



E-ISSN: 2663-2268
P-ISSN: 2663-225X
IJARMSN 2022; 4(1): 36-42
Received: 06-11-2021
Accepted: 18-12-2021

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Occupational exposure to blood and body fluids and their knowledge regarding post exposure prophylaxis among nurses in a tertiary care hospital at national capital of India

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Abstract

Background: Nurses are at greater risk of exposure to the blood and body fluids. Blood borne pathogens are transmitted through accidental needle or sharps injury especially during exposure while caring patients with Hepatitis B Virus, Hepatitis C Virus and Human Immunodeficiency Virus [1]. Nurses have a small but significant risk of acquiring HIV by occupational exposure to blood or through others body fluids. In addition, such exposures cause fear and stress among Nurses and their families. Accidental exposure is more frequent when nurses neglect proper personal protective equipment, high workload and high workload so nurses must be knowledgeable about occupational exposure to blood and body fluids and its preventive measures and management [2]. Accidental exposure is more frequent when nurses neglect proper personal protective equipment, high workload and high workload so nurses must be knowledgeable about occupational exposure to blood and body fluids and its preventive measures and management.

Methodology: A quantitative research study using cross sectional survey research design after obtaining ethical committee permission. Study was conducted among 279 nurses in Institute of liver and biliary sciences, New Delhi (ILBS) employing total enumeration as sampling technique. The data was collected from the nurses who were working in ILBS. Self-structured Questionnaire regarding occupational exposure to blood and body fluids and knowledge post exposure prophylaxis were distributed individually among nurses after filling participant informed consent form. Validity and Reliability of tool were established. Data was analyzed using appropriate descriptive (mean, frequency and percentage) and inferential statistics (t-test, ANOVA test) under SPSS version 20.

Results: More than half the number of nurses who had exposed and who had not exposed to blood and body fluids were in the age group of >30-40 years and majority were female nurses and had GNM as their educational qualification. More than half the number of nurse's had got exposure occurred during the time of cannulation and the most common reason was shortage of staff and helper. With regard to post exposure knowledge, more than half number of nurses who had exposed had good knowledge whereas nearly half the number of nurses who had not exposed had average knowledge and found to be statistically significant with p value less than <0.05. Moreover, there was a significant association found between knowledge regarding post exposure prophylaxis with educational qualification and working experience in nurses who had not exposed found to be statistically significant with p = 0.05.

Conclusion: The result indicated that the incidence of occupational exposure to blood and body fluids was more than one fourth among total nurses. Exposure to blood and body fluids can be prevented if the nurses had adequate knowledge, skill and practice to a greater extent. However if any nurses had exposed accidentally they should be taking adequate post exposure prophylaxis to reduce the chances of blood borne infections.

Keywords: Occupational health, blood exposure, prophylaxis, post exposure

Introduction

In the evolving nations like India, the Nurses are at larger risk due to sub-optimal infection control put into practice like lack of apparatus, training, acquiescence with Uttar Pradesh. A study amongst Nurses in rural health care services presented that percentage exposed to Blood and Body Fluids and Needle Stick Injuries during last year was 37.1 percent and 63.2 percent respectively [3]. Percutaneous Injury defined as exposure occurs where the skin is penetrated by a needle or any sharps objects contaminated by blood or other body fluid due to accidental punctures. Percutaneous Injury is the second most common cause of Occupational injury Within the National Health Facilities.

It is recognized that 3–6 billion injections are given per year, of which 60 percent are precarious. Reliable data of Percutaneous Injury in India are rough, due to irregular reporting. Percutaneous Injury is a serious risk for occupational transmission of blood borne pathogens such as hepatitis B virus, hepatitis C virus (HCV) human immunodeficiency virus (HIV). Percutaneous Injury can occur through numerous procedures such as needle recapping, operative procedures, blood collection, intravenous line administration, checking blood sugar, and due to improper sharps/needle discarding [4]. Post Exposure Prophylaxis includes of administering a short course of Anti retro Viral Therapy (ART) to reduce the chances of seroconversion following events with high amount of exposure to HIV. The overall Post Exposure Prophylaxis procedure includes first aid, therapy, risk assessment, appropriate laboratory examination with the consent of the exposed person and sources and followed by providing of a short course of Anti Retro Viral Therapy for a twenty eight days, and observing of person [5]. Although most studies on the efficacy of Post Exposure Prophylaxis are derivative from animal models, surveying data from prevention of mother-to-child transmission (PMTCT) studies and occupational exposure care the efficiency in human subjects and also between health care providers in Europe and the U.S [6].

