended pregnancies and children. The sour truth is that the children of PWDs also spend their time begging with their parents rather than going to school, which is very dangerous for the current and future lives of the children and the country.

Due to discrimination against and marginalized from different services, people with disabilities are facing many reproductive health problems like unintended pregnancy and sexual violence, which make them doubly burdened with their disabilities, increase the risk of life-threatening complications during unwanted pregnancy termination processes and expose them to various sexually transmitted infections, including HIV/AIDS (54). To develop strategies for reproductive health services and problems, assessing the situation of the services and problems is very important.

The previous studies about contraceptive utilization, unintended pregnancy and sexual violence among people with disabilities did not include all types of PWDs (they focused only on young blind and deaf individuals), rural residents, or determinants associated with unintended pregnancy and sexual violence. Even the identified associated factors for contraceptive utilization were focused only on individual-level determinants. Assessing community-level determinants is also necessary to develop strategies for reproductive health services utilization and problems. To determine reproductive health service utilization and burden of problems, this dissertation encompassed women with disabilities, excluding those with mental disabilities. It assessed community-level factors by considering urban and rural residencies (Papers I, II and III).

2. LITERATURE REVIEW

2.1.Reproductive health service utilization and burden of problems

This dissertation focuses on the three main components of reproductive health: the ability to produce offspring, fertility regulation, and enjoying sex (5). From the first component, the ability to produce offspring, we assess unintended pregnancy; from fertility regulation, we assess contraceptive utilization; and from the enjoying sex component, we assess sexual violence.

2.1.1. Contraceptive utilization among women with disabilities

Though contraception is a cost-effective public health intervention (55), in Africa, including Ethiopia, there is low contraceptive utilization and a high unmet need for it, especially for PWDs. The study conducted in South Ethiopia reported that the prevalence of unmet need for contraceptive utilization among married and union WWDs was 25.17% (56).

Regrettably, people with disabilities are often not counselled about contraceptive methods and their advantages and disadvantages (31). Twenty-five percent of PWDs believed that the current contraceptive service delivery system is not accessible to them (36).

The study conducted in the United States of America revealed that reversible contraceptive method utilization was 5.4% and non-reversible method utilization was 28.2% among WWDs (57). The overall utilization of female sterilization among 15–44-year-old WWDs in the United States of America was 20.8% (58). Another study conducted in seven different states of the United States discovered that 70.1% of WWDs used contraception during their most recent sexual encounter (59). A study from Istanbul, Türkiye, among WWDs revealed that 67.4% of them were using contraceptive methods (60).

The study conducted in African countries revealed that the utilization of contraceptive methods among people with disabilities was low. That is 17% (61) in Ghana among in-school young PWDs and 34% (modern contraceptive methods) in Nigeria among in-school adolescents (62). In Uganda, 26.1% (63) of reproductive-age WWDs had ever used contraceptives. In Kenya, 16%(64) of WWDs utilized contraceptives. In Namibia, among women with disabilities, 32.7% (65). In Sierra Leone, among people with disabilities, 26.9% (66). The qualitative study in Senegal also showed that contraceptive utilization among young PWDs was deficient (67). The study conducted in Nigeria reported that 51% (68) of adolescents with learning disabilities used abstinence as a contraceptive method to prevent unintended pregnancy. The Ghana study

showed that contraceptive utilization among males with disabilities was higher than among females with disabilities. That is, 33.6% of deaf males and 14.2% of deaf females used contraception, as did 37.58% of blind males and 9% of blind females (61). The other study from Ghana, conducted among adolescents with disabilities, reported that knowledge about contraceptive methods was poor. Most adolescents only know about emergency pills (51%) and condoms (99%) (69).

The prevalence of contraceptive utilization among PWDs in Ethiopia ranged from 18% in Gondar city (36) to 34% in Arba Minch town (37). The other studies conducted in the Mekele and Amhara regions revealed that the prevalence of contraceptive utilization was 27.2% (38) in Mekele and 24.5% (39) in the Amhara region.

The above five studies from Ethiopia were conducted from 2013 to 2019. The Gondar City study was done among 308 reproductive-age WWDs in 2013. The Arba Minch Town study was conducted in 2019 among 418 reproductive-age women with disabilities. The Mekele study also revealed that the leading method used was injectable (93.2%), followed by oral pills (6.1%) and implants (0.7%) (38). The Mekele, Arba-Minch, and Gondar town studies were conducted among reproductive-age women living with disabilities and living in urban settings. The study conducted in Addis Ababa was among deaf and blind reproductive-age women. The North Shewa Zone study was conducted among PWDs enrolled in supporting organizations.

2.1.1.1. Factors associated with contraceptive utilization

Numerous researchers have identified many factors significantly associated with contraceptive utilization among people with disabilities (PWDs). In the USA, physical or system barriers, financial limitations, non-responsive healthcare providers, and the absence of appropriate contraceptive methods were the associated factors for WWDs using contraceptive methods (70). A study from Nepal revealed that the negative attitude of healthcare providers towards disability affects the provision of maternal health services, including contraceptive utilization (71). In Africa (Sierra Leone, Uganda, and Kenya), media access, marital status, actively working, income, age, and ANC follow-up were associated factors for contraceptive utilization (66, 72, 73).

In Ethiopia, various researchers have identified distinct factors that affect contraceptive utilization among women with disabilities. The most commonly identified factors were marital status, age, disability types, women's attitude toward contraceptive methods, knowledge about contraceptive methods, the presence of nearby health facilities to provide contraceptives and

keeping confidentiality and privacy by the health facility, having a good self-perception, and educational and economic status (36, 38, 39, 40, 64, 74). It is essential to discuss the identified factors by categorizing them into sociodemographic, economic, and facility-related factors. This categorization allows for a comprehensive analysis and understanding of the various elements that influence contraceptive utilization among people with disabilities (PWDs).

Sociodemographic and economic factors

Marital status: Marriage is one of the most frequently identified and reported factors influencing contraceptive utilization among women with disabilities. The reason may be that marriage increases the chance of unprotected sex and pregnancy. Therefore, the chance of using contraceptive methods will increase among married WWDs when we compare them with unmarried women's disabilities. Community-based cross-sectional studies in Ethiopia showed that, when compared with unmarried women, being married increases the chance of contraceptive method utilization by 2.13 to 18.37-fold (36, 38, 39, 40, 74). The studies showed that the odds of family planning method utilization among married WWDs when compared with unmarried women were 2.13 (36), 3.41 (39), 3.95 (74),5.11 (40), and 18.7 (38). Compared with unmarried, separated, or divorced women with disabilities, the utilization of contraceptive methods increases by 1.6-fold (64).

Age: Three community-based studies from Ethiopia (36, 39, 40) identified that contraceptive method utilization was associated with age. When compared with the age group of 15 to 25, being at the age of 26 to 45 increases by five-fold (36), being in the age group of 31 to 40 increases by twofold compared with the 18 to 30 age group (39), and being at the age group of 25 to 48 increases by fourfold when compared with 15 to 24 (40). Compared with the age group of 12 to 24, being in the age group of 25 to 49 increased by 1.3 times (64). This may be due to the increased chance of sexual intercourse, marriage, and the risk of pregnancy.

Educational status: One study from Ethiopia revealed that when we compare literate women with illiterate (no education) women, the probability of using contraceptive methods increases by fivefold (36). According to a Kenyan study, the utilization of family planning methods increased by 1.5 times among individuals with primary education and by 33% among those with secondary education compared to those without formal education (64).

Economic status: Economic status has been identified as a significant factor in the utilization of contraception among people with disabilities. The study conducted in Ethiopia revealed that

women who were at the level of medium or rich economic status had increased odds (6–12 fold) of contraceptive utilization when compared with poor WWDs (36)

Behavioural and other factors

Types of disabilities: Disability types are one of the factors associated with the utilization of contraceptive methods among women with disabilities. Two studies in Ethiopia showed that the probability of using the method increased fourfold (40) among people who are blind and sixfold (36) among those with limb disabilities compared to deaf women. This might be due to the inaccessibility of information among people who are deaf.

Knowledge about contraceptives: Two studies from Ethiopia showed that, when compared with women who do not know about contraceptive methods, women who knew about contraceptive methods had increased odds (twofold (39) to threefold (40)) of using contraceptives.

Self-perception: As identified by the study conducted in Ethiopia, WWDs who have good (high) self-perception were 48% less likely to utilize contraceptive methods when compared with those who had low self-perception (40).

Attitude for contraceptives: A study from Ethiopia showed that having a positive attitude increased the utilization of contraceptive methods twofold when compared with those having a negative attitude (74).

Health facility-related factors

Presence of contraceptives providing nearby health facilities: According to the Ethiopian study, the odds of WWDs having access to nearby health facilities that provide contraceptive services increased fourfold when compared to those who did not (38).

Keeping of confidentiality and privacy by health facilities: It was identified by the study from Ethiopia that keeping confidentiality and privacy increases contraceptive utilization among WWDs twofold when compared with health facilities that do not keep confidentiality and privacy (38).

Residence: When compared to rural resident women, urban resident women are 1.3 times more likely to utilize contraceptive methods (64).

2.1.2. Unintended pregnancy among women with disabilities

Women with disabilities have the same desire to have children as women without disabilities, and they intend to have as many children as they can support (75). Due to different barriers, people with disabilities cannot access and utilize contraceptives and are exposed to reproductive health problems like unintended pregnancy (76). The proportion of unintended pregnancies is higher (53%) among PWDs than among women without disabilities (36%) (77). PWDs suffer from unintended pregnancies and their effects, which make them doubly burdened with their disabilities.

A cross-sectional study from the USA about unintended pregnancy among WWDs revealed that the prevalence of unintended pregnancy ranged from 17.1% (59) to 53% (77). The prevalence among women with independent living disabilities was high at 62% (77). A study from Cameroon revealed that unplanned pregnancy among women with physical disabilities was common (78).

The prevalence of unintended pregnancy among PWDs in Ethiopia ranged from 15.4% (43) in Bahirdar to 67% (40) in Addis Ababa. The other studies from Addis Ababa revealed that the prevalence was 62.5% (79) in 2011.

2.1.2.1. Factors associated with unintended pregnancy

The study conducted in South Africa among women with mental disabilities identified marital status, level of education, ethnicity, and substance (alcohol, chat) use as risk factors for unintended pregnancy (80). The risk of an unintended pregnancy among unmarried women was increased by 1.44 when compared with married women. Compared to women with tertiary education, the risk of unintended pregnancy for women with below secondary education was 7.3 times higher, and the risk for women with secondary education was 5.7 times higher. When we compared African and Indian women with Caucasian women, the risk of an unintended pregnancy was increased by 1.5 times.

2.1.3. Sexual violence among women with disabilities

Sexual violence is an act or attempt to engage in sexual intercourse without the consent of the other person (81). People with disabilities have an increased risk of sexual violence. The chance of sexual violence among females with disabilities is higher than that among males with disabilities (8.9% vs 4.9%) (82). Women with disabilities are more likely to suffer from sexual violence than women without disabilities (47, 83) because they are perceived as defenceless and live under poor protection (84). The prevalence of sexual violence among people with disabilities is higher (2.27fold) than among people without disabilities (46).

A study conducted in the USA in 2010 revealed that 12.5% of WWDs experienced sexual violence (85). Of these, 2.6% have been raped. In Denmark, the prevalence of sexual violence was 9.4% (86) in 2013 among 16 to 65-year-olds with disabilities. In Nepal, 21.5% (9.7% within 12 months) of WWDs had ever experienced sexual violence (47).

In Africa, the prevalence of sexual violence is high; it was 73.47% (87) in the Democratic Republic of the Congo in 2020. A study from Nigeria reported that the rate of rape among in-school young people was 28% (88) and 23.3% (68) among adolescents with learning disabilities. In Ethiopia, there is no adequate evidence about the prevalence and associated factors of sexual violence. However, one qualitative study conducted in Addis Ababa on the utilization of modern family planning services revealed that two of four blind and deaf individuals were raped by their relatives (40).

This study indicated how sexual violence is hidden and exposes people with disabilities to different reproductive health problems. The magnitude of sexual violence among other types of disabilities, like mental disability, maybe the worst and needs further investigation (86, 89, 90).

Regarding gender, as expected, women living with disabilities are more likely to experience sexual violence than men (86). Women with mild disabilities experienced higher intimate partner sexual and physical violence (85%) compared to women with severe (76.5%) and no disabilities (70.8%) (87).

2.1.3.1. Factors associated with sexual violence

To date, different studies have identified many factors associated with sexual violence among women with disabilities. The studies were from Canada (91), South Africa (92), and Senegal (93). All of the African studies were qualitative.

The study conducted in Canada among women with physical disabilities identified age, household income, information about sexuality, and marital status as the factors associated with sexual violence (91). Women with physical disabilities in the age group of 17 to 29 had 1.5 times the odds of experiencing sexual violence when compared to women in the age group of 30 to 59. Having less than 20,000 dollars in annual income increased the chance of sexual violence by threefold when compared to having 50,000 or more dollars in yearly income. Women who had information about sexuality reduced sexual violence by 38% when compared to women who had no information.

Sensory impairment is the type of disability associated with the highest risk of sexual violence (46). A qualitative study conducted in South Africa in 2014 among school learners with mild intellectual disability showed that peer pressure, concealment of reported incidents of sexual violence, unsupervised areas linked to schools, and arranged relationships were identified as contributing factors to sexual violence (92). Another qualitative study from Senegal also revealed that women with hearing impairments were more likely to be sexually violated (93).

2.2. Conceptual Framework

This conceptual framework was developed after an intensive literature review on contraceptive utilization, unintended pregnancy, sexual violence and associated factors among reproductive-age women with disabilities. Then, after reviewing the literature, variables like (accessibility of health institutions, marital status, types of disability, income, attitude, knowledge about contraceptives, age, etc.) (Fig 1) were identified from different kinds of literature (36, 38, 39, 40, 74, 76, 79, 94, 95, 96).

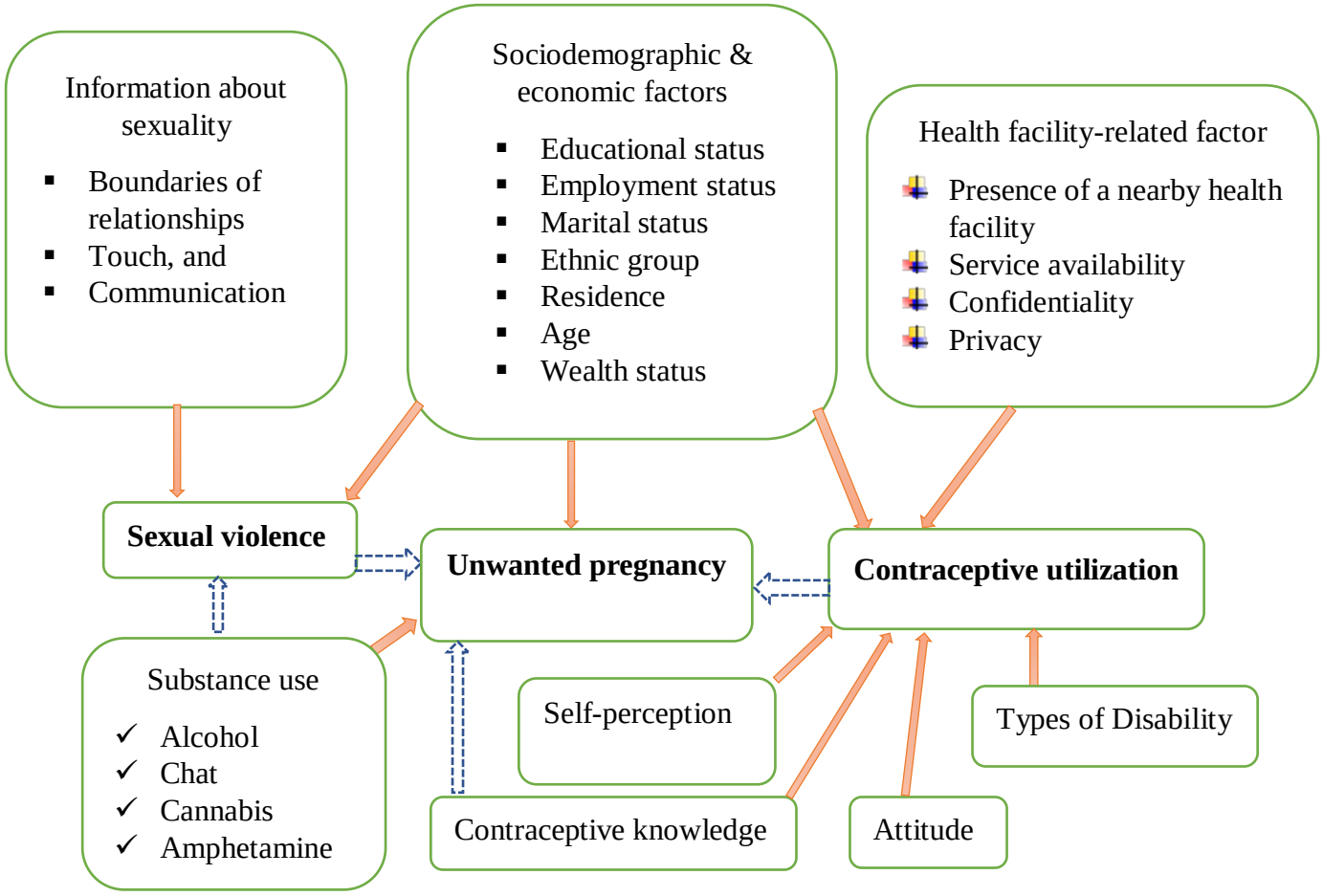

Figure 1: Conceptual Framework for reproductive health service utilization and burden of problems and associated factors among reproductive-age women with disabilities adapted from different literatures, 2021.

3. OBJECTIVES OF STUDY

3.1. General Objective

The study's general objective was to assess reproductive health service utilization and burden of problems among women with disabilities in Central Sidama National Regional State, Ethiopia.

3.2.Specific Objectives

1. To determine the prevalence and associated factors of contraceptive utilization among women with disabilities in the Dale and Wonsho districts and Yirgalem city administration (Paper I)
2. To determine the prevalence and associated factors of unintended pregnancy among women with disabilities in Dale and Wonsho districts and Yirgalem city administration (Paper II)
3. To assess the prevalence and associated factors of sexual violence among women with disabilities in Dale and Wonsho districts and Yirgalem city administration (Paper III)

4. MATERIALS AND METHODS

4.1. Study Setting and Period

A study was conducted in Central Sidama National Regional State, Ethiopia, a newly formed region in Ethiopia. The study occurred in two phases, from May 1 to July 15, 2022. The first phase, a community-based disability-specific house-to-house census, was conducted from May 01 to May 30, 2022. The second data collection phase was conducted from June 20 to July 15, 2022. The region formed as an autonomous region in June 2020 from the Southern Nations, Nationalities, and Peoples' Region after the 2019 Sidama referendum. There are 37 districts and city administrations (30 districts and 07 city administrations) in the region, as well as 589 kebeles (54 urban and 535 rural) (97). According to the 2021 report of the Sidama Regional Health Bureau, the total population of Dale district is 254,653; that of Wonsho district is 129,730; and Yirgalem city administration is 85,072 with an estimated 53,768 households in Dale district, 21,857 households in Wonsho district, and 42,902 households (HHs) in Yirgalem city administration (98). According to the Ethiopian Central Statistical Agency, the female population accounts for 49.7% of the Dale woreda population, 49.2% of the Wonsho population, and 50.4% of the Yirgalem city administration population (98, 99). The two districts are the Health and Demographic Surveillance sites of Hawassa University. Both districts are known for their coffee production and highly dense populations. Dale district has 36 rural and two urban kebeles.

In contrast, Wonsho district has 17 rural and one urban kebele, and Yirgalem city administration has 03 rural and 07 urban kebeles (small administrative units in Ethiopia). Dale district (woreda) has ten health centers and 33 health posts, while Wonsho district has five health centers and 17 health posts. Yirgalem city administration has one hospital, a health centre, and four health posts. Although the districts have these health institutions, the utilization of sexual and reproductive health services is not satisfactory; only 37% of reproductive-age women utilized at least one of the sexual and reproductive health services (100). Services used by people with disabilities may be significantly less than those used by non-disabled people. According to a report by the Labour and Social Affairs Office in 2021 and WHO estimates, there are an estimated 44,819 disabled people in the Dale district and 14,973 disabled people in the Wonsho district. Among these, 10,443 are in Dale, 5,320 are in Wonsho, and it is expected that 3,444 of them fall within the reproductive-age group.

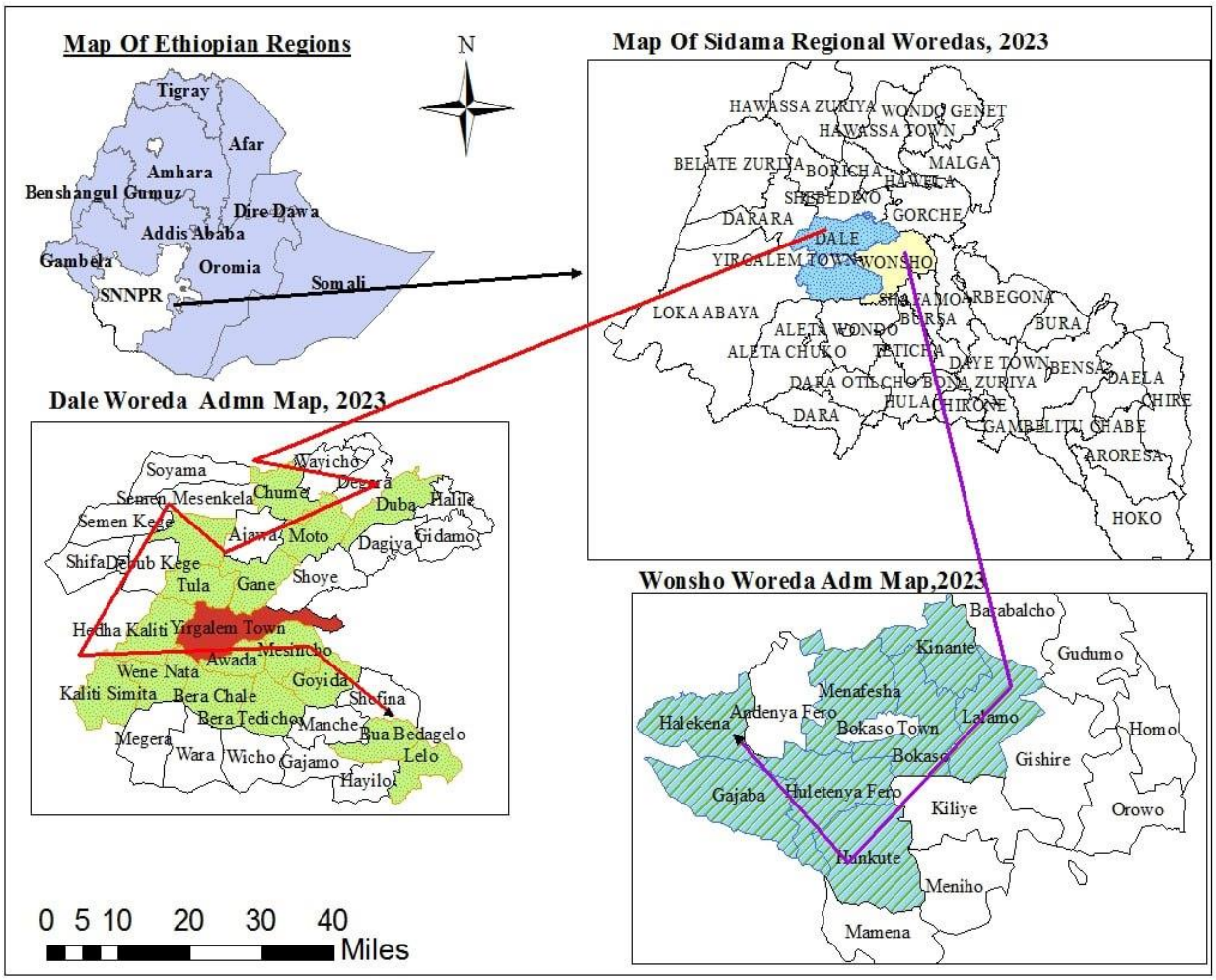

Figure 2: Map showing the study area

Study designs

Census (community-based disability-specific house-to-house) and cross-sectional study designs were used.

