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Prevalence of Sharp Injuries and Associated Factors among Healthcare Workers in North Gondar (Debark), West Gondar (Metema), and South Gondar (Addis Zemen) Primary Hospitals, Northwest Ethiopia

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Abstract

Objectives: Occupation-related sharp injuries are a global problem; the death toll is around 2 million and is rising in low-income nations like Ethiopia. No information has been reported on sharp injuries in North and South Gondar primary hospitals and present study aims to determine the prevalence of sharp injuries among healthcare workers. **Methods:** A institutional cross-sectional study conducted and 351 were randomly chosen. A self-administered questionnaire was used to collect data and analyzed with SPSS ver23. Bivariate analysis and Multiple logistic regression were used to understand confounding factors. **Findings:** The prevalence of sharp injuries among Healthcare workers (HCWs) lifetime and preceding 12 months were 131 (37.3%) and 86 (24.5%), respectively, of which 76 (58%) and 47 (54.65%) were reported by females. The chance of recurrent incidence of sharp injuries was more in operation theatre (37.5%). The primary source of injury was syringe needles 52 (42.5%). HCWs >10 years of work experience are more likely to experience sharp injuries compared to those less experience (<5 years) [AOR: 0.40, 95% CI: (0.21, 0.79)]. Never had any training on sharp injuries were more likely to report a sharp injury compared to those reported training [AOR: 0.55, 95% CI: (0.3, 1.024)]. Worked more than 48 hours/week reported more likely sustained sharp injuries [AOR: 0.95, 95% CI: (0.93, 0.98)]. HCWs dissatisfied with their work environment reported sharp injuries more than satisfied ones [AOR = 0.34, 95% CI: (0.2, 0.6)]. Similarly, having low [AOR: 0.26, 95% CI: (0.13, 0.56)] and moderate risk perception [AOR: 0.36, 95% CI: (0.19, 0.67)] significantly raised the odds of sharp injuries occurrence compared to a high-risk perception for sharp injuries. **Novelty/conclusion:** Present study showcases the moderate risk perception,

work hours more than 48 h/week were the key factors identified, along with job dissatisfaction, lack of training and avoiding recapping may reduce the injury burden.

Keywords: Amhara; Ethiopia; Hospital; Nurse; Occupational injury 1

1 Introduction

Sharp injuries are accidental skin punctures or lacerations caused by a needle or other sharp instrument in a healthcare setting⁽¹⁾. Sharps include hypodermic needles, blood collection needles, intravenous (IV) cannulas or needles, scalpels, razor blades, lancets, retractors, scissors, pins, clamps, cutters, staplers, and glass objects⁽²⁾. Healthcare workers (HCW) are likely to be exposed to contracting life-threatening blood-borne infections at work⁽³⁾. Globally, 86 % of occupationally related infections are attributed to needlestick injuries, and the disease burden caused by percutaneous sharps injuries is approximately 3 million infections annually⁽⁴⁾.

Sharps injuries place healthcare workers at risk for contracting hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV. About forty % of all cases of HBV, forty % of all cases of HCV, and four and a half % of all cases of HIV/AIDS among HCWs are due to sharp injuries, and the consequences of these effects include absenteeism and inadequate healthcare service delivery⁽²⁾.

In a meta-analysis, it was found that education to raise health workers' awareness, training them on universal safety precautions, safe injection practices, and sharp waste disposal, and provision of engineered safety devices reduced such incidents by 62%.⁽¹⁾ According to the WHO, each healthcare worker experiences an average of four needlestick injuries annually. in Africa, the Western Mediterranean, and Asia⁽⁵⁾, and healthcare workers (HCWs) in Africa experience an average of two to four needlestick injuries annually⁽²⁾.

The developing world, particularly sub-Saharan Africa, has the highest prevalence of HIV-infected patients, and more than ninety percent of occupational exposure occurs in these nations⁽²⁾. In sub-Saharan Africa, workload, and inadequate personal protective equipment (PPE) result in multiple injuries per healthcare worker per year. According to one study, the prevalence of NSSIs among healthcare workers in sub-Saharan Africa was 29.5%⁽⁶⁾.

