



Knowledge, Attitude, and Practice Regarding Needle Stick Injuries Among Health Care Workers in Baghdad Teaching Hospital and Ghazy Al-Hariri Hospital for Surgical Specialties in 2020

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Abstract

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BACKGROUND: Needle stick injuries are serious occupational hazards in the transmission of a variety of bloodborne diseases, several pathogens can be transmitted through NSI including hepatitis B, C virus, and human immunodeficiency virus (AIDS) among healthcare workers.

AIM: The objectives of the study were to assess the knowledge, attitude, and practice of healthcare workers toward needle stick injuries.

METHODS: Cross-sectional descriptive study, a convenient sample of 260 healthcare workers was selected from Baghdad Teaching hospital and Ghazy Al Hariri hospital in Baghdad, Iraq. Data were collected by questionnaire from January to June 2020.

RESULTS: The prevalence of NSIs among HCWs was found to be 53.8%, which was higher in nurses (29.3%) and laboratory technicians (28.5%) followed by surgeon doctors (15.7%), assistant surgeons (13.6%), and dentists (12.9%). The highest number of needle stick injuries occurred by recapping of needles (41.4%) followed by during drug administration (27.9%), from hand to hand (10.7%), and during blood drawing (7.9%). A proportion of (64.5%) healthcare workers who sustained needle stick injury had reported their injury. Doctors scored better than others regarding mean scores of knowledge, attitude, and practice. There was a highly significant association between the knowledge attitude and practice scores of the HCWs ($p < 0.001$). A considerable percentage of the participants (80.2%) were completely immunized against HBV.

CONCLUSIONS: The study showed a high prevalence of NSIs among healthcare workers. The score of knowledge was high; moreover, acceptable responses were obtained in most attitude and practice statements, except for recapping of needles statements.

Introduction

Percutaneous injuries induced by needle sticks and other sharp items provide a considerable risk of occupational transmission of bloodborne infections among health care workers [1]. According to a WHO report from 2002, 2 million healthcare workers experience percutaneous exposure to infectious diseases each year, with Hepatitis B (37.6%), Hepatitis C (39%), and HIV/AIDS (4.4%) being the most common bloodborne pathogens transmitted due to needle stick injuries in the world [2], [3].

Many factors contribute to the spread of infections caused by needle stick injuries, including overuse of injections, a lack of disposable syringe supplies, safer needle devices, sharps disposal containers, passing instruments from hand to hand while performing any procedure, and a lack of awareness and adequate training [3]. Needle stick injuries not only put health professionals at risk of infection but also have a severe and long-lasting emotional impact. As a

result, there is a need for the implementation of health education programs that can result in positive changes in both knowledge and attitude toward safety practices that guard against unintentional blood-borne disease transmission [4].

NSIs are avoidable if healthcare professionals implement a comprehensive program that addresses institutional, behavioral, and device-related variables that contribute to the occurrence of needle stick injuries among healthcare workers [5], [6], according to the CDC, safer needle devices can prevent up to 86 percent of needle stick injuries [6].

Although HBV exposures provide the greatest risk of infection, there is an effective vaccination and post-exposure prophylaxis (PEP) for healthcare workers that can significantly minimize the risk. This is not the case with HCV and HIV. As a result, the only option for them is prevention [7]. Preventing NSI is an integral component of any workplace blood-borne virus prevention program. Every healthcare facility should have an infection control program in place, which should be overseen by a functioning hospital infection control

committee. The current study addresses the critical issue of NSI and aims to determine the occurrence of NSI among various categories of HCWs, the various factors responsible, the circumstances under which these occur, and the availability and possibilities of measures to prevent these through improved knowledge. The study also aims at assessing the awareness levels among various categories of HCWs, on issues such as NSI policy, segregation of sharps at source, and the use and availability of safety devices to prevent NSI [8].