A community-based disability-specific house-to-house census (It is not an all-encompassing census; instead, it involves visiting households and creating a list of individuals with disabilities, with particular emphasis on reproductive-age women with disabilities). Then, a community-based cross-sectional study design was used to determine the prevalence and determinants of contraceptive utilization, unintended pregnancy, and sexual violence among reproductive-age WWDs (Papers I, II, and III).

4.2.Population

4.2.1. Source population

All reproductive-age women with disabilities in Dale and Wonsho districts, and Yirgalem city administration, Sidama National Regional State were the source population.

4.2.2. Study population

Women of reproductive-age (15–49 years old) with disabilities who lived in the selected kebeles for at least six months were eligible.

4.3. Inclusion and exclusion criteria

4.3.1. Inclusion criteria

Women of reproductive-age with disabilities were included. Specific criteria for inclusion are outlined as follows: For Paper II, women who have a pregnancy history or were pregnant during the data collection period were included in the study.

4.3.2. Exclusion Criteria

I excluded reproductive-age women with mental disabilities because the issues of sexual violence are sensitive, and other people may not tell the truth about them. Additionally, contraceptive utilization should be voluntary, but it can be challenging to determine whether reproductive-age women with mental disabilities are using contraceptives voluntarily. I also excluded them from the unintended pregnancy study because of recall bias when answering questions about pregnancy. Other participants excluded from the study were those with severe illnesses during data collection and having dual disabilities (i.e., cannot see and hear).

4.4.Sample size determination

The sample sizes of the first, second, and third papers were calculated by OpenEpi software (version 3.01), considering a 95% confidence level, and 82,625 population size, a 15.4% prevalence of unintended pregnancy (43), a 33.7% prevalence of contraceptive utilization (74), and a 73.47% prevalence of sexual violence (87), as well as a design effect of 1.64. The design effect was calculated using the 1 + (average cluster size -1) *ICC (Intraclass correlation) formula. The average cluster size was approximately 33 individuals per cluster. There are 30 clusters. The ICC was not reported in the previous studies. According to Allan Donner, if the ICC value is not reported, we can assume an ICC value of 0.01 to 0.05 (101). I considered 0.02 as an ICC value. Based on this, the calculated sample size for the first paper was 563; for the second paper, 330; and for the third paper.

Before considering the non-response rate and maximum sample size determination, calculating the sample size of the associated factors was necessary. Then, considering the non-response rate, the maximum sample size based on the prevalence and associated factors was considered for each paper. The sample size for the associated factors of contraceptive utilization, sexual violence, and unintended pregnancy was computed using Epi-Info 7 and the following assumptions: a two-sided confidence level of 95%, a power of 80, a ratio of unexposed to exposed, a percent outcome in the unexposed group, and a percent outcome in the exposed group.

I selected the maximum sample size to compare the sample sizes determined by prevalence and associated factors. Therefore, the maximum sample size for Paper I was 563; for Paper II, it was 330; and for Paper III was 592. Considering a 10% non-response rate, the final sample size for Paper I was 620; for Paper II, it was 363; and for Paper III, it was 652 (Table 1).

Table 1: Sample size calculation for the associated factors of contraceptive utilization, unintended pregnancy and sexual violence.

Associated factors		Contraceptive utilization		Sample size
		Yes	No	
Age (years) (36)	26-35 (Exposed)	24 (24.4%)	73	426
	15-25	8 (13%)	52	
Attitude (37)	Positive (Exposed)	101 (42.8)	135	152
	Negative	33 (20.37)	129	
Marital status (36)	Married (Exposed)	24.50%	75.50%	530
	Single	14.50%	85.5%	
The presence of a nearby contraceptive-providing health facility (38)	Yes (Exposed)	129 (43.3%)	169 (56.7%)	54
	No	17 (7.1%)	221 (92.9%)	
Keeping confidentiality and privacy (38)	Yes (Exposed)	124 (37.8%)	204 (62.2%)	90
	No	22 (10.6%)	186 (89.4%)	
Associated factors		Sexual violence		Sample size
		Yes	No	
Age (91)	17 to 29 (Exposed)	37.6%	62.4%	550
	30 to 59	49.8%	50.2%	
Having information about sexuality (91)	Yes (Exposed)	48.1%	51.9%	592
	No	36.4%	63.6%	
Risk factors		Unintended pregnancy		Sample size
		Yes	No	
Marital status (80)	Married (Exposed)	25.6%	74.4%	42
	Unmarried	73.2%	25.8%	
Substance use (80)	Yes (Exposed)	70.8%	29.2%	94
	No	40.1%	59.9%	

4.5. Sampling technique and procedure

Since the selection of reproductive-age WWDs passed through more than one stage (stratification (urban/rural), cluster (Kebele)), a multi-stage stratified cluster random sampling technique was used. The stratification was based on residency (rural and urban). Dale and Wonsho districts and Yirgalem city administration have 56 rural and ten urban kebeles. Of these Kebeles, 30 (20 rural and 10 urban) were randomly selected (Fig 2). By estimating the number of people in the Kebeles (an average of 10,000 of these 17.6% estimated PWDs, of whom 23.3% are of reproductive-age), I considered 33 participants per cluster, and 30 Kebeles were considered. The proportion of people with disabilities residing was used to select the urban and rural Kebeles. According to the Kenya 2019 census report, 65% of people with disabilities lived in rural and 35% in urban settings (102).

We conducted a disability-specific census by visiting each household within the eligible and selected kebeles (103). The leader or head of the household was asked about the presence of a person who had a problem with seeing, hearing, speaking, and or standing, walking, or sitting, body part movement, the functioning of hands and legs, or mental retardation or mental problems, or other mental or physical damages and confirmed by observation. After completing the census, the sample size was proportionally allocated for each Kebele, and the study participants were selected randomly for all papers. During the census, we used a tracing form to register women of reproductive-age with disabilities. Then, using a random number generator in OpenEpi software, we selected study participants from each kebele chosen using a simple random sampling technique.

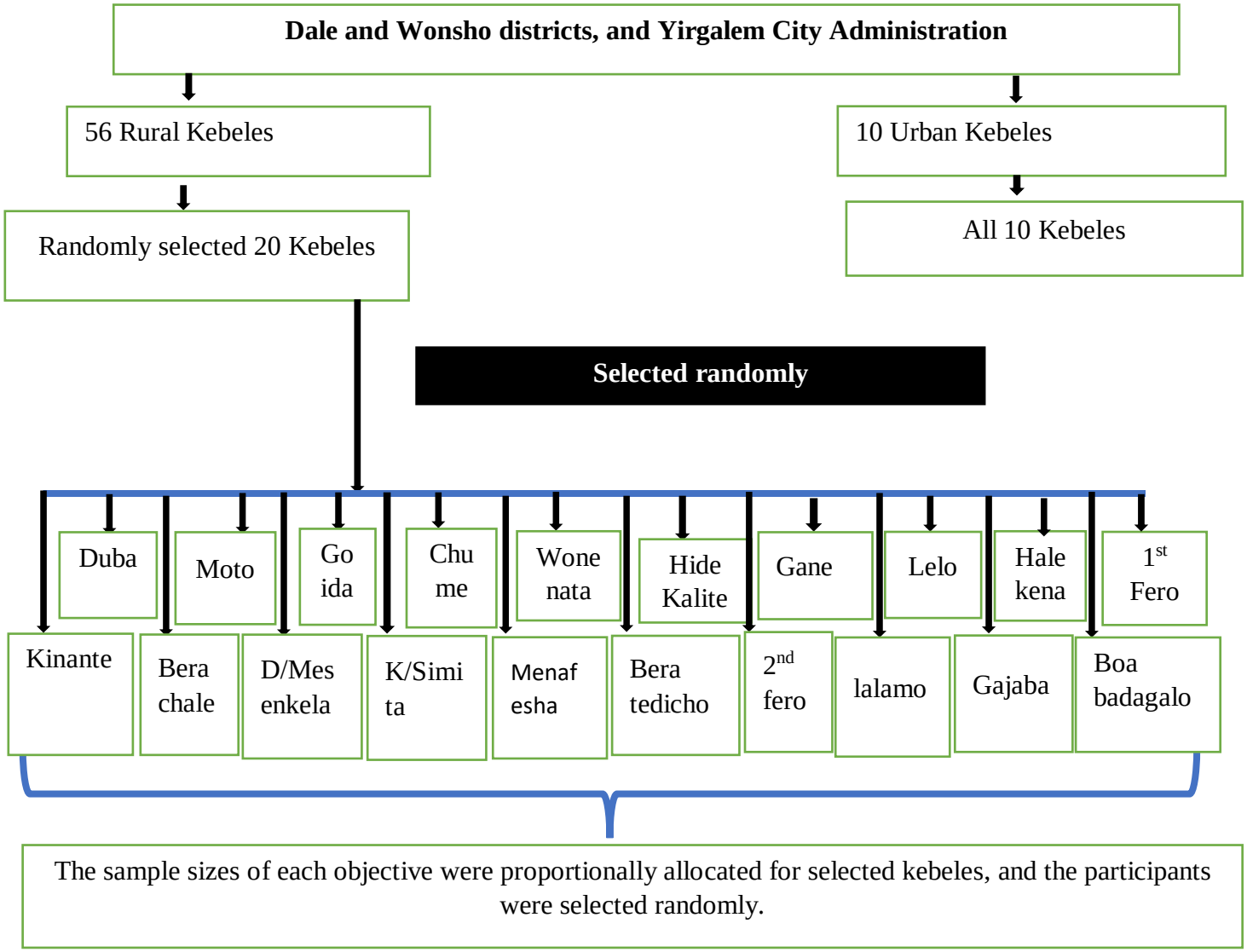

Figure 3: Schematic presentation of sampling technique and procedure to select reproductive-age women with disabilities for assessing reproductive health service utilization and burden of problems in Sidama Region, Ethiopia 2021/22.

4.6. Variables, Measurements and Data Sources

Variables

The outcome variables of this dissertation were as follows: the first was the utilization of contraceptives among reproductive-age females with disabilities; the second was the prevalence of unintended pregnancy among reproductive-age women with disabilities; the third was the prevalence of sexual violence among reproductive-age females with disabilities.

Marital status, age, types of disabilities, educational level, knowledge of family planning, income, self-perception, attitude towards family planning, presence of service providing nearby health facilities, and privacy and confidentiality protection by health facilities are potential confounders for contraceptive utilization. For unintended pregnancies, marital status, level of education, ethnicity, and substance (alcohol, chat) usage are also potential confounders. Marital status, age, household income, sexuality information, and other sociodemographic factors for sexual violence are the potential confounders.

Measurements and data sources

Disability was measured when there is a person in the household having at least one of the following issues: vision (both eyes are blind), hearing (deaf), speaking and, or standing, walking, or sitting (wheel-chaired), body part movement, functioning of hands or legs (extreme paralysis), mental retardation, mental problems, or other mental or physical damages, the presence of people with disabilities in the household is considered, and the types of disability are then identified. The data source was the head of the household. It is measured by asking the ("yes" or "no") questions and confirmed by observation.

The participant who responded that she or the couple is currently (during the survey) using any contraceptive method was considered a contraceptive user, and those who were not using any contraceptive during the study period were considered non-contraceptive users. The data sources were WWDs of reproductive-age (Paper I). For those who are deaf, sign language translators were considered (Papers I-III).

Unintended pregnancy was measured using the London Measure of Unplanned Pregnancy (LMUP) tool (1). The tool has six questions (on contraceptive utilization, timing, intention, desire for a baby, partner discussion, and pre-conception preparations) through which women report the circumstances of their current or recent pregnancy. Each item in the tool was scored 0, 1, or 2 according to the LMUP scoring guidelines (1). The scores were summed across all

six items, resulting in a total score of 0 to 12. Then, the total LMUP scores were divided into categories of pregnancy intentions: unplanned (0–3), ambivalent (unsure) (4–9), and planned (10–12), based on the scoring used in the original development of the scale (1, 104). The data sources were a reproductive-age group of WWDs who have a history of pregnancy or are currently pregnant (Paper II).

Sexual violence was measured using the WHO multi-country study measurement tool (2). The tool had three items used to assess sexual violence. The items are: (had someone physically forced her to have sexual intercourse; was she forced to have sexual intercourse when she did not want to and because she was scared of what someone might do; or had someone forced her to do something sexual that she found shameful)? Sexual violence was coded "yes" if the participant had experienced any of the above three types of violence. Sexual violence was committed when a participant responded that she had experienced an act or attempted to perform sexual intercourse without her consent (105, 106). The data sources were females with disabilities of reproductive-age (Paper III).

Knowledge about contraceptives and attitudes towards contraceptive utilization were assessed by computing knowledge based on four fundamental items: understanding of family planning regarding the number of children, timing, spacing, and awareness of side effects. Additionally, seven questions were used to assess attitudes. Participants scoring above the mean value were categorized as having both knowledgeable and positive attitudes. The other exposure variables were measured by asking the participants about their marital status, age, educational status, self-perception, religion, place of residence, ethnicity, presence of nearby health facilities, whether their privacy was kept, whether they used substances and their wealth index. The wealth index was calculated using a principal component analysis (107, 108, 109).

4.7. Data collection methods and quality control

4.7.1. Data collection methods

The data was gathered using the Kobo Collect application. Data collection tools (questionnaires) were adapted from the Ethiopian Demographic Health Survey 2016 (EDHS 2016), the 2007 Ethiopian Central Statistical Agency (CSA), and other important literature (1, 34, 39, 110). The London unintended pregnancy measurement tool was used to measure an unintended pregnancy (1). It was a validated and standard tool to measure an unintended pregnancy. After adapting the tool, I have redesigned and restructured it based on the study's

objectives. The data collection tool had seven sections. Section I is about disability (reproductive-age women disability) and has 16 questions; Section II is about the sociodemographic characteristics of the participants and has 17 items; Section III is about the wealth index of the study participants' households and has 28 items; Section IV is about contraceptive utilization and has 31 questions assessing contraceptive knowledge, practice, and attitude of participants; and Section V is about sexual violence and was measured using the WHO multi-country study measurement tool (2). The tool had three items used to assess sexual violence. The last section (VI) is about unintended pregnancy, with six items adapted from the London unintended pregnancy measurement tool (1).

The wealth index questionnaire was adapted from the Ethiopian Demographic and Health Survey (111). After adapting and pretesting the data collection tools, six data collectors and one supervisor collected the data. The data collectors visited the selected kebeles and enumerated all the eligible households to check if there were any people with disabilities (focusing reproductive-age women with disabilities) living in them. To facilitate the census, the enumerators utilized vehicles, such as motorcycles. After the census, face-to-face interviews were conducted. The interviews were performed in a place where confidentiality and privacy are assured. The calculated sample size was proportionally allocated for each kebele based on the census result. The study participants were randomly selected using a simple random sampling method.

4.7.2. Data quality control

A 3-day data collectors' training was prepared for six data collectors and one supervisor. The trained data collectors and supervisor have done a pretest in a non-selected study area (Hawassa Lokie kebele) with 5% of the sample size (33 of reproductive-age women with disabilities), and corrections have been made based on the feedback from the pretest. Six nurses who speak Sidaamu Afoo fluently and have experience collecting data were recruited to collect the data for the study. An experienced supervisor supervised the data collectors.

The principal investigator (PI) was to monitor and control the overall data collection process, give appropriate corrections for any issues during data collection, and check the questionnaires' completeness daily. When there are participants who cannot hear, I used trained translators. The data collection tool was initially prepared in English, then translated into the Sidamu Afoo language, and subsequently converted to English to ensure its originality and consistency. We tried to reduce the risk of information bias from the head of the household by raising awareness

of the importance of the census among community members and involving health extension workers and kebele managers throughout the data collection process.

4.8. Data management and analysis

As the data was collected using the Kobo Collect tool, it was directly input into the Kobo Collect application. The data was analyzed using STATA version 16 software developed by Stata Corp LLC in California. Before the final data analysis, the process involved recoding, categorizing, and describing key variables. The data were analyzed using descriptive and inferential statistics. To explain the association between exposure and outcome variables, I considered using an adjusted odds ratio and a 95% confidence level (CI). A chi-square test was carried out to check the strength of the association. Data stratification was used to identify possible confounders and effect modifiers by doing cross-tabulation and risk estimation (odds ratio of the stratum, strata and Mantel-Haenszel-OR) and comparing the odds ratio of the stratum, crude odds ratio of the strata, and Mantel-Haenszel odds ratio (112).

A multilevel binary logistic regression analysis model was employed. Before doing multilevel analysis, I decided whether the multilevel model was required by doing a random intercept model (a null model). This model provides information about interclass correlations (ICC), determining whether a multilevel model is required (113, 114). When the chi-square test (P-value) is significant, or the ICC value is greater than 5%, using a multilevel analysis model is reasonable and mandatory. I considered the random intercept (null) model and model two, including individual and community-level predictors. Since the level two variable (kebele) was considered, I analyzed individual and community levels together as a model two after deciding on the use of a multilevel model, a bivariable and multivariable analysis was carried out to identify factors associated with contraceptive utilization, unintended pregnancy, and sexual violence. Any variable whose bi-variable p-value <0.25 (115) was considered a candidate for the multivariable analysis model.

To estimate the effect of the cluster (kebele) on the outcome, I measured ICC since I considered hierarchical structure (116). Based on the analysis in this dissertation, the ICC values of the random intercept model of paper I (0.12), paper III (0.16), paper III (0.05). Moreover, the median odds ratio (MOR) was used to quantify the variation or heterogeneity (the effect of clustering) in outcomes between kebeles (117). It was calculated using the formula MOR= ~ $\exp^{0.95*\sqrt{(\text{estimated variance of clusters})}}$ (118). In this dissertation, the MOR with CI of the null model for paper I was equal to (1.75 (1.15, 2.63), for paper II (2.05 (1.29, 3.25), and for paper

III (1.01(0.63,1.95)), there was a MOR significant difference between kebeles in papers I and II. The MOR with CI of the final model for paper I was equal to (1.55 (0.89, 2.67), for paper II (6.78), and for paper III (1.06 (0.45, 2.42)), there was no MOR significant difference between kebeles only in paper V. The Akaike information criterion (AIC), Bayesian information criterion (BIC), and likelihood ratio test methods (119) were used to determine model fitness. The lowest value of the likelihood ratios, AIC and BIC, reflected the best-fit model. In this dissertation, the null model log-likelihood ratios, AIC (Akaike Information Criterion), and BIC (Bayesian Information Criterion) for papers I (-351, 706, 715), II (-220, 445, 452), and III (-431, 866, 875). The final model log-likelihood ratio, AIC, and BIC of our dissertation are as follows: for paper I (-267, 565, 636); for paper II (-191, 408, 458); and for paper III (-287, 605, 677).

Effect modifiers are a third variable that can alter or modify the effect of the exposure on the outcome. They influence the relationship between the exposure and the outcome, making it stronger, weaker, or different depending on the effect modifier levels (112, 120). In this dissertation, I examined the effect modifiers by doing data stratification using cross-tabulation and risk estimation of suspected variables (In paper one, I explore relationships such as Distance versus transport availability, educational status versus occupation (job), and contraceptive knowledge versus educational status; In paper two, I investigate the correlation between Alcohol use and chat use; and in paper three, I checked the associations between sexual information and residence, as well as sexual information and educational status. After stratification, I compared the odds ratio of the stratum with 95% CI. This helps assess how the exposure's effect on the outcome varies across different strata defined by the effect modifier. Suppose there is a notable contrast in the odds ratios specific to each stratum, and the 95% confidence intervals between the strata do not overlap. In that case, we can assert that the variable functions as an effect modifier. We conducted the Breslow-Day significance test in cases where the confidence intervals overlap. A significant outcome in the Breslow-Day test suggests the presence of an effect modifier. Unfortunately, there was no effect modifier in this dissertation. Regarding confounders (see methodological discussion)

Table 2: Summary of the methods and materials of the study

Paper	Participants	Sample size	Study design	Analysis	Outcome
I	Women with disabilities in the reproductive-age group	620	Cross-sectional	Multilevel	Contraceptive utilization
II	Women with disabilities in the reproductive-age group	363	Cross-sectional	Multilevel	Unintended pregnancy
III	Women with disabilities in the reproductive-age group	652	Cross-sectional	Multilevel	Sexual violence

Ethical considerations

Ethical clearance was obtained from the Institutional Review Board of Hawassa University at the College of Medicine and Health Sciences with an approval number of Ref.No: IRB/143/14. After approval, a support letter was obtained from Hawassa University College of Medicine and Health Sciences. Subsequently, this support letter was provided to the Sidama National Regional State Public Health Institute to seek permission and cooperation. The letter acquired from the Sidama National Regional Public Health Institute was then submitted to the health offices of Dale district, Wonsho district, and Yirgalem city administration. In turn, letters from the health offices were also submitted to their respective Kebele administrative units included in the study.

After getting permission from kebele administrative, the data collectors introduced the study's objectives, outlined the data collection process, and explained the measures taken to ensure the privacy and confidentiality of the participants. Finally, written consent was obtained from individuals aged 18 years and above, while assent was sought from those below 18 years, along with consent from their parents/guardians. Individuals who cannot read or write, including those who are visually impaired, may signify their consent by marking their names with their index fingers following a verbal confirmation that the data collectors have read the consent. For deaf participants, sign language translators facilitated the translation of the consent form. After translation, voluntary consent was then obtained from the deaf participant.

The entirety of the study information was treated as confidential. All information underwent identification following data collection, and data analysis exclusively utilized subject codes. Electronic data were securely stored in STATA version 16 software for five years. Hard copies of participants' signatures were safely stored in a locked cabinet with restricted access granted only to authorized individuals, with control exercised by the principal investigator. Participation in this study posed no risks. Participants encountering reproductive health issues such as sexual violence and unintended pregnancy were connected with nearby health facilities for potential support and follow-up.

