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## Research Article

# Factors Associated with Outcomes of Status Disclosure among Antiretroviral Therapy (ART) Attendees in Public Health Facilities of Mekelle City, Tigray, Ethiopia

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**Introduction:** Positive status disclosure is considered a central strategy and a critical gateway in the prevention and treatment of the Human Immunodeficiency Virus. Disclosure of serostatus plays a significant role in preventing transmission and provides early care services for people with the virus. It also improves adherence to treatment and the quality of life in Human Immunodeficiency Virus-positive clients. However, research on the outcome of seropositive status disclosure has been uneven, both in time and geography, and is limited, particularly in the Tigray region.

**Objective:** To assess the factors associated with outcomes of status disclosure among antiretroviral therapy attendees in public health facilities of Mekelle City.

**Method:** An institution-based cross-sectional study was conducted. A systematic random sampling technique with K=6 was used to select study participants, recruiting a total sample size of 273. The data were collected based on face-to-face interviews using structured questionnaires. Bivariate and multivariable logistic regression analysis with a 95% confidence interval and a cut-off point p-value < 0.25 were used to assess the associated factors. SPSS version 21 was used to analyze the data.

**Result:** Of the total respondents in this study, 231 (84.6%) reported that the outcome of discussing their HIV seropositive result was positive. Conversely, 15.4% reported negative outcomes of disclosure. In the multivariable analysis, the outcome of disclosure was significantly associated with gender (AOR=3.5, 95% CI [1.110–11.272]) and the quality of the relationship with a partner before disclosure of status (AOR=0.172, 95% CI [0.045–0.647]).

**Conclusion:** Although the majority of the people experienced positive outcomes, a significant proportion of individuals are experiencing negative outcomes from positive status disclosure. Therefore, healthcare providers should be aware of both the benefits and the negative consequences of disclosure. They should also identify women most at risk for negative outcomes and provide counseling and support throughout the entire disclosure process.

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## Introduction

Since the start of the HIV epidemic, globally, more than 35.4 million people have died from AIDS-related illnesses [1][2]. HIV continues to spread, and in 2017, 1.8 million people were newly infected, 940,000 people had died of AIDS-related conditions, and an estimated 36.9 million people are living with HIV (PLHIV) globally [2]. The HIV epidemic is mostly affecting Africa, in which Eastern and Southern Africa accounts for 45% of new HIV infections and is home to 53% of PLHIV globally [3]. The national prevalence of HIV in Ethiopia in adults aged 15-49 years in 2017 was 0.9% (0.7% in males and 1.2% in females) [3][4]. In Ethiopia, only 436,000 individuals are currently taking antiretroviral (ARV) treatment out of the estimated 613,000 people living with HIV by 2018 [5].

The UN Sustainable Development Goals (SDGs), in response to this burden, aimed to end the HIV/AIDS epidemic by 2030 [1][6]. These goals intend to reduce both new infections and AIDS deaths to less than one per thousand [1][6]. As most HIV infections in developing countries occur through sexual transmission, HIV status disclosure is among the priority strategies in HIV prevention and treatment to achieve these SDG goals [7].

Disclosure is defined as the process of revealing an HIV-positive status to other people in their social circle [3]. Although encouraging HIV status disclosure dates back to the late 1980s globally, in recent years, 24 states have made failure to disclose a positive HIV status to a sexual partner a criminal offense [7][8].

The two main processes for informing partners of an individual's HIV infection are disclosure, which is more recommended and refers to actions by individuals themselves to notify their partners of their HIV serostatus, and partner notification, which is applied when people become afraid of the consequences or have limited knowledge of their partner's location [5].

Disclosing HIV status can result in two contrary consequences, namely either positive or negative outcomes, but rarely it can also result in a neutral response [7][9]. The positive outcomes outweigh the negative outcomes, and all clients, whether positive or negative, should be empowered to inform their families of their test results [8].

The prevalence of disclosure has increased over time, and outcomes of disclosure present different findings, with many reporting positive outcomes, which are associated with good adherence and quality of care [10]. Disclosure of HIV sero-status plays a significant role in prevention and care services for PLHIV and improves adherence to treatment and quality of life in HIV-positive clients [8][11]. Disclosure helps couples make informed reproductive health decisions and also reduces the risk of mother-to-child transmission of HIV [9][12]. Disclosure of status to sexual partners increases the participation of women in PMTCT services [10]. Disclosure of HIV-positive status leads to the practice of safe sex, thereby decreasing further transmission of HIV [13].