Aim

The aim of the study was to assess the knowledge, attitude, and practice of healthcare workers toward needle stick injuries using a guided questionnaire in Baghdad Teaching Hospital and Ghazy Al Hariri Hospital in 2020, Determine the prevalence of needle stick injuries among healthcare workers in Baghdad Teaching Hospital and Ghazy Al Hariri Hospital in 2020, assess the predisposing factors of needle stick injuries, and to assess hepatitis B immunization status in the study group [3], [9], [10].

Materials and Methods

The study was a cross-sectional descriptive survey conducted among 260 HCWs using convenient sampling technique [1], [2], [3], [4]. The HCWs studied were surgeon doctors, assistant surgeons, nurses, laboratorians, and dentists in Baghdad Teaching Hospital and Ghazy Al-Hariri Hospital.

Data collection process

Data were collected using a structured questionnaire with sections that assessed the demographic characteristics, how the injuries occurred and whether they were officially reported to appropriate authority [11], [12], [13].

Data analysis

All patients' data entered using (SPSS version 23). Descriptive statistics presented as (mean \pm standard deviation) and frequencies as percentages. Chi-square used for categorical variables and t-test used to compare between two means (p value) set at ≤ 0.05 and the result presented as tables and/or graphs.

Ethical consideration

We have been received an ethical approval and following the ethical regulation from Iraqi medical

research center commit and ethical committee of collage of medicine university of Baghdad Iraq.

Results

Table 1 shows that females (59.6%) were more prominent than males (40.4%) and the main age group (43.4%) were in (30–39) years with mean age of (32 \pm 9) years. Regarding to job category; the surgeons, assistance surgeons, nurses, and laboratory technicians were represented in (23.1%) for each one and the dentists were only found in (7.7%), (58.5%) were worked in ward, (33.8%) in emergency room, and only (7.7%) in outpatients department. For job duration, it was found (42.7%) with < 5years experiences, (35.4%) have experience 5–10 years, and (21.9%) more than 10 years with mean duration of (10.9 \pm 3.2) years.

Table 1: Sociodemographic characteristics of the studied group

Variables	n (%)
Gender	
Male	105 (40.4)
Female	155 (59.6)
Age	
<30	105 (40.4)
30–39	113 (43.4)
40–49	14 (5.4)
≥ 50	28 (10.8)
Mean of age (mean \pm SD)/years	32 \pm 9
Job category	
Surgeon doctors	60 (23.1)
Assistance surgeon	60 (23.1)
Dentist	20 (7.7)
Nurse	60 (23.1)
Laboratory technicians	60 (23.1)
Job location	
Ward	152 (58.5)
ER	88 (33.8)
OPD	20 (7.7)
Job duration/years	
<5	111 (42.7)
5–10	92 (35.4)
>10	57 (21.9)
Job duration (mean \pm SD)/years	10.9 \pm 3.2

OPD: Outpatients department, SD: Standard deviation, ER: Emergency room.

Table 2 shows that in Q1 (98.5 percent), safety boxes are available in their facility, in Q2 (97.3%), disposable gloves are available in their facility, in Q3 (58.6%), safer needle devices are available in their facility, in Q4 (78.3%), Hep B vaccine is available, in Q5 (63.5%), Hep C serologic IX is available, and in Q6 (33.9%), antiretroviral medications for HIV are available.

Table 2: Response of the studied group regarding general questions

General questions	Yes, n (%)	No, n (%)
Availability of safety boxes in the facility	256 (98.5)	4 (1.5)
Availability of disposable gloves in the facility	253 (97.3)	7 (2.7)
Availability of safer needle devices in the facility	152 (58.6)	108 (41.4)
Availability of hepatitis B vaccine and Hepatitis B Immunoglobulin in the facility	204 (78.3)	56 (21.7)
Availability of HCV seroconversion test in the facility	165 (63.5)	95 (36.5)
Availability of antiretroviral medications of HIV in the facility?	88 (33.9)	172 (66.1)
Complete immunization against Hepatitis B	209 (80.2)	51 (19.8)
Infection with hepatitis B virus	9 (3.5)	251 (96.5)
Infection with hepatitis C virus	7 (2.7)	253 (97.3)
Infection with HIV	0	260 (100.0)

HIV: Human immunodeficiency virus.