5. RESULTS

5.1. Paper I: Contraceptive utilization among reproductive-age females with disabilities in Central Sidama Region, Ethiopia

The prevalence of current contraceptive utilization among reproductive-age females with disabilities was 27.3 % (95% CI: 23.8 %, 31.0 %). Regarding the methods, 82 (48.5%) of the reproductive-age females with disabilities used implants. The odds of contraceptive utilization is (AOR=9.03; 95% CI: 4.39, 18.6) times higher among reproductive-age women who have good contraceptive knowledge compared to their counterparts. Reproductive-age women with disabilities who have transport accessibility to health facilities are (AOR=2.28; 95% CI: 1.32, 3.94) times more likely to utilize contraceptives compared to those have no transport access to health facility. Compared to young reproductive-age (15 to 24 years old) women with disabilities, those aged 25 to 34 years are (AOR=3.04; 95% CI: 1.53, 6.04) times higher odds of contraceptive utilization. Reproductive-age women with a hearing disability have (AOR = 0.38; 95% CI: 0.18, 0.79) a lower chance of contraceptive utilization. Similarly, those with paralysis of the extremities (AOR = 0.06; 95% CI: 0.03, 0.12) demonstrate a lower chance of contraceptive utilization, while reproductive-age women using a wheelchair also showed (AOR = 0.10; 95% CI: 0.05, 0.22) lower chance of contraceptive utilization compared to reproductive-age women with vision disability (Objective I).

Paper II: Unintended pregnancy and its associated factors among women with disabilities in Central Sidama Region, Ethiopia

The prevalence of unintended pregnancy among women with disabilities was 65.6% (95% CI: 60.4, 70.6). Of these, 47.32% (95% CI: 42, 52.7) were women with hearing disabilities; 28.73% (95% CI: 24.08, 33.74) were women with vision disabilities; 20.56% (95% CI: 16.48, 25.15) were women with extremity disabilities; and 3.40% (95% CI: 1.76, 5.83) of women use a wheelchair. Compared with poor income tercile, women who have a middle-income tercile have (AOR = 2.07; 95% CI: 1.02, 4.20) times higher risk for unintended pregnancy. Women with disabilities who gave birth (AOR = 2.20; 95% CI: 1.21, 3.99) have a higher risk of unintended pregnancy compared to those who have not given birth. The risk of unintended pregnancy is (AOR = 0.26; 95% CI: 0.12, 0.57) lower among women with extremity paralysis compared with vision disability. Compared with rural resident women with urban residents have (AOR = 0.22; 95% CI: 0.12, 0.40) a lower risk of unintended pregnancy. Women with

disabilities who drink alcohol have (AOR = 0.28; 95% CI: 0.11, 0.74) a lower risk of unintended pregnancy when compared with those who did not drink alcohol (Objective II).

Paper III: Sexual violence among reproductive-age females with disabilities in Central Sidama Region, Ethiopia

The prevalence of sexual violence among reproductive-age females with disabilities was 59.8% (95% CI: 56, 63.56). Specifically, 17 % (95% CI: 14, 20) were among those with hearing disabilities; 16% (95% CI: 13.4, 19.2) were among those with vision disabilities; 15.3 % (95% CI: 12.7, 18.4) were among those with extremity paralysis; and 11.5% (95% CI: 9.11, 14.2) were among disabilities on a wheelchair. Within the preceding year, 14.3% (95% CI: 11.7, 17.2) of sexual violence incidents occurred. Reproductive-age WWDs who reside in urban settings have (AOR = 0.51; 95% CI: 0.29, 0.88) a lower risk of sexual violence compared to their counterparts in rural settings. Compared with young (15 to 24 years old) reproductive-age women with disabilities, those aged 25 to 34 years have (AOR = 5.9; CI: 3.01, 11.6) times higher risk of sexual violence. Similarly, reproductive-age WWDs aged 35 to 49 years have (AOR = 3.47; CI: 1.48, 8.14) times higher risk of sexual violence. Reproductive-age WWDs having no sexuality information have (AOR = 11.3; CI: 6.24, 20.5) times higher risk of sexual violence compared to their counterparts who have sexuality information. and having hearing disabilities (AOR = 3.19; CI: 1.49, 6.83) were factors associated with sexual violence (Objective III).

Post hoc power analysis results

Power analysis is a statistical method used to evaluate the adequacy of a sample size in order to detect a true effect, especially when dealing with non-significant variables. The primary goal is to minimize the risk of Type II errors, which involve failing to reject a false null hypothesis when there is a true effect (121). In this dissertation, I did post hoc power analysis for non-significant variables of all objectives using OpenEpi software by considering the 95% confidence interval, sample size, and prevalence (coverage) for exposed and non-exposed variables. In paper I, considering contraceptive utilization as an outcome variable and the explanatory non-significant variables, power was 99.5% for marital status, 16.5% for occupation, 55% for self-perception, 98.8% for distance to a health facility, 5.7%–17.8% for the wealth index, and 35.3% for residence. In paper II, for the outcome of unintended pregnancy, the explanatory non-significant variables power was 4.15% for marital status, 17.3% for education, 24.2% for occupation, 11.2% for self-perception, 1.6%–18% for age, and 6.4% for chat use. In the sexual violence outcome (Paper III), the power of non-significant explanatory variables was 100% for marital status, 5.8%–23% for educational status, 14.4% for occupation, 69% for self-perception, and 9.6%–89% for wealth index. I also checked the power of the sample size of the outcomes to cross-check the adequacy of the sample size. Based on the calculation, the power was 100% for all papers.

6. DISCUSSION

6.1. Discussions of the main findings

This dissertation aimed to provide information about reproductive health service utilization and burden of problems among women with disabilities in central Sidama National Regional State, Ethiopia. I observed that contraceptive utilization among reproductive-age females with disabilities is low due to different individual and contextual factors. Reproductive-age WWDs are doubly burdened by unintended pregnancy and sexual violence.

Contraceptive utilization among reproductive-age women with disabilities

After censusing and determining reproductive-age women with disabilities, the current dissertation evaluated contraceptive utilization and reproductive health problems (unintended pregnancy and sexual violence) among reproductive-age women with disabilities.

The prevalence of contraceptive utilization among reproductive-age females with disabilities was evaluated in the current dissertation, and it was found to be 27.3%. Contraceptive knowledge, transport accessibility to the health facility, being an adult (25 to 34 years old), and types of disability were significantly associated with contraceptive utilization.

The prevalence of contraceptive utilization (27.3%) is almost the same as studies conducted in Uganda, 26.1% (72), Sierra Leone, 26.9% (66), Sub-Saharan Africa, 25.6 (122) and Ethiopia, 24.5% (39) and 27.2% (38). However, this prevalence is higher than the studies conducted in Kenya, 16% (73), Ghana, 17% (123), and Ethiopia, 18% (36). The substantial time gap between our study (2022) and previous ones (2008) (73) could be a significant contributing factor. Furthermore, this dissertation focused on disabled females of reproductive-age, unlike the previous study (123), which included school-aged children, thus introducing age variations in the sample group. Moreover, given that the data was gathered from caregivers, it could result from bias in the data's source (73). However, compared to studies done in Namibia, 32.7% (65), Nigeria, 34% (62) and Ethiopia, 34% (37), the prevalence is lower. The possible reasons might be the study period 2014 vs 2022 (62), residency (37) and marital status (65). The Namibia study (65) was done among married women with disabilities, and the likelihood of having unprotected sex increased with those who were married. Because of this, disabled people are more likely to want to avoid getting pregnant (124), and married disabled women are more likely to utilization contraceptives.

The current dissertation found a strong association between contraceptive knowledge and use among reproductive-age females with disabilities. Compared to those who did not know about contraception, those who did had a higher likelihood of using contraceptives. The finding is consistent with the studies conducted in Uganda (72), Nigeria (62) and Sub-Saharan Africa (122). The potential of knowledge to raise awareness and remove some cultural and social limitations that can serve as barriers to the utilization of contraceptives is a plausible justification (125). Additionally, the current dissertation found that access to transportation to healthcare facilities was significantly associated with contraceptive utilization among reproductive-age females with disabilities. Those who had access to transportation to healthcare facilities were more likely to utilize contraceptives. However, travelling to healthcare institutions can be physically challenging for people with disabilities (62); as a result, transportation is crucial for going to health facilities and getting contraceptives. Being an adult (25–34 years old) increases the likelihood of using contraceptives compared to the age group of 15–24 years. This finding is consistent with the Sub-Saharan Africa study (122). The argument is that among females aged 25 to 34 with disabilities, the likelihood of marriage, unprotected sexual activity, and the utilization of contraception will all increase since disabled people are more likely to wish to avoid becoming pregnant (124). Reproductive-age women with hearing impairments, extremity paralysis disabilities, and wheelchair-dependent disabilities are less likely to utilize contraceptives than reproductive-age women with visual impairments. This finding aligns with research in Gondar, the Amhara region, Ethiopia (36), and Sub-Saharan Africa (122). The possible explanation could be that visually impaired females with impairments are more likely to obtain information through various media, most frequently radio. For those with disabilities living in impoverished nations like Ethiopia, radio is one of the most practical and effective forms of information delivery (36) and physical inaccessibility issues.

In Paper II, the prevalence and factors associated with unintended pregnancy among reproductive-age females with disabilities were assessed. According to the study, 65.6% of women with disabilities experienced unintended pregnancies. Unintended pregnancy was found to be significantly associated with Economic status, birth status, disability types, residence, and alcohol use.

The prevalence of unintended pregnancy among women with disabilities (65.6%) is almost similar to the prevalence of unintended pregnancy in Ethiopia: 62.5% in 2011 (79) and 67% in 2017 (40). However, it is significantly greater than the research done in Bahirdar City, Ethiopia

(15.4%) (43). They used one yes-or-no question to determine the magnitude of an unintended pregnancy, which is prone to response bias due to the sensitive nature of the issue. The different methods used for data collection could be another explanation. Besides, the Bahirdar City study employed institution-based techniques, which may have overlooked the community's hidden majority of women who are carrying unintended pregnancies.

According to this dissertation, WWDs and middle-class incomes were more likely to have unintended pregnancies than those with poor incomes. One possible reason for this could be that WWDs who earn more money may be more independent and more unrestricted to use their sexual rights, which could put them at risk for unintended pregnancies. Compared to women with disabilities who did not give birth, those who did so had a higher risk of an unintended pregnancy. The possible reason for this is that women who gave birth had a higher likelihood of engaging in sexual intercourse, which may have exposed them to unintended pregnancy (126) and, or resulted from unmet contraception needs (127). On the other hand, women with extremity disabilities had lower probabilities of having unintended pregnancies than women with vision disabilities. The reason might be that women with extremity paralysis were viewed as asexual, physically unattractive, and ineligible for sexual activity. The likelihood of having sexual relations and an unplanned pregnancy may be lower than for women with vision disabilities as a result of this and the fear of sociocultural discrimination during pregnancy (128, 129).

Additionally, women with disabilities who resided in urban settings had a lower chance of unintended pregnancy compared to those residing in rural settings. The reason might be that compared to urban settings, rural residences may lack access to information, transportation to a health institution, and contraceptive availability and accessibility (130). The other reason can be low socioeconomic status and the existence of sociocultural norms in rural settings (130, 131). Moreover, women with disabilities who drank alcohol had a lower chance of having unintended pregnancy than WWDs who did not drink alcohol. However, the studies done in South Africa (80, 132) and other evidence revealed that alcohol exposure might increase the probability of having sexual relations and an unintended pregnancy (133, 134). The possible justification for the contradictory finding in this dissertation might be the small number of study participants (62 out of 355).

In paper III, I assessed the prevalence and associated factors of sexual violence among reproductive-age females with disabilities. The study found that the prevalence of sexual

violence among females with disabilities in reproductive-age was 59.8%. Residence, sexual information, age, and type of disability are the factors associated with sexual violence.

This study's prevalence (59.8%) is lower than that of the study conducted in the Democratic Republic of the Congo (73.47%) (87). The study conducted in the Democratic Republic of Congo (DRC) may have shown a higher incidence of sexual violence since it was carried out in a particular area where there is frequent high conflict and instability (135). However, the present finding was higher than that of a study conducted among young people with disabilities in in-school Nigeria (28%) (88). The Nigerian study included disabled young women aged 10 to 25, and it found that lifetime sexual violence may have been less likely to occur among them than among women aged 15 to 49. The other possible reason might be that the Nigeria study only included rape cases, which may affect other components used to measure sexual violence. Likewise, the current finding is higher than in a similar study of adolescents with learning disabilities conducted in Nigeria, which also found that 23.3% (68) had experienced sexual violence. The possible justification might be that the Nigeria study participants were only asked to agree or disagree with statements intended to detect cases of sexual violence instead of using a standard sexual assessment technique.

This dissertation showed that sexual violence is more likely to occur in rural areas when compared to urban residences. The rationale may be associated with the attitudes and socio-cultural influences within the rural population (136), coupled with a deficiency in sexual information. Additionally, compared to women between the ages of 15 and 24, sexual violence was more common among women between the ages of 25 and 49. This evidence is consistent with the findings of a global meta-analysis (46). A possible reason could be that as age increases, sexual desire and their dependence on other people for care and personal assistance could also increase, placing them at a higher risk of sexual violence. According to this dissertation, women of reproductive-age who have hearing impairments are at a higher risk of experiencing sexual violence compared to females with vision impairments. A global meta-analysis study (46) and a qualitative study in South Africa (67) support this finding. This can be the case because those who have hearing impairments have little information about sexuality. This result was in contrast to a study done in the United States of America (137). The study in the United States of America included all violent victimisations like robberies, whereas our study solely looked at sexual violence. This could be the possible reason. In addition, women with disabilities who lack information about sexuality are more likely to experience sexual violence. The possible justification might be that having information about

sexuality (healthy relationships, boundaries, and communication) may be used to prevent sexual violence (91, 92).

6.2.Methodological Discussion

Validity and generalizability of the study

In this dissertation, I used a community-based disability-specific house to house census and cross-sectional study designs. A cross-sectional study design was used to measure the outcome and exposure status at a specific point in time (138, 139).

A cross-sectional study design is one of the most commonly used observational designs (140). The design boasts several advantages, enabling us to delineate the burden and comprehend the prevalence of an issue we are keen on understanding, whether for the entire population or through sampling (138, 140, 141). The other strengths of this design are that it is quick and inexpensive, multiple outcomes and exposures can be assessed, and there are no ethical difficulties (141). However, the design has some limitations, like being prone to nonresponse and recall bias, needing help identifying temporal relationships between outcomes and exposures, and being challenging to make cause-and-effect relationships (141).

The sample size is the number of participants incorporated into the study to represent the general population sufficiently to answer the research question (142). Considering an adequate sample size, the random error that distorts our findings could reduce and narrow the confidence interval (143). In this dissertation, 45% of the central Sidama kebeles were included. I calculated the post-hoc power to check the adequacy of the sample size. The power of non-significant variables for paper I ranges from 16.5% to 99.5%; for paper II, 4.5% to 24.2%; and for paper III, 14.4% to 100%. This indicates that the variables having less power (less than 80%) may be non-significant due to an inadequate case.

Validity of the findings

The validity of a research study is an essential method of assessing research quality by determining the representativeness of findings for similar non-participants based on study participants' results (144, 145). It is the capacity to conduct an accurate investigation with the right equipment and environmental factors to generate trustworthy and acceptable data. It can be challenging for researchers to gather relevant data (144). To obtain and sustain validity, research studies must be carried out in a manner that does not affect the findings. Validity domains that are used frequently are internal and external validity.

Internal validity

It is the extent to which the study avoids systematic error throughout the study process (146, 147); in short, it answers the question, "Are the reported findings true?" The validity of a study may be influenced by various factors, such as errors in measurement and biases associated with participant selection (144). The internal validity of observational studies like cross-sectional studies could be affected by selection bias, information bias, and confounding (146, 148). To conduct valid research, researchers should avoid errors that may distort the study's validity.

Selection bias

Bias is the intentional or unintentional deviation from the truth at any stage of the research process (149). Research bias could occur at any phase of the research process (planning, data collection, analysis and publication) (150). When designing and conducting research, researchers have to understand and consider bias minimization (150, 151). Due to taking samples to infer the population, most studies are prone to error (152). The error could be random (the play of chance affects the estimate effect) or systematic (bias), which causes the estimate to be below or above its actual value. Systematic bias can be categorized into selection and information bias (152). Selection bias is a systematic characteristic difference between the selected study groups and those not (146). Most of the time, selection bias relates to participant recruitment and inclusion criteria and could be reduced using random selection of participants (151).

In this dissertation, I tried to minimize selection bias by considering explicit inclusion and exclusion criteria and using a simple random sampling technique to select the kebeles and study participants. However, the three districts were purposefully selected based on their population density and other criteria, which may result in selection bias. Reproductive-age women with mental disabilities were excluded; it might underestimate the prevalence of unintended pregnancy and sexual violence and might overestimate contraceptive utilization.

Information bias

It occurs during data collection because of differences in data collection from study participants (153), which causes an incorrect determination of independent, dependent or both variables (154). Information bias is also called measurement bias (like self-reporting (recall or social desirability) bias, observer or recorder bias and confirmation bias), observation bias or classification bias (146, 154). Due to the sensitive nature of the study population (women with

disabilities) and study design (cross-sectional), self-reporting bias, specifically social desirability bias, is the most likely source of bias in our study (155). On the other hand, recall bias is not a significant source of bias in our study because of the sensitive nature of the issues. Practically recall bias is common in case-control study design (156). Response bias and data collector bias are the other likely biases. I considered different strategies to minimize the above information biases as follows;

Social desirability bias

This bias occurred when there was a tendency for participants to respond to the questions in a way that was favoured by others or consistent with their socially acceptable way (154). In this dissertation, there was an expected social desirability bias during the census of reproductive-age WWDs in the selected kebeles through a house-to-house census. The question was asked for the head of the household: When the head of the household is asked about the presence of people with disabilities in the household, cultural and social discrimination may lead to a potential social desirability bias. This bias can cause the head of the household to deny the presence of people with disabilities, which might underestimate the prevalence of reproductive-age WWDs (103). Considering additional reports from different stakeholders is vital to overcome social desirability bias (157). Therefore, to mitigate informational bias originating from the household head, the collaboration of the kebele's health extension worker and manager with the data collectors, along with community communication and awareness initiatives regarding the census's objectives, was deemed essential.

This dissertation was also prone to response bias since the issues (contraceptive utilization, unintended pregnancy, and sexual violence) were sensitive. To minimize this bias, we tried to interview in a place where confidentiality and privacy are assured, used same-sex interviewers, and ensured the participants' sensitive responses were not unusual.

Observers (data collectors) bias

The systematic discrepancy between the correct and observed values caused by observer variance is known as observer bias (158). In this dissertation, due to the attitude and experience of data collectors (153), bias might have occurred, although they have been trained. They might choose the "no" option to not continue the interview in detail if the answer is yes. For example, they might choose "no" about the presence of people with disabilities in the household to not continue the details of people with disabilities; if they choose the "yes" option, this might be

underestimating the prevalence. To minimize data collector bias, I considered training the data collectors and utilising pretested data collection tools before data collection. Additionally, day-to-day monitoring of the collected data by the principal investigator was conducted, as well as the use of common language translators to minimize the language translators' bias.

Confounding

Confounding is the term used to describe the mixing effect of a third variable and an exposure variable on a particular outcome, leading to the distortion of the true relationships among the variables (159). In contrast to other biases, confounding bias can be managed during both study design and analysis by applying statistical models (160). In this dissertation, the potential confounders were controlled during data analysis using multivariate analysis. Before conducting multivariate analysis, I checked the strata's crude and adjusted odds ratio. I considered the variable a confounder when the crude odds ratio differed from the Mantel-Haenszel (M-H) odds ratio on stratified data (160). In Paper One, I employed stratification for numerous variables: distance versus transport availability, educational status versus occupation, and contraceptive knowledge versus educational confounding effect. In Paper Two, I stratified alcohol use and chat use. Paper III involved the stratification and examination of sexual information to residence and educational status.

Stratified analyses are constrained by multiple strata, confounders, and small sample sizes (161). I considered multivariate analysis to concurrently manage and control numerous covariates and potential confounding factors, including those that might be unidentified or hidden (160). Based on the multivariate analysis, in paper I, the effects of marital status, education, occupation, self-perception, and distance to a health facility; In paper II, marital status, occupation, self-perception, and chat use; and in paper III, marital status, educational status, occupation, self-perception, and wealth index were controlled confounding factors.

However, residual or unknown confounding factors cannot be addressed in the analysis stage (159). Therefore, in this dissertation, there may be missed or unassessed confounding factors like culture and healthcare provider-related factors.

Chance

It is a random error when we infer the population from the selected sample size due to sampling variability (162). It may underestimate or overestimate the actual effect. Chance can be estimated by conducting a statistical test of significance (P-value) with its narrow confidence

interval (154). The possibility of chance could decrease as the sample size increases (147). In this dissertation, we tried to minimize random error (chance) by considering an adequate sample size based on the standard assumptions and randomly selecting participants. The possibility of chance for the observed results was reported using the statistical significance test of a P-value less than 0.05.

External validity

It is the extent to which the generalizability of the findings from the study participants for the general population that the samples were drawn (147) and outside the study context (163). Considering internal validity, sample size and study participant selection are essential issues for external validity (164). In this dissertation, the three districts were purposefully selected to represent the region's population based on population density, distance, and population characteristics. This may affect the generalizability of our findings for the region since the districts were not selected randomly. The other issue is the exclusion of women with mental disabilities, this could affect the generalizability of the findings for all reproductive-age women with disabilities. To ensure external validity, this dissertation incorporates a variety of backgrounds, residences, and ages, random selection of study participants and kebeles. Thus, it might be generalized for similar settings and in the region.

As a methodological limitation, although we considered hierarchical data (districts, kebeles, and households) to determine individual and community-level determinants, we were unable to identify specific kebele-level factors associated with contraceptive utilization, sexual violence, and unintended pregnancy due to pre-study tool design issues in measuring community-level determinants. However, we did demonstrate the overall effect of the kebele on contraceptive utilization, sexual violence, and unintended pregnancy.

Conclusions and Recommendations

Conclusion

I aimed to determine the prevalence of and factors associated with reproductive health service utilization and burden of problems among reproductive-age women with disabilities in central Sidama National Regional State, Ethiopia. The finding concludes that due to different individual and contextual factors, contraceptive utilization is low, while the burden of reproductive health problems, particularly unintended pregnancy and sexual violence are high among reproductive-age women with disabilities. Here below, I present the detailed conclusions of each objective:

- Contraceptive utilization among reproductive-age females with disabilities is low, especially among the unmarried. Contraceptive knowledge, accessible transportation to the health facility, being an adult (25 to 34 years old), and having specific types of disabilities (hearing disabilities, extremity paralysis, and wheelchair-bound disability) were factors associated with contraceptive utilization (Objective I).
- Unintended pregnancy among women with disabilities is high. Economic status, parity, types of disability, residence, and alcohol use were factors associated with an unintended pregnancy (Objective II).
- Sexual violence among reproductive-age females with disabilities is high. Residence, sexuality information, age, and disability types were associated factors with sexual violence (Objective III).

Recommendations

I recommend that policymakers, researchers, and programmers give great attention to women with disabilities and their use of reproductive health services (contraceptive utilization), and their reproductive health problems (unintended pregnancy and sexual violence). I also recommend that they implement signed conventions about people with disabilities and their reproductive health. Specifically, I recommend the following:

For policymakers

- I recommend integrating the contraceptive provision strategies with health extension programs and providing the service at home for women with disabilities (Objective I).
- Furthermore, I recommend that policymakers devise job opportunity creation and economic empowerment strategies for women with disabilities (Objective II)

For program planners and implementers

- I recommend that program planners and implementers devise strategies aimed at raising awareness among reproductive-age women with disabilities regarding contraception. These strategies could involve utilizing various forms of mass media, including radio, television, and posters, tailored to suit the specific types of disabilities (Objective I).
- I also recommend that program planners and implementers to develop strategies focused on dispelling myths about sexuality education for women with disabilities, particularly within rural communities. These strategies should aim to address misconceptions and provide accurate information tailored to the unique needs of women with disabilities in rural settings (Objectives II & III).