Needlestick incidents are linked to a variety of occupational factors, including heavy workload, working in surgical or intensive care units, insufficient work experience, and youth. Despite the existence of data on the prevalence of NSSIs and associated factors among HCWs in many larger urban health facilities in Ethiopia⁽⁷⁾, these study results are not comparable due to differences in healthcare delivery, HCW occupations, injection methods, blood collection, and needle disposal, and the practice of recapping needles⁽⁶⁾. Therefore, needlesticks and sharp injuries pose a significant risk for the transmission of occupational bloodborne pathogens to all healthcare workers^(2,4).

A limited reports on sharp injuries from the study region, mostly confined to referral and urban settings, Northeast Ethiopia 60.2%,⁽⁸⁾ Western Ethiopia 33.7%,⁽⁹⁾, Dessie 34.5%,⁽¹⁰⁾, Gambela 32.2%,⁽¹¹⁾ and Addis Ababa 36.2%,⁽²⁾. No study has been conducted in South and North Gondar Zone primary hospitals in Ethiopia. The present study aimed to assess the current prevalence and risk factors for sharp injuries among HCWs in North, West, and South Gondar district hospitals in Ethiopia.

2 Methodology

2.1 Study design

An Institutional based cross-sectional study evaluated the prevalence and associated factors of sharp injuries among HCWs in North, West, and South Gondar primary hospitals.

2.2 Study area and period

The study was conducted from March to April 2018 in three primary hospitals in North Gondar (Debank), West Gondar (Metema), and South Gondar (Addis Zemen). They are located 100, 160, and 150km far from Gondar town, respectively. According to the Ethiopian census report (2007), the above three hospitals have a total population of 1,90,845, including 98,242 men, and 92,603 are women 368 HCWs existing⁽¹²⁾. Each primary hospital was serving a population of about 250,000 coming from different geographical locations surrounding it.

2.3 Source and Study population

All HCWs worked in primary hospitals, and HCWs working in North, West, and South Gondar primary hospitals were included in the study.

2.4 Inclusion and exclusion criteria

2.4.1 Inclusion criteria

All HCWs engaged in the direct day-to-day care of patients and those who directly contacted sharp injuries in the selected primary hospitals were included in the study.

2.4.2 Exclusion criteria

Those HCWs who were not present during the study period on maternity, annual, or sick leave were excluded from the study.

2.5 Sample size determination

The sample size was ascertained using the formula for a single population proportion and considering that the prevalence of sharp injuries was 31% based on studies conducted in Gondar town⁽¹³⁾, 95% level of confidence, and 5% margin of error. Therefore, the sample size was determined as follows:

$$n = (Z\alpha/2)^2 P (1 - P) \quad n = (1.96)^2 0.31(1-0.31) = 329$$

$$d^2 (0.05)^2$$

By adding 10% non-response rates, the final sample size was 362.

2.6 Sampling and Data collection procedure

The study participants were chosen using a simple random sampling technique.

Data was collected using a semi-structured and pretested questionnaire. Data collectors (Facilitators) employed a self-administered questionnaire to the selected HCWs and collected the data.

2.7 Data quality assurance

The questionnaire was initially written in English and translated to Amharic and back to English to keep the questions' consistent. The questionnaire was pretested to identify potential problem areas, unanticipated interpretations, and cultural objections to any questions in 18 respondents having similar characteristics with the study subjects in the Dabat health center. Based on the pretest outcome, the questionnaire was contextually adjusted and administered to the whole sample of HCWs. Data consistency was ensured by training data collectors and supervisors and pretesting the questionnaire. Two days of training proved to data collectors and supervisors by the Principal Investigator, made countercheck of the filled questionnaire, constant supervision, and reviewed the completed questionnaires daily to ensure the collected information's completeness and consistency.

2.8 Study variables

2.8.1 Dependent variable: Sharp injuries

2.8.2 Independent variables:

- **Socio-demographic variables:** Age, sex, job category, level of education, monthly salary, work experience.
- **Behavioral factors:** Recapping of needles, risk perception, awareness of diseases transmitted by sharp injuries, job satisfaction, reporting pattern of sharp injuries, and use of personal protective equipment (PPE).
- **Work environment:** OHS training, length of working hours per week, the existence of safety guidelines, shift work, availability of sharps containers (safety boxes), and working department.