Although HIV status disclosure demands culturally and locally specific and also timely evidence, research on the factors that contribute to an adverse outcome to the disclosure of HIV seropositive status has been uneven, both in time and geography, and is limited, particularly in the Tigray region. As far as my level of knowledge goes, evidence is insufficient on the outcome of disclosure and the factors that have an association with it. Therefore, the present study is intended to contribute by bridging the knowledge gap and subsequently improving HIV care and treatment.

Disclosure of HIV status is a critical gateway and central strategy in HIV prevention and treatment [7][14]. HIV-positive status disclosure has become the major concern and determining factor in the success of HIV/AIDS-related programs, and so, it should be addressed in HIV prevention and control activities [9].

However, there is a gap in knowledge on the outcomes of disclosure of HIV-positive status and the factors that are associated with it in the Tigray region in general and Mekelle city in particular. This paper aims to assess factors associated with outcomes of disclosure among ART attendees who disclosed their status in public health facilities of Mekelle City, Tigray, Northern Ethiopia.

## Methodology

### *Study area and period*

The study was conducted in Mekelle City public health facilities, Mekelle, Tigray regional state, Ethiopia. Mekelle is located 783 km north of Addis Ababa, with latitude and longitude coordinates of 13.4830°N, 39.4570°E and is found at an elevation of 2084 meters above sea level. Mekelle is the economic and political

capital of the Tigray regional state. The total population of the area was 233,000, with 119,800 females, and the health service coverage of Mekelle City was 90% [15].

According to the Tigray regional health bureau profile report, there were 3 public hospitals and 11 health centers in Mekelle City [15]. The total number of people attending ART and disclosing their status in this city was 10,462. This study was conducted from October to November 2019.

### *Study design*

An institutional-based cross-sectional study was employed.

### *Population*

#### *Source Population*

All HIV-positive clients who were registered and receiving clinical services at the ART clinic in public health facilities of Mekelle city.

#### *Study population*

HIV-positive individuals who had disclosed their HIV status to somebody else. Participants were approached during their routine follow-up medical visits in their respective health facilities.

#### *Eligibility criteria*

#### *Inclusion criteria*

All HIV-positive clients on ART who had disclosed their status and contacted health facilities for care and treatment follow-up during the study period. Clients were 15 years old and above and aware of their HIV-positive status for at least six months.

#### *Exclusion criteria*

Clients with active mental problems that led to incoherence of speech and memory were excluded from participation. Clients who were found to be critically ill during the data collection period were also excluded from participation in this study.

#### *Sample size determination*

The number of respondents for this study was selected from HIV-infected clients who had disclosed their status and were receiving HIV care and treatment in the public health facilities of Mekelle City.

The sample size was calculated as follows: To determine the sample size, the single population proportion formula was used, with a proportion of positive outcomes in the disclosure of 80% [16] from a study in southwest Ethiopia. Using a confidence level of 95%, a degree of precision of 5%, and assuming a 10% non-response rate, the total sample size for this study was computed as follows:

$$n = \frac{(Z\alpha/2)^2 P * (1 - P)}{D^2}$$

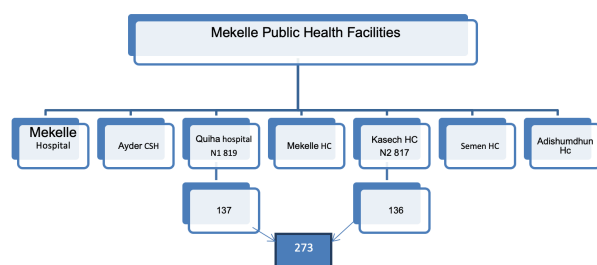
Where required sample size:

- P = Prevalence of HIV status disclosure
- D = Margin of error (5%)
- Z = Standard value at 95% CI (From Z table, which is 1.96)  
= (1.96)<sup>2</sup> \* (0.80) \* (0.20) / (0.05)<sup>2</sup> = 246

By adding a 10% non-response rate, the final sample size is n = 273.