For researchers: I recommend to researchers;

- To investigate contraceptive utilization, unintended pregnancy and sexual violence among women with mental disabilities
- To identify community-level determinant factors of contraceptive utilization, unintended pregnancy, and sexual violence among women with mental disabilities
- To delve into the community's perceptions regarding the utilization of sexual and reproductive health services by women with disabilities.

- To study the implementation and challenges of current initiatives aimed at promoting sexual and reproductive health (SRH) inclusivity for women with disabilities.
- To conduct interventional studies like sexuality education intervention

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8. Original articles Paper I-III and Appendices

Original articles paper I-III

8.1. Paper I

Contraceptive use among reproductive-age females with disabilities in central Sidama National Regional State, Ethiopia: a multilevel analysis

Zelalem Tenaw[1], Taye Gari[2] and Achamyelesh Gebretsadik[2]

[1] Midwifery, Hawassa University, Hawassa, Sidama, Ethiopia
[2] Public Health, Hawassa University, Hawassa, Sidama, Ethiopia

ABSTRACT

Background. Contraceptive use is an important and cost-effective intervention to prevent unwanted pregnancies. People with disabilities face discrimination when it comes to using contraception and are doubly burdened by unwanted pregnancies. However, the status of contraceptive use and associated factors among reproductive-aged females with disabilities was not adequately determined in Ethiopia.

Objective. This study aimed to assess contraceptive use and associated factors among reproductive-age females with disabilities in Dale and Wonsho districts and Yirgalem city administration of central Sidama National Regional State, Ethiopia.

Methods. A community-based cross-sectional study was conducted among randomly selected 620 reproductive-age females with disabilities living in the selected districts from June 20 to July 15, 2022. The data were collected through face-to-face interviewing techniques using a structured questionnaire. A multilevel logistic regression analysis model was employed to analyze the data. The adjusted odds ratio (AOR) with a 95% confidence interval (CI) was used to report the measures of associations.

Results. In this study, 27.3% (95% CI [23.8%–31.0%]) of the reproductive-age females with disabilities were current contraceptive users. Regarding the methods, 82 (48.5%) of the reproductive-age females with disabilities used implants. Having good contraceptive knowledge (AOR = 9.03; 95% CI [4.39–18.6]), transport accessibility to health facilities (AOR = 2.28; 95% CI [1.32–3.94]), being an adult (25 to 34 years old) (AOR = 3.04; 95% CI [1.53–6.04]), having a hearing disability (AOR = 0.38; 95% CI [0.18, 0.79]), having paralysis of the extremities (AOR = 0.06; 95% CI [0.03–0.12]), and wheel-chaired disability (AOR = 0.10; 95% CI [0.05–0.22]) were factors associated with contraceptive use.

Conclusion. Contraceptive use among reproductive-age females with disabilities is low. Transport accessibility, contraceptive knowledge, being in the age groups of 25 to 34 years, and the types of disability determine their contraceptive use. Therefore, designing appropriate strategies to provide contraceptive education and information and provide contraceptive services in their homes is important to enhance contraceptive use.

Subjects Drugs and Devices, Global Health, Public Health, Women's Health

Keywords Disability, Contraceptive, Use, Prevalence, Associated factors, Ethiopia, Multilevel analysis

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Corresponding author
Zelalem Tenaw,
abigiatenaw@gmail.com

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INTRODUCTION

More than one billion people in the world are estimated to have disabilities. The majority of them are from developing countries (*Zziwa et al., 2019*). People with disabilities are the most discriminated against and marginalized group in many countries, particularly in developing countries, including Ethiopia (*MacKay, 2006*; *Hosseinpoor et al., 2013*). In Sidama National Regional State, Ethiopia, we have observed that many females with disabilities are sacrificing themselves with unwanted pregnancies and unwanted children. Due to these problems, women with disabilities have been facing many challenges and have spent their lives begging around the roads and in churches with their unwanted pregnancies and children.

Contraceptive methods are chemicals, drugs, and surgical procedures used to prevent unwanted pregnancy (*Jain & Muralidhar, 2011*). Although people with disabilities have a reproductive right to access and use contraception, coverage of contraceptive use in developing countries, including Ethiopia, is low when compared to developed countries. This is evidenced by the fact that 70.1% (*Haynes et al., 2018*) of disabled women in the United States of America, 67.4% (*Aslan, Yılmaz & Acar, 2021*) in Turkey, 34% (*Olajide et al., 2014*) in Nigeria, 26.9% (*Trani et al., 2011*) in Sierra Leone, 26.1% (*Ayiga & Kigozi, 2016*) in Uganda, 17% (*Kumi-Kyereme, 2021*) in Ghana, 16% (*Odhiambo, 2012*) in Kenya, and 18% (*Beyene, Munea & Fekadu, 2019*) to 34% (*Yesgat et al., 2020*) in Ethiopia have access to contraceptives.

In Ethiopia, various factors associated with contraceptive use among females with disabilities were identified. Of the reported factors, marital status, age, types of disabilities, knowledge and attitude towards family planning methods, the presence of nearby health facilities providing family planning services, keeping confidentiality and privacy in the health facility, having a good self-perception, and educational and economic status were the most common (*Tsegay, Gebremariam & Haile, 2017*; *Beyene, Munea & Fekadu, 2019*; *Yimer Awol Seid, 2019*; *Gonie et al., 2020*; *Yesgat et al., 2020*). Not only do the factors listed above influence contraceptive use, but disability, such as types of disabilities and contraceptive methods, also has an administrative impact on contraceptive use.

In Ethiopia, few studies were conducted to determine the prevalence of contraceptive use and associated factors among reproductive-age females with disabilities from 2013 to 2019 (*Tsegay, Gebremariam & Haile, 2017*; *Beyene, Munea & Fekadu, 2019*; *Yimer Awol Seid, 2019*; *Gonie et al., 2020*; *Yesgat et al., 2020*). These studies considered only urban female residents, deaf and blind females, and females enrolled in supporting organizations and considered only individual-level factors. Contraceptive coverage in these populations is also inconsistent, ranging from 18% (*Beyene, Munea & Fekadu, 2019*) to 34% (*Yesgat et al., 2020*).

Therefore, this study aimed to determine the prevalence of contraceptive use and its associated factors among reproductive-age females with disabilities by considering rural and urban residency, all types of disability (except mental disability), and individual and community-level factors.

METHODS AND MATERIALS

Study design and setting

A community-based cross-sectional study was conducted from June 20 to July 15, 2022, to determine the prevalence and factors associated with contraceptive use among reproductive-age females with disabilities in Sidama National Regional State, Ethiopia. The study was conducted in the Dale and Wonsho districts and in the Yirgalem city administration. According to the *Sidama Region Health Bureau (2021)*, the total population of Dale and Wonsho districts and Yirgalem city administration was 469,455 (*Sidama Region Health Bureau, 2021*; *Sidama Region Health Bureau, 2022*). The two districts are the health and demographic surveillance sites of Hawassa University. Both districts are known for their coffee production and highly dense populations. In the districts and city administration, there are 56 rural and 10 urban kebeles (the lowest political administrative units in Ethiopia). The districts and city administration have one hospital, 16 health centers, and 54 health posts.

Population

Reproductive-age females with disabilities in Dale and Wonsho districts and Yirgalem city administration in Sidama National Regional State were the source population. Reproductive-age females with disabilities who lived in the selected kebeles for at least six months were the study population, except for those who have dual disabilities (*i.e.,* cannot see and hear) and are seriously ill during the data collection time.

Sample size and sampling procedure

The sample size for the first objective (prevalence) was determined by using Epi-Info version 7 software with the assumptions of a 95% confidence interval with 33.7% contraceptive use among reproductive-age women with disability (*Yesgat et al., 2020*), a level of significance (α) of 0.05, a 5% margin of error ($d = 0.05$), and a design effect of 1.64. The sample size for factors associated with contraceptive use was also computed using Epi-Info version 7 with the assumptions of a two-sided confidence level of 95%, a power of 80, a ratio of one (unexposed: exposed), and a percent outcome in the unexposed group (14.5) *versus* a percent outcome in the exposed group (24.5). Accordingly, the maximum (530) sample size was determined by marital status (*Beyene, Munea & Fekadu, 2019*). The sample size from the prevalence of 563 was larger than the associated factors' maximum sample size of 530. After adjusting for an anticipated 10% nonresponse rate, the final sample size was 620.

The sample size was proportionally allocated to the randomly selected 30 kebeles (20 rural and 10 urban) based on the number of reproductive-age females with disabilities. Before conducting this study, a house-to-house census was done to determine the number and identify reproductive-age females with disabilities in each kebele. Reproductive-age females with disabilities were registered during the census using the tracing form. The registration form was used to select study participants using a simple random sampling technique.

Variables

The outcome variable was contraceptive use. Whereas the independent variables were marital status, age, types of disability, educational status, knowledge about family planning, income, self-perception, attitude toward family planning, health care providers' attitudes, the presence of family planning provision at a nearby health facility, and the keeping of confidentiality and privacy by the health facility.

Data collection procedures and quality assurance

The questionnaires (data collection tools) were developed by reviewing different existing literature, like EDHS 2016 (*Central Statistical Agency (CSA) [Ethiopia] and ICF, 2016*; *Gonie et al., 2020*; *Yesgat et al., 2020*), which consists of personal and socio-demographic characteristics and contraceptive use-related issues. After developing and pretesting the data collection tool, six data collectors and one supervisor who are fluent speakers of Sidamu Afoo and who have data collection experience were employed. The data were collected through face-to-face interviewing techniques using structured questionnaires. Two of the data collectors were proficient in sign language and collected the data from reproductive-age females with hearing disabilities. The interview was conducted in a place where confidentiality and privacy are assured. To assure the quality of the data collection, a three-day data collector training was given. The data collection tool was first prepared in English and then translated into Afoo-Sidamu, a local language, and then back to English to check the consistency. The trained data collectors did a pre-test on 31 (5%) reproductive-age females with disabilities in *Lokie kebele* Hawassa city to check the tools, and corrections were made based on the feedback. The principal investigator (PI) monitors and controls the overall process of data collection and makes appropriate corrections for any issues raised during data collection. The PI also checked the completeness of the questionnaires daily.

Data management and analysis

The Kobo Collect version 2021.3.4 application was used to collect the data. Following collection, the data were imported into Stata version 16 for analysis using the "SSC install kobo2stata" command. The cleaning and organizing of the data were done in Stata. The types of variables were clarified, and the distribution was checked by running the frequency for categorical data and mean ± SD (standard deviation) for continuous variables. A multilevel logistic regression analysis model was used to account for the kebele level. Before using the multilevel logistic analysis model, we checked the intraclass correlation coefficient (ICC) level with the chi-square significance level to determine whether using the multilevel logistic analysis model is justifiable. The ICC of 0.12 and its chi-square ($P = 0.001$) significance level showed that using a multilevel analysis model is reasonable. Then, bi-variable multilevel logistic regression was done to identify eligible variables (P-value < 0.20) for multivariable multilevel logistic regression analysis. The multivariable multilevel logistic regression was performed to check for the presence of an association between level one or level two variables and contraceptive use. To determine whether a significant association existed and its strength, variables with adjusted odds ratios with a 95% confidence interval and a P-value < 0.05 were considered.

Ethical considerations

The ethical clearance was obtained from the Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University with an approval number of Ref. No. IRB/143/14. After approval, a support letter was written to the Sidama National Regional Public Health Institute. Then, after obtaining the support letter from Sidama National Regional Public Health Institute, the permission and cooperation letter were given to the woreda health offices. Finally, the woreda health offices wrote a permission letter to selected kebeles, asking them to cooperate and give consent to conduct the study. Written consent was obtained from the study participants to collect the data. There is no risk in participating in this survey. People with disabilities having different health problems were linked to nearby health facilities for possible support and follow-up.

RESULTS

Socio-demographic characteristics of study participants

A total of 620 reproductive-age females with disabilities were included in this study. The mean (SD) age of the study participants was 28.12 (8.54) years. Of the study participants, 55.32% had no formal education (illiterate) and almost all (98.90%) were not employed. Most (83.71%) of the reproductive-age females with disabilities had no occupation, and 54.20% were married (Table 1).

Contraceptive knowledge and attitude

Among the study participants, 382 (61.6%) had good knowledge about contraceptives. Regarding attitude, 303 (48.9%) of reproductive-age females with disabilities had a positive attitude towards contraceptive use.

Contraceptive use prevalence

In this study, the overall prevalence of current contraceptive use among reproductive-age females with disabilities was 27.3% (95% CI [23.8–31.0]), of which 19.19% (95% CI [16.17–22.52]) were from rural residents and 8.06 (95% CI [6.04–10.49]) were from urban residents. From the overall contraceptive use, 20.3% (95% CI [17.2–23.7]) were married, and 7% (95% CI [5.06–9.22]) were unmarried.

Types of contraceptive methods used

Of the contraceptive method users, 82 (48.5%) of the reproductive-age females with disabilities used implants, followed by injectable (36%), oral contraceptive pills (12%), and intrauterine contraceptive devices and condoms (4%).

Reasons for not using contraceptives and their plan to use in the future

This study tried to identify the possible reasons for not using contraceptives among the 451 non-users of contraceptives of reproductive age females with disabilities. Of the respondents, the majority, 161 (36%) did not use it due to a lack of information about contraceptives, and 23 (5%) are due to the plan to have a baby in the near future (Fig. 1).

Table 1 **Socio-demographic characteristics of reproductive-age females with disabilities in Sidama Regional Stata, Ethiopia, 2022 ($N = 620$).**

Variable		Number	Percent
Age in years mean (SD)	28.12 (8.54)		
Marital status of the participants	Married	336	54.2
	Never married	239	38.6
	Widowed	20	3.20
	Divorced	25	4.00
Residency	Rural	381	61.45
	Urban	239	38.55
Participants educational status	Illiterate	343	55.32
	Primary school	192	30.96
	Secondary school	78	12.60
	Vocational and technique	7	1.12
Employment status	Employed	6	1.10
	Unemployed	538	98.90
Wealth index of household	Low	216	34.84
	Medium	196	31.61
	High	208	33.55

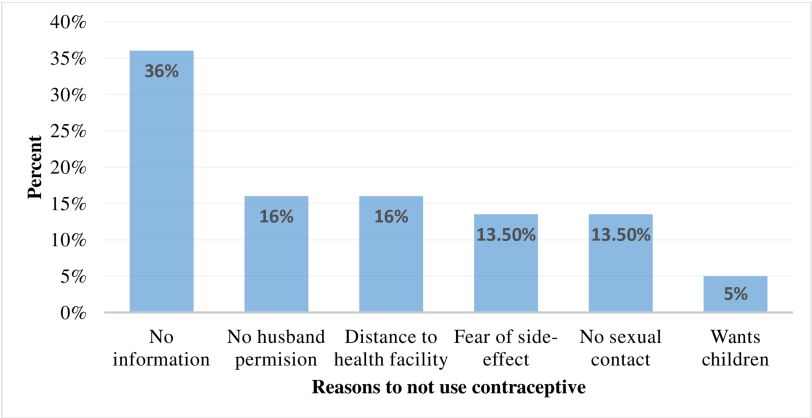

Figure 1 **Reasons for not using contraceptives among reproductive-age females with disabilities in Sidama National Regional State, Ethiopia, 2022.**

Full-size DOI: 10.7717/peerj.15354/fig-1

Regarding their future plans for contraceptive use, 147 (32.59%) had the plan to use, 209 (46.34%) had no plan to use, and 95 (21.06%) were not sure about their future plans.

Factors associated with contraceptive use random effect model

In the zero model (model I), 12% of the variability in contraceptive use was at the community level (kebele level). This may be attributable to other unobserved community factors (ICC = 0.12), which were supported by the chi-square test ($P < 0.001$). This finding also showed that using a multilevel analysis model is reasonable.

Fixed effect model

In the bivariable logistic regression, marital status, education, occupation, self-perception, age, transport accessibility, contraceptive knowledge, types of disability, and residence were significantly associated with contraceptive use, but in the multivariable multilevel logistic regression analysis (after adjusting for the possible confounders), contraceptive knowledge, transport accessibility to the health facility, age, and types of disability were significantly associated with contraceptive use.

Reproductive-age females with a disability who knew about contraceptives had nine (AOR = 9.03; 95% CI [4.39–18.6]) times higher odds of contraceptive use compared with those who had no contraceptive knowledge. On the other hand, reproductive-age females with disabilities who had transport accessibility to health facilities had a twofold (AOR = 2.28; 95% CI [1.32–3.94]) higher likelihood of contraceptive use compared with those who had no transport accessibility. Regarding age, reproductive-age females with disabilities who were 25 to 34 years old had three (AOR = 3.04; 95% CI [1.53, 6.04) times higher odds of contraceptive use compared with those who were in the age group of 15 to 24 years old. Participants with hearing disabilities were 62% (AOR = 0.38; 95% CI [0.18–0.79]), those with extremity paralysis were 94% (AOR = 0.06; 95% CI 0.03–0.12]), and those with wheel-chair disabilities were 90% (AOR = 0.10; 95% CI [0.05–0.22]) less likely to use contraceptives than their counterparts with vision disabilities (Table 2).

DISCUSSION

The prevalence of contraceptive method use among reproductive-age females with disabilities was 27.3%. In the multivariable multilevel logistic regression analysis, contraceptive knowledge, transport accessibility to the health facility, being an adult (25 to 34 years old), and types of disability were significantly associated with contraceptive use.

This study revealed that the contraceptive method use prevalence of 27.3% was almost similar to the studies conducted in Uganda, 26.1% (*Ayiga & Kigozi, 2016*), in Sierra Leone, 26.9% (*Trani et al., 2011*) and in Ethiopia, 24.5% (*Gonie et al., 2020*) and 27.2% (*Tsegay, Gebremariam & Haile, 2017*). On the other hand, the prevalence of contraceptive use in the current study is higher than in the previous studies conducted in Kenya, 16% (*Odhiambo, 2012*), Ghana, 17% (*Kumi-Kyereme, 2021*), and in Ethiopia 18% (*Beyene, Munea & Fekadu, 2019*). The possible reasons might be the long time interval between previous studies (2008) (*Odhiambo, 2012*) and our study (2022). Due to age group differences in the study population, school young people in the previous study (*Kumi-Kyereme, 2021*) and reproductive-age females with disabilities in the current study. Due to information bias from the source of data, since the information was collected from caregivers (*Odhiambo, 2012*). The other possible elucidation might be due to sample size differences. However, the prevalence of contraceptive use is lower than the studies conducted in Namibia, 32.7% (*Loeb & Grut, 2005*), Nigeria, 34% (*Olajide et al., 2014*) and in Ethiopia 34% (*Yesgat et al., 2020*). The possible justification might be that the Namibia study (*Loeb & Grut, 2005*) was conducted among married women with disabilities ,the chance of having unprotected

Table 2 **Multilevel logistic regression analysis for factors associated with contraceptive use among reproductive-aged females with disabilities in Sidama National Regional State, 2022.**

Variables		Contraceptive		COR with 95% CI	AOR with 95% CI
		Use	Not use		
Marital status	Not married	48	238	1.00	1.00
	Married	121	215	2.79 (1.92, 4.35)*	1.53 (0.87, 2.69)
Education	Illiterate	85	258	1.00	1.00
	Literate	84	198	1.30 (0.89, 1.91)*	1.13 (0.68, 1.88)
Occupation	No occupation	130	389	1.00	1.00
	Have occupation	39	62	1.88 (1.02, 2.68)*	1.17 (0.63, 2.16)
Self-perception	Bad	66	127	1.00	1.00
	Good	103	324	0.61 (0.41, 0.92)*	0.99 (0.57, 1.70)
Age (Years)	15 to 24	28	193	1.00	1.00
	25 to 34	88	153	3.96 (2.61, 7.22)*	3.04 (1.53, 6.04)**
	35 to 44	48	85	3.89 (1.89, 6.02)*	2.20 (0.99, 4.85)
	45 to 49	5	20	1.70 (0.52, 4.85)	2.09 (0.56, 7.83)
Transport accessibility	Yes	129	257	2.34 (1.52, 3.59)*	2.28 (1.32, 3.94)**
	No	40	194	1.00	1.00
Distance to a health facility	≥ 30 min on foot	56	90	1.39 (0.84, 2.30)*	1.17 (0.64, 2.11)
	<30 min on foot	113	361	1.00	1.00
Knowledge	Knowledgeable	143	239	4.85 (2.97, 7.90)*	9.03 (4.39, 18.6)**
	Not knowledgeable	26	212	1.00	1.00
Wealth index	Rich	67	141	1.21 (0.76, 1.92)	1.41 (0.77, 2.57)
	Medium	46	150	0.99 (0.61, 1.63)	1.22 (0.66, 2.24)
	Poor	56	160	1.00	1.00
Disability type	Hearing	30	100	0.26 (0.14, 0.48)*	0.38 (0.18, 0.79)**
	Extremity	36	185	0.18 (0.10, 0.31)*	0.06 (0.03, 0.12)**
	Wheel-chaired	40	84	0.39 (0.22, 0.71)*	0.10 (0.05, 0.22)**
	Vision	63	82	1.00	1.00
Residence	Urban	50	189	0.65 (0.34, 1.21)*	0.84 (0.42, 1.71)
	Rural	119	262	1.00	1.00

Notes.
*P-value < 0.2.
**P-value < 0.05.
AOR, Adjusted odds ratio; CI, Confidence interval.

sex increased among married people, and people with disabilities have a higher desire to prevent pregnancy (*Casebolt et al., 2022*).

In this study, contraceptive knowledge is found to be significantly associated with contraceptive use. Those participants who had contraceptive knowledge had a higher chance of using contraceptives compared with those who had no contraceptive knowledge. The finding is consistent with the studies conducted in Uganda (*Ayiga & Kigozi, 2016*) and Nigeria (*Olajide et al., 2014*). The possible justification might be due to the power of knowledge to create awareness and overcome some cultural and social constraints that may act as a barrier to the use of contraceptives (*Beyene, Munea & Fekadu, 2019*).

Those who had transport availability to the health facility had a greater chance of contraceptive use when compared with those who had no transport accessibility to the health facility. As it is known, most people with disabilities face a physical challenge (*Olajide et al., 2014*) in accessing health facilities. Due to this, transportation is very important for accessing health facilities and getting contraceptive methods. Being an adult (25 to 34 years old) increased the chance of contraceptive use when compared with the age group of 15 to 24 years old. The possible justification is that the chance of marriage and unprotected sexual intercourse will increase among 25 to 34-year-old females with disabilities, and the chance of using contraception will also increase due to the greater desire of people with disabilities to avoid pregnancy (*Casebolt et al., 2022*). Compared with vision impairment, the probability of using contraceptives by hearing-disability reproductive age females with disabilities had 62% lower odds of contraceptive use, 94% lower odds of contraceptive use by extremity paralysis disabilities, and 90% lower odds by wheel-chaired disabilities. This finding is inconsistent with studies conducted in Gondar, the Amhara region, Ethiopia, and Addis Ababa. The studies revealed that the probability of contraceptive use increased among vision-impaired females with disabilities when compared with other types of disabilities (*Beyene, Munea & Fekadu, 2019*). The possible reason for the difference might be that visually impaired females with disabilities had an increased chance of accessing information access through different social media, most commonly radio. Radio is one of the most accessible and effective channels of information transmission for people with disabilities in developing countries, including Ethiopia (*Beyene, Munea & Fekadu, 2019*).