2.9 Data processing and analysis

Data were entered using Epi Info version 3.5.3 and then exported to SPSS version 23 for further analysis. Descriptive statistics were done for variables in the study using statistical parameters: percentages, means, and standard deviations. Bivariate analysis was used initially to check which variables were associated with the dependent variable and then entered into multiple logistic regressions for the possible effect of confounders. Finally, the variables with significant association were identified based on odds ratio 95%CI ($p \leq 0.05$).

2.10 Ethical considerations

The present study got ethical clearance (DSN/577/13; dated: 15/06/2011 EC) from the Ethical Review Board, School of Nursing, the University of Gondar. Written informed consent was acquired from each study participant of the district hospitals. The purpose of the study was addressed to each respondent. At the end of data collection, the data collectors were brief about preventing sharp injuries to each study participant. All methods were carried out in accordance with relevant guidelines and regulations.

3 Results and Discussion

3.1 Socio-demographic characteristics of HCWs

Out of 362 HCWs, 351 participated in the study, resulting in a response rate of 96%. Of the total participants, 184 (52.4%) were males. The study participants' ages range from 18 to 55 years, with a mean age of 30.36 ± 7.71 SD years and the mean employment of the study participants was 1 to 32 years (mean 6.81 ± 7.57 SD) (Table 1). Most of the study participants' religion was Orthodox Christianity (73.5), nurses by profession (47.3%).

Table 1. Socio-demographic characteristics of HCWs in primary hospitals, Northwest Ethiopia, 2018 (n=351)

Variables		N	%
Sex	Male	184	52.4
	Female	167	47.6
Age group	18–29	213	60.7
	30–39	80	22.8
	>40	58	16.5
	Primary school	44	12.2
Educational level	Secondary school	38	10.2
	Technical and vocational school	7	1.5
	College diploma	121	35.1
	First degree and above	141	41
Marital status	Married	140	39.9
	Single	179	51.0
	Divorced	19	5.4
	Widowed	6	1.7
	Separated	7	2.0
	Housekeepers	75	21.4
Job category	Nurse	166	47.3
	Midwifery	38	10.8
	Health officer	22	6.3

Continued on next page

Table 1 continued

	Laboratory technologist	31	8.8
	Anesthetist	3	0.9
	Physician	16	4.6
	<5	202	57.5
Work experience (years)	5–10	80	22.8
	>10	69	19.7

The mean age of the study respondents is 30.36 years (SDV. 7.71)

3.2 Working environment characteristics among HCWs

The absence of safety instructions and work guidelines was reported by 67.5% and 36.5% of the HCWs. Only 27.1% of the respondents had ever received any training on OHS, and 42.7% on sharp injuries. The majority (92.1%) reported that they had never been provided with written protocols for reporting sharp injuries in their organization. High levels of awareness (95.7%) regarding disease transmission through sharp injuries were noted. 42.8% of the HCWs who sustained sharp injuries in the previous 12 months had officially reported their injury to their respective managements. Recapping was common; only 33% of the respondents reported never recapped needles after use. Most of the respondents (91.7%) used at least one type of PPE, generally disposable gloves (Table 2).

Table 2. Work Environment Factors Affecting sharp injuries Among HCPs in primary hospitals, Northwest Ethiopia, 2018 (n=351)

Question		n	Percent (%)
Are there safety instructions at your workplace?	No Yes	237 114	67.5 32.5
Are there work guidelines at your workplace?	No Yes	128 223	36.5 63.5
Have you ever had training on Occupational Health Safety?	No Yes	256 95	72.9 27.1
Have you ever had training on sharp injuries?	No Yes	201 150	57.3 42.7
Is there a written protocol to report sharp injuries in your organization?	No Yes	320 31	91.2 8.8
What shift had you most often been assigned in the last 12 months?	Morning Evening Night	302 24 25	86.0 6.8 7.1
Is the availability of safety boxes in your working room?	No Yes	15 336	4.3 95.7
How often you recap the needles after use?	Never Sometimes Most of the time All the time	116 72 85 78	33.0 20.5 24.3 22.2
How do you recap the needles after use?	Using single hand Using two hands	143 92	60.1 39.9
Do you use any personal protective equipment?	No Yes	29 322	8.3 91.7
If not, what are the reasons for not using PPE?	Lack of PE. Not comfortable to use and HE Decrease work performance Create safety and health hazards	18 6 3 1 1	62.0 20.7 10.3 3.5 3.5