#### *Sampling Technique and Procedure*

The systematic random sampling method was used to select a sample with equal probabilities of selection from the entire HIV/AIDS population receiving care in Mekelle City public health facilities. First, all the ART-providing health facilities were listed, and thereafter, two health facilities were selected using a simple random sampling method. Quiha general hospital and Kasech Assfaw health center were selected at random (Figure 2). A pre-survey was conducted, and there were a total of 1636 attendants revealed in both health facilities. Participants were recruited from each health facility using the register as a sampling frame for the study. Based on the sample fraction, clients were selected at equal intervals using systematic random sampling (K=6). This allowed for the recruitment of respondents with different characteristics in terms of their age, marital status, and education level, which will help provide insight into the similarities and differences in their experiences regarding the disclosure of HIV-positive status. HIV-positive individuals who didn't fulfill the inclusion criteria were excluded, and the next client fulfilling the criteria was included (Figure 1).



**Figure 1.** Sampling procedure for a study on the outcome of disclosure among ART attendees who disclosed status in Mekelle city health facilities.

### *Data Collection Tools, Procedures, and Sources of Data*

All questions regarding the outcome of disclosure were adapted from the WHO guide and recommendations, as well as previous similar articles. A structured and pretested survey questionnaire was initially prepared in English, and later it was translated into the local language that the participants use, which is Tigrigna. The questionnaire was also back-translated into English to check for the consistency of the questions. A pretest of the questionnaire was conducted among currently active HIV-positive clients at Adishumduhun Health Center, first by a supervisor, and thereafter by a data collection team.

Data collection took place from the first day of the third week of October to the end of the third week of November 2019, lasting for 5 weeks, on-site, with local teams in the respective sampled facilities, i.e., Quiha General Hospital and Kasech Assfaw Health Center. The data were collected by trained health professionals. This study used an interviewer-administered questionnaire. To ensure privacy and confidentiality, written consent (documented using signatures for literate participants and thumb impressions for illiterate ones) was obtained from respondents, and each data collection session with participants took place in a quiet location. The principal investigator attended interviews at random to ensure that the data collection protocol was consistently followed by the research team members.

This study employed both primary and secondary sources. The primary sources included data collected from structured survey questionnaires directly from study units. The secondary source for the study was the individual patient charts for selected variables like WHO staging, recent viral load result, and adherence level.

### *Data Quality Control*

In this study, to maintain data quality, the questionnaire was initially prepared in English, and the English version of the questionnaire was then translated into the local language, Tigrigna. The Tigrigna version was subsequently retranslated back into English by different language experts to ensure consistency and ease of understanding by the data collectors and interviewees.

A half-day training session was provided to data collectors and supervisors, covering the research objectives, data collection tools and procedures, and interview methods that were to be applied during data collection. This training was based on the prepared training manual to ensure the collection of required data. A pre-test was also conducted on 5% of the questionnaires to assess their consistency at a facility other than the sampled one, i.e., Adishumduhun Health Center. Based on the results of the pre-test, necessary corrections were made to the questionnaire. During the data collection period, supervision was carried out by the supervisor and principal investigator, including daily spot-checking for completeness and consistency of the collected questionnaires. To minimize errors during data entry, 15% of the collected data was entered and cross-checked. Additionally, the principal investigator carefully entered the data and thoroughly cleaned it before starting the analysis to ensure data quality.

### *Data Processing and Analysis*

Following data collection, the questionnaire was checked for completeness using simple frequency and tabulation, along with explanations and interpretations. Data entry was conducted by the principal investigator. The collected data were entered into Epi-info version 7.2.1 and then exported to Statistical Package for Social Science (SPSS) version 21 for analysis.

Binary logistic regression analysis was performed. The crude odds ratio (COR) with a 95% confidence interval was used to estimate and assess the association between each independent variable and the outcome variable, as well as to select candidate variables for the multivariable logistic regression analysis and appreciate the adjusted effect and derive adjusted odds ratios for each of the dichotomous independent variables. Variables found to be statistically significant at a  $p$ -value  $< 0.25$  during binary logistic regression analysis were included in the multivariable logistic regression model. For all of the statistical tests used in this study, descriptive statistics such as frequency distribution and measures of central tendency and

variability were computed to describe the study variables. The Hosmer-Lemeshow goodness-of-fit with a backward stepwise logistic regression procedure was used to test and evaluate model fitness. Variance inflation factors (VIF) less than 10 for the associated factors were used to check for collinearity. Adjusted odds ratios (AOR) with a 95% confidence interval were estimated to assess the strength of the association, and a p-value < 0.05 was used to declare the statistical significance of the multivariable analysis.