These findings may be important for different stakeholders who are concerned about reproductive-age females with disabilities and their reproductive health services, specifically contraceptive use. This study was conducted among all types of reproductive-age females with disabilities who reside in urban and rural areas. In the previous studies, rural residents with disabilities were excluded from the contraceptive use assessment studies. The other strength of this study was the use of multilevel analysis to check the effect of kebele-level variables on contraceptive use. However, due to the sensitivity and principles of contraceptive use, this study did not consider reproductive-age females with mental disabilities. Therefore, this study could be generalized to all reproductive-age females with disabilities except for mental disabilities.

CONCLUSION

Contraceptive use among reproductive-age females with disabilities, specifically among the unmarried, is noticeably low in the Dale and Wonsho districts and Yirgalem city administration, Sidama National Regional State, Ethiopia. Contraceptive knowledge, accessible transportation to the health facility, being an adult (25 to 34 years old), and having specific types of disability were factors associated with contraceptive use among reproductive-age females with disabilities. Therefore, designing appropriate strategies to provide contraceptive education and information and provide contraceptive services in their homes is important to enhance contraceptive use.

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ADDITIONAL INFORMATION AND DECLARATIONS

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The authors received no financial support for this study.

Competing Interests

The authors declare there are no competing interests.

Author Contributions

- Zelalem Tenaw conceived and designed the experiments, performed the experiments, analyzed the data, prepared figures and/or tables, authored or reviewed drafts of the article, data analysis, and approved the final draft.
- Taye Gari analyzed the data, prepared figures and/or tables, authored or reviewed drafts of the article, and approved the final draft.
- Achamyelesh Gebretsadik analyzed the data, prepared figures and/or tables, authored or reviewed drafts of the article, and approved the final draft.

Ethics

The following information was supplied relating to ethical approvals (i.e., approving body and any reference numbers):

The Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University approved the study (Ref.No: IRB/143/14.).

Data Availability

The following information was supplied regarding data availability:

The raw data is available in the Supplemental Files.

Supplemental Information

Supplemental information for this article can be found online at http://dx.doi.org/10.7717/peerj.15354#supplemental-information.

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8.2. Paper II

BMC Pregnancy and Childbirth

RESEARCH

Open Access

Unintended pregnancy and its associated factors among women with disabilities in central Sidama National Regional State, Ethiopia: a multilevel analysis

Zelalem Tenaw[1*], Taye Gari[1] and Achamyelesh Gebretsadik[2]

Abstract

Background Unintended pregnancy is one of the most common reproductive health problems. The problem makes women with disabilities doubly burdened by their disabilities. The previous evidences are inconsistent and do not address all women with disabilities. The study aimed to assess the prevalence of unintended pregnancy and its associated risk factors among women with disabilities in Dale and Wonsho districts and Yirgalem city administration central Sidama National Regional State, Ethiopia.

Methods A community-based cross-sectional study design was conducted among 355 randomly selected women with disabilities living in the selected districts from June 20 to July 15, 2022. The data were collected through face-to-face interviews using a structured questionnaire. A multilevel logistic regression analysis model was employed to identify factors associated with an unintended pregnancy. The adjusted odds ratio (AOR) with a 95% confidence interval (CI) was used to report the measures of associations.

Results In this study, the prevalence of unintended pregnancy among women with disabilities was 65.6% (95% CI: 60.4, 70.6). After adjusting for potential confounding variables, middle economic status (AOR = 2.07; 95% CI: 1.02, 4.20), giving birth (AOR = 2.20; 95% CI: 1.21, 3.99), extremity paralysis types of disability (AOR = 0.26; 95% CI: 0.12, 0.57), living in urban residences (AOR = 0.22; 95% CI: 0.12, 0.40) and alcohol using (AOR = 0.28; 95% CI: 0.11, 0.74) were risk factors with unintended pregnancy.

Conclusions Unintended pregnancy among women with disabilities is remarkably high in central Sidama National Regional State, Ethiopia. Economic status, giving birth, types of disability, residence, and alcohol use were factors associated with an unintended pregnancy. As a result, economic empowerment, strengthening education and information about unintended pregnancy and its prevention strategies in rural settings are vital.

Keywords Disability, Unintended pregnancy, Prevalence, Associated risk factors, Ethiopia, Multilevel analysis

*Correspondence:
Zelalem Tenaw
abigiatenaw@gmail.com
[1]Department of Midwifery, College of Medicine and Health Sciences, Hawassa University, Hawassa, Ethiopia
[2]School of Public Health, College of Medicine and Health Sciences, Hawassa University, Hawassa, Ethiopia

Background

Women with disabilities desire children in the same way that women without disabilities do, and they intend to have as many children as they can support [1]. Women with disabilities are discriminated against and excluded from various reproductive health services in the majority of developing countries, including Ethiopia [2, 3]. Due to different barriers, women with disabilities cannot access and use reproductive health services and could be exposed to reproductive health problems, mainly unintended pregnancy [4].

An unintended pregnancy is a pregnancy that occurs when a woman does not want to have a child at the time of conception [5]. Women with disabilities also suffer from unintended pregnancy and its effects, which makes them doubly burdened with their disabilities. They may go to unsafe abortion services to terminate the unintended pregnancy. Finally, they may lose their lives due to the complications of unsafe abortion [6].

A study conducted in the United States of America revealed that the proportion of unwanted pregnancies is higher (53%) among women with disabilities than among women without disabilities (36%) [7]. Another study from Cameroon also showed that unintended pregnancy among women with physical disabilities was common [8]. In our country, Ethiopia, the prevalence of unintended pregnancy among women with disabilities ranges from 15.4% [9] in Bahirdar to 67% in Addis Ababa [10, 11].

Different risk factors that are associated with unintended pregnancy among women with mental disabilities were identified by previous studies. A study conducted in South Africa marital status, level of education, ethnicity, and substance use as the main factors determining unintended pregnancy among women with disabilities [12].

The previous studies conducted in Ethiopia [9–11] did not identify the associated factors for unintended pregnancy among women with disabilities. There is also a disparity in the prevalence of unintended pregnancy. On the other hand, the previous studies had considered only urban women residents with disabilities and deaf and blind women with disabilities.

Therefore, this study aimed to determine the prevalence of unintended pregnancy and its associated risk factors among women with disabilities by considering rural and urban residency, all types of disability (except mental disability) and individual and community-level risk factors that are associated with an unintended pregnancy.

Methods

Study design and setting

A community-based cross-sectional study was conducted from June 20 to July 15, 2022. The study was conducted in Central Sidama Regional State, Ethiopia. The region report (2021) showed that the total population of the Central Sidama is 469,455 [13, 14]. Of these, 82,625 are people with disabilities. Based on the Labor and Social Affairs Office report (2021) and the WHO estimation [15], 19,207 people with disabilities are estimated to be of reproductive age. The details of the study settings were described in the previously published project [16].

Population

Women with disabilities in central Sidama National Regional State were the source population. Women who have a pregnancy history or were currently pregnant and lived in the selected kebeles for at least six months were the study population, except those who cannot see and hear and are seriously ill during the data collection time.

Sample size and sampling procedure

The sample size was determined by using Epi Info version 7 software with the following assumptions: a 95% confidence interval with a 15.4% prevalence of unintended pregnancy among reproductive-age women with disability [9] a level of significance (α) of 0.05, a 5% margin of error (d=0.05), and a design effect of 1.64. The sample size for associated risk factors of unintended pregnancy was also computed using Epi-Info version 7 with the assumptions of a two-sided confidence level of 95%, a power of 80, a ratio of exposed to unexposed subjects, percent outcome in the unexposed group and percent outcome in the exposed group. Accordingly, the maximum (94) sample size was determined using substance use as a factor [12]. The sample size from the prevalence of 330 was larger than the associated factors' maximum sample size of 94. After adjusting for an anticipated 10% nonresponse rate, the final sample size was 363. Then, the sample size was proportionally allocated to the 30 selected kebeles (20 rural and 10 urban) based on the number of women with disabilities who have a pregnancy history or are currently pregnant. Before conducting this study, a house-to-house census was conducted to determine the eligible women with disabilities in each kebele. The study participants were selected using a simple random sampling technique.

Variables

The outcome variable was unintended pregnancy. Whereas the independent variables were marital status, educational status, ethnicity, and substance use (alcohol, chat) were the exposure variables.

Data collection procedures and quality assurance

The data collection tool was adopted from the London Measure of Unplanned Pregnancy (LMUP) standard tool [17]. The data collection procedures and quality assurance were described elsewhere [16]. The trained data collectors did a pre-test on 19 (5%) women with disabilities

who have a pregnancy history or are currently pregnant in Lokie and Tiltie kebele, Hawassa city, to check the tools, and corrections were made based on the feedback. The principal investigator (PI) monitored and controlled the overall process of data collection and made appropriate corrections for any issues that could be raised during data collection. The PI also checked the completeness of the questions daily.

Outcome measurement

Unintended pregnancy was measured using the London Measure of Unplanned Pregnancy (LMUP) [17]. The tool had six questions (on contraceptive use, timing, intention, desire for a baby, partner discussion, and pre-conception preparations) through which women reported the circumstances of their current or recent pregnancy. Each item in the tool was scored 0, 1, or 2 according to the LMUP scoring guidelines [17]. The scores were summed across all six items, resulting in a total score of 0 to 12. Then the total LMUP scores of 0 to 3 are considered an unintended pregnancy [17, 18].

Table 1 Socio-demographic characteristics of women with disabilities in Central Sidama Regional Stata, Ethiopia, 2022 (N = 355)

Variable		Number	Percent
Age in years mean (SD)		31.25(5.72)	
Religion	Protestant	277	78.03
	Orthodox	42	11.83
	Muslim	18	5.07
	Catholic	18	5.07
Marital status of the participants	Married	307	86.48
	Never married	48	13.52
Residency	Rural	214	60.28
	Urban	141	39.72
Participants educational status	Primary school	73	20.56
	Secondary school	42	11.83
	Vocational and technique	8	2.25
	Unable to read and write	232	65.35
Employment status	Employed	7	2
	Unemployed	343	98
Occupation	Have occupation	55	15.49
	No occupation	300	84.51
Self-perception	Good	261	73.52
	Bad	94	26.48
Wealth index of household	Low	124	34.93
	Middle	118	33.24
	High	113	31.83
Living with	Husband	281	79.15
	Family member	61	17.19
	Others*	13	3.66

*: Peers, relatives

Data management and analysis

Following collection, the data were imported into Stata version 16 for analysis using the "SSC install kobo2stata" command. The details of data management and analysis were described elsewhere [16]. The ICC of 0.16 and its chi-square ($P<0.001$) significance level showed that using a multilevel analysis model is reasonable.

Results

Socio-demographic characteristics of study participants

A total of 355 women with disabilities participated in this study, with a 97.80% response rate. The ages of women with disabilities ranged from 15 to 48 years, with a mean (standard deviation) age of 31.25 (5.72) years. The majority (86.48%) of the study participants were married. 65% of women with disabilities had no formal education (were illiterate) and most (98%) of the study participants were not employed (Table 1).

Prevalence of unintended pregnancy among women with disabilities

In this study, the prevalence of unintended pregnancy among women with disabilities was 65.6% (95% CI: 60.4, 70.6). Of these, 47.32% (95% CI: 42, 52.7) were women with hearing disabilities; 28.73% (95% CI: 24.08, 33.74) were women with vision disabilities; 20.56% (95% CI: 16.48, 25.15) were women with extremity disabilities; and 3.40% (95% CI: 1.76, 5.83) of women at wheel-chair.

Factors associated with unintended pregnancy among women with disabilities

Random effect model

In the null model (model I), 16.11% of the variability in unintended pregnancy occurred at the community level (kebele level) and could be attributed to other unobserved community factors (ICC = 0.16), as supported by the chi-square ($P<0.001$). This evidence also demonstrated the rationale for employing a multilevel analysis model.

Fixed effect model

In the bivariable logistic regression, marital status, occupation, self-perception, economic status, giving birth, types of disability, alcohol use, chat use, and residence were associated risk factors for unintended pregnancy. But in the multivariable, multilevel logistic regression analysis, economic status, giving birth, types of disability, residence, and alcohol use were significantly associated with an unintended pregnancy.

Women with disabilities having a middle economic status had a twofold (AOR = 2.07; 95% CI: 1.02, 4.20) higher

likelihood of unintended pregnancy than those with a low economic status. When comparing women who gave birth to those who did not the odds of an unintended pregnancy increased by twofold (AOR=2.20; 95% CI: 1.21, 3.99) among those who gave birth. In terms of disability type, those with extremity disabilities had a 74% (AOR=0.26; 95% CI: 0.12, 0.57) lower risk of unintended pregnancy compared with those with visual disabilities. Women with disabilities living in urban residences had 78% (AOR=0.22; 95% CI: 0.12, 0.40) lower odds of unintended pregnancy compared with those living in rural residences. Those who use alcohol have a 72% (AOR=0.28; 95% CI: 0.11, 0.74) lower likelihood of unintended pregnancy compared with women with disabilities who do not use alcohol (Table 2).

Discussion

The prevalence of unintended pregnancy among women with disabilities was 65.6%. After controlling for potential confounding variables, economic status, giving birth, disability types, residence, and alcohol use were found to be significantly associated with unintended pregnancy.

The prevalence of 65.6% in this study is almost similar to studies conducted in Addis Ababa, Ethiopia: 62.5% in 2011 [11] and 67% in 2017 [10]. However, it is much higher than a study conducted in Bahirdar City, Ethiopia (15.4%) [9]. The possible reason might be that the study in Bahirdar City did not use a standard unintended pregnancy measurement tool. It simply used one yes-or-no question to determine the magnitude of unintended pregnancy, which is prone to bias. The other possible reason might be the difference in data collection approaches. The Bahirdar City study used institution-based techniques, which may have missed the hidden majority of women with unwanted pregnancies in the community.

Regarding economic status, women with disabilities and middle economic status had a higher probability of having an unintended pregnancy compared with those with poor economic status. The possible justification might be that women with disabilities having a better economic income might increase their independence and freedom to enjoy sexual rights, which might expose them to unintended pregnancy. On the other hand, women with disabilities who gave birth had a higher chance of having an unintended pregnancy compared with those

Table 2 Multilevel logistic regression analysis for factors associated with unintended pregnancy among women with disabilities in Central Sidama, 2022

Variables	Pregnancy			COR with 95% CI	AOR with 95% CI
	Wanted	Unintended			
Marital status	14	34	Never married	0.59 (0.27,1.29)*	0.68 (0.31, 1.47)
	108	199	Married	1.00	1.00
Education	85	147	Illiterate	1.29 (0.77,2.18)	
	37	86	Literate	1.00	
Occupation	15	40	Yes	0.62 (0.31,1.26)*	0.79 (0.38, 1.66)
	107	199	No	1.00	1.00
Self-perception	38	56	Bad	1.55 (0.89,2.68)*	1.38 (0.73, 2.61)
	84	177	Good	1.00	1.00
Age (Years)	37	54	35 to 48	1.18 (0.46,3.03)	
	73	162	25 to 34	0.84 (0.34,2.05)	
	12	17	15 to 24	1.00	
Wealth index	52	61	Rich	2.06 (1.13,3.78)*	1.54 (0.82, 2.90)
	38	80	Middle	1.46(0.79,2.68)	2.07 (1.02, 4.20)**
	32	92	Poor	1.00	1.00
Gave birth	85	137	Yes	1.72(1.02,2.93)*	2.20 (1.21, 3.99)**
	37	96	No	1.00	1.00
Types of Disability	64	104	Hearing	0.87(0.44, 1.70)	0.67 (0.38, 1.18)
	13	60	Extremity	0.31(0.13, 0.78)*	0.26 (0.12, 0.57)**
	2	10	Wheel-chaired	0.39(0.07,2.09)	0.64 (0.11, 3.77)
	43	59	Vision	1.00	1.00
Alcohol use	7	55	Yes	0.24(0.10,0.57)*	0.28 (0.11, 0.74)**
	115	182	No	1.00	1.00
Chat use	6	26	Yes	0.43(0.16,1.17)*	0.97 (0.32, 2.97)
	116	207	No	1.00	1.00
Residence	24	117	Urban	0.24 (0.13,0.43)*	0.22 (0.12, 0.40)**
	98	116	Rural	1.00	1.00

*: P-value < 0.2; **: P-value < 0.05; AOR: Adjusted odds ratio; CI: Confidence interval;

who did not give birth. The reason might be the fact that women who gave birth had an increased chance of sexual intercourse, which may have exposed them to unintended pregnancy [19] and could be due to unmet contraceptive needs [20]. Compared with women with vision disabilities, women with extremity disabilities had a lower probability of having an unintended pregnancy. Although it is difficult to compare a study from the United States of America due to socioeconomic and other differences, the national survey results revealed that unintended pregnancy was more common among women with vision disabilities than other disabilities [21]. The possible reason could be that women with extremity paralysis were considered asexual, physically unattractive, and not eligible for sexual intercourse. Due to this and the fear of sociocultural discrimination during pregnancy, the probability of having sexual intercourse and unintended pregnancy was lower than for women with vision disabilities [22, 23]. The other significant factor that is associated with an unintended pregnancy is the residential place of women with disabilities. Those who lived in the urban had a lower risk of having an unintended pregnancy compared with women with disabilities living in rural residence. The possible reason for the difference could be that, in rural residences, there is a high probability of a lack of access to information, transportation to the health facility, and contraceptive access compared with urban residences [24]. The other possible justification could be low socioeconomic status and the presence of sociocultural norms in the rural residence [24, 25]. Regarding alcohol use, women with disabilities who used alcohol had a lower chance of having an unintended pregnancy compared with those who did not use alcohol. This finding is in contrast with the studies conducted in South Africa [12, 26]. The possible reason might be that, in our study, the number of people exposed to alcohol was very limited (62 out of 355 people). Different evidence revealed that alcohol exposure might increase the probability of having sexual relations and unintended pregnancy [27, 28].

The findings of this study could be useful for governmental and non-governmental organizations to alleviate the burden of unintended pregnancy on women with disabilities, which makes them doubly burdened with their disabilities. This study attempted to address all women with disabilities who lived in either urban or rural settings, which may be used to demonstrate the magnitude and associated factors of unintended pregnancy among rural women with disabilities, who are frequently overlooked. The other important strengths of this study were the consideration of kebele level (level 2) factors associated with an unintended pregnancy and the use of a standard unintended pregnancy measurement tool known as the London Measure of Unplanned Pregnancy (LMUP) [17]. However, limitations should be taken into consideration while we are interpreting the results. The limitation of this study was the exclusion of women with mental disabilities and a lack of generalizability across all types of women with disabilities.

Conclusions

Unintended pregnancy among women with disabilities is remarkably high in central Sidama National Regional State, Ethiopia. Economic status, giving birth, types of disability, residence, and alcohol use were factors associated with an unintended pregnancy. Therefore, informational communication and behavioural change are crucial to changing the risky behaviours of women with disabilities. It is also crucial to develop an appropriate strategy to address issues of unintended pregnancy and its prevention for women residing in rural settings.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12884-023-05848-3.

Supplementary Material 1

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Author contributions

ZT, AG, and TG designed and wrote the proposal. ZT analyses and writes the manuscript. AG and TG commented on and edited the manuscript.

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The author(s) received no financial support for this study.

Data Availability

All data supporting this information is included in the main document.

Declarations

Ethics approval and consent to participate

The study fulfilled with the declaration of Helsinki and approved by the Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University with an approval reference number of (Ref. No.): IRB/143/14. After approval, a support letter was written to the Sidama National Regional Public Health Institute. Then, after obtaining the support letter from Sidama National Regional Public Health Institute, the permission and cooperation letter were given to the woreda health offices. Finally, the woreda health offices wrote a permission letter to selected kebeles, asking them to cooperate and give consent to conduct the study. After being informed about the purpose, their rights to participation, and the potential benefits and risks of the study, written informed consent was obtained from the study participants and their guardians to collect the data.

Consent for publication

Not applicable.

Competing interests

All the authors declared that there were no financial or personal competing interests.

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Publisher's Note

8.3. Paper III

BMC Women's Health

RESEARCH Open Access

Sexual violence and associated factors among reproductive-age females with disabilities in central Sidama National Regional State, Ethiopia: a multilevel analysis

Zelalem Tenaw[1*], Taye Gari[2] and Achamyelesh Gebretsadik[2]

Abstract

Background Sexual violence is one of the most common problems in reproductive health that causes different traumatic events that lead to mental, social, and physical problems. Females with disabilities are subjected to more traumatic events and consequences. In Ethiopia, there are limited evidences about the prevalence and associated factors of sexual violence among reproductive-aged females with disabilities. Therefore, this study aimed to assess the prevalence and associated factors of sexual violence among females with disabilities in reproductive-age in central Sidama National Regional State, Ethiopia.

Methods A multistage sampling technique was used to select 645 reproductive-age females with disabilities. Initially, three districts were purposefully selected, from which 30 kebeles and study participants were selected randomly from June 20 to July 15, 2022. A face-to-face interviewing technique was used to collect the data. The data were analyzed using a multilevel logistic regression analysis model. The measures of associations were reported using the adjusted odds ratio (AOR) and its 95% confidence interval (CI).

Results The prevalence of sexual violence among reproductive-age females with disabilities was 59.8% (95% CI: 56, 63.56). Residing in an urban setting (AOR = 0.51; 95% CI: 0.29, 0.88), being an adult (25 to 34 years old) (AOR = 5.9; CI: 3.01, 11.6), being an adult (35 to 49 years old) (AOR = 3.47; CI: 1.48, 8.14), having no sexuality information (AOR = 11.3; CI: 6.24, 20.5), and having hearing disabilities (AOR = 3.19; CI: 1.49, 6.83) were factors associated with sexual violence.

Conclusions Sexual violence among reproductive-age females with disabilities is noticeably high. Place of residence, sexual orientation, age, and disability type were all factors associated with sexual violence. Therefore, providing sexuality education, giving high attention (information and education about sexuality) to rural residents, and considering females with hearing disabilities are important to minimize sexual violence among reproductive-age females with disabilities.

Keywords Ethiopia, Disability, Multilevel analysis, Prevalence, Sexual violence

*Correspondence:
Zelalem Tenaw
abigiatenaw@gmail.com
[1] Department of Midwifery, College of Medicine and Health Sciences, Hawassa University, Hawassa, Ethiopia
[2] School of Public Health, College of Medicine and Health Sciences, Hawassa University, Hawassa, Ethiopia

Background

According to the World Health Organization, disability is defined as any impairment of a person's body function or structure, activity limitation, and participation restriction (environmental factors) [1, 2]. Sexual violence is an act or attempt to engage in sexual intercourse without the

consent of the other person [3]. in majority of developing countries, including Ethiopia, reproductive health services are not easily accessible and not inclusive to reproductive-age females with disabilities [4, 5].

