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RESEARCH ARTICLE

ASSESSMENT OF KNOWLEDGE, ATTRIBUTION AND PRACTICE RELATED TO NSIS AND BLOOD EXPOSURE AMONG HEALTH CARE WORKERS IN THE ARMED FORCES REFERRAL AND TEACHING HOSPITAL, ADDIS ABABA, ETHIOPIA.

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Abstract

Sharpe injury has been recognized as one of the potential occupational hazards for health care workers risking them to blood borne pathogens such as HBV, HCV, and HIV/AIDS while performing their clinical activities in health facilities. The objective of this study is to assess the knowledge, attribution and practices among health care workers regarding sharp injuries and exposure to blood and body fluids. This facility based cross-sectional descriptive study was conducted among in the Armed Forces Referral and Teaching Hospital found in Addis Ababa, Ethiopia. A sample of 200 health care workers (HCWs) were selected using a simple random procedure and in order to represent various health professionals sample selection was made proportionate to size involving nurses, physicians, lab technicians, midwives, and anesthetists. A pretested structured questionnaire consisting of 27 items were administered to health care workers in two weeks' time with four assist and data collectors. Data was coded and entered into excel worksheet and then imported to SPSS version 20 database. Both descriptive and inferential statistics were generated for analysis. Apart from frequency tables displaying counts and per cents, chi-square test was applied to see if there are any significant findings between the profile of HCWs and their knowledge, practice and compliance of universal precautions guideline. Accepting or rejecting hypothesis was determined setting alpha at 0.05 with 95% level of significance.

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Introduction:-

Health care worker were at risk of occupational hazards because they perform their clinical activities in hospital they were exposed to blood born infection from pathogen such as Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV) and other blood born pathogen from sharp injuries and contacts with blood and deep Body fluid [1]. Standard precaution meat to reduce the risk of transmission of blood borne pathogen from recognized and unrecognized source occupational exposure to blood and body fluid is a serious concern for health care workers and present as major for the transmission of infection such as human immunodeficiency virus (HIV) hepatitis B virus and hepatitis C virus Recognizing this threats the USA center for diseases control and prevention centers disease control (CDC) proposed a serious of procedure for preventing occupational exposure for handing potentially infection material such as blood and body fluid. This procedure is known as standard precaution the main

aim is advice health care workers to practice regular personal hygiene .use protective barriers such as gloves, gown, and masks goggles face shields .whenever there is contact with mucus membrane, blood and body fluid of patient and dispose of sharps .body fluids and other clinical waste products.

The world health organization (WHO) estimates about 3 million health care workers faces occupational exposure to blood borne virus each year .from these figure hepatitis B virus 2 million actually 99% of the blood bone pathogen .hepatitis C virus 900.000 and 300.000 to 90% of the result from those exposure were in low economic countries [2] Stud Study done on injection safety world health organization (WHO) estimates that 16 billion injection were administered annually in developing countries of which 90-95% was for therapeutic purpose.

Approximately 5% of HIV 40% hepatitis C virus and 32% of hepatitis B virus infection were caused by unsafe and unnecessary injection worldwide [3]. In developing countries, 40-60% of HIV infection in health care worker were attribute to professional hazard. While in developed countries, the attributed fraction were less than 10% due to vaccination coverage. So unsafe injection practice associated with risk such as HBV, HCV and HIV/AIDS, Occupational sharp injuries affective in addition to health care provider .more than 50 pathogen can be transmitted by sharp injures. The risk acquiring among these disease after accidental sharp injury is 30% for hepatitis B virus 4% for hepatitis C and 0.3% for HIV .the average risk of HIV transmission after mucus coetaneous exposure of potentially hazards body fluid is 0.09%[(4)

In Ethiopia the number of health professional that suffer from sharp injury remain un known, study have shown the risk of diseases after exposure to hepatitis B virus from a single needle stick injury range from 27-37% while the risk following a single needle stick exposure to HIV is much lower 0.2-0.4% .Study done in Ethiopia at sidama zone southern Nation Nationality and people region (SNNPR) on injection safety showed that 32% of health care workers reported as they had sustained at least one form of accidental injuries by needle or sharp injury [5]