Table 3 contains the knowledge questions. Each of the following questions had a proper answer: In Q1 (91.5%) knew about safety boxes, in Q2 (71.2%) knew about using double gloves in phlebotomy procedures, in Q6 (96.2%) knew that needles should be discarded after use, in Q7 (96.5%) knew that Hep B can be transmitted through NSI, in Q8 (94.1%) knew about Hep C can be transmitted through NSI, in Q9 (94.4%) knew about HIV can be transmitted through NSI, in Q13 (Table 3).

Table 3: Response of the studied group regarding knowledge questions

Knowledge questions	Correct, n (%)	Incorrect, n (%)
Knowledge about safety boxes	238 (91.5)	22 (8.5)
Knowledge about wearing double gloves during phlebotomy procedure	185 (71.2)	75 (28.8)
Knowledge about wearing double gloves will decrease the depth of needle penetration and so reduce the risk of transmission of blood borne diseases	243 (93.5)	17 (6.5)
Knowledge about wearing double gloves will decrease the amount of blood inoculum and so reduce the risk of transmission of blood borne diseases	235 (90.4)	25 (9.6)
Knowledge about safer needle devices	167 (64.2)	93 (35.8)
Knowledge about discarding needles soon after usage	250 (96.2)	10 (3.8)
Knowledge about hepatitis B transmission through a needle stick injury	251 (96.5)	9 (3.5)
Knowledge about hepatitis C transmission through a needle stick injury	245 (94.1)	15 (5.9)
Knowledge about HIV transmission through a needle stick injury	247 (94.9)	13 (5.1)
Knowledge about reporting every needle stick injury to an authority	217 (83.4)	43 (16.6)
Knowledge about post exposure prophylaxis against blood born infections after a needle stick injury	248 (95.3)	12 (4.7)
Knowledge about checking patient's blood for hepatitis B, hepatitis C, and HIV if was with unknown serum condition	244 (93.8)	16 (6.2)
Knowledge about educational training programs of blood borne pathogens	169 (65.0)	91 (35.0)
Knowledge about post exposure prophylaxis of hepatitis B that should be taken within 24 h	202 (77.7)	58 (22.3)
Knowledge about post exposure serologic Ix's of hepatitis C that should be done monthly for 6 months	156 (60.0)	104 (40.0)
Knowledge about post exposure prophylaxis of HIV that should be taken within 72 h	167 (64.2)	93 (35.8)

HIV: Human immunodeficiency virus.

Table 4 shows that the Knowledge score level was found poor in (16.9%) of the participants and moderate in (22.3%) and good at (60.8%) (Table 4).

Table 4: Knowledge score level

Variable	n (%)
Participants' knowledge level of NSI	
Poor (<60%)	44 (16.9)
Moderate score (60-80%)	58 (22.3)
Good (>80%)	158 (60.8)
Total	260 (100.0)

NSI: Needlestick injury.

As shown in Table 5; the improper answers were presented in (99.6%) of the respondents in Q1 regarding recapping needles, in Q2 (93.1%) agreed that double gloves protect against NSI, (98.8%) were proper answered in Q3, (89.6%) were properly answered in Q4, in Q5 (97.3%) agreed that NSIs need to be reported, and in Q7 (98.8%) agreed that post-exposure prophylaxis is necessary.

Our study also conduct questioner following Bhargava *et al.* 2013 [16] questioner regarding the attitude score in this regard 34 health-care provider poor attitude score have reveals that 64.2% of the participants had an excellent attitude score, 22.7% had a moderate attitude score, and 13.1% had a low attitude score our result summarized in Table 6.