Because of exclusion, discrimination and misconceptions, people with disabilities are excluded from sexual education [6]. Due to a lack of sexuality information (boundaries of relationships, touch, and communication) and knowledge, females with disabilities are more vulnerable to reproductive health issues such as sexual violence [7]. In addition, dependence on others, less education about sexuality, and physical vulnerability, among others, people with disabilities are more vulnerable to sexual violence [8].

Sexual violence is more prevalent among people with disabilities compared with non-disabled [9]. Relative to non-disabled women, women with disabilities have a higher proportion of lifetime sexual violence which is twofold [10]. Females with disabilities are more likely to be sexually abused than males with disabilities [11]. Sexual violence causes serious traumatic events that lead to mental, social, and physical problems [12]. Females with disabilities who are sexually abused appear to suffer the worst consequences [13].

The prevalence of sexual violence had a great difference between developed and developing countries. For instance, the reported prevalence among women with disablity was 12.5% in the United States of America, [14], in Denmark, 9.4% [7], in Nepal, 21.5% [15], in the Democratic Republic of the Congo, 73.47% [16], in Nigeria, 28% [17], and 23.3% [18]. In Ethiopia, there is limited evidence about the prevalence and associated factors of sexual violence, but one qualitative study conducted in Addis Ababa revealed that two of four blind and deaf individuals were raped by their relatives [19].

Likewise, different researchers tried to identify the factors associated with sexual violence. But the evidence is scarce in African countries, including Ethiopia. The African studies were qualitative and conducted in South Africa [20] and Senegal [21]. On the other hand, the study conducted in Canada [22] identified age, household income, information about sexuality, and marital status as the factors associated with sexual violence among females with disabilities.

Therefore, the aim of this study was to assess the prevalence and factors associated with sexual violence among reproductive-age females with disabilities.

Methods

Study design and setting

A community-based cross-sectional study was carried out from June 20 to July 15, 2022. The study was conducted in the Dale and Wonsho districts and in the Yirgalem city administration in Sidama National Regional State, Ethiopia. The details of the study settings were described elsewhere [23].

Population

Reproductive-age females with disabilities in Dale and Wonsho districts and Yirgalem city administration in Sidama National Regional State were the source population. Reproductive-age females with disabilities who lived in the selected kebeles for at least six months were the study population. The details of population were described elsewhere [23].

Sample size determination

By considering a single population proportion formula, the sample size was determined using Epi Info version 7 software with the assumptions of a 95% confidence interval with 73.47% of sexual violence [16], a level of significance (α) of 0.05, a 5% margin of error (d = 0.05), and a design effect of 1.64. The sample size for associated factors of sexual violence was also computed using Epi-Info version 7 with the assumptions of a two-sided confidence level of 95%, a power of 80, a 1:1 ratio of exposed to unexposed subjects, and percent outcomes in the unexposed and exposed groups. Accordingly, the maximum (592) sample size was determined by having information about sexuality [22]. The sample size from the associated risk factors (592 samples) was larger than the prevalence sample size (510 samples). After adjusting for an anticipated 10% nonresponse rate, the final sample size was 652.

Sampling procedure

The sample size was proportionally allocated to the 30 selected kebeles. Initially, based on our resource, population density and the nature of socio-demographic characteristics to represent the Sidama population, the three districts were purposefully selected, from which 30 kebeles and study participants were selected randomly. The details of sampling procedure were described elsewhere [23]. The heads of households were asked about the presence of people with disabilities in the household. Reproductive-age females with disabilities were identified based on the World Health Organization's disability definition and registered (a total of 700) during the census using the tracing form. Based on the registration, the study participants were selected by a simple random sampling technique.

Variables

The outcome variable was sexual violence. It is an act or attempt to perform sexual intercourse without the consent of the other person in life time. Whereas, the independent variables were marital status, age, household

income, information about sexuality, Type of disability, residence.

Data collection procedures and quality assurance

The data collection tool was adopted from the World Health Organization multi-country study measurement tool [24]. After adopting and pretesting the data collection tool, six data collectors and one supervisor who are fluent speakers of Sidamu Afoo and who have data collection experience were employed. The data collection procedures and quality assurance were described in the previously published project [23]. The trained data collectors did a pre-test on 33 (5%) reproductive-age females with disabilities in *Lokie kebele* Hawassa city to check the tools, and corrections were made based on the feedback.

Outcome measurement

Sexual violence was measured using the World Health Organization multi-country study measurement tool [24]. The tool had three items used to assess sexual violence. The items were: had someone physically forced her to have sexual intercourse; had she had sexual intercourse when she did not want to and because she was scared of what someone might do; or had someone forced her to do something sexual that she found shameful? Sexual violence was coded "yes" when the participant has experienced any of the above three types of violence in their life. For deaf participants, sign language translators were considered to translate the sign language.

Data management and analysis

The Kobo Collect version 2021.3.4 application was used to collect the data. Following collection, the data were imported into Stata version 16 for analysis using the "SSC install kobo2stata" command. The details of data management and analysis were described elsewhere [23]. The ICC of 0.05 and its chi-square ($P<0.001$) significance level showed that using a multilevel analysis model is reasonable.

Results

Socio-demographic characteristics of study participants

A total of 645 reproductive-age females with disabilities participated in this study, with a 98.92% response rate. The mean (standard deviation) age of the study participants was 27.72 (8.16) years. The majority (60.40%) of the study participants reside in rural settings. Among the participants, 59.53% had no formal education (unable to read and write). Almost all (97.86%) were not employed, and 90.08% had no occupation (Table 1).

Table 1 Socio-demographic characteristics of study participants in central Sidama Regional Stata, Ethiopia, 2022 ($N=645$)

Variable		Number	Percent
Age in years mean (SD)	27.72 (8.16)		
Marital status of participants	Married	344	53.33
	Never married	264	40.93
	Others[a]	37	5.7
Residency	Rural	396	60.40
	Urban	249	38.60
Participants educational status	Primary school	174	26.98
	Secondary school	78	12.09
	Vocational and technique	9	1.40
	Unable to read and write	384	59.53
Employment status	Employed	11	1.02
	Unemployed	505	97.86
Occupation	Have occupation	64	9.92
	No occupation	581	90.08
Self-perception	Good	442	68.53
	Bad	203	31.47
Sexuality information	Yes	297	46.05
	No	348	53.95
Household wealth index	Low	212	32.87
	Medium	218	33.80
	High	215	33.33
Having health insurance	Yes	41	6.36
	No	604	93.64
Living with	Husband	329	51.01
	Family member	280	43.41
	Others[b]	36	5.58

[a] Divorced, widowed

[b] Peers, relatives, alone

Prevalence of sexual violence among reproductive-age females with disabilities

In this study, the prevalence of sexual violence among reproductive-age females with disabilities was 59.8% (95% CI: 56, 63.6). Of these, 15.3% (95% CI: 12.7, 18.4) were among extremity disabilities; 16% (95% CI: 13.4, 19.2) were among vision disabilities; 17% (95% CI: 14, 20) were among hearing disabilities; and 11.5% (95% CI: 9.11, 14.2) were among wheel-chair disabilities. In the previous year, 14.3% (95% CI: 11.7, 17.2) of the violence occurred.

Factors associated with sexual violence among reproductive-age females with disabilities

Random effect model

The random intercept model is used to decide whether or not to use the multilevel analysis model based on the ICC value and chi-square test significance level [25]. In our random effect model analysis, the empty model (model I) showed that 5.15% of the variability in sexual violence

occurred at the community level (kebele level) and could be attributed to other unobserved community factors (ICC = 0.05), ($P < 0.001$). This evidence shows that using a multilevel analysis model is reasonable.

Fixed effect model

In the bivariable logistic regression, marital status, educational status, occupation, self-perception, age, sexuality information, wealth index, residency, and types of disability were significantly associated with sexual violence. But in the multivariable, multilevel logistic regression analysis, age, sexuality information, types of disability, and residency were significant factors associated with sexual violence. Reproductive-age females with disabilities who reside in urban settings had 49% (AOR = 0.51; 95% CI: 0.29, 0.88) lower odds of sexual violence compared with those who reside in rural settings. The odds of sexual violence among females with disabilities aged 25 to 34 years old increased by six folds (AOR = 5.9; CI: 3.01, 11.6) and by 3.47 folds (AOR = 3.47; CI: 1.48, 8.14) among females with disabilities whose age is 35 to 49 compared with females aged 15 to 24 years old with disabilities. On the other hand, reproductive-age females with disabilities who had no sexuality information had a higher chance (AOR = 11.3; CI: 6.24, 20.5) of experiencing sexual violence compared with those who had sexuality information. Regarding types of disabilities, the odds of sexual violence among females with hearing disabilities were threefold (AOR = 3.19; CI: 1.49, 6.83) compared with females with vision disabilities (Table 2).

Discussion

The prevalence of sexual violence among reproductive-age females with disabilities is 59.8%. The associated factors with sexual violence were residence, sexuality information, age, and type of disability.

The prevalence of 59.8% in this study is lower when compared with studies conducted in the Democratic Republic of the Congo (73.47%) [16]. The difference could be due to the difference in study setting. The Democratic

Table 2 Multilevel logistic regression analysis for factors associated with sexual violence among reproductive-age females with disabilities in Dale and Wonsho districts and Yirgalem city administration, 2022

Variables		Sexual violence		COR with 95% CI	AOR with 95% CI
		Yes	No		
Marital status	Never married	128	173	1.00	1.00
	Married	258	86	0.23(0.16, 0.33)♦	0.63 (0.35, 1.12)
Educational status	Unable to read and write	216	168	1.00	1.00
	Primary	116	58	1.54(1.05, 2.27)♦	1.04 (0.57, 1.87)
	Secondary and above	54	33	1.28(0.78, 2.09)	0.74 (0.35, 1.56)
Occupation	Have no occupation	330	251	1.00	1.00
	Have occupation	56	8	5.04(2.33,10.89)♦	1.72 (0.69, 4.28)
Self-perception	Bad	138	65	1.00	1.00
	Good	248	194	1.66(0.40,0.83)♦	1.67 (0.95, 2.93)
Age (Years)	15 to 24	79	157	1.00	1.00
	25 to 34	207	70	6.09(4.09,9.08)♦	5.90 (3.01, 11.6)**
	35 to 49	100	32	6.60(3.96,11.00)♦	3.47 (1.48, 8.14)**
Sexuality information	Yes	107	190	1.00	1.00
	No	279	69	8.12(5.54,11.91)♦	11.3 (6.24, 20.5)**
Wealth index	Poor	139	73	1.00	1.00
	Medium	97	121	0.41 (0.27,0.61)♦	0.68 (0.38, 1.19)
	High	150	65	1.19(0.78,1.81)♦	0.79 (0.46, 1.35)
Types of Disability	Vision	104	44	1.00	1.00
	Hearing	109	25	1.70(0.94, 3.08)♦	3.19 (1.49, 6.83)**
	Extremity	99	135	0.27(0.16,0.43)♦	0.61 (0. 32, 1.16)
	Wheel-chaired	74	55	0.57(0.34,0.98)♦	2.05(0.97, 4.32)
Residence	Rural	236	160	1.00	1.00
	Urban	150	99	0.48(0.34, 0.67)♦	0.51(0.29, 0.88)**

AOR Adjusted odds ratio, *CI* Confidence interval

♦ *P*-value < 0.2

** *P*-value < 0.05

Republic of the Congo study was conducted in a special area where high conflict and instability are common, which might increase the likelihood of sexual violence [26]. On the other hand, the prevalence of 59.8% was higher than the study conducted in Nigeria on in-school young people with disabilities (28%) [17]. The possible reason could be that the Nigerian study was conducted among young females with disabilities aged 10 to 25 years old, which could mean that sexual violence was not common compared with those ages 25 to 49 [27]. The other possible reason might be that the Nigeria study reported only rape cases, which may compromise other components used to measure sexual violence. The prevalence of 59.8% in this study was higher than in another study done in Nigeria among adolescents with learning disabilities, which also revealed that 23.3% [28] were sexually abused. The possible reason might be that the Nigeria study did not use a standard sexual measurement tool, they used a single question to identify sexually abused cases by asking participants to agree or disagree with questions.

In this study, residence is one of the risk factors for sexual violence. Living in a rural residence increased the probability of sexual violence compared with those living in an urban residence. The reason could be due to the rural community's negative attitude toward people with disabilities and socio-cultural positive contributions for sexual violence [29], as well as a lack of sexual information.

Age is another significant factor associated with sexual violence. Females aged 25 to 49 years old experienced more sexual violence than those aged 15 to 24 years old. This evidence is in line with the meta-analysis study [27]. The possible justification might be that the increased sexual desire of females with disabilities and their dependence on other people for care and personal assistance placed them at a higher risk of sexual violence. The odds of sexual violence were higher among reproductive-age females with hearing disabilities (3 folds) compared with those with vision disabilities. This evidence is supported by meta-analysis study [27] and a qualitative study conducted in South Africa [30]. This could be because people with hearing disabilities have little information about sexuality. Having access to sexuality information was also found to be a significant predictor of sexual violence among reproductive-age females with disabilities. Those who had no sexuality information had a higher chance of experiencing sexual violence compared with reproductive-age females with disabilities who had sexuality information. Although this report is contrary to the study conducted in Canada [22], due to different myths about sexual health information for people with disabilities being limited [31] and having low sexuality education knowledge [32], having information about sexuality (healthy relationships, boundaries, and communication) might be used to prevent sexual violence [20, 22].

These findings could be useful for various stakeholders working with people with disabilities to develop appropriate strategies to combat the dangers of hidden sexual violence. On the other hand, this study used standard sexual violence measuring tools to determine the prevalence of sexual violence [24]. The other strength of this study was considering rural resident reproductive-age females with disabilities. However, due to feasibility issues, this study did not include reproductive-age females with mental disabilities. Another limitation of this study was its exclusion of women over the age of 50, despite the possibility of sexual violence. Recall bias could also be a limitation of the study.

Conclusions

Sexual violence among reproductive-age females with disabilities is noticeably high in central Sidama National Regional State, Ethiopia. Residence, sexuality information, age, and disability types were associated factors with sexual violence. Therefore, policymakers need to design specific strategies to tackle myths (especially in rural communities) that could discriminate against people with disabilities in sexuality education and strengthen sexuality education. Giving information and education about sexuality to deaf reproductive-age females with disabilities by using appropriate teaching aids (sign languages) is also critical and significant in preventing sexual violence. The magnitude of sexual violence among reproductive-age females with a mental disability may be the worst, and it needs further investigation [7, 33].

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Authors' contributions

ZT, AG, and TG designed and wrote the proposal. ZT analyses and writes the manuscript. AG and TG commented on and edited the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

All data on which the results based are provided with in the manuscript.

Declarations

Ethics approval and consent to participate

The study fulfilled with the declaration of Helsinki and approved by the Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University with an approval reference number of (Ref. No.): IRB/143/14. After approval, a support letter was written to the Sidama National Regional Public Health Institute. Then, after obtaining the support letter from

Sidama National Regional Public Health Institute, the permission and cooperation letter were given to the woreda health offices. Finally, the woreda health offices wrote a permission letter to selected kebeles, asking them to cooperate and give consent to conduct the study.
After being informed about the purpose, their rights to participation, and the potential benefits and risks of the study, written informed consent was obtained from the study participants and their guardians to collect the data.

Consent for publication
N/A.

Competing interests
All the authors declared that there were no financial or personal competing interests.

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Publisher's Note

8.4. Appendices

8.4.1. Appendix I: Data collection tools for papers I-III

Participant information

My name is Zelalem Tenaw Currently I am a PhD. Student at Hawassa University in public health and now I am researching contraceptive use, unintended pregnancy and sexual violence among reproductive age women with disabilities in Dale and Wonsho districts, and Yirgalem city administration, Sidama National Regional State.

Objective: To provide new knowledge that could support the efforts to improve the RHSU of reproductive age women with disabilities in SNRS**,** Ethiopia. You are selected randomly as a possible participant in this study.

Potential risks: There is no potential risk that may cause any harm to study participants.

Benefits: No financial benefits are related to this study. But by participating in this study, you contribute to improving reproductive health service utilization among reproductive age women with disabilities.

Confidentiality: Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential. Your participation is voluntary and you are not obligated to answer any question which you do not wish to answer. If you feel discomfort responding to the questionnaire, please feel free to drop it. This questionnaire will take about 20 minutes.

Are you willing to participate in the study?

1- Yes 2 - No

If the answer is yes, thanks! Conduct the interview.

If the answer is no, Thanks! Don’t force or reinforce an individual to participate in the study

Written consent form participants/family members/head of the household

Hawassa University

I have read/heard and understood all about the objective and the process of the study. My participation is voluntary and not obligated to answer any question which I do not know or do not wish to answer. I also understood that all information given by me will be kept strictly confidential. Therefore, I am willing to participate in this study.

Study participant sign _____ date _____

Data collector name: _____Signature _____

Date of interview ---------- Month ---------- /2014 E. C.

Supervisor's Name _____ Signature_____

Checked date_____ /2014E.C.

Complete 1

Incomplete 2

Contact Address of the Principal investigator

Name: Zelalem Tenaw

E-Mail: abigiatenaw@gmail.com

Cell-Phone: +251-916415147

English Version questionnaires for paper I-III

This questionnaire is designed to census reproductive age people with disabilities from the selected kebeles in Sidama Regional State, Ethiopia.

Wereda: _____ Keble code_____ Household code _____

NO	Question	Response	Skip
Section I: Disability, type and cause Census questions			
101	Is there a person who has a problem with seeing, hearing, speaking and/or standing/walking/seating, body parts movement, functioning of hands/ legs or mental retardation, or a mental problem?	1. Yes 2. No	
102	If yes, what is the type of disability or problem?	1. Both eyes blind: 1. Yes 2. No 2. Deaf: 1. Yes 2. No 3. Extremity paralysis or handicap: 1. Yes 2. No 4. Wheel-chaired/walking disability: 1. Yes 2. No 5. Confirmed mental disabilities: 1. Yes 2. No	
103	What was the cause of disability?	1. Fall 2. Burn 3. Poisoning 4. polio 5. Car Accident 6. Sharp objects 7. Farming equipment 8. Hit by another person by stick 9. Animal Bite 10. Inborn 11. Other (specify: _____)	
104	Sex of the person	1. Male 2. Female	
105	The current age of the person	____years (in completed year)	
106	What is the religion of the person?	1. Orthodox 2. Catholic 3. Protestant 4. Muslim 5. Other (Specify)_____	
107	What is the ethnic group of the person?	1. Sidama 2. Amhara	

		3. Oromo 4. Wolayita 5. Guragie 6. Others (specify)_____	
108	What is the marital status of the person?	1. Never married 2. Married 3. Divorced/separated 4. Widowed	
109	Residence of the person	1. Urban 2. Rural	
110	What is the employment status of the person?	1. Employed 2. Not employed	
111	If employed; for Q 110, what is the type of employer	1. Government 2. NGO 3. Private	
112	What is the educational status of the person?	1. Unable to read and write 2. Attended formal education	
113	If attended formal education, specify the highest grade completed	_____Grade	
114	Number of reproductive age (15-49 female and 15 and above male) people in the household	Mention: _____	
115	Total number of reproductive age (15-49 female and 15 and above male) people in the Kebele (Ask from Kebele/woreda)	Mention: _____	
116	The total population in the kebeles (Ask from Kebele/woreda)	Mention: _____	

Section II. Respondent's socio-demographic characteristics

This questionnaire is designed to collect information from respondents concerning **contraceptive use, unintended pregnancy and sexual violence** among reproductive age women with disabilities in Sidama Regional State, Ethiopia.

Wereda: _____ Kebele code: _____Participant code: _____

NO	Question	Response	Skip
201	How old are you?	____years (in completed year)	
202	What is your religion?	1. Orthodox 2. Catholic 3. Protestant 4. Muslim 5. Other (Specify)_____	
203	What is your ethnic group	1. Sidama 2. Amhara 3. Oromo 4. Wolayita 5. Guragie 6. Others (specify)_____	
204	What is your marital status	1. Never married 2. Married 3. Divorced/separated 4. Widowed	
205	Residence	1. Urban 2. Rural	
206	Kebele	Mention: _____	
207	With whom you are living now?	1. Husband/wife 2. Family member 3. Alone 4. Relatives 5. Friends/peers 6. Others (specify)_____	
208	What is your educational status?	1. Unable to read and write 2. Attended formal education	
209	If attended formal education, specify the highest grade completed	_____Grade	
210	What is your employment status?	1. Employed 2. Not employed----------	213
211	Types of employers	1. Government 2. Non-governmental organizations (NGO)	

		3. Family members 4. Non-family member 5. Self-employed	
212	Do you have an occupation?	1. Yes 2. No ----------	215
213	What is your occupation?	1. Professional/technical/managerial 2. Clerical/religious 3. Sales and services 4. Skilled manual 5. Unskilled manual 6. Agriculture 7. Other (specify)_____	
214	What is your view about yourself? (Self-perception?	1. Good self-perception 2. Bad self-perception 3. Not sure	
215	Do you have community-based health insurance?	1. Yes 2. No ----------	301
216	Mention types of community-based health insurance	_____	
Section III: Participants and household wealth index: Ask (and observe when possible) the following questions one at a time and write the response on the space provided or encircle the appropriate response from the options listed.			
301	What is the main source of drinking water for members of your household?	Piped water: 1. Piped into dwelling 2. Piped to yard/plot 3. Public tab/standpipe 4. Borehole	
		Dug well: 1. Protected well 2. Unprotected well	
		Water from spring: 1. Protected spring 2. Unprotected spring	
		Surface water: 1. River/lake/pond/stream/dam	

302	What is the main source of water used by your household for other purposes such as cooking and handwashing?	Piped water: 1. Piped into dwelling 2. Piped to yard/plot 3. Public tab/standpipe 4. Borehole	
		Dug well: 1. Protected well 2. Unprotected well	
		Water from spring: 1. Protected spring 2. Unprotected spring	
		Surface water: 1. River/lake/pond/stream/dam	
303	Where is that water source located?	1. In own dwelling 2. In own yard/plot 3. Elsewhere	
304	How long does it take to go there, get water, and come back?	1. Minutes _____ 2. Don't know	
305	In the past two weeks, was the water from this source not available for at least one full day?	1. Yes 2. No 3. Don't know	
306	Do you do anything to the water to make it safer to drink?	1. Yes 2. No ----------	308
307	What do you usually do to make the water safer to Drink? Record all mentioned	1. Boil 2. Add bleach/chlorine 3. Strain through a cloth 4. Use water filter (Sand/composite/etc.) 5. Solar disinfection 6. Let it stand and settle	
308	What kind of toilet facility do members of your household usually use?	FLUSH OR POUR-FLUSH TOILET 1. Flush to a piped sewer system 2. Flush to septic tank 3. flush to a pit latrine 4. Flush to somewhere else 5. Flush, don't know where PIT LATRINE 1. Ventilated improved pit latrine	

		2. Pit latrine with slab 3. Pit latrine without slab/open pit 4. composting toilet 5. bucket toilet 6. Hanging toilet/hanging latrine 7. No facility/bush/field	
309	Do you share this toilet facility with other households?	1. Yes 2. No	
310	Including your household, how many households use this toilet facility?	1. Less than 10 2. 10 or more 3. Don't know	
311	Where is this toilet facility located?	1. In own dwelling 2. In own yard/plot 3. Elsewhere	
312	What type of fuel does your household mainly use for cooking?	1. Electricity: 1. Yes, 2. No 2. Liquid petroleum gas: 1. Yes, 2. No 3. Natural gas: 1. Yes, 2. No 4. Bio-gas: 1. Yes, 2. No 5. Kerosene: 1. Yes, 2. No 6. Charcoal: 1. Yes, 2. No 7. Wood: 1. Yes, 2. No 8. Straw/grass: 1. Yes, 2. No 9. Agricultural crop: 1. Yes, 2. No 10. Animal dung: 1. Yes, 2. No 11. No food cooked in the house: 1. Yes, 2. No	
313	Is the cooking usually done in the house, in a separate building, or outdoors?	1. In the house 2. In separate building 3. Outdoors 4. Other	
314	Do you have a separate room which is used as a kitchen?	1. Yes 2. No	
315	Who is the owner of the house?	1. Me 2. Rental 3. Family 4. Relative 5. Others (specify)_____	

316	How many rooms in this household are used for sleeping?	--------Rooms			
317	The main material of the roof of the house?	1. Natural roofing (no roof, mud, and sod) 2. Rudimentary roofing (rustic mat/plastic shee, reed/bamboo, wood planks, and cardboard) 3. Finished roofing (metal/corrugated iron, wood, calamine/cement, ceramic tiles, roofing shingles)			
318	The main material of the floor of the house?	1. Natural floor (Earth/sand, dung) 2. Rudimentary floor (wood planks, and palm/bamboo) 3. Finished floor (parquet or polished wood, vinyl or asphalt strips/ plastic tiles, cement, ceramic tiles, carpet)			
319	Does this household own any livestock, herds, other farm animals, or poultry?				
320	How many of the following animals does this household own? IF NONE, RECORD '00'. IF 95 OR MORE, RECORD '95'. IF UNKNOWN, RECORD '98'.	1. Cows bulls_____ 2. Other cattle_____ 3. Horses/Donkeys/Mules ____ 4. Camels_____ 5. Goats _____ 6. Sheep _____ 7. Chickens/poultry _____ 8. Beehives _____			
321	Do you have separate rooms for cattle?	1. Yes 2. No			
322	Does any member of this household own any agricultural land?	1. Yes 2. No ----------			324
323	How many hectares of agricultural land do members of this household own?	_____hectares			
324	Does any member of this household own:		Yes (1)	No (0)	
		1. Electricity---------- 2. Radio----------			

		3. Television --------- 4. Non-mobile telephone--------- 5. Computer ---------- 6. Refrigerator ------- 7. Table---------- 8. Chair ---------- 9. Bed with spring matters---------- 10. Electric mitad ----- 11. Kerosene lamp/pressure------ 12. Lamp----------			
325	Does any member of this household own:		Yes (1)	No (0)	
		1. Watch ---------- 2. Mobile phone------ 3. Bicycle---------- 4. Motorcycle/scooter- 5. Animal-drawn cart- 6. Car/truck ---------- 7. Boat with motor----- 8. Baggage ----------			
326	Does any member of this household have a bank account?	1. Yes 2. No			
327	Does any member of this household have a microfinance account?	1. Yes 2. No			
328	How often does anyone smoke inside your house? Would you say daily, weekly, monthly, less often than once a month, or never?	1. Daily 2. Weekly 3. Monthly 4. Less often than once a month 5. Never			

Section IV: Contraceptive/family planning methods related questions: Ask the following questions one at a time and write the response on the space provided or encircle the appropriate response from the options listed.