Another study done in Amahara region (North wollo on knowledge attitude and practice of universal precaution showed that 87% of the observed injunction practice were found to be unsafe the health care worker and client community [6] Another study done in Amahara region (North wollo june 2006 on all HCW at Bahardar city administration on knowledge ,attitude and practice showed that the knowledge of respondent regarding to prevention of health care associated infection sharp injury and body fluid 90.7% for hepatitis B virus 44% for hepatitis C virus . Practice of the respondent regarding infection prevention like hand hygiene use of personal protective equipment and injunction overall score were 54.2% safe practice and 45% unsafe practice [7] So proper knowledge and practice of blood born pathogen handling during drawing blood administration of drugs or performing other procedure injuries were commonly occurred in failure to placed used needle in appropriate container splashing blood to eyes, mouth and, face by neglecting or incidentally .therefore the study will help to identify knowledge and practice of health care worker on standard precaution and will have significant input to improve standard precaution measures in the clinical area.

Health care workers (HCWs) are persons working in health care setting and they are potentially exposed to infectious materials such as blood, tissue, specific body fluids, medical supplies, equipment or environmental surfaces contaminated with these substances [12]

They are frequently exposed to occupational hazards through percutaneous injury such as needle stick or cut with sharps, contact with the mucus membrane of eyes or mouth of an infected person, contact with non-intact skin exposed with blood or other potentially infectious body fluids [13]. One of the potential hazards for healthcare workers (HCWS) is needle stick and sharp object injuries (NSSIs). NSIs are associated with a number of different health hazards for HCWs; the most important of which is the risk of acquisition of potentially fatal diseases such as hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV /AIDs. The National Institute for Occupational Health and Safety (NIOSH) has estimated that 600,000 to 800,000 needle stick and other percutaneous injuries occur annually in hospitals in the United States [14]

The risk associated with transmission after percutaneous exposure to infected blood varies according to the specific blood borne pathogen. For HBV, this risk can be up to 30% depending on the presence of various serological markers in the blood of the patient. For HCV, the transmission rate is around 3-4%. At 0.3%, this risk of transmission is lowest for HIV [15]

It was observed in the study that was conducted at Istanbul 59% of the healthcare personnel had suffered from sharp object injury at least once, and these injuries (54%) often occurred when capping the syringe needle [16]. It was found that study at Chennai Medical College Hospital and Research Centre, indicated that 64% participants experienced NSI at least once during the past 3 months. Of participants, 55% were vaccinated for hepatitis B whereas the rest were not vaccinated or did not complete the entire schedule. An NSI was experienced by 60.9% of participants during recapping of needle; 56.2% of HCW reported the incident to the infection control staff [17]

The study conducted at University Hospital in the United Arab Emirates indicated that 25.7% reported having had exposure to splashes of blood and body fluids into the eyes or mouth. 98% of nurses reported that if there had been any splash of blood or body fluids it is important to rinse with plenty of running water. 98% knew that the ideal method of disposal of sharp waste was to put it in a puncture proof container immediately after use. 93.1% of the nurses reported that the needle pricks, cuts or scratches should be bled by squeezing. 93% habitually used masks always during surgery and 80.4% always wore goggles during surgery. With regard to recapping of needles, 44.6% were aware that needles should be recapped by single hand technique after use and among them 93.3% practiced this method [18];

The study conducted at Vardhman Mahavir Medical College & Safdarjang Hospital, New Delhi, India indicated that the commonest clinical activity to cause the NSI was blood withdrawal (55%), followed by suturing (20.3%) and vaccination (11.7%). The practice of recapping needles after use was still prevalent among HCWs (66.3%). Some HCWs also revealed that they bent the needles before discarding (11.4%). It was alarming to note that only 40 per cent of the HCWs knew about the availability of PEP services in the hospital and 75 per cent of exposed nursing students did not seek PEP [19]. The study conducted at İnönü University, Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology in Malatya, Turkey indicated that the number of percutaneous injuries were found to be 87% for needle stick injuries, 8% for lancet injuries and 5% for mucosal (eye) contacts [20].