Table 5: Response of the studied group regarding attitude questions

Attitude questions	Proper, n (%)	Improper, n (%)
After usage, needles should not be recapped	1 (0.4)	259 (99.6)
Double gloves protect against NSI	242 (89.6)	18 (6.9)
Needles should be thrown as soon as they are used	257 (98.8)	3 (1.2)
When the depth of penetration of the sticking needle is lowered, the danger of transmission of blood-borne infections is reduced	233 (80.5)	27 (10.4)
Injuries from needle sticks must be reported	253 (97.3)	7 (2.7)
Attending a blood-borne pathogen educational training session is required to decrease needle stick injuries	246 (93.1)	14 (10.4)
After a needle stick injury, postexposure prophylaxis is required	257 (98.8)	3 (1.2)
The use of safer needle devices reduces needle stick injuries	256 (98.5)	4 (1.5)
Needles should not be shared or damaged in any way	258 (99.2)	2 (0.8)
Following a needle stick injury, it is vital to test the patient's blood for hepatitis B, hepatitis C, and HIV	255 (98.1)	5 (1.9)
The danger of contracting hepatitis B through a contaminated needle is higher than the risk of contracting hepatitis C or HIV	225 (71.3)	35 (13.5)

HIV: Human immunodeficiency virus, NSI: Needlestick injury.

Table 6: Attitude score level

Variable	n (%)
Participants' attitude level of NSI	
Poor attitude score (<60%)	34 (13.1)
Moderate (60%–80%)	59 (22.7)
Good attitude score (>80%)	167 (64.2)
Total	260 (100.0)

NSI: Needlestick injury, OPD: Outpatients department, ER: Emergency room.

Practice of the participant regarding using safety equipment regarding (88.8%) of the participants used safety boxes, (58.1%) wore double gloves, and about (93.5%) were recapping needles, (64.5%) of them reported their NSI, and finally about (33.8%) of health-care provider had taken Hep B vaccine after a NSI.

Regarding practical score many of health-care provider show good practical score (61.5%) and (20.0%) had moderate and (18.5%) with poor practice scores.

Figure 1 shows that 120 (46.2%) participants did not have NSI, and 140 (53.8%) had NSI; 50/140 (35.7%) of subjects with one time NSI, 51/140 (36.4%) with two-3 times, and 39/140 (27.9%) with > 3 times NSI.

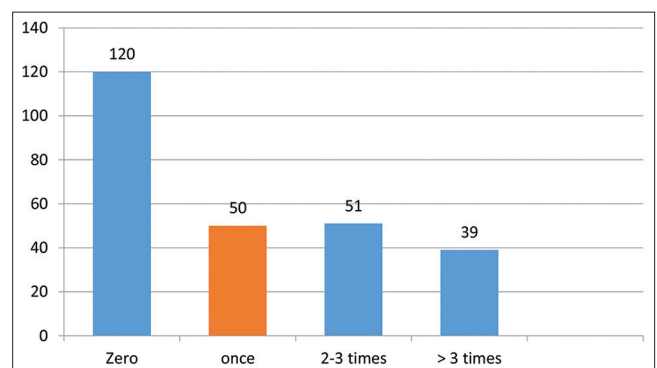


Figure 1: Bar chart represents the times of NSIs

Figure 2 shows needle recapping 58/140 (41.4%) was represented as the most common cause of NSI, then during drug administration 39/140 (27.9%), then from hand to hand in 15/140 (10.7%), during blood drawing in 11/140 (7.9%), 9/140 (6.4%) participants after use before disposal, and 8/140 (5.7%) participants during conducting procedures.