NO	Question	Response	Skip
401	Have you ever heard about family planning methods?	1. Yes 2. No----------	503
402	Source of information *Multiple answers are possible*	1. Radio: 1. Yes 2. No 2. Television: 1. Yes 2. No 3. Newspaper message: 1. Yes 2. No 4. Community/ friends: 1. Yes 2. No 5. Health care providers: 1. Yes 2. No 6. Others (specify)_____	
403	What is family planning? (*Knowledge*) *Do not read the options, please*	1. Planning the number of children, time, and space between children 2. Limiting the number of children 3. Stopping birth 4. The spacing of birth intervals 5. Do not know 6. Other (specify) _____	
404	Which type of family planning methods did you know? *Do not read the options, please*	1. Oral contraceptive pills 2. Condom 3. Injectable 4. Implants 5. Intrauterine contraceptive device 6. Sterilization (male and female) 7. Calendar method 8. Periodic abstinence 9. Withdrawal (coitus interrupts) 10. Lactational amenorrhea method	
405	What is/are the side effects of using family planning? (*Knowledge*) *Do not read the options, please*	1. Heavy bleeding or irregular bleeding 2. Absence of menstrual cycle 3. Abdominal cramp 4. Head ach 5. Do not know 6. Other (specify) _____	
406	Were you ever counselled about family planning methods?	1. Yes 2. No	
407	Do you currently utilize any of the family planning methods?	1. Yes 2. No ----------	514
408	If 'yes' to Q 5.6, Who used the method?	1. Self 2. Couple (husband/wife)	

409	What is the method you used currently? *Multiple answers are possible*	1. Oral contraceptive pills 2. Condom 3. Injectable 4. Implants 5. Intrauterine contraceptive device 6. Sterilization (male and female) 7. Calendar method 8. Periodic abstinence 9. Withdrawal (coitus interrupts) 10. Lactational amenorrhea method	
410	Were you asked for payment for the family planning service?	1. Yes 2. No	
411	If 'yes to Q 510, mention the payment in Birr	_____Birr	
412	Were you counselled about, method options and side effects?	1. Yes 2. No	
413	Did you get the family planning method you choose?	1. Yes 2. No	
414	How far the nearest health institutions are from your home?	_____km or _____Minutes on foot	
415	Is transportation available to the health facility?	1. Yes 2. No	
416	Did you use transportation to go to the health facility?	1. Yes 2. No	
417	If 'No' to Q 5.14, what is/are the reason?	Mention: _____	
418	Is the health facility building accessible for you?	1. Yes 2. No	
419	Do you have permission from your partner (family) to use the method?	1. Yes 2. No	
420	Was the health facility (the provider) kept confidentiality?	1. Yes 2. No	
421	Was the health care provider giving the counselling or method alone by keeping your privacy?	1. Yes 2. No	
422	Do you have an intention to use the methods in the future	1. Yes 2. No 3. Not sure	
423	If 2 for Q 521, What is your reason	Mention: _____	
424	Reasons for not using family planning services	1. Fear of side effects: 1. Yes 2. No 2. No information: 1. Yes 2. No 3. No permission from husband/wife1.Yes 2. No 4. No money for transportation 1. Yes 2. No	

		5. Distance to the health facility: 1. Yes 2. No 6. Waiting time to get service: 1. Yes 2. No 7. Not wanting to go alone: 1. Yes 2. No 8. Other (specify) _____					
The respondent's attitude toward family planning methods							
	Variables	**Strongly Agree**	**Agree**	**Do not know**	**Strongly Disagree**	**Disagree**	
425	Do you think using FP makes women unhealthy?						
426	Do you think pregnancy must be properly planned?						
427	Do you think pregnancy spaced < 2 years should be avoided by using family planning methods?						
428	Do you think the use of FP methods interferes with sexual relationships between husband and wife?						
429	Do you think using modern FP methods causes anger from God?						
430	Do you think FP methods result in infertility to getting pregnant later on?						
431	Do you think women are more responsible than men for using modern FP methods?						

Section V: Sexual violence-related questions: Ask the following questions one at a time and write the response on the space provided or encircle the appropriate response from the options listed. Dear data collector, since the issue is very sensitive, please keep strictly privacy and confidentiality be wise during the interview.

NO	Question	Response	Skip
501	Have you been pushed, shaken, or thrown something at you by someone?	1. Yes 2. No	
502	Have you been slapped by someone?	1. Yes 2. No	
503	Have you twisted your arm or pulled your hair by someone?	1. Yes 2. No	
504	Was someone punching you with his/her fist or with something that could hurt you?	1. Yes 2. No	
505	Was someone kick you, drag you, or beat you up?	1. Yes 2. No	
506	Was someone trying to choke you or burn you on purpose?	1. Yes 2. No	
507	Was someone threatening or attacking you with a knife, gun, or any other weapon?	1. Yes 2. No	
508	What was your relationship with the person who committed the above violence?	1. Wife/Husband 2. Boy/girl friend 3. Acquaintance/ friend 4. Family member 5. Other (specify)_____	
509	Have you been physically forced to have sexual intercourse with someone even when you did not want to?	1. Yes 2. No	
510	Have you been Physically forced to perform any other sexual acts you did not want to?	1. Yes 2. No	
511	Have you been forced with threats or in any other way to perform sexual acts you did not want to?	1. Yes 2. No	
512	How old were you when you experience the first violence?	_____years (age in year)	
513	How many times did you experience violence?	Mention _____times in life time	
514	Did you experience violence in the last 12 months?	1. Yes 2. No	
515	What was your relationship with the person who committed the above violence?	1. Wife/Husband 2. Boy/girl friend 3. Acquaintance/ friend 4. Family member 5. Other (specify)_____	

516	Was someone say or do something to humiliate you in front of others?	1. Yes 2. No	
517	Was someone threatening to hurt or harm you or someone close to you?	1. Yes 2. No	
518	Was someone Insulting you or making you feel bad about yourself?	1. Yes 2. No	
519	What was your relationship with the person who committed the above violence?	1. Wife/Husband 2. Boy/girl friend 3. Acquaintance/ friend 4. Family member 5. Other (specify)_____	
520	Have you ever heard/discussed sex education?	1. Yes 2. No	
521	About Which information do you hear/discussed?	1. Boy/Girl relationship: 1. Yes 2. No 2. Sexual intercourse: 1. Yes 2. No 3. Pregnancy and its prevention 1Yes2. No 4. Others(specify)_____	

Section VI: Unwanted pregnancy questions: Please think of your current pregnancy (if currently pregnant) / your most recent pregnancy (if NOT currently pregnant) when answering these questions.

NO	Question	Response	Skip
601	In the month that you became pregnant, were you and your husband used contraception?	0. Always used contraception 1. Inconsistent use 2. Not using contraception	
602	What do you feel about the timing of the pregnancy happened?	0. Wrong time 1. OK but not quite right 2. Right time	
603	Did you have an intention to become pregnant, just before conception?	0. Did not intend to become pregnant 1. Changing intentions 2. Intended to get pregnant	
604	Have you wanted a baby, just before conception?	0. Did not want a baby 1. Mixed feelings about having a baby 2. Wanted a baby	
605	Have you discussed with your partner about children, before conception?	0. Had never discussed children 1. Discussed but no firm agreement 2. Discussed and agreed to pregnancy	
606	Did you have health preparation (taking folic acid, stopping/reducing alcohol and smoking, seeking medical advice) before conception?	0. No actions 1. Health preparations (1 action) 2. Health preparations (>2 actions)	
607	Did you give birth?	1. Yes 2. No	
608	How many live children do you have?	Mention: _____	
609	Did you use alcohol?	1. Yes 2. No	
610	Did you use chat?	1. Yes 2. No	

Thank you very much for your participation!!

Sidamu Afoo version

AYIDDE KEEREHO!

Xa'maanchu anino _____yaamameemmohu tenne taje gamba assate kaayyo atewa iilliteennae techo xaandoommo; tenne xiinxaallo xiinxallannohu rodiinke ZELAALEMI XEENAHO 3ki digire Hawaasi yuniversitera Hikkiminnunna Fayyimmate kolleejera. Ani xa tenne yannara xiinxallo assanni noommohu 15-49 diri meereero noo bisu xe'ne noo meya beettora fayyimmate owaante afateeti Sidaamu Dagoomi Qoqqowi giddo

Xiinxallote umino'Haaro egenno kalanqe fayyimmansara bisu xe'ne noo amuwa sirote amanyooti aana xiinxallateeti. Xiinxallo hananfannihunno Onkoleessa 1-30/2014 geeshshaati. Kaayyo atera iillitinohe xa'matena, sumuu yoottaeha ikkiro harunsie:

Xiinxallote Beeqqaancho Ikkakkira Mittu Qarri Di''iillinohe!

Xiinxallote horo: xiinxallote beeqqo assootta daafira baattooshshu dino; kayinnilla, xiinxallote beeqqo assakki bisu aana xe'ne noo sirote orte amanyooti fayyimmara roorenkanni 15-49 diri mereero noo meyatera lowo irko afi'nanni.

FOJO AGARRANNI ORTE

Xiinxallote beeqqo assatta yannara su'ma diboreessinanni horontanni. Ati dawarootta dawaro woleho fojo sayinse horontanni dikullanni. Dawarokki xiinxallote lowo qeechi noose; konni dafira, xiinxallote gumano mootimma noowa shiqinshanni daafira, mootimma adhitanno fayyimmate owaante woyyeessate loosira lowo eltooti. Kayinnilla, sumuu yaa hoogate qoosso agarantinote; ate fajjo gobbaanni mittoreno diborreesseemo.

Ane ledo keeshshineemmohu 20 xiqqessiraati!

Xiinxallote beeqqattara sumuu yaattae?

1- Ee 2 - Dee'ni

Sumuu yoottae daafira lowo geeshsha galaxxeemmo! Borri-xa'mo hanafi! If thethanks!

Dee'ni yootta daafira galaxxeemmo! Hanni gadachi xiinxallote beeqqo assitanno gede!

Fajjo borreessinoonni qoola xunse xiinxallote iillacha nabbawoomma/maciishshooma. Xiinxallote beeqqo asseemmohu umi'yanni sumuu yaatenniiti aye gadadishshi heerikkinniiti labbinoe dawaro dawareemmahu. Dawarata dawaro horontanni fojo agarrannita kawaanni qole qaaggisseemmohe. Konni daafira tenne xiinxallora beeqqo asseemma!

Xa'mamaanchu malaate_____ barra _____

Xa'maanchu su'ma: _____malaate_____

Xa'minoonni barri ---------- Aganunni ---------- /2014 Tophiyu kiiro garinni

Illaallisaanchu su'ma _____ malaate_____

Buunxoonni barra_____ /2014M.D.

Guutaaho 1

Diguutaho 2

Xiinxallote anni Su'ma: Zelalem Xeenawu

Iimeele: abigiatenaw@gmail.com

Bilibilla: +251-916415147

SIDAAMU AFII GANO

Hawaasi Yuniverisite, Dagate Fayyimma Rosi Mine

Aantete xa'minanni xa'muwa iillate diri meerero noo ama bisu aana xe'ne noorira calla dooraamino olliira Sidaamu Qoqqowi Mootimma giddo heedhanno teessaanora..

Worada: _____ Olluu koodde_____ Minu koodde _____

A.k	Xa'mo	Dawaro	sai
Gafa I: Hasiisote bisu xe'ne ikkito, hiittennenna may koorkaatinniiti bisu xe'ne xaaddinoro buunxanni xa'muwa			
101	La''ate qarri/maciishshate qarri/coyi'rate qarri/lekkate uurre ha'rate qarri/ofolla hoogate qarri/bisu millimo hoggate qarri/angate hoonge qarri/buqqeete xe'ne qarri/mannimmate xe'ne qarri noohu no?	1. Ee 2. Dee'ni	
102	Xa'mo 101 dawarokki Ee, ikkiro, hiitti bisu xe'ne noohe?	1. Lamenti ille dila'anno: 1.Ee 2. Dee'ni 2. Macciishsha didadiitanno.: 1.Ee Dee'ni 3. Lekka woy anga laanshawate: 1.Ee 2. Dee'ni 4. Uuritte hadhe dandiiktannokite: 1.Ee 2. Dee'ni 5. Buuxantinoti buqqeete xisso noote: 1. Ee 2. Dee'ni	
103	Bisu xe'ne abbihehu maati?	1. Uwatenniiti. 2. Giirate 3. Haadho agatenni. 4. poliyootenni 5. Kaameelu danooti. 6. Qara afi'rinorichooti. 7. Baatto loosi'nanni uduunninniiti. 8. Mannu anganni bordunni ganameeti. 9. Saada ga'mitinoe 10. Bisu xe'nenni hee're ilamoomma. 11. Wole xawisi (:_____)	
104	Koo/tee	1. Koo 2. Tee	
105	Xa dirikki me''eho?	_____dirooti.	
106	Amma'nokki hiittenneeti?	1. Ortodokise	

		2. Kaatoolikete 3. Protesitaante 4. Islaamaho 5. Wole xawisi _____	
107	Hiittenne daga giddo gaamamatta?	1. Sidaamaho 2. Amaaraho 3. Oromote 4. Wolayitta 5. Guraage 6. Wole xawisi_____	
108	Adhammekki dani?	1. Leexa 2. Adhaminoha 3. Adhe/ ite Tirroha 4. Baxxinoha	
109	Teessokki?	1. Quchumaho 2. Baadiyyete	
110	Loosikki qeechi?	1. Mootimmate loosaasincho. 2. Mottimmate loosaasincho ikkitinokkite	
111	Xa'mo 110 umikki doorsha ikkiro, hiikkonne looso?	1. Mootimmate looso 2. Mootimmanniha ikkinokki looso 3. Hallanyu looso	
112	Rosikki deerri?	1. Nabbawanna borreessa didandiintanno 2. Xaddote roso rosinoho.	
113	Xamo 112 layinki doorsha ikkiro, me''e kifile geeshsha rosootta?	_____kifile	
114	Meyaa beetto 15-49 diri mereero noo kiironna 15 diri ali labbaaha mini'ne giddo noore kiirootenni fooqa darga wori.	Kiirotenni_____	
115	Meyaa beetto 15-49 diri mereero noo kiironna 15 diri ali labbaha ollii'nera (ollaa woy worada xa'mi)	kiirotenni:_____	
116	Xaphoomunni olluu giddo mageeshshi manni kiiro nooro fooqa darga wori.(olluu manna woradu manna xa'mi)	kiirotenni:_____	

Gamo II. . Meessimmate Mayimma

Konni woroonni noo xa'muwa sirote owaante qarri bisu xe'ne noo meyaata xa'minanni borri-xa'mo, Sidaamu Qoqqowi giddo.

Worada: _____ Olluu koodde_____ Minu koodde _____

A.k	Xa'mo	Dawaro	Sai
201	Dirikki me''eho?	_____ dirooti	
202	Amma'nokki hiitteeti? (dawarokki qoqqowi)	1. Ortodokise/ Kiristaana 2. Kaatoolike 3. Pirotestaante /Kiristaana 4. Musiliime 5. Woleno (xawisi) _____	
203	Hiikko ayiddeeti?/ Hiikko mineeti?	1. Sidaama 2. Amaara 3. Oromo 4. Wolayitta 5. Guraage 6. Wole xawisi_____	
204	Adhammete Gara	1. Leexa ……. 2. Adhaminoha 3. Tirroha/baxxinoha 4. Shiidhinota	
205	Teessokki?	1. Quchumaho 2. Baadiyyete	
206	Olluu su'mi	: _____ti	
207	Aye ledo hee'ratta xa?	1. Gashshaanni'ya ledo 2. Maate'ya ledo. 3. Calla'ya 4. Fiixi'ya ledo 5. Jaalla'ya/milla'ya ledo 6. Wole xawisi_____	
208	Rosu deerrikki?	1. Nabbawanna borreessa didandiintanno 2. Xaaddote roso rossinote.	
219	Xa'mo 209 layinki doorsha ikkiro, me'e kifile geeshsha rossino?	_____kifile	

210	Loosikki doorshi mootimmanniha/loosu dinohe?	1. Mootimmate loosaasinchooti 2. Loosu dinoe---------- Dawarokki 2 kiiro ikkituro, 213 sai	213
211	Loosikki dani?	1. Mootimmate loosaasinchooti 2. Mootimmannita ikkitinokki uurrinshara 3. Maatete urrinshara. 4. Maatete uurrinsha ikkitinokkitera. 5. Hallanya	
212	Loosu noohe?	1. Ee 2. Dee'ni ---------- dawarokki dee'ni ikkituro, 215 sai	215
213	Loosikki qeechi maati?	1. Ogimmate looso 2. Amma'note massagaancho. 3. Daddalaanchoho 4. Dandoo noote 5. Dandoo nookkite 6. Giwirinnu looso. 7. Wole xawisi_____	
214	Ate laooshshinni, ati mitoricho hedatta dandookki hiittooti?	1. Mulenni heda dandeemma 2. Hakeeshshi geeshshaati.. 3. Dibuxoomma	
215	Fayyimmate woowe noohe?	1. Ee 2. Dee'ni ---------- dawarokki Dee'ni ikkituro, 301 sai	301
216	Hiitti fayyimmate woowe noohe xawisi.	_____	
Gamo III: : Jajju woy Jirote Amadooshshe			
301	Maatekki agganno waa afidhannohu hiikkiinniiti?	Baambu waa : 1. Mini giddo baambu waa 2. Hoowete afamanno baambu waa 3. Dagoomu tuqi horoonsi'ranno baambu waa 4. Umme fushshinoonni waa	
		Agarooshshe: 1. Garunni agaraminoha 2. Garunni agaraminokkiha	

		Buete waa: 1. Garunni agarroonnita 2. Garunni agarroonnikkita	
		Daadanno Waa (Lagu/garbu/kofaminoha/xashshuwa/ waa)	
302	Maatekki sagale loosi'ratenna anga hayishshi'rate horoonsidhanno waa maminni afidhanno?	Baambu waa: 1. Mini giddo baambu waa 2. Hoowete afamanno baambu waa 3. Dagoomu tuqi horoonsi'ranno baambu waa 4. Umme fushshinoonni waa	
		Agarooshshe: 1. Garunni agaraminoha 2. Garunni agaraminokkiha	
		Buete waa: 1. Garunni agarroonnita 2. Garunni agarroonnikkita	
		Daadanno Waa: 1. Lagu/garbu/kofaminoha/xashshu/ waa	
303	Way afamanno dargi hiikkooti?	1. Meessi mini giddo 2. Meessi hoowe giddo 3. Wolu darginni	
304	Waa dirri'ne hinganni yanna mageeshsha adhanno?	1. Daqiiqa/xu'eessa _____ 2. Dibuuxoommo/a	
305	Sa'uta lame lamala giddo way bae barra wo'ma keeshshino?	1. Eewa 2. Dee'ni 3. Diqaagamannoe	
306	Way co'ichimma agarsiisate atewayinni agarrannire assoottori/tari no yite hedatta/o?	1. Eewa 2. Dee'ni ---------- Dawarokki Dee'ni ikkituro, 308 sai	308
307	Anganni way co'ichimma agara maa assa noohe? Wo'manta hedo maareekki	1. Gafe agatenni 2. Xagga woratenni 3. Hoccootunni ximbiiwaetnni	