### *Operational Definition*

**Disclosure of HIV status:** is the act of revealing HIV-positive status to somebody else and has consequences categorized into two categories, namely positive and negative outcomes.

**Positive outcome:** This is the outcome that results in encouraging the positive client by improving adherence to medication and follow-ups and reducing the risk of transmission to partners, which includes support (financial and emotional) and gaining freedom to take medication.

**Negative outcome:** Any devastating or discouraging consequence that follows revealing HIV-positive status,

such as inflicting stigma, separation, divorce, violence, and abandonment<sup>[3]</sup>.

**Sexual Partner:** A person who has at least one sexual relationship with a participant. A regular partner is a person with whom you have sex regularly but isn't your spouse<sup>[7]</sup>.

**Adherence:** This was measured by identifying whether any dose(s) of antiretroviral medication had been missed or not taken at the right time in the previous month<sup>[3]</sup>.

## **Results**

### *Socio-demographic Characteristics of Participants*

The total number of participants was 273, with a response rate of 100%. Of these, 90 were male, and 183 were female, currently on ART. The median age of respondents was 37 years (IQR 14). About 97% and 98% of respondents were Tigrayan in ethnicity and Orthodox Church followers by religion, respectively. The majority of the respondents, 210 (77%), were urban residents, and about 45% were married. Approximately half of the respondents attended the primary level of education, as indicated in Table 1.

Variable	Category	Male	Female	Total
Had a sexual partner after knowing HIV status	Yes	67 (24.3)	136 (50)	203 (74.3)
	No	23 (8.4)	47 (17.3)	70 (25.7)
Type of relationship with their partner	Spousal	53 (26)	102 (50.3)	155 (76.3)
	Steady or casual	14 (6.7)	34 (17)	48 (23.7)
Co-habitation status	Living together	53 (26)	112 (55)	165 (81)
	Not living together	14 (7)	24 (12)	38 (19)
Duration of partnership with most recent partner	<=5 years	41 (20)	82 (40.5)	123 (60.5)
	>5 years	26 (13)	54 (26.5)	80 (39.5)
Discussion about HIV testing with partner	Yes	14 (7)	45 (22)	59 (29)
	No	53 (26)	91 (45)	144 (71)
Know the HIV Status Of Partner	Yes	12 (7)	32 (19)	44 (26)
	No	42 (25)	83 (49)	125 (74)

**Table 1.** Socio-demographic Characteristics of Participants among ART Attendants Who Disclosed Status in Mekelle City Health Facilities by Gender (n=273).

### *Partnership Characteristics of Participants*

A large proportion, 203 (74.3%) of participants, had a sexual partner since becoming aware of their HIV-positive status, of whom 155 (76.3%) reported being in a spousal type of relationship. 74% of those who reported having a sexual partner reported that they did not know their partner's HIV status before disclosure, as shown in Table 2.

**Table 2.** Partnership Characteristics of Participants among ART Attendants Who Disclosed Status in Mekelle City Public Health Facilities (n=273).

### *Medical and Psycho-social Characteristics of Participants*

Of the total respondents, 99 (36%) had self-reported low social support, and respondents reported having membership and participation in PLHIV associations were 70 (24%). The median duration of participants after knowing their HIV-positive status was 7 (IQR±3) years. The vast majority of the participants, 239 (87.5%), 248 (91%), 264 (96.8%), 252 (92.4%), and 259 (94.7%) were provided pretest counseling, tested alone, had a good adherence level, had suppressed recent viral load results, and were in WHO stage one, respectively, as shown in Table 3.