3.3 Sharp injuries characteristics among HCWs

Near to half of the respondents exposed by syringe needles (45.2%), followed by intravenous cannula (catheter) (12.2%), were the most common pieces of equipment involved in sharp injuries (Table 3). A majority of the injuries occurred when they performed injection (22%), followed by assembling sharps after use and operation theatre (17.4%) and recapping of used needles (9.8%). The highest percentage of sharp injuries occurred on Monday (31.3%), followed by Friday (19.6%). Among 351 HCWs, 86 (24.5%) reported sharp injuries in the preceding 12 months, 54.6% were females, and 32.6% reported sharp injuries experienced

more than one such injury. Of 131 (37.3%) sharp injuries reported in the entire work experience, the highest percentage (47.3%) was reported by nurses, followed by 22.9% housekeepers. The most common reasons for non-reporting were lack of awareness about reporting procedures (35%) and awareness of the need for such reporting (22.3%).

Table 3. Frequency of sharp injuries associated factors among the HCWs in primary hospitals, Northwest Ethiopia, 2018 (N= 351)

	n	Percentage (%)
Experience of sharp injuries in the total of work experience		
No	220	62.7
Yes	131	37.3
Frequency of sharp injury in the last year		
1	58	67.4
≥1	28	32.6
Day of injury		
Monday	35	31.3
Tuesday	15	13.4
Wednesday	9	8.0
Thursday	7	6.3
Friday	22	19.6
Saturday	5	4.4
Sunday	3	2.7
Do not remember	16	14.3
Timing of injury		
Morning	63	48.1
Afternoon	33	25.2
Evening	15	11.4
Midnight	11	8.4
Do not remember	9	6.9
Type of item caused the injury (n=115)		
Syringe needle	52	45.2
An intravenous cannula (catheter)	14	12.2
Scalpel blade	10	8.7
Suture needle	9	7.8
Glass item	7	6.1
Blade	7	6.1
Lancet	6	5.2
Butterfly needle	5	4.3
Scissor	3	2.6
Other sharps	2	1.8
Received medical care for injury		
No	80	61.0
Yes	51	39.0
Work practice		
Dressing and injection	29	22.0
Assembling needle and syringe after use	23	17.4
Operation theatre	23	17.4
Recapping of a used needle	13	9.8
Drawing blood	12	9.1
Opening the needle cap	11	8.3
Securing IV line	10	7.6
Catheterizing patient	8	6.1
Other	3	2.3
Reporting of sharp injuries		
No	76	57.1
Yes	57	42.9
Reason for not reporting sharp injuries		
Not aware of the reporting procedure	27	35.5
I did not think it was important	17	22.3

Continued on next page

Table 3 continued

I thought the source patient was low risk for HIV	12	15.8
Lack of support by management	5	6.6
Fear of stigma/discrimination	5	6.6
Reporting is a too time-consuming process	5	6.6
I emphasized patient care	3	4.0
I thought I might be blamed or in trouble	2	2.6

3.4 Factors associated with sharp injuries among HCWs

The bivariate analysis showed concerns about sharp injuries, job satisfaction, and OHS training decreased sharp injuries risk over their counterparts. However, these were not showed significance in multivariate logistic regression analysis. The prevalence of sharp injuries was significantly associated with tenure, lack of training on sharp injuries, high workload, lack of perception of risk, and dissatisfaction with the work environment for multivariate analysis. HCWs with >10 years of work experience were more than to experience sharp injuries in the previous 12 months compared to those with less experience (<5 years) [AOR = 0.40, 95% CI: (0.21, 0.79)].

HCWs who never had any training on sharp injuries were more likely to report a sharp injury than those reporting such training [AOR: 0.55, 95% CI: (0.3, 1.024)]. HCWs who worked more than 48 h/week reported more sharp injuries than those who had worked ≤48h/week [AOR: 0.95, 95% CI: (0.93, 0.98)]. Similarly, having low [AOR: 0.26, 95% CI: (0.13, 0.56)] and moderate risk perception [AOR: 0.36, 95% CI: (0.19, 0.67)] significantly raised the odds of sharp injuries occurrence compared to their counterparts who had a high-risk perception for sharp injuries. There was also a statistically significant association between dissatisfaction with the work environment with sharp injuries. HCWs dissatisfied with their work environment reported sharp injuries more than the satisfied ones [AOR = 0.34, 95% CI: (0.2, 0.6)] (Table 4).