Objective

Primary objective

1. To assess the frequency of Occupational Exposure to Blood and Body Fluids among Nurses working in Institute of Liver and Biliary Sciences, New Delhi.
2. To assess Knowledge regarding Post Exposure Prophylaxis among Nurses working in Institute of Liver and Biliary Sciences, New Delhi.
3. To compare knowledge regarding post exposure prophylaxis among nurses between exposed and non-exposed to blood and body fluids.

Secondary objective

- 1 To find the association between Knowledge regarding post exposure prophylaxis with selected Demographic Variables among nurses who had exposed to blood and body fluids.
- 2 To find the association between Knowledge regarding post exposure prophylaxis with selected Demographic Variables among nurses who had not exposed to blood and body fluids.

Research Hypothesis

The following hypothesis will be tested at 0.05 level of significance:

H₁: There is significant association of knowledge regarding post exposure prophylaxis between exposed and non-exposed to blood and body fluids among nurses.

H₂: There is significant association between knowledge of nurses regarding post exposure prophylaxis with selected demographic variables among who had exposed to blood and body fluids.

H₃: There is significant association between knowledge of nurses regarding post exposure prophylaxis with selected demographic variables among who had not exposed to blood and body fluids.

Methodology

Research Approach: Quantitative research approach was identified as appropriate for the study and therefore the investigator adopted the quantitative research approach.

Research Design: Cross sectional survey design was used in the present study and researcher also believed that cross sectional survey design is appropriate for this study.

Study variable: These are the variables, studied in present study included:

Occupational exposure to blood and body fluids among nurses
Knowledge regarding post exposure prophylaxis among nurses

Setting: The study was conducted at Institute of Liver and Biliary Sciences, New Delhi.

Population: In this present study population comprises of nurses those who are working in Institute of Liver and Biliary Sciences, New Delhi.

Sample and sampling technique: Total enumeration technique to abstract the all information of each one nurses.

Sample size: Nurses who were took part in research that were 279 out of 350 nurses. Sampling was done using following inclusion and exclusion criteria. All nurses working in ILBS were enrolled. 30 nurses were excluded because they were the part of pilot study 71 nurses on leave.

Inclusion criteria: Nurses who are working in Institute of Liver and Biliary Sciences.

Exclusion criteria: Nurses who are on leave during data collection period.

Content validity: The prepared tool along with the objectives, hypothesis, operational definitions, blue print, scoring key and criteria checklist for validation were submitted to 8 experts. Among those, 5 experts from Medical Surgical Nursing Department, three were from the field of epidemiology and who were had knowledge regarding biostatistics to establish content validity.

Reliability of Tools: The Reliability of questionnaire regarding occupational exposure to blood and body fluids was calculated by Cronbach's α that was 0.86 and for knowledge regarding post exposure prophylaxis was calculated by KR-20 formula that was 0.87.

Ethical Consideration: Ethical permission was granted for conducting the study at Institute of liver and Biliary Sciences. The approval was granted by letter no F15/(2/2.25)/2017/HO (M)/ILBS.

Pilot Study: It was conducted in Institute of Liver and Biliary Sciences, New Delhi. Prior permission was taken from hospital authority.

Data collection process: The data collection process was from 22nd February 2020 to 23rd March 2020. The investigator visited the selected hospital in advance and obtained the necessary permission from the concerned authority.

Analysis and Interpretation of data

The collected data was entered into master data sheet. It was planned to do the analysis of the findings by the following ways and presented in the form of graphs and tables i.e. Demographic data were analyzed using frequency and percentage, Occupational exposure to blood and body fluids were analyzed by frequency percentage, Knowledge questionnaire scores were analyzed by Frequency, Mean and Percentage, Association of total knowledge score and selected demographic variable were analyzed by

Independent t test, One Way ANOVA, Post hoc analysis, Association of knowledge score of PEP between who had exposed and non-exposed nurses analyzed by Independent t test.

Results

Section I: Description of socio demographic characteristics of exposed and non-exposed nurses from blood and body fluids.