Variable	Category	Male	Female	Total
Duration after diagnosis or test result of HIV	<5 years	26 (10)	51 (19)	77 (29)
	6-10 years	39 (14)	93 (34)	132 (48)
	>10 years	25 (9)	39 (14)	64 (23)
Pretest counseling provided	Yes	80 (29)	159 (58)	239 (87)
	No	10 (4)	24 (9)	34 (13)
Counseled about disclosure of status	Yes	88 (32)	168 (61.5)	256 (93.5)
	No	2 (1)	15 (5.5)	17 (6.5)
Counseled about status to be disclosed by the provider (if the client failed to disclose)	Yes	56 (20)	120 (44)	176 (64)
	No	34 (13)	63 (23)	97 (36)
Level of adherence	Good	87 (32)	177 (64.8)	264 (96.8)
	Fair	3 (1)	6 (2.2)	9 (3.2)
Recent viral load result	Suppressed	79 (29)	173 (63.4)	252 (92.4)
	Unsuppressed result	11 (4)	10 (3.6)	21 (7.6)
WHO clinical staging	Stage One	85 (31)	174 (63.7)	259 (94.7)
	Stage Two	5 (2.1)	9 (3.2)	14 (5.3)
Social support	High	62 (23)	112 (41)	174 (64)
	Low	28 (10)	71 (26)	99 (36)
PLHIV association membership and participation	Yes	19 (7)	51 (17)	70 (24)
	No	71 (28)	132 (48)	203 (76)
Had a history of stigma	Yes	3 (1)	6 (2.2)	9 (3.2)
	No	87 (31.8)	177 (65)	264 (96.8)

**Table 3.** Medical and Psycho-social Characteristics of Participants among ART Attendants Who Disclosed Status in Mekelle City Public Health Facilities (n=273).

### *The Outcome of Disclosure of HIV-Positive Status*

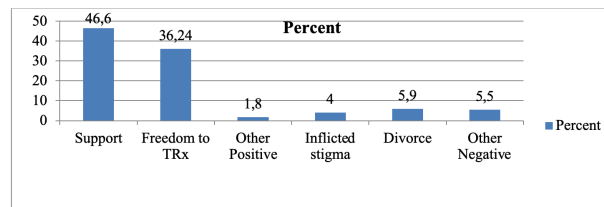
The total of 273 respondents in this study revealed or disclosed their HIV-positive status to at least one person in their social circle. Of those reported as having sexual partners after knowing their HIV-positive status, 169 (83% [95% CI 77.8-88.2]) disclosed their status to

their sexual partner. Out of these disclosed, 242 (88.4% [95% CI 83.2-93.6]) actively discussed their result, with the majority of them, 236 (86.4%), initiating disclosure themselves. Among the total respondents who disclosed their HIV seropositive status, 231 (84.6% [95% CI 79.4-89.6]) had a positive outcome of disclosure, whereas 15.4% [95% CI 10.2-20.6] demonstrated a negative response, as indicated in Table 4.

Variables	Category	Male (N%)	Female (N%)	Total (N%)
Process of disclosure of status	Actively	81 (22.2)	161 (66.2)	242 (88.4)
	Passive	9 (3.6)	22 (8)	31 (11.6)
	Supported me (emotionally, and financially)	33 (12.2)	94 (34.4)	127 (46.6)
	Freedom to access HIV treatment	47 (17.04)	52 (19.2)	99 (36.24)
	Negative outcome	7 (2.6)	35 (12.8)	42 (15.4)
	Positive outcome	83 (30.4)	148 (54.2)	231 (84.6)

**Table 4.** Outcome of HIV Seropositive Status Disclosure among ART Attendants Who Disclosed Status in Mekelle City Health Facilities (n=273).

Reaction to disclosure: Most of the respondents reported having positive outcomes, such as receiving support (emotional and financial support) (46.6%) and gaining the freedom to access HIV treatment (36%). The negative reactions experienced by respondents include stigma (4%) and divorce (5.9%) (Figure 2).



**Figure 2.** Reaction to the disclosure of HIV status among ART attendants who disclosed status in Mekelle City health facilities.

### Factors Associated with the Outcome of Disclosure

A binary logistic regression model was used to assess the association of each independent variable with the

outcome of disclosure of HIV-positive status. Bivariate analysis of this study demonstrated that sex, getting counseled to disclose status, social support, WHO clinical staging, and quality of partnership before disclosure were significantly associated with the outcome of HIV-positive sero-status disclosure. Ten variables with a p-value of less than 0.25 in the bivariate analysis were included in the multivariable regression model to avoid missing significant variables and to control confounding factors.