Table 4. Bi-variable and multi-variable logistic regression analysis of potential factors associated with sharp injuries among HCWs in primary hospitals, Northwest Ethiopia, 2018 (N= 351)

Variables	Category	Injury		Crude OR (95% CI)	Adjusted OR (95% CI)
		Yes	No		
Working experience (years)					
	<5	39	163	1.00	
	5–10	20	60	2.68 (1.48, 4.87) ^b	0.90 (0.45, 1.18)
	>10	27	42	1.39 (0.75, 2.57)	0.40 (0.21, 0.79) ^b
Ever had training on sharp injuries					
	No	72	184	2.71 (1.58, 4.66) ^a	.55 (0.3, 1.02) ^c
	Yes	14	81	1.00	
The average number of hours worked per week					
	<=48	14	109	1.00	
	>48	72	156	3.6 (1.92, 6.69) ^a	0.95 (0.93, .98) ^a
Risk perception	Low	19	26	3.93 (1.97, 7.85) ^a	0.26 (0.13, 0.56) ^b
	Moderate	31	45	3.71 (2.08, 6.63) ^a	0.36 (0.19, 0.67) ^b
	High	36	194	1.00	
Work environment satisfaction					
	No	43	61	3.34 (2.0, 5.57) ^a	0.34 (0.2, 0.60) ^a
	Yes	43	204	1.00	

^aSignificant at p ≤ 0.001; ^bSignificant at p ≤ 0.01; ^cSignificant at p ≤ 0.05.

4 Discussion

The prevalence of sharp injuries among HCWs in the last 12 months was 24.5%, in line with Tigray, northern Ethiopia's 25.9% prevalence rate⁽¹⁴⁾, Dire Dawa, Eastern Ethiopia (26.6%)⁽⁷⁾, Dessie City Hospitals, northeast Ethiopia 28.3%⁽¹⁵⁾. However, the rate we obtained was higher than the 11.57% rate observed in Saudi Arabia⁽¹⁾. Similarly, the rate of prevalence in our study was

lower than similar studies reported in Ethiopia and the prevalence of sharp injuries varied considerably across the different parts of Ethiopia; 29.5% in Northwestern Ethiopia⁽⁶⁾, 32.2%, Gambella town, Southwest Ethiopia⁽¹¹⁾, 33.7% Western Ethiopia⁽⁹⁾, 34.5% in Dessie town, Northeast Ethiopia⁽¹⁰⁾, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 36.2%⁽²⁾, 40.1% in Northeast Ethiopia⁽⁸⁾, 75.5% North Wollo Zone Public Hospitals, Northeast Ethiopia,⁽¹⁶⁾. This may be due to the number of HCWs in the facility, different work environments, and resource availability.

In the present study the overall prevalence of sharp injuries was 37.3%, higher than a similar study in Western Wollega 32.9%⁽⁴⁾. However lesser than a similar study in Dessie referral hospital Amhara region, Ethiopia, 43%⁽¹⁷⁾, Tigray, northern Ethiopia's 38.5% prevalence rate⁽¹⁴⁾, and 53.8% Dire Dawa, Eastern Ethiopia (26.6%)⁽⁷⁾.

In this study, the prevalence of sharp injuries was highest in nurses (47.3%), similar to several other studies in Dessie⁽¹⁷⁾, in Saudi Arabia⁽¹⁾, and Dire Dawa, Ethiopia⁽⁷⁾, Northwestern Ethiopia⁽⁶⁾, Western Wollega⁽⁴⁾. It could be because nurses administer most of the injections and are responsible for intravenous fluid administration and other procedures which require the use of needles and other sharp devices. Also, the insufficient number of nurses and medical devices at workplaces, distraction at work, heavy workload, poor organization, multiple or repeated attempts to complete a procedure, and spending more time in direct patient contact may have increased their vulnerability to such injuries. The current study found that 67% of the study subjects recapped needles after use, which was an important cause of sharp injuries, as observed in several other studies^(1,4,7,14).