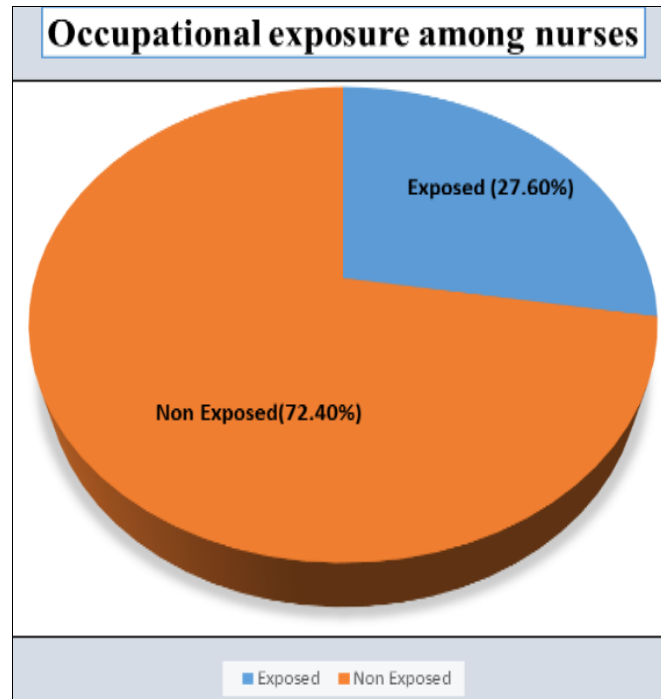


Fig 1: A Pie chart showing nurses who had exposed to blood and body fluids and who had not exposed to blood and body fluids.

Table 1: Frequency and percentage distribution of nurses as per their demographic characteristics, $n_1+n_2=77+202$.

Demographic Variables	Exposed to blood and body fluids($n_1=77$)		Non-Exposed to blood and body fluids($n_2=202$)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Age in years				
20–30	27	35.1	88	43.5
>30-40	47	61.0	108	53.5
>40–50	3	3.9	6	3.0
Gender				
Male	24	31.2	63	31.2
Female	53	68.8	139	68.8
Qualification				
GNM	42	54.5	115	56.9
Post B.Sc. Nursing	19	24.7	28	13.9
B.Sc. Nursing	16	20.8	59	29.2
Area of posting				
ICUs	37	48.1	74	36.6
Wards	22	28.5	85	42.1
Others	18	23.4	43	21.3

Table 1 illustrates the frequency and percentage distribution of demographic characteristics among nurses who were exposed to blood and body fluids these were seventy seven. Sixty one percentage of the nurses were in between the age group 30-40 years, 68.8 percentage were female nurses, and 54.5 percentage had GNM qualification, with regard to area of posting of nurses 48.1 percentage posted in ICUs and 28.5 percentage posted in wards. Demographic

characteristics of nurses ($n=202$) who were not exposed to blood and body fluids showed that 53.5 percentage of the participants were in between the age group 30-40 years, 68.8 percentage were female participants, in regard with qualification 56.9 percentage of had GNM qualification, in regard of area of posting of nurses 42.1 percentage posted in wards.

Table 2: Frequency and percentage distribution of nurses as per their demographic characteristics, N₁+N₂=77+202

Personal Variables	Exposed to blood and body fluids(N ₁ =77)		Non-Exposed to blood and body fluids(n ₂ =202)	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Vaccinated of (Hep-B)				
Yes	72	93.5	181	89.6
No	5	6.5	21	10.4
Total Working experience				
0-1 year	9	11.7	6	3.0
>1-6 years	19	24.7	72	35.6
>6-10years	18	23.3	66	32.7
>10 years	31	40.3	58	28.7
Work experience at ILBS				
0-1 year	11	14.3	38	18.8
>1-6 years	40	52.0	95	47.0
>6-10years	14	18.2	46	22.8
>10 years	12	15.5	23	11.4
Trained in infection control				
Yes	76	98.7	189	93.6
No	1	1.3	13	6.4

Table 2 nurses who were exposed to blood and body fluids, 93.5 percentage nurses completed the vaccination series, 40.3 percentage nurses had more than a decade of experience, and in ILBS around 18.2 percentage nurses had 6-10 years of experience and 98.7 nurses have completed training of post exposure prophylaxis. And on the other hand, nurses who had in not exposed to blood and body fluids, 89.6 percentage nurses completed the vaccination

series, 35.6 percentage nurses had in between 1-6 years of experience and in ILBS 47 percentage nurse had 1-6 years' experience, 93.6 percentage nurses were completed training of post exposure prophylaxis.