Study at Ibadan University in Nigeria showed that 20% of sharp injury occurred while they were administering injectable medicines and 35.3% of them identified needle recapping. To 21.2% and 11% of the participants, breakage of medication ampoule and packing used syringes and needles for disposal were identified respectively. Also, 87.6% of the respondents experienced sharp injury at work while 12.4% did not [21].

The study conducted at Rawalpindi Medical College showed that 70.6% of HCW were accidentally pricked at least once in the past 12 months. The most common source of prick injury was found to be needle 80.49%. The most common procedure during which the respondents were accidentally pricked was during drawing of blood 41.16% and the least common procedure was found to be during breaking vials 12.20%. After the prick 27% respondents did nothing, 33% did wound dressing, 35% did wound toilet, and 5% went for immunization [22]. The study conducted at Shahid Beheshti University of Medical Sciences in Iran indicated that the incidence rate of NSI was 64.1%. Recapping of needles 25.8% and IV access 19.7% were the most common actions resulted to exposure. Exposed people believed that the most important reason for NSIs was patient's unpercaution 38.5%, and crowdedness 33.8%. The most injuries were occurred in the emergency department 21% and internal ward 16.1%. 80.8% of nurses had been vaccinated against hepatitis B virus [23].

World Health Organization Protection of the Human Environment Geneva 2003 indicated that in developing regions, 40%–65% of HBV and HCV infections in health-care workers were attributable to percutaneous occupational exposure. In developed regions, by contrast, the attributable fraction for HCV was only 8%–27%, and that for HBV was less than 10%, largely because of immunization and PEP. The attributable fraction for HIV in the various regions ranged between 0.5%–11percent [24]. The study at Ahvaz Jundishapur University of Medical Sciences showed that Among the individuals who had experience injury, 46.38% had taken primary actions (washing with soap and water or bleach, etc.) to prevent transmission of infection. Only 38.23% had reported the needle-stick injury and received prophylactic medication. The highest frequency of needle-stick injuries was observed in the medical staff 79.7% [25].

Materials and Methods:-

Description of Study Area:-

The study will be conducted at armed force referral and teaching hospital, is located in Addis Ababa, Lideta sub city, at old airport known as “Tor Hay loch” formerly known as Princess Tsehay memorial Hospital and was renamed in 1974 revolution after the fall of Emperor Haile Selassie. The stakeholder is minister of defense. It is referral hospital serving army members, army families and serving as teaching hospital for defense health Science Collage.



Figure 1:- Ethiopia Map in World - Image Results for Addis Ababa

Sample size determination:-

Sample size was determined using a standard sample calculation formula. In the calculation, the prevalence of NSIs was used as a population parameter as reported by Berket et. al. (2015) who studied factors associated with occupational needle stick and sharp injuries among 340 Hospital health care workers in Bale Zone of Southeast Ethiopia. In that study the prevalence of NSIs was 19%. The formula used to calculate the sample size was as follows:

$$n = \frac{z^2 \cdot p \cdot q}{e^2}$$

Where:

n =sample size

p = sample proportion from previous similar study (which is 0.15)

$q=1-p$ (which is 1-0.15=

e =acceptable error rate (which is 0.05, thus $e^2=0.0025$)

z =standard z score obtained from statistics table value (which is 1.96, thus $z^2=3.8416$)

When the mathematical steps are completed by replacing the given values, the result is 185, and then a 10% non-response rate is added. Therefore, the final sample size (n) equals to 204.

Sampling technique and procedure:-

The sampling technique employed was a simple random technique using the employees register available from the personnel section of the hospital. Before drawing sample of study participants, separate lists were prepared to select samples proportionate to size. This step was important to represent respondents from various disciplines and qualifications of the health care professionals.