		4. Waa ximbiimbanni meemonni (shaafa/shiimmaadda lubbuwa/etc.) 5. Arrishshote xawaabbinni xagisatenni 6. Mittowa kofatenni/ kuusatenni	
308	Maatekki duucha yannara hiittooha shumate mine horoonsidhanno?	**Wayinni xaadinsoonnita/ xaadinsoonnikkita** 1. Baamba fanne horoonsi'nannita 2. Baambaho xaaddino way maashine 3. Ummooni balera waa horoonsi'ra 4. Base baalate waa horoonsi'ratenni 5. Shumate mini waa hiissine horoonsi'nanniro diafoommo/a? **Bale umme qixxeessinoonni shumate mine** 1. Ayyare e'anno shumate mine 2. Bale umme suudinsoonni kinchinni 3. Bale umme afoo tu'noonnikkita 4. Gate ha'rishshate horonsi'nanni shumate bale gede asse horoonsi'rate 5. Baaldete giddo horoonsi'neemmo 6. Gottiima shumate mine 7.Injiinowi dino/dubbu giddo/xawoho	
309	Tenne shumaate mini owaante woloota maate ledo horoonsidhinanni?	1. Ee 2. Dee'ni	
310	Ate maate ledo mageeshshi mannaati konne shumate mine horoonsidhinannihu?	1. 10 nni ajanno 2. 10 woy hakkuy ali 3. Afoommori/mari dino	
311	Hakku shumate mini afmannohu hiikkooti?	1. Mini giddo 2. Meessi hoowe giddo 3. Wole dargaati	
312	Maatekki sagale loosi'rate hiittee gaaze horoonsidhanno?	1. Korreentete wolqa 1.Ee 2 Dee'ni 2. Du'nantanno gaaze.Ee 2 Dee'ni 3. Kalaqamu gaaze 4. Addi addi keemikaalla.Ee 2 Dee'ni 5. Laamba .Ee 2 Dee'ni 6. Qitiissinoonni haqqe (kasale).1Ee 2 Dee'ni 7. Haqqe 1.Ee 2 Dee'ni 8. Kashee/hayissotenni 1.Ee 2 Dee'ni 9. Gidu damatenni 1.Ee 2 Dee'ni 10. Saadate obbinni 1.Ee 2 Dee'ni	

		11. Sagale diloosi'neemmo mini giddo 1.Ee 2 Dee'ni	
313	Sagale loosi'nannihu gallaniwaati, baxxitino kifileeti/ mini gobbaanniti?	1. Mini giddooti 2. Baxxino mineeti 3. Barandahooti 4. Wolewaati	
314	Sagale loosi'rate horoonsidhinanni baxxino mini noo'ne?	1. Ee 2. Dinonke	
315	Minu galtinannihu ayeho?	1. Ko meessiho 2. Baante gallanniho 3. Maatenniho 4. Elunniho 5. Wole hee'riro xawisi_____	
316	Konni mini giddo gonxanni kifilla me''e no?	--------Kifilla no	
317	Minu giddoydo iimiidi raga (korniise) mayinni biifinsoonniho?	1. Kalaqamu haqqinni (biinfori dino, sabbunni,nna kandoonni sabbinni) 2. Calla anfi gede assinnoonniha (xu'minsoonnikki saattinni/plastic shara, shomboqqotenni/leemmichunni, haqqu xaawulinni, and komborsaatunni) 3. Xu'minsoonni korniise (siwiilunni/culku siwiilinni, haqqunni,alumineemetnni/simintotenni	
318	Mini uulliidi loosaminohu mayinniiti?	1. Kalaqamunni noo gedeenni nooho (baatto/ bushshaho)	

		2. Safo tunge doogo hunnoonniho (haqqu xaawula, nna shomboqqotenni/ leemmichunni) 3. Xu'minsoonni mine (shakilunni) (haqqu xaawulinni xu'minsoonniha, uullano iimano shakila, simintotenni, alumineemetenni, uulla karranni shara(minxaafe)	
319	Minu anni / ati saadate hoshsho, baatto hawuurranni saadanna lukkuwa ceo noohe?	1. Ee 2. Dino	
320	Aliidi saada giddonni minu annihu mageeshshaati? Mitturi nokki ikkiro (00) wori. 95 tu woroonna aleenni ikkiro (95) wori. Kiiro anfonikkiha ikkiro(98) wori	1. Saadanna bootta_____ 2. Wole saada_____ 3. Farado/harre/gaangootta ____ 4. Gaala_____ 5. Me''e _____ 6. Ge'reewo _____ 7. Caacurre/ lukkuwa _____ 8. Diishshote koshsha	
321	Saada galtannowi baxxino dargi noo'ne?	1. Eewa 2. Dinonke	
322	Maate'ne giddo loosi'nanni baatto afi'nohu no?	1. Ee 2. Dino---------- Dawarokki Dino ikkituro, 324 sai	324
323	Minu annira me''e hekitaare ikkitannoti loossi'nanni baatto noosi?	_____Hekitaare	
324	Konni mini maate umisinni afirinori hikuuriti?		

	Ee (1)	Dee'ni (0)
1. Korreente---------- 2. Raadoone ---------- 3. Telewishiine -------- 4. Mine silke---------- 5. Kompiitere ---------- 6. Mitore qiissanno udiinnichi ------- 7. Xarapheezzu ------- 8. Barcimu ----------		

		9. Shiwote daallasi--- 10. Korreentete wolqanni sagale raisi'nanni mixashsho ----- 11. Laambunni/shaamu/ ---- 12. Faanoose----------			
325	Maatekki giddo togoo udiinni no?		Ee (1)	Dee'ni (0)	
		1. Tolobishiine -------- 2. Bilbilu------ 3. Shalleette---------- 4. Xexxerrisu------ 5. Saadate gaare- 6. Kaameelu/ hogowi kaameeli ---------- 7. Yowolo motor nooti--- 8. Sasu goommi baajaaje-			
326	Maatekkira baankete akkowaante kiiro noonsa?	1. Ee 2. De'ni			
327	Maatekki giddo shiimmaadda daddalu uurrinsha akkowaante kiiro noonsa?	1. Ee 2. De'ni			
328	Maate'ne giddo sigaara wiliishshaahu barrunni me''e higeeti? Barrunni/lamalatenni/ aganunni/ dirunni / takkonta?	1. Barrunni 2. Lamalatenni 3. Aganunni 4. Aganunni mitteege 5. Takkonta			

Gafa IV: Maatete Damboowishsha Lainohunni Qixxaabbino Xa'muwa

Woroonni shiqqino xa'muwara halaalaancho dawaro ikkitino doorte qoqqowi

A.K	Xa'muwa	Dawaro	Sai
401	Maatete damboowishsha kayinsanna macciishshite egennootta/o?	1. Ee 2. Dee'ni ---------- Dawarokki Dee'ni ikkituro, 503 sai	503
402	Mashalaqqe afi'rootta bu'a mamaati? *Dawaro duucha ikkitara dandiitanno*	1. Raadonetenni: 1. Eewa 2. Dee'ni 2. Telewishiinetenni: 1. Eewa 2. Dee'ni 3. Gaazeexunni: 1. Eewa 2. Dee'ni 4. Qooxxeessu dagoominni 1. Eewa 2. Dee'ni 5. Fayyimmate gargaraano: 1. Eewa 2 Dee'ni 6. Woleno (xawisi)_____	
403	Maatete damboowishshi maati? *Doorha baala nabbabbooti*	1. Qaaqquullu kiiro, xeertise ilatenna illanni darga balaxe mixi'rate 2. Qaaqquullu kiiro ajishate 3. Ila uurrisate 4. Ilate mereero noo yanna ledate 5. Dafoomma 6. Woleno xawisi	
404	Hiikkonne maatete damboowishshi mixo hayyo hiittenne afootta/a? *Doorsha Nabbabbooti!*	1. Afuunni adhinanni kiniine / xagga 2. Kondome 3. Marfe 4. Dasaho worranni xagga 5. Otoottote worranni xagicho 6. Illannikki gede assate) 7. Yanna kiiratenni 8. Godowu gatanno yanna qorophatenni 9. Labbaahu sirote guma gobbaanni hunatenna 10. Qaaqqoho unuuna duuchaage qansatenni	
405	Maatete damboowishshinni daggara dandiitanno hori-gawajjo maati? *Doorsha nabbabbooti!*	1. Deerra sa'ino mundaa 2. Aganu mundee doycho ba'ne 3. Godowu game / xisso 4. Umu damuume 5. Dafoomma 6. Woleno xawisi _____	
406	Maatete damboowishshi daafira amaalle egenninoonnihe?	1. Ee 2. Dee'ni	
407	Xaa yannara maatete damboowishshi mixo hayyo horoonsidhanni nootta?	1. Ee 2. Dee'ni ---------- Dawarokki Dee'ni ikkituro, 514 sai	514
408	Xa'mote kiiro 506 nna 507, dawarokki ''Eewa' ikkituro, assi'nanni gara ay kulihe?	1. Ani umi'yanni 2. Aninna gashshaanni'ya	

409	Muli yanna giddo hiittenne hayyo horoonsi'ritta? *Duucha dawaro heedhanno*	1. Afuunni adhinanni kiniine / xagga 2. Kondome 3. Marfe 4. Dasaho worranni xagga 5. Otoottote worranni xagicho 6. Illannikki gede assate) 7. Yanna kiiratenni 8. Godowu gatanno yanna qorophatenni 9. Labbaahu sirote guma gobbaanni hunatenna 10. Qaaqqoho unuuna duuchaage qansatenni	
410	Maatete damboowishshi daafira womaashsha xa'minoonnihe?	1. Ee 2. Dee'ni	
411	Aliidita xa'mote kiiro 510tdawarokki 'Eewa' ikkituro , birra xawisi	_____Birraati	
412	Horoonsi'nanni doogganna hori-gawaajjo amaalle egenninoonnihe?	1. Ee 2. Dee'ni	
413	Ati ha'rootta maatete damboowishshi doogo afi'rootta?	1. Ee 2. Dee'ni	
414	Minikkira mulaahu fayyimmate mini mageeshsha xeerti'rannoho?	_____Km woy Lekkkate ------daqiiqi doogooti	
415	Fayyimmate uurrinsha raga hodhishshu bado injiitannote?	1. Ee 2. Dee'ni	
416	Fayyimmate uurrinsha marate hodhishshu hasiissannohe?	1. Ee 2. Dee'ni	
417	Xa'mote kiiro 516te dawaro 'Dee'ni'' ikkituro, korkaatu maati?	xawisi:_____	
418	Fayyimmate uurrinshara minnoonni ijaarri injaadoho?	1. Ee 2. Dee'ni	
419	Maatete damboowishshi mixo hayyo horoonsi'rate miilikki fajjannohe?	1. Ee 2. Dee'ni	
420	Fayyimmate mini loosaasine fojo maaxxaaareeti?	1. Ee 2. Dee'ni	
421	Fayyimmate mini ogeeyye doogga kultannohe wote foje maaxxeeti?	1. Ee 2. Dee'ni	
422	Tenne doogga horoonsi'rate konni albira ajuuja noohe ?	1. Ee 2. Dee'ni 3. Afoommari dino	
423	Xa'mote kiiro 522 te dawaro 'Dee'ni'' ikkituro, korkaatu maati?	xawisi:_____	
424	Maatete damboowishsha horoonsi'rattakkihu mayraati?	1. Iillishshara dandiitanno hori-gawajjo waajjeeti: 1. Ee 2. Dee'ni 2. Huwanyo hooggeennaeeti: 1. Ee 2. Dee'ni	

		3. Galte'ya fajjitannoekkihuraati 1.Ee 2. Dee'ni 4. Hodhishshaho woxu wolqa hooggeennaeeti 1. Ee 2. Dee'ni 5. Fayyimmate uurrinsha mini'yawiinni faffinoehuraati: 1. Ee 2. Dee'ni 6. Tara agadha giwisannoehuraati: 1. Ee 2. Dee'ni 7. Calla'ya ha'ra giwisannoehuraati: 1. Ee 2. Dee'ni 8. Woleno xawisi) _____	

Dawaraasinete Lao Maatete Damboowishshi Mixo Doogga Lainohunni

	Babbadooshshe Xa'muwa	**Lowo geeshsha sumuu yaa**	**Sumuu yaa**	**Diafoomma**	**Lowo geeshsha sumuu diyeemma**	**Sumuu diyeemma**	
425	Maatete damboowishshi mixo amuwu fayyimmara bushate yite hedatta?						
426	Godowatta yannara mixidhe egennootta?						
427	Maatete damboowishshi mixo garinni 2 diri woro godowa dandiinannikkita afootta?						
428	Maatete damboowishshi galtetenna gashshaanni qooda ikkinota baddine affinoonni?						
429	Yannichu maatete damboowishshi doogga Maganu hanqo iillishshanno yite hedatta						
430	Maatete damboowishshi ila hunanno yite hedatta?						
431	Maatete damboowishshi annuwunni sao amuwaho yawo roortanno yite hedatta?						

Gafa V: Siimu Xaadooshshe Assate Gawaajjo Ledo Xaaddino Xa'muwa: Woroonni shiqqino xa'muwara halaalaancho dawaro ikkitino doorte qoqqowi

Muxxe taje gamba assatto/a xiinxallaancho, coyubba addanko iibbabbite qaarrisse nooha ikkiro, maafuda maaxate wo'naali

A.K	Xa'mo	Dawaro	Sai/kubbi
501	Sae sae ate labbaa beetti okka gadache woy shashshafe egenninohe?	1. Ee 2. Dee'ni	
502	Labbaa beetti baqqaallakki qawaade egenninohe?	1. Ee 2. Dee'ni	
503	Labbaa beetti dasakki rade cu'me woy umikki danancho goshooshe egenninohe?	1. Ee 2. Dee'ni	
504	Mitu mitu manni ate tuntu'motenni xagare gane egenninohe?	1. Ee 2. Dee'ni	
505	Mitu mitu manni raantise, utteesse woy uulla goshooshanni gane egenninohe?	1. Ee 2. Dee'ni	
506	Mitu mitu manni afookki fuge giirate waajjishiishe egenninohe?	1. Ee 2. Dee'ni	
507	Mito mito woyte mannu ate qaawwetenni, siwiilunninna addi addi qohanno udiinnichinni waajjishiishe egenninohe?	1. Ee 2. Dee'ni	
508	**Aleenni kayinsi hekko atera iillishihehu ayeti?**	1. Galte/gashshaanni 2. Labbaa/meya jaali 3. Bari barita xaadatta jaali 4. Maatekki miili 5. Woleno xawisi _____	
509	Hasi'rittakkinni siimu xaadooshshe assine egenninoonnihe?	1. Ee 2. Dee'ni	
510	Hasi'rittakkinni bisokki kikkinse woy sunqine egenninoonnihe?	1. Ee 2. Dee'ni	
511	Hasi'rittakkinni waajjishiinshe, gadachine sirote bisokki kikkinse egenninoonnihe?	1. Ee 2. Dee'ni	
512	Meu dirikkira heedheennaati umikki gadacho woy hekko iillituhehu?	_____diri'yanni (dirunni wori)	

513	Aleenni kayinsi hekko me''e higge iillituhe?	Xawisi _____heeshshokki dirira	
514	Saiha 12 agani giddo hekko iillite egentinohe?	1. Ee 2. Dee'ni	
515	**Aleenni kayinsi hekko kalaqihehu ate hiittoo fiixooma afi'rinoho?**	1. Galte/gashshaanni 2. Labbaa/meya jaali 3. Bari barita xaadatta jaali 4. Maatekki miili 5. Woleno xawisi _____	
516	Ate mannu wolu manni noowa saalsiise egenninohe?	1. Ee 2. Dee'ni	
517	Ate mitu manni atewa doge xagare woy waajjishiishe egenninohe?	1. Ee 2. Dee'ni	
518	Ate mitu manni xone woy bushiishe egenninohe?	1. Ee 2. Dee'ni	
519	**Aleenni xawinsi hekko iillishshuherira ate ledo may fiixooma afidhinoreeti?**	1. Galte/gashshaanni 2. Labbaa/meya jaali 3. Bari barita xaadatta jaali 4. Maatekki miili 5. Woleno xawisi _____	
520	Siimu xaadooshshi rosi daafira macciishshite woy hasaabbe egennootta?	1. Ee 2. Dee'ni	
521	Hiittenne mashalaqqe daafira macciishshitta woy hasaawitta?	1. Beettu/beettote shiqo: 1. Ee 2. Dee'ni 2. Siimu xaadooshshe: 1. Ee 2. Dee'n 3. Godowu gatonna gargarooshshe 1. Ee 2. Dee'n 4. Woleno xawisi _____	

Gafa VI: Hasi'nikki Gatanno Godowa Lainohunni Qixxaabbino Xa'mubba:

Hanni godowii noottaro qaagi (xaa yannara) / callichoterono aantino xa'mubba dawarate wo'naali

A.K	Xa'mubba	Dawaro	Sai
601	Godowu gatihe aganira ila hooltanno doogga ati woy galtekki horoonsidhinoonni?	0. Duuchaange horoonsi'noommo 1. Sa'ne sa'ne horoonsi'noommo 2. Co'onta dihoroonsi'noommo	
602	Godowu gatihe yannara marichi macciishamihe ?	0. Yanniweelo 1. Ikkkirono didancha yannaati 2. Dancha yannaati	
603	Goduwu gatahera albaanni godowate hasatto noohe?	0. Godowate dihasi'roomma 1. Hasatto'ya soorri'roomma 2. Godowammara hasi'roomma	
604	Godowu gatahera albaanni ooso hasi'roottankanni?	0. Dihasi'reemma 1. Lame wodana ikkoomma 2. Hasi'reemma	
605	Godowu gatahera albaanni galtekki ledo qaaqquullu daafira hasaabbine egentinoonni?	0. Horontanni dihasaamboommo 1. Hasaambe ilate mudhinoommo 2. Hasaamboommona muro di''iillinnoommo	
606	Godowakkira albaanni Fayyimmakkira balaxxe qixaawo assootta? (Afooho adhinanni xagicho (folic acid) Ago aganna sigaara wiliishsha uurrisatenni/ajishatenni, fayyimmate mini amaale adhatenni) adhitinoonni qaafo no?	0. Noori dino 1. Fayymmankera qixxaamboommo (1 qaafo) 2. Fayymmankera qixxaamboommo (< 2 qaafo)	
607	Ilte egennootta?	1. Ee 2. Dee'ni	
608	Lubbote noohe qaaqqi me''eho?	Xawisi :_____	
609	Dimbisanno ago horoonsi'ratta?	1. Ee 2. Dee'ni	
610	Caate corqatta?	3. Ee 4. Dee'ni	

Beeqqo Assoottahura Lowo Geeshsha Galaxxeemmohe!!

8.4.2. Ethical approval

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HAWASSA UNIVERSITY
COLLEGE OF MEDICINE AND HEALTH SCIENCES
Institutional Review Board

Ref. No: IRB/143/14
Meeting No: 8/2014 Date: 1/05/2022

Name of Researcher(s): **Zelalem Tenaw Bogale, Achamyelesh G/Tsadik (Ph.D), Taye Gari (Ph.D)**

Topic of Proposal: ***Disability and reproductive health in Sidama regional state, Ethiopia: Burden of problems and service utilization***

Dear researcher(s),
The Institutional Review Board (IRB) at the College of Medicine and Health Sciences of Hawassa University has reviewed the aforementioned research protocol with special emphasis on the following points:

1. Are all principles considered?
   - 1.1. Respect for persons: Yes ☑ No ☐
   - 1.2. Beneficence: Yes ☑ No ☐
   - 1.3. Justice: Yes ☑ No ☐
2. Are the objectives of the study ethically achievable? Yes ☑ No ☐
3. Are the proposed research methods ethically sound? Yes ☑ No ☐

Based on the aforementioned ethical assessment, the IRB has:

- **A.** Approved the proposal for implementation ☑ -Approval period from **May.1/ 2022** to **Apr. 30 /2023**
- B. Conditionally Approved ☐ -Element Approved: **Protocol Version No. 1**
- **C.** Not Approved ☐ -Follow up report expected in **6 months**

Obligation of the PI:

1. Should comply with the standard international and national scientific and ethical guidelines
2. All amendment and changes made in protocol and consent form needs IRB approval
3. The PI should report SAE within 3 days of the event
4. End of study, including manuscript, should be reported to the IRB

Yours faithfully,

Dawit Jember (Asst. Prof.)
Institutional Review Board Chairperson.

☎: + 046 8209290 Website: Fax: + 046 2208755 ✉ 1560 CMHS, Hawassa-Ethiopia

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HAWASSA UNIVERSITY
COLLEGE OF MEDICINE AND
HEALTH SCIENCES
Institutional Review Board

Ref. No: IRB/079/15
Date: 01/11/2022

To: Zelalem Tenaw et al.
Hawassa, Ethiopia

Re: Approval of protocol amendment

It is recalled that you have applied to the Institutional Review Board (IRB) of Hawassa University College of Medicine and Health Sciences requesting amendment to your previously approved protocol (Ref. No: IRB/143/14; 01/052022 titled "*Disability and reproductive health in Sidama Regional State, Ethiopia: Burden of problems and service utilization*".

Our IRB has evaluated your request and learnt that the amendments involve increment of study kebeles from 15 to 30, and sample size modification.

Your protocol amendment has therefore been approved through an expedited review and you can undertake your study as per your amended protocol.

With Best Regards,

Dawit Jember (Asst. Professor)

Chairperson, Institutional Review Board

CC

- **IRB**

☎ + 046 820 92 90 Fax: + 046 2208755 ✉ 1560 Hawassa, Ethiopia

8.5. Scientific Conference Certificates

St. PAUL INSTITUTE
FOR REPRODUCTIVE HEALTH AND RIGHTS

Certificate of Completion

Acc No: 02EMwA-CPDP2321
CEU: 5
Ref. No: SPIRHR/CPD/1032

This is awarded to

Zelalem Tenaw Bogale

for taking part as a poster presenter on a scientific symposium entitled **"The 5th Annual Reproductive Health Conference: Advancing Adolescents and Youth Sexual and Reproductive Health and Rights: Bridging the Gaps"** organized by St. Paul Institute for Reproductive Health and Rights (SPIRHR) in collaboration with St. Paul's Hospital Millennium Medical College (SPHMMC), conducted on November 9, 2023 to November 10, 2023

Date of Issue: November 10, 2023

SP-IRHR
St. Paul Institute for Reproductive Health and Rights

Mekitie Wondafrash, MD, Ph.D
CPD Coordinator
St. Paul Institute for Reproductive Health and Rights (SPIRHR)

Delayehu Bekele, MD, MPH
Director and PI
St. Paul Institute for Reproductive Health and Rights (SPIRHR)

CERTIFICATE OF ATTENDANCE

This certificate is presented to

Zelalem Tenaw Bogale

for presenting his research work in Scientific Conference Organized by the School of Public Health in Collaboration with the SENUPH II project
at the College of Medicine and Health Sciences, Hawassa, Sidama Region, Ethiopia
November 08 - 10, 2023

SENUPH II project

School of Public Health

Nana Chea
Assistant Professor
Head, school of public Health

Chief Academic Director

Dr. Mehretu Belaynoh Dinage
Chief Academic Affairs
Director

St. PAUL INSTITUTE
FOR REPRODUCTIVE HEALTH AND RIGHTS

Certificate of Completion

Acc No: 02EMwA-CPDP2321
CEU: 10
Ref. No: SPIRHR/CPD/887

This is awarded to

Zelalem Tenaw Bogale

for taking part as an oral presenter on a scientific symposium entitled **"The 5th Annual Reproductive Health Conference: Advancing Adolescents and Youth Sexual and Reproductive Health and Rights: Bridging the Gaps"** organized by St. Paul Institute for Reproductive Health and Rights (SPIRHR) in collaboration with St. Paul's Hospital Millennium Medical College (SPHMMC), conducted on November 9, 2023 to November 10, 2023

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