The multivariate logistic regression in the present study revealed that low [AOR: 0.26, 95% CI: (0.13, 0.56)] and moderate perceived risk of sharp injuries [AOR: 0.36, 95% CI: (0.19, 0.67)] was a significant association with their occurrence. HCWs with a low perceived risk of sharp injuries might not take special care to avoid injury while performing different activities using sensitive materials. According to a study conducted in Gambella, Ethiopia,⁽¹¹⁾ mishaps can also occur when sharps containers are disposed of improperly. Each ward of the primary hospitals has a safety box for collecting discarded needles and other sharps materials, which are replaced once full due to a shortage of safety boxes, impairing the appropriate collection and disposal of this waste.

Consistent with a finding of similar study in Addis Ababa, Ethiopia⁽²⁾ syringe needles were the most frequent cause of sharp injuries, and this might be due to their use in every department of the HCFs. Replacement of the traditional needles with safer needle devices such as needleless sets, safety cannula, self-capping intravenous catheters, self-retracting lancets for blood glucose monitoring, and auto-disposable syringes certainly helps in reducing injuries among HCWs.

The number of sharp injuries has decreased after introducing such safety-engineered alternatives in Saudi Arabia⁽¹⁾. However, in an underdeveloped country like Ethiopia, health services are under intense economic constraint and often understaffed and underequipped.

The present study detailed that most of the sharp injuries (22%) reported during injections were similar to a study in Dire Dawa, Eastern Ethiopia⁽⁷⁾, which may be due to unexpected or sudden movement by the patient during injection or momentary lack of concentration, resulting in injury.

Even though HCWs have repeated the procedure hundreds of times, one slip can cause injury with potentially serious consequences.

After nurses, housekeeping staff sustained 22.9% of total sharp injuries in this study, slightly lower than a similar study where lab technicians reported 46%⁽⁷⁾. Improper disposal at the upstream and lack of resources places these downstream workers at risk. The Occupational Safety and Health and Health Administration (OSHA) standard, limiting exposure to infectious disease pathogens, forbids recapping of needles after being used; nonetheless, a considerable number of employees are still becoming sick from it. This could be because HCWs have not been properly trained or do not have sufficient expertise with the standard procedures⁽¹⁰⁾. The injury occurrence of unnecessary needle incidents highlights the necessity of ongoing education, seminars, and simulations as outlined in other studies about safety measures for healthcare workers at a tertiary care hospital, Awassa and other similar studies^(4,9,14,15).

This study showed that most injuries (31.3%) occurred on Monday, which might be linked to comparatively high patient flow and a heavier workload after the weekend. This finding was similar to a couple of studies in different parts of Ethiopia. However, in a study done in Public Sector Tertiary Care Hospitals in Pakistan⁽¹⁸⁾, most injuries were reported on Saturday. This variation could be explained by the two countries' organizational and cultural differences.

About 48.1% of sharp injuries occurred in the morning shifts, which may be due to more patients in the morning shift, sometimes causing inattentiveness among HCWs due to workload.

Similar observations in different studies in Ethiopia.

The participants who had no training on sharp injuries [AOR: 0.55, 95% CI: (0.3, 1.024)] were significantly at higher risk of sustaining sharp injuries than those who underwent training.

Similar reports from different parts of Ethiopia: Dessie City Hospitals, Northeast Ethiopia more than 4.92 times probability of having sharp injuries⁽¹⁵⁾. Western Ethiopia 2.25 times more exposed to the risk of occupational hazards than those who

had (AOR: 2.25, 95% CI: 1.22, 4.13)⁽⁹⁾ a higher risk of getting sharp injuries, Gambella, Ethiopia [AOR=4.89, 95% CI: (2.21, 10.84)]⁽¹¹⁾. This finding is vital for planning preventive measures in a setting such as Ethiopia, where arranging proper training is more practical than buying expensive equipment. Due to a lack of OHS training, HCWs may not be familiar with the different mechanisms of preventing sharp injuries associated with their activities and may be at risk for such injuries. Studies showed Sub-Saharan Africa supported the importance of training among HCWs.