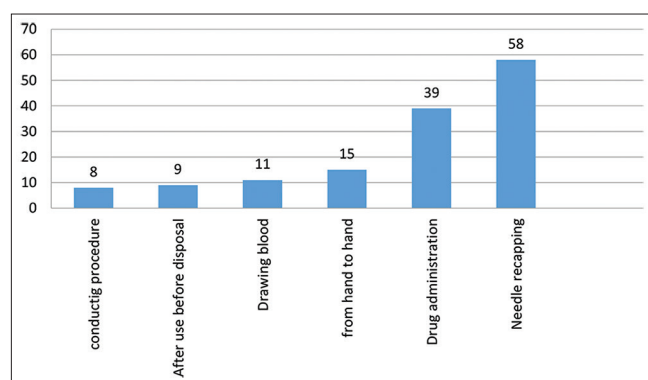


Figure 2: Bar chart represents the risk factors of NSIs (n = 140)

Figure 3 shows that nurses were the most common group injured by NSI in 41 (29.3%), then Lab technicians in 40 (28.5%), surgeon doctors 22 (15.7%), assistance surgeon 19 (13.6%), and dentist 18(12.9%).

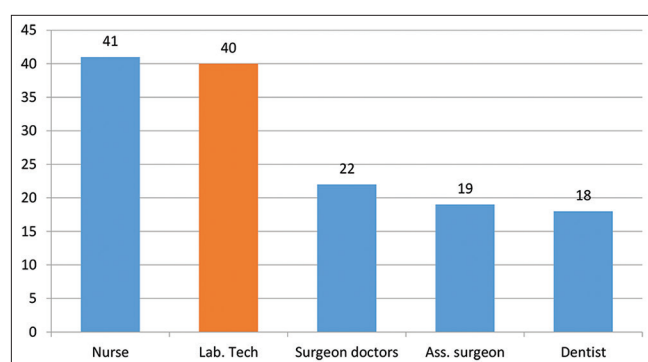


Figure 3: Bar chart represents the distribution of HCWs according to NSI

Table 7 shows that there is a highly significant association were found between gender and job category with needle stick injury (NSI) ($p < 0.001$); moreover, significant association found between each of age, job location, and job duration ($p < 0.05$)

Table 8 shows that the mean knowledge score shows that doctors were better from others regarding the NSI then assistant doctors, lab technicians then

Table 7: The relationship between socio-demographic parameters and the needlestick injury of the examined group

Variables	NSI		p
	Yes (n = 140), n (%)	No (n = 120), n (%)	
Gender			
Male	75 (53.6)	30 (25.0)	<0.001
Female	65 (46.4)	90 (75.0)	
Age			
<30	48 (34.3)	57 (47.5)	0.02
30–39	62 (44.2)	51 (42.5)	
40–49	12 (8.6)	2 (1.7)	
≥50	18 (12.9)	10 (8.3)	
Job category			
Surgeon doctors	22 (15.7)	38 (31.7)	<0.001
Assistance surgeon	19 (13.6)	41 (34.2)	
Dentist	18 (12.9)	2 (1.7)	
Nurse	41 (29.3)	19 (15.8)	
Laboratory technician	40 (28.5)	20 (16.6)	
Job location			
Ward	73 (52.1)	79 (65.8)	0.01
ER	51 (36.5)	37 (30.8)	
OPD	16 (11.4)	4 (3.4)	
Job duration/years			
<5	71 (50.7)	40 (33.3)	0.01
5–10	45 (32.1)	47 (39.2)	
> 10	24 (17.2)	33 (27.5)	

NSI: Needlestick injury, OPD: Outpatients department, ER: Emergency room.

Table 8: Healthcare workers' mean knowledge score

Qualification	Mean ± SD
Doctors	8.6 ± 1.3
Ass. Dr.	7.7 ± 1.1
Lab technicians	7.4 ± 1.7
Dentist	6.3 ± 0.9
Nurse	6.5 ± 2.3

nurses and dentists (Table 9).