As observed from the findings of the multivariable analysis in this study, only sex and the quality of the relationship with a partner during disclosure were significantly associated with the outcome of HIV seropositive status in the multivariable logistic analysis. Accordingly, the odds of experiencing a negative outcome were 3.5 times more likely among females compared to male participants (AOR=3.537, 95% CI [1.110-11.272]). The odds of reporting a negative outcome were also 82.8% less likely among those who had peaceful relationships before disclosure compared to those in quarrelsome ones (AOR=0.172, 95% CI [0.045-0.647]) as shown in Table 5.



Characteristics	Negative outcome (n%)	Positive outcome (n%)	COR (95% CI)	AOR (95% CI)
Employment				
Unemployed	17 (6.2)	62 (22.7)	1.854 (0.938–3.664)	0.896 (0.339–2.270)
Employed	25 (9.1)	169 (62)	1	1
Educational status				
Literate	16 (6)	113 (41)	0.643 (0.327–1.261)	0.996 (0.400–2.476)
Illiterate	26 (10)	118 (43)	1	1
Known partner's positive status				
No	25 (15)	100 (59)	1.950 (0.697–5.457)	1.910 (0.638–5.719)
Yes	5 (3)	39 (23)	1	1
With whom HIV testing done				
With other	36 (13)	212 (78)	1.860 (0.696–4.972)	1.153 (0.304–4.374)
Alone	6 (2)	19 (7)	1	1
Counseling about Disclosure provided				
No	6 (2.1)	11 (4.8)	3.333 (1.160–9.576)*	2.994 (0.817–10.976)
Yes	36 (13.1)	220 (80)	1	1
WHO clinical stage				
Stage 1	37 (13.8)	222 (81)	0.300 (0.095–0.945)*	0.474 (0.113–1.996)
Stage 2	5 (2)	9 (3.3)	1	1
Social support				
Low	25 (9)	74 (27.3)	3.120 (1.588–6.130)*	2.207 (0.944–5.160)
High	17 (6.2)	157 (57.5)	1	1
Sex				
Female	35 (12.8)	148 (54.2)	2.804 (1.193–6.592)*	3.537 (1.110–11.272)**
Male	7 (2.6)	83 (30.4)	1	1
PLHIV association participation				
No	36 (13.1)	167 (61.3)	2.299 (0.925–5.718)	1.749 (0.588–5.201)
Yes	6 (2.1)	64 (23.5)	1	1
Relationship quality at disclosure				
Peaceful	24 (14.2)	134 (79.3)	0.149 (0.042–0.528)*	0.172 (0.045–0.647)**

**Table 5.** Binary and Multivariable Logistic Regression Result to Assess Factors Associated with the Outcome of Disclosure

Key \*= $p < 0.05$  in bivariate, \*\*= $p < 0.05$  in multivariable

## Discussion

In this study, two categories of outcomes were reported for the disclosure of HIV-positive status. The magnitude of positive outcomes after disclosing HIV seropositive status was 84.6%. Conversely, a significant proportion of respondents, i.e., 15.4%, reported negative consequences in response to the disclosure of HIV-positive status. In multivariable analysis, sex and the quality of the partnership before disclosing HIV-positive status were found to be independent predictors of the outcome of disclosing HIV-positive status.

Studies have shown that the benefits of disclosure far outweigh its negative outcomes [17][18]. The participants in this study reported experiencing both negative and positive consequences as a result of disclosure. This study indicated that most of the respondents reported positive outcomes from disclosing their HIV seropositive status. These positive outcomes or the support received from families in response to disclosure are intrinsically linked to better health, which improves the general well-being and life of people living with HIV/AIDS [19].

Although the majority of participants indicated that they experienced a positive outcome following disclosure, a significant proportion encountered negative outcomes. This finding is consistent with other studies in Ethiopia [3][20][21], as well as studies conducted in Uganda and Belgium [10][19][22], which similarly reported adverse outcomes such as blame, depression, accusations, divorce, and separation from partners and other family members following the disclosure of HIV seropositive status.