Data collection:-

Four data collectors were recruited and they were familiarized with the study instrument through a one day training that involved practice on how to distribute and collect the questionnaires. Moreover, information was given to them on the objectives as well as relevance of the study, how to ensure confidentiality, regarding the rights of staff not to participate, and about getting consent for a voluntary participation.

Analysis and discussion:-

In this section of the study report, the method of data analysis was described first followed by the results of research questionnaire consisting of reliability statistics are presented. Then, descriptive statistics related to the research objectives are displayed with analysis. Finally, inferential statistics consisting of chi square tests are presented by highlighting significant findings.

Data Analysis Methods:-

The responses of 200 respondents were imported into SPSS version 20 database from an excel workbook. Both descriptive and inferential statistics were computed in line with the research objectives and research questions. The descriptive statistics containing frequencies and per cents were summarized into three summary tables by including variables and categories dealing with similar issues.

Knowledge has a total of 8 scores aggregated from the following four variables which were also assigned one up to three points depending on their relative weights.

Awareness of PEP (1 point)
Knows where to get PEP during injury (1 point)
Knows universal precaution guidelines (1 point)
Level of HBV surface knowledge (maximum of 2 points)
Diseases known to be transmitted via blood (maximum of 3 points)

Reliability of the study instruments:-

The survey questionnaire was checked and coded for entry into the SPSS database. Out of the total 27 items, there were 10 items with a scale type measurement. Using SPSS v: 20, the reliability was calculated and the result revealed a relatively high reliability coefficient. As is displayed below the instrument has a Cronbach's alpha of 0.74 and inter-item correlation of 0.73.

Profile of study participants:-

The demographic characteristics of participants are displayed in Table 1. Their age ranges from 22 to 54 years. Over three-fourth of them are between 22 and 43 years while the remaining are veteran.

Table 1:- Profile of study participants

Profile by category		Frequency	Percent
Age	22-32 years	76	38.0
	33-43 years	77	38.5
	44-54 years	47	23.5
	Total	200	100.0
Gender	Male	112	56.0
	Female	88	44.0
	Total	200	100.0
Profession	Health officer	29	14.5
	Midwife	13	6.5
	Anesthetist	16	8.0
	Physician	26	13.0
	Nurse	67	33.5
	Lab technician	17	8.5
	Others	32	16.0
	Total	200	100.0
Training on IP	Trained	116	58.0
	Not trained	84	42.0
	Total	200	100.0
Year since IP training	One year	44	37.9
	2 years	30	25.9
	3 years	42	36.2
	Total	116	100.0

Among participants, females constitute 44% (n=88). In terms of profession, the majority were found to be nurses. Physicians and health officers constituted 14.5% and 13.0%, respectively. On the other hand, lab technicians, anesthetist and midwives together sum up to a quarter of participants while the remaining portion did not specify their profession.

Awareness of pathogens and knowledge:-

According to data of the study, almost all participants (n=198, 99%) reportedly are aware about injury with sharp object is a medium of infection (see Table 2). In fact, people sometimes perceived injury per se as a disease. This however can be more pronounced if seen from the level of risk perception.

Table 2:- Awareness and knowledge

Variable	Response	Frequency	Percent	P
Aware of disease transmission	Yes	198	99.0	1
	No	2	.0	1
	Total	200	100.0	1
Aware of PEP	Yes	148	74.0	1
	No	52	26.0	2
	Total	200	100.0	1
Knows where to get PEP during injury	Yes	111	55.5	1
	No	37	18.5	2
	Total	148	74.0	1
Knows universal precaution guidelines	Yes	132	66.0	1
	No	68	34.0	3
	Total	200	100.0	1
Level of HBV surface knowledge	Cannot say	15	7.5	7
	Strongly agree	57	28.5	2
	Agree	87	43.5	4
	Disagree	36	18.0	1
	Strongly disagree	5	2.5	2
	Total	200	100.0	1
Diseases known to be transmitted via blood	Mentioned one	19	9.5	9
	Cited all pathogens	159	79.5	7
	Mentioned two	21	10.5	1

	Other	1	5
	Total	200	100.0

In the study, different types of diseases or infections were indicated. Some of them are incurable Ex. Hepatitis immune virus HIV/AIDS), and others like Human papilloma virus (HPV) largely are asymptomatic. Of these, however, a quarter did not know where to get it. According to data displayed in Table 2, nearly three-fourth (74%, n=148) of participants said that they are aware about post exposure prophylaxis (PEP).