Table 9: Association between practice of the studied group with their knowledge and attitude

Level	Practice score			p
	Low level	Moderate level	High level	
Knowledge score				
Low level	38	4	2	<0.001
Moderate level	7	45	6	
High level	3	3	152	
Attitudes score				
Low level	22	6	6	<0.001
Moderate level	18	7	34	
High level	8	39	120	

Discussion

Knowledge, attitude, and practice of HCWs regarding NSIs with comparison to other studies

Regarding knowledge, the doctors had higher score of knowledge than other groups with mean knowledge score of about (8.6 ± 1.3) then assistant doctors (7.7 ± 1.1), laboratory technologists (7.4 ± 1.7), nurses (6.5 ± 2.3), and lastly dentists (6.3 ± 0.9). In a study carried by Bhargava *et al.* [16] revealed that doctors and nurses scored better than technical and attendant staff possibly because NSI knowledge is in their academic curriculum and hence they are well aware of all hospital infection control practices and procedures.

The knowledge score level was found poor in (16.9%) of the participants and moderate in (22.3%) and good at (60.8%) while in Malaysian study the knowledge score 67.3% of respondents had good knowledge and only 32.7% had fair knowledge [8], [33]. In the present study, (your style of writing is poor).

There was deficient knowledge regarding the “need to wear double gloves during phlebotomy procedure” statement which goes with Mast *et al.* study [9]. However, our study shows that there is a highly significant association between wearing double gloves with not injured HCWs, also a highly significant association found between recap needle and injured respondents. No significant association was found between the use of safety boxes or wearing gloves in any other procedures with needle stick injury (Table 10).

This study shows an overall good knowledge level of health care workers regarding the transmission of important diseases through NSI. On average 96.5% of healthcare workers were aware that HBV can be

Table 10: Association between practice and needle stick injury

Practice	NSI		p
	Injured (n = 140), n (%)	Not injured (n = 120), n (%)	
Usage safety box	120 (51.9)	111 (48.1)	0.08
Wearing double gloves during phlebotomy procedure	45 (29.8)	106 (70.2)	<0.001
Wearing gloves in any other procedures	133 (53.0)	118 (47.0)	0.1
Recapping needles after use	138 (57.0)	104 (43.0)	<0.001

NSI: Needlestick injury.

transmitted through NSIs, 94.1% aware of HCV and 94.9% aware of HIV can be transmitted through NSIs. This was higher than the study done in India in which only 50.2% of HCWs gave correct answers regarding disease transmission through NSIs [10]. This is most probably a result of awareness programs conducted in our hospitals.

In the current study, only 60% of HCWs were awareful that post exposure serologic IXs of Hep C should be done monthly for 6 months. This was higher than the Berthelot P study, which found that 33.2% of HCWs were aware of Hep C seroconversion, 64.2% of the subjects knew that post-exposure prophylaxis of HIV should be taken within 72 h, and 77.7% knew that post-exposure prophylaxis of Hep B should be taken within 24 h, which agrees with other studies, which found that two-thirds of the subjects were unaware of post exposure prophylaxis of Hep B [36], [37], [38].

Regarding attitude in the present study, the doctors' and nurses' mean attitude scores were significantly higher (9.2 ± 1.3 and 7.6 ± 2.2 , respectively) than other groups which goes with what was found by Arli [12] who mentioned that doctors and nurses were having better attitude than other health care workers, also in agreement with Jahan in Saudi Arabia [38] and Bhargava *et al.* [16].

Acceptable responses were obtained in most attitude questions, but there was significant lack of awareness regarding recapping needles after usage. The results showed that 99.6% of HCWs supposed that needles should be recapped after usage. This result is much higher than the results of Mendelson study, in which 72% of healthcare workers reported that needles should be recapped after use [14]. In this study, 98.8% of participants agree that post exposure prophylaxis measures are important to minimize the risk of diseases transmission. This is in agreement with a study which was carried out in Gondar university hospital (92.8%) done by Gholami *et al.* [15].

Regarding practice, the doctors scored better than others followed by dentists with mean practice scores of (7.9 ± 0.3 and 7.7 ± 2.2 , respectively). There was a highly significant association between knowledge scores and practice scores ($p < 0.001$); moreover, a highly significant association was found between practice and attitude scores of the HCWs ($p < 0.001$) (Table 10).