In our study, participants with working experience of >10 years had a high rate of sharp injuries [AOR: 0.40, 95% CI: (0.21, 0.79)] compared with those having <5 years were significantly at higher risk of getting sharp injuries compared to ≥ 5 years^(8,15). So merely having work experience is not enough. Training on preventive behaviors and the use of safety-engineered needles are needed. It is recognized that adverse schedule characteristics such as long work hours significantly increased the risk of sharp injuries. HCWs with >10 years of work experience were more likely to experience sharp injuries⁽¹⁰⁾.

In the current study, workload >48h/week significantly increased the prevalence of sharp injuries compared to those who worked 48h/week [AOR: 0.95, 95% CI: (0.93, 0.98)]. One potential explanation is that working long hours can cause stress and emotional and physical distress, which are likely to increase the chance of human error and lead to a tendency towards risky behaviors, such as recapping needles and poor compliance with the precautions.

5 Limitations of the study

This study might have recall bias, constraints of time, and finance for study. The study might be subjected to the response set bias from the respondent. Since it was a cross-sectional study design, it was difficult to draw causal relationships. We excluded seriously ill participants as they might suffer from sharp injuries and sharp acquired bloodborne pathogens.

6 Conclusion

In this study, the incidence of needle stick injuries among healthcare workers over the previous 12 months was 24.5%, and more than half of the injuries went unreported. The likelihood of an occupational injury increased in Ethiopia due to factors like working longer than eight hours a day, a lack of personal protective equipment, a lack of supervision, and a lack of training in occupational health and safety. Future research must examine the causes of sharp injuries and evaluate how well preventive measures can lower the risk. The nurse should follow the recommendations for preventing infections, avoid recapping the needles, and reduce work-related stress. It is strongly advised to raise HCWs awareness of the issue and conduct regular training on how to use sharp objects safely. It is also advised to enhance the current sharp injury reporting systems to guarantee that post-exposure prophylaxis is used as soon as possible. The use of safety precautions, safe injection techniques, and the provision of engineered safety devices may all help to further lower the risk of sharp injuries.

7 Declarations

6.1 Ethics approval and consent to participate

The present study got ethical clearance (DSN/577/13; dated: 15/06/2011 EC) from the Ethical Review Board, School of Nursing, the University of Gondar. Written informed consent was acquired from each study participant of the district hospitals. The purpose of the study was addressed to each respondent. At the end of data collection, the data collectors were provided brief information about preventing sharp injuries to each study participant.

6.2 Consent for publication

All authors read and agreed to the final form of the manuscript.

6.3 Availability of data and materials

The datasets used to support the findings of this study are available on reasonable request. All relevant data are within the manuscript.

6.4 Authors' contributions

AA, ZB, and MI were involved in proposal development, data collection, statistical analysis, manuscript write-up. All authors read and approved the final manuscript.