Among those Health care workers (HCWs) who ever heard about post exposure prophylaxis (PEP) (n=148), a quarter (25.0%, n=37) did not know the place where to seek post exposure prophylaxis (PEP) intervention during injury from sharp objects. Health care workers (HCWs) need to be knowledgeable about medical precautions not only to protect themselves from risks but also safeguard their patients. The study, nevertheless, found out that a little over one-third (34%) of participants did not know this essential guideline.

In order to understand the level of risk of perception, participants were prompted to indicate their agreement or disagreement on five points' range. Results revealed that 43.5% respondents agreed and 28.5% of them strongly agreed with the risk of contracting HBV through injuries from sharp objects. By contrast, 18% of them simply disagreed and a negligible proportion (2.5%) of them strongly disagreed with the fact that HBV can be contracted through injuries from sharp objects.

The large majority of the study participants (n=159, 79.5%) identified all of the disease types (see Table 2) as transmittable through injuries. Among participants, few cited only one type of disease as communicable through bleeding caused by injuries from sharp objects. Hepatitis B virus and Human immune virus (HIV) infections were mentioned by 5% and 4.5% of respondents, respectively. Some others (4%) said that they knew both diseases as transmittable. Very negligible participants (0.5%) included type C hepatitis as well as HIV as transmittable.

Reasons attributed by HCWs for exposure to blood:-

As regards the risks associated with getting injured from sharp objects, several respondents made attribution to different single causes, including hectic workload (22%), carelessness (11.5%), lack of experience (11%), and knowledge gap (0.5%). Participants also attributed injuries to combined conditions. For example, workload and carelessness both attributed by 11% and all reasons except experience were indicated by 7% of respondents. The remaining majority of HCWs (37%) attributed to all of the four kinds of reasons enlisted in Table 6. According to study data summarized in Table 6, different reasons were cited by those (n=36) who did not report their injury. Many (40%) of HCWs who were already risked to unsafe blood or body fluids said that they were afraid of getting into trouble by reporting about their risky exposure. A quarter of them (9 participants), surprisingly, said that they took some prophylaxis by their own and likewise the same number of participants could not specify a reason. Lack of compliance was manifested by 11 per cent of study participants who attributed not reporting because they opted to wait for seeing symptoms or feeling ill. So long as PEP is somehow a preventive intervention, reluctance to seeking proper intervention is not justifiable for medical personnel.

Table 3:- Attributions for not reporting and compliance

Variable by response		Frequency	Percent
Circumstances of injuries from sharp object	Hectic work load	44	22.0
	Carelessness	23	11.5
	Knowledge gap	1	.5
	Lack of experience	22	11.0
	Workload & carelessness	22	11.0
	All except experience	14	7.0
	All	74	37.0
	Total	200	100.0
Reasons for not reporting	Fear of further trouble	14	38.9

exposure to blood & body fluids	Taking own measures	9	25.0
	Waiting till feeling ill	4	11.1
	Other	9	25.0
	Total	36	100.0
PEP time lapse from incidence of exposure to blood & body fluids	within 24 hours	22	73.3
	within 48 hours	4	13.3
	within 72 hours	3	10.0
	missing	1	3.3
	Total	30	100.0
Number of HB vaccination dose taken	One dose	18	32.1
	Two dose	14	25.0
	Three dose	24	42.9
Total		56	100.0

In fact, post exposures prophylaxis (PEP) intervention is time-bound in order to be effective. The study hence enquired exposed Health care workers (HCWs) the time lapse from the incident to blood / body fluid contact until they started the prophylaxis. As displayed in Table 6, the many (65.4%) obtained the intervention within 24 hours which is the most recommended time. While 11.5% of those who were exposed to blood or body fluid took post exposures prophylaxis(PEP) within 48 hours, there were 72 hours delay among over one-fifth (21.2%) of them. On a similar account, out of those Health care workers (HCWs) who reported taking the Hepatitis B Virus (HBV) vaccination, only 12% completed the proper doses.