Section II: Description of occupational exposure to blood and body fluids and percutaneous injury among nurses who had exposed to blood and body fluids.

Table 3: Frequency percentage distribution of nurses who had exposed to blood and body fluids, N=77

Questionnaire	Frequency (f)	Percentage (%)
Occupational exposure in overall career		
1-10	71	92.2
11-20	5	6.5
21-30	1	1.3
How many months ago		
0-6 months	30	39.0
>6-12 months	20	26.0
>12-18 months	17	22.0
>18 months	10	13.0
Place of last exposure		
Wards	23	29.9
ICUs	28	36.4
Others	26	33.7
Duty shift		
Morning	29	37.7
Evening	26	33.7
Night	22	28.6
Types of fluids and materials		
Blood and blood product	62	80.5
Others fluids(ascetic, pleural, biliary)	15	19.5

Table 3 illustrated the frequency and percentage of occupational exposure to blood and body fluids, 92.2 percentage nurses were exposed to 1-10 times, 39 percentage nurses were exposed in last twelve months ago.

Among all exposed nurses 36.4 percentage nurses had last exposure in ICUs, most common is morning shift that was almost 37.7 percent, 80.5 percentage nurses had blood and blood product exposure.

Table 4: Frequency percentage distribution of nurse who were exposed to blood and body fluids, N=77

Questionnaire	Frequency(f)	Percentage (%)
Which type of exposure		
Splashing type	36	45.4
Blood spill	20	26.5
Non intact skin	21	28.1
Sites of exposure		
Hands and fingers	53	68.8

Eyes and face	17	22.1
Arms and leg	7	9.1
Received post exposure care		
Yes	35	45.5
No	42	54.5
Worn PPE during exposure		
Yes	74	96.1
No	3	3.9
Measure taken after the exposure		
Washed area with running water	45	58.4
Soap and water	30	39.0
Applied spirit and alcohol	2	2.6
Activity/events exposure occurred		
During medical procedure	21	27.3
During cannulation	40	51.9
During surgical procedure	16	20.8
Main reason of exposure		
Shortage of staff, time, helper	34	44.2
High workload, night shift, fatigue	16	20.7
Self-negligence	27	35.1

This table 4 showed the frequency and percentage of occupational exposure to blood and body fluids, in this table 45.4 percentage nurses had splashing types of fluids injury, interestingly hands and finger were most common site of exposure that is 68.9 percent, after exposure 54.5 percentage nurses had not taking care from infection control department, 58.4 percentage nurses were taken immediate measure to hand washing with running water, the most common event of exposure occurred was during cannulation that is 51.9 percent, around 44.2 percentage nurses reported the main reasons of exposure were shortage of staff, time,

and helper.

In table 5 showed the frequency and percentage of percutaneous injury among exposed nurses. Among all exposed nurses 59.8 (total) percentage had last exposure in between of 0-12 months, 97.4 percentage nurses had 1-10 times of injury, 50.6 percentage nurses had sterile types of percutaneous injury, 41.6 percentage nurses belongs to the ICUs that place injury occurred, most common device or item caused injury was broken ampule that is 75.1 percentage among all 77 exposed nurses, 46.8 percentage nurse had injury during preparing or giving injection.

Table 5: Frequency and percentage distribution of percutaneous injury among nurses who had exposed to blood and body fluids. N=77

Questionnaire	Frequency(f)	Percentage (%)
Last percutaneous injury		
0-12 months	46	59.8
>12 months	31	40.2
How many times		
1-10	75	97.4
11-20	2	2.6
Status of source of injury		
Sterile	39	50.6
Clean	22	28.6
Contaminated	10	13.0
Don't know	6	7.8
Area of injury		
Wards	27	35.0
ICUs	32	41.6
Others	18	23.4
Device or item caused the injury		
1. Hollow bore needle		
Hypo needle	33	57.2
IV stylet	10	15.6
Suture needle	11	13.0
2. Glass		
Ampule broken glass	58	75.3
3. Sharp object		
Surgical item injury(cautery, Surgical blade)	3	3.9
Forceps and scissors injury	13	18.2
Purpose and procedure		
IV or arterial access	29	37.6
Preparing and giving injection	36	46.8
Suturing	12	15.6

In table 6 depicts that 23.4 percentage injury occurred patient while moved during the time of injection given, majority of the nurses had not taken care after the post exposure. However more than half of the nurses 51.9

percentage washed with running water and almost 46 percentage nurses washed with soap and running water after the exposure.