Conversely, this study demonstrated a lower rate of negative responses to the disclosure of status compared to a study conducted in Hawassa, which reported a rate of 59% [23], and 27.4% domestic violence reported in a study conducted in Nigeria [24]. This difference could be explained by the variability in socio-demographic characteristics and the recruitment of study participants in the other studies, which were limited to women only. Females are more likely to suffer from negative consequences due to power imbalances that disadvantage women [25]. Moreover, most females in low-income countries are financially dependent on

their sexual partners, which may lead to difficulties during and after disclosure [25].

Additionally, unlike in other studies, participants in this study were all on ART. As patients stay in HIV care services for a longer duration, they obtain information about HIV, including the benefits and ways of disclosure. This increased access to treatment and information over time could help destigmatize HIV, ultimately assisting individuals in coping with and reducing adverse consequences after disclosing their HIV-positive status [10].

The negative consequences that follow revealing HIV-positive status are reduced in South Africa through an intervention that promotes couple counseling by health care providers after identifying those at risk of violence and negative consequences if disclosed [26].

Disclosure is a complex choice, often difficult, a lifelong process, and can be dangerous, affected by various factors. The outcome of disclosure of HIV-positive status in this study was significantly associated with sex and the quality of the relationship before disclosure of status. As observed in this study, females were 3.5 times more likely to report experiencing negative reactions following disclosure compared to males, possibly related to gender inequities in which power imbalances in relationships favor men.

It is well documented in low socioeconomic countries like Africa that women are more likely than men to be HIV+, to know their status, to seek social and medical support, and to experience violence as the reason for disclosure, often because they lack the power to make independent decisions about themselves [13][22][27]. In agreement with this study, other studies also reported sex as a determining factor for the outcome of disclosure of HIV-positive status, such as in Addis Ababa [3], Zimbabwe, and Nigeria [7][27], which reported that females were more at risk for a negative outcome.

Another systematic review study in Eastern Africa also revealed that women not only report more negative outcomes but also report the most severe consequences than males, possibly due to the gender inequality that favors men [25]. These undesirable or negative outcomes in women can be reduced by the involvement of men. In Uganda, a study conducted to examine the impact of the combination of HIV services and violence prevention interventions demonstrated lower self-

reports of abuse among women when men are involved [28].

Participants described their quality of relationships with partners before the time of disclosure as “mostly quarrelsome” and reported more negative outcomes to disclosure and fewer positive outcomes compared to those describing their relationship as “mostly peaceful.” Those who had peaceful relationships before disclosure were 82.8% less likely to report negative outcomes compared to those in quarrelsome relationships. This is not surprising, as another study from Ethiopia [3] similarly reported that couples with prior poor-quality relationships were more likely to experience negative consequences following disclosure.

Studies from Zambia [29] also found that a history of being in an abusive relationship was associated with experiencing verbal, physical, and/or sexual abuse and separation in a relationship or divorce following disclosure. Studies suggest health care providers assess HIV-positive clients for potential risks of violence and other negative responses that follow disclosure, and when at risk, give intensive counseling, make necessary referrals, and offer alternative models of disclosure such as facilitated disclosure [30].

## Limitations of the Study

It was conducted in a clinical setting and among ART service utilizers, so it may not be representative of all HIV-positive individuals. Because this group has good access to frequent counseling and better adherence, it improves the coping ability of the individuals and reduces the risk of negative consequences that follow the revealing of status.

## Conclusion

Although most of the PLHIV attending ART in Mekelle public health facilities experienced positive outcomes in response to the disclosure of HIV-positive status, significant proportions of individuals are still facing adverse outcomes of disclosing their HIV-positive status. Gender and the quality of the relationship at the time of disclosure were identified as predictors of the outcome of disclosure of HIV-positive status. Gender differences regarding disclosure experience demonstrate a strong need to support women because of their susceptibility to negative outcomes.

## Declarations

### *Ethics and Consent*

After the purpose, benefit, and risks were explained, informed consent was obtained from all study participants and/or their legal guardians. Ethical approval was obtained from the Ethical Review Board of the School of Public Health, College of Health Sciences, Mekelle University, and official permission from the Tigray Regional Health Bureau was obtained.

### *Consent to Publication*

Not applicable.

### *Availability of Data*

Data will be available from the corresponding author through email.

### *Competing Interest*

The author(s) declare(s) that there is no conflict of interest regarding the publication of this article.

### *Funding Statement*

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### *Authors' contributions*

Both authors reviewed the manuscript.

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