Discussion:-

The study assessed knowledge and practice among health care workers deployed in one of the known hospitals in Addis Ababa. A total of 200 individuals participated in the study upon based on oral consent. Awareness about the risk of contracting blood transmittable pathogens was almost universal among the participants. Nearly three-fourth and two-thirds of the HCWs in the hospital understands PEP and know about universal precautions, respectively. Even though much over fifty per cent of the participants had attended an IP training, for many HCWs (62% in all), there has been two to three years lapse since they took the training. HCWs need to obtain a refresher course. A lapse of three years seems too much as skills might become obsolete unless upgraded through acquiring advanced knowledge and emerging findings in that respect.

Knowledge:-

Although overall knowledge of the study participants regarding the risk of transmission seems good, it is not well consolidated when it comes to specific facts. For example, participants were asked to express their degree of agreement about the surface time of HB virus. It is worrisome to find out that one-fifth of HCWs to be ignorant of the transmission mode of HBV which is known to be more infectious than HIV.

Attributions:-

The study has revealed different interesting finds as regards reluctance to report one's exposure to blood and body fluids as well as the circumstances that made their health prone to risk. A significant number of HCWs mentioned fear of getting into further trouble (by 39%) and waiting until illness manifests (cited by 11%). Both reasons are obviously unprofessional. In relation to exposure to risky blood and body fluids, more than one in ten HCWs attributed to carelessness. This is an evident of low level of risk perception. Similar findings were reported by Anupriya and Manivelan (2015) who assessed the KAP of 100 health worker in Tami Nadu district of India. In the Indian study the risk of injection or drawing blood was cited by 26.6% while surgical procedure was responsible among 9.4% of those who reported injury from sharps.

Practice and Compliance:-

Precautions against risky exposure and injury are normally expected to prevail given the fact that there is a system of reporting incident and HCWs are not only informed about PEP but also many of them had an IP training. The practice of safety procedure was assigned 4 points score aggregated from three variables: reporting to concerned

body, taking PEP, and vaccinated for HBV. An aggregate index for knowledge of HCWs was computed resulting in a maximum of 8 points and a minimum of zero. Taking the mean (5.65) as a cut-off point, those above this point accounted for 61% of the study participants. Thus, the remaining 39% were identified as not knowledgeable.

Prevalence and Incidence:-

The present study showed that 38% of HCWs in the Armed Forces Referral Hospital had been exposed to blood and body fluids. Also, the prevalence of sustained injury from sharp object during the last 12 months among participants was 36%.

These findings are different from others. Zewdie Aderaw (2013) who studied health care workers in East Gojam zone found out 22.2% while Bekele et al. (2015) reported a prevalence of 19.1% among health professionals in Bale health facilities. This difference could be attributed to the fact that the setting where the present study was done is a referral one and partly because it is a military premise, very complicated and emergency lifesaving procedure might happen frequently.

Conclusion:-

In general, the study demonstrates that HCWs in the study facility face high level of risk from exposure to blood and body fluids encountered from their patients. Likewise, HCWs also experienced varying degrees of injuries from sharp objects during their day-to-day duties of providing diagnostic and caring services. Training in infection prevention was found to be significantly associated with high knowledge and with better compliance to selected indicators of universal precaution guidelines. However, there are some grey areas at facility level that deserve more attention to ensure the well-being of HCWs like proper waste disposal and provision of proper safe boxes to carry bloods.

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