Table 6: Frequency and percentage distribution of percutaneous injury among nurses who had exposed to blood and body fluids, N=77

How did injury occur	Frequency	Percentage
1. During use of item		
Patient moved	18	23.4
Inserting or withdrawal needle	24	31.2
Mishandling of equipment's	16	20.8
2. After use, before disposal item		
Mishandling and recapping failed	18	23.4
Opening /breaking glass container	16	20.8
Struck by detached IV line needle	10	13
3. During and after disposal		
Placing sharp items in container	12	15.6
Stuck by detached IV line	13	16.9
Received any PEP treatment		
Yes	14	18.2
No	63	81.8
Measures taken post-exposure		
Washed with running water	40	51.9
Washed with soap water	37	48.1
Reason of injury		
Shortage of staff, time, helper	46	59.8
Fatigue and self-negligence	31	40.2

Section III: Description of Knowledge regarding Post Exposure Prophylaxis among nurses who had exposed and non-exposed to blood and body fluids.

Tables 7: Level of knowledge regarding post exposure prophylaxis among nurse who had exposed and non-exposed to blood and body fluids, n₁+n₂=77+202

Level of Knowledge	Exposed Nurses (N ₁ =77)		Non-exposed Nurses (N ₂ =202)		Range
	Frequency (f)	Percentages (%)	Frequency (f)	Percentages (%)	
Good (10-14)	45	58.44	84	41.58	3-14
Average (7-9)	30	38.96	93	46.05	
Poor (<7)	2	2.60	25	12.37	

Table 7 illustrated that the knowledge of post exposure prophylaxis among nurses who had exposed. In this table 58.44 percentage nurses had good knowledge, 38.96 percentage nurses had average knowledge and 2.60 percentage nurses had poor knowledge about post exposure prophylaxis and post exposure prophylaxis among nurses who had not exposed. In this table 41.58 percentage nurses

had good knowledge, 46.05 percentage nurses had average knowledge and 12.37 percentage nurses had poor knowledge about post exposure prophylaxis.

Section IV: Comparison of knowledge regarding post exposure prophylaxis among nurses who had exposed and non-exposed to blood and body fluids.

Table 8: Association of knowledge regarding post exposure prophylaxis between nurses who had exposed and non-exposed to blood and body fluids. N=279

Groups	Comparison of Knowledge Regarding Post Exposure Prophylaxis			t	P value
	f	Mean	SD		
Exposed nurses	77	9.75	1.87	t= 45.72	<0.01*
Non exposed nurses	202	9.08	2.17		

Table 8 showed that there was statically significant association found of knowledge regarding post exposure prophylaxis in terms exposed and non-exposed nurses to blood and body fluids as evidence by p value less than 0.05 for these variables. Therefore, the null hypothesis was rejected for the nurses who had exposed and non-exposed to blood and body fluids. It is interpreted that knowledge regarding post exposure prophylaxis among nurses who had exposed to blood and body fluids was more as compare to non-exposed nurses to blood and body fluids.

Section V: Association between knowledge regarding post exposure prophylaxis and demographic characteristics among nurses who had exposed and non-exposed to blood and body fluids.

There was no significant association found between knowledge regarding post-exposure prophylaxis and nurses who had exposed to blood and body fluids in terms of Age, gender, qualification, total years of experience and experience in ILBS as evidence by p value more than 0.05 for these variables.

- However there was statically significant association found between nurses who had not exposed to blood and body fluids exposure qualification of nurses and knowledge regarding post exposure prophylaxis at p value less than 0.05.

Discussion of the study

The present study showed 35.1 percentage age of exposed group was >30-40 years and the nearly 68.8 percentage were female category. Similar findings were discussed by the (Tabatabaei SM *et al.*, 2015) in this study 28 percentage age of exposed group was >30-40 years and 80.9 percentage were female nurses although (Yasin, Fisseha, Mekonnen & Yirdaw, 2019) ^[7] conducted a study in which 64.5 percentage nurses were in between >21-30 years in age group or 55 percentage were male category.