References

- 1) Alsabaani A, Alqahtani NSS, Alqahtani SSS, Al-Lugbi JHJ, Asiri MAS, Salem SEE, et al. Incidence, Knowledge, Attitude and Practice Toward Needle Stick Injury Among Health Care Workers in Abha City, Saudi Arabia. *Frontiers in Public Health*;10:771190–771190. Available from: <https://doi.org/10.3389/fpubh.2022.771190>.
- 2) Liyew B, Sultan M, Michael M, Tilahun AD, Kassew T. Magnitude and Determinants of Needlestick and Sharp Injuries among Nurses Working in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *BioMed Research International*. 2020;2020:1–14. Available from: <https://doi.org/10.1155/2020/6295841>.
- 3) Lakshmi A, Raja A, Paul CM. A cross sectional study on needle stick and sharp injuries among health care providers in tertiary centers, Tamil Nadu. *Int J Community Med Public Health*. 2018;5(3):982–988. Available from: [10.18203/2394-6040.ijcmph20180524](https://doi.org/10.18203/2394-6040.ijcmph20180524).
- 4) Yohannes BG. Sharp Injuries and Associated Factors Among Health Care Professionals in Western Wollega Public Hospitals, West Ethiopia. *American J of Clin and Exp Medicine*. 2020;8(5):88–95. Available from: <https://doi.org/10.11648/j.ajcem.20200805.12>.
- 5) Kols A, Kibwana S, Molla Y, Ayalew F, Teshome M, Van Roosmalen J, et al. Factors Predicting Ethiopian Anesthetists' Intention to Leave Their Job. *World Journal of Surgery*. 2018;42(5):1262–1269.
- 6) Berhan Z, Maleda A, Gizeyatu A, Sisay T, Lingerew M, Kloos H, et al. Prevalence and associated factors of needle stick and sharps injuries among healthcare workers in northwestern Ethiopia. *PLOS ONE*. 2021;16(9):e0252039–e0252039. Available from: <https://doi.org/10.1371/journal.pone.0252039>.
- 7) Mekonnen R, Yosef H, Teklegiorgis K, Tesfaye F, Dagne I. Magnitude and Impact of Occupational Related Needle Stick and Sharp Injuries and Associated Factors among Health Care Workers in Dire Dawa, Eastern Ethiopia. *Medical Safety & Global Health*. 2018;07(01):2–7.
- 8) Bazie GW. Factors Associated with Needle Stick and Sharp Injuries Among Healthcare Workers in North East Ethiopia</p> <p>. *Risk Management and Healthcare Policy*. 2020;Volume 13:2449–2456. Available from: <https://doi.org/10.2147/RMHP.S284049>.
- 9) Abadiga M, Mosisa G, Abate Y. Magnitude of Needlestick and Sharp Injury and Its Associated Factors Among Nurses Working at Health Institutions in Western Ethiopia, 2020</p> <p>. *Risk Management and Healthcare Policy*. 2020;Volume 13:1589–1602. Available from: <https://doi.org/10.2147/RMHP.S254641>.
- 10) Kebede A, Gerensea H. Prevalence of needle stick injury and its associated factors among nurses working in public hospitals of Dessie town, Northeast Ethiopia, 2016. *BMC Research Notes*. 2018;11(1):413–413. Available from: <https://doi.org/10.1186/s13104-018-3529-9>.
- 11) Mengistu YB, Desta AA, Fekadu SA. The pattern of sharp injuries and its associated factors among healthcare workers in Gambella town, Southwest Ethiopia. *International Journal of Scientific Reports*. 2021;7(2):101–101. Available from: <https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20210093>.
- 12) Summary and statistical report of the 2007 population and housing census: population size by age and sex. Ethiopia, Addis Ababa. 2008. Available from: [https://www.ethiopianreview.com/pdf/001/Cen2007_firstdraft\(1\).pdf](https://www.ethiopianreview.com/pdf/001/Cen2007_firstdraft(1).pdf).
- 13) Kebede G, Molla M, Sharma HR. Needle stick and sharps injuries among health care workers in Gondar city, Ethiopia. *Safety Science*. 2012;50(4):1093–1097. Available from: <https://dx.doi.org/10.1016/j.ssci.2011.11.017>.
- 14) Weldesamuel E, Gebreyesus H, Beyene B, Teweldemedhin M, Welgebriel Z, Tetemke D. Assessment of needle stick and sharp injuries among health care workers in central zone of Tigray, northern Ethiopia. *BMC Research Notes*. 2019;12(1):654–654. Available from: <https://doi.org/10.1186/s13104-019-4683-4>.
- 15) Assen S, Wubshet M, Kifle M, Wubayehu T, Aregawi BG. Magnitude and associated factors of needle stick and sharps injuries among health care workers in Dessie City Hospitals, north east Ethiopia. *BMC Nursing*. 2020;19(1):31–31. Available from: <https://doi.org/10.1186/s12912-020-00422-0>.
- 16) Getie A, Wondmienieh A, Tesfaw G. The Prevalence of Needlesticks and Sharp Injuries, and the Associated Factors Among Midwives and Nurses in North Wollo Zone Public Hospitals, North East Ethiopia: An Institution-based Cross-sectional Study</p> <p>. *Drug, Healthcare and Patient Safety*. 2020;12:187–193. Available from: <https://doi.org/10.2147/DHPS.S273669>.
- 17) Abebe AM, Kassaw MW, Shewangashaw NE. Prevalence of needle-stick and sharp object injuries and its associated factors among staff nurses in Dessie referral hospital Amhara region, Ethiopia, 2018. *BMC Research Notes*. 2018;11(1):840–840. Available from: <https://doi.org/10.1186/s13104-018-3930-4>.
- 18) Zafar A, Aslam N, Nasir N, Meraj R, Mehraj V. Knowledge, attitudes and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan. *J Pak Med Assoc*. 2008;58(2):18333520–18333520.