In this study, 64.5% of the participants reported needle stick injuries to a responsible authority. In

health care department, total number of needle stick damage were report through 24 h to the Department or the Infection Control Team or to the Safety and Health Committee. However, this is just a guideline for health care workers and reporting is purely voluntary. Hence, the prevalence of reported and non-reported sharp injuries remains uncertain. Until healthcare workers acknowledge the importance of reporting such incidents, the size of the problem cannot be accurately determined. As they may think that it is not important to report, do not know injuries are reportable or Fear of stigma.

In the current study, the highest number of NSIs occurred by recapping of needles (41.4%). This is in agreement with Anupriya [17], Kaphle *et al.* [18], and Muralidhar *et al.* [19] that have shown recapping to be a major cause of NSI.

The current study revealed that from the total respondents (80.2%) are completely immunized against hepatitis B. This finding is affirmed by studies [19], [33], [34], [35], [36] with the principle to decrease incidence of infection of HBV by widespread immunization with hepatitis B vaccine.

Prevalence of NSIs among HCWs

The prevalence of NSIs among HCWs in this study was more than half of the respondents 140 (53.8%) out of 260 which is in agreement with a study done by Madhavan *et al.* [20] where the prevalence was more than half of the studied group. And also agrees with Bairami *et al.*, who reported that half of the HCWs experience NSIs during their working career [21].

Siddique *et al.* [39] in their study concluded prevalence of NSI found in 94% of the subjects which is very high that may be due to reporting of the injuries by HCWs.

In this study, the prevalence of NSIs was higher in nurses 41/60 (29.3%) and laboratory technologists 40/60 (28.5%) compared to surgeon doctors 22/60(15.7%), assistant surgeon 19/60 (13.6%), and finally dentists 18/60 (12.9%). Similar results have been documented by several other studies such as Anupriya [17] and Garus-Pakowska [22]. This may be clarified by the fact that nurses administer most of the injections and are responsible for venipuncture, intravenous fluid administration, and other procedures which necessitate the usage of needles.

In this study, the results showed higher prevalence of NSIs among males (53.6%) compared to that in females (46.4%) which is consistent with Bhardwaj *et al.* [23] and Gabr *et al.* [24]. However, Kebede *et al.* reported that half of NSIs occurred in women [25]. There was a significant relationship between the gender and needle stick injuries ($p = <0.001$) that was in line with the study of Pili *et al.* [26], [27].

Predisposing factors of needle stick injury

In the current study, the NSIs mostly occurred by recapping of needles in 140/260 (41.4%), this goes with Kaphle *et al.* [18] who reported recapping as the major cause (55.1%) of NSIs. Also goes with studies conducted by Jahangiri *et al.* [28] and Mondal *et al.* [29] that also reported the highest number of NSIs had happened during recapping of needles. Adams *et al.* [30], [31] states that there are variant factors manipulating needle stick or sharp injuries, type of devices and procedure and measures that are undertaken, obtainability of training on safer sharp use and proper discarding, lack of knowledge, and awareness of the consequences of NSIs. Several authors have stated that inappropriate working schedules, such as long working hours, can lead to mental and physical exhaustion, which are likely to upsurge the chance of human mistakes and increase the risk of NSIs [32], [33], [40], [41], [42].

Conclusions

This study revealed that more than half of study participants had NSIs. Nurses and laboratory technologists were more affected than other healthcare workers. Despite the fact that the majority of accused were worried about the potential of needle stick and sharp injury, and almost all were aware of the illnesses transmitted by needles, the majority of research participants were recapping the needles after use.

The doctors have better knowledge, attitude and practice regarding NSIs than others do. More than three quarters of the participants were immunized against HBV. It is recommended that every hospital should develop a multifocused strategy to deal with NSIs among HCWs through encouraging educational and training programs, developing a protocol for documented reporting of NSIs, encouraging all HCWs to take vaccination against HBV thus lowering the risk of disease transmission and commitment of application of proper needle discarding in the safety box.

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