The present study depicted that the qualifications of nurses most common was GNM (Diploma) that was 54.5 percentage. Similar finding were discussed by the Belachew, Lema, Germossa & Adinew, (2017) ^[8] in this study qualification of nurses had diploma courses that was 60.7 percentage. (Yasin, Fisseha, Mekonnen & Yirdaw, 2019) Stated in his study the qualification of the nurses had bachelor degree that was 87.2 percentage.

Present study revealed that the splashing type of injury is more common in blood exposure that was approximately 45.4 percentage. Similar study conducted by the Yasin, Fisseha, Mekonnen & Yirdaw, (2019) were stated that 39 percentage participant were exposed to the splashing type of injury. Although a 88.8 percentage had splashing type of injury stated in Belachew, Lema, Germossa & Adinew, (2017) study that was higher from similar study or supporting study.

Regarding activity events occurred during the time of exposure was the cannulation procedure in which inserting cannula, withdrawal blood and vein puncture that was more than half. A similar finding reported by (Belachew, Lema, Germossa & Adinew, 2017) and they stated 51.3 percentage nurses exposed during the cannulation process.

Present study revealed that the main device or item caused the percutaneous injury was ampule broken glass that was more than seventy percentage and activity was during giving injection or preparing injection that was 46.8 percentage. A comparable finding reported by the (Belachew, Lema, Germossa & Adinew, 2017) and specified that nearly 45 percentage which is highest in this study and they also mentioned regarding the activity 46 percentage nurses had exposure during giving or preparing injection that was relatable to present study. Although (Alhazmi RA, Surber SJ, 2018) revealed that in his study the majority of the percutaneous injury was hollow bore needle that was 84.17 percentage.

Conclusion

Training of the nurses regarding safety has to practice needed to avoid the occupational exposure to blood and body fluids. The study findings revealed that the majority of nurses had broken ampule injury as more common or similar hollow bore needle injury that occur during preparation or giving injection. Nurses had average knowledge regarding post exposure prophylaxis. Many of nurses did not receive any post exposure care.

Strengths of the study

The strengths of present study are:

- Study was conducted on a large sample size that is 279.
- It was based on through review of related literature.
- Reliable and validated tools were used in the study.

Future recommendations

Study can be done in multiple settings

- Exposure can be reduced by maintaining nurse patient ratio in wards.
- Exposure can be prevented if proper facility provided for preparing injection site or well-equipped materials.
- Nurses should be educated regarding post exposure prophylaxis management.

References

- 1 Auta A, Adewuyi E, Tor-Anyiin A, Aziz D, Ogbole E, Ogbonna B, *et al.* Health-care workers occupational exposures to body fluids in 21 countries in Africa: systematic review and meta-analysis. *Bulletin of the World Health Organization.* 2017;95(12):831-841F.
- 2 Kasat V, Chavan M, Giri P, Ladda R, Diwan N. Knowledge, attitude and practices toward post-exposure prophylaxis for human immunodeficiency virus among dental practitioners in Pune, India. *Journal of Education and Ethics in Dentistry.* 2015; 5(1):30.
- 3 Sangwan B, Kotwal A, Verma A. Occupational Exposure to Blood and Body Fluids amongst Health Care Workers in a Teaching Hospital of the Armed Forces. *Medical Journal Armed Forces India.* 2011;67(1):21-24.
- 4 Rishi E, Shantha B, Dhami A, Rishi P, Rajapriya H. Needle stick injuries in a tertiary eye-care hospital: Incidence, management, outcomes, and recommendations. *Indian Journal of Ophthalmology.* 2017; 65(10):999.
- 5 Whitlock G, Nwokolo N, McOwan A. Is PEP prescribed appropriately?. *HIV Medicine.* 2015;16(8):519-520.
- 6 DSM, BM, JE. Assessment of knowledge about post exposure prophylaxis of HIV among medical, nursing and paramedical students in hospital and laboratory practice. *International Journal of Basic & Clinical Pharmacology.* 2017;6(10):2408.
- 7 Yasin J, Fisseha R, Mekonnen F, Yirdaw K. Occupational exposure to blood and body fluids and associated factors among health care workers at the University of Gondar Hospital, Northwest Ethiopia. *Environmental Health and Preventive Medicine.* 2019;24(1).
- 8 Belachew Y, Lema T, Germossa G, Adinew Y. Blood/Body Fluid Exposure and Needle Stick/Sharp Injury among Nurses Working in Public Hospitals; Southwest Ethiopia. *Frontiers in Public Health,* 2017, 5.