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Assessment of the Knowledge, Attitude and Practice of Fourth, Fifth and Sixth Year Medical Students on Standard Precaution in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2014

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Research Article

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ABSTRACT

Background: Standard precautions are set of measures formulated to prevent the transmission of blood borne pathogens and other pathogens from recognized and unrecognized sources when providing health care service.

Health care workers especially medical students are at risk of acquiring infection through occupational exposure. Few studies have reported on medical students' knowledge of standard precautions and sharp injuries and noted lack of adequate knowledge of standard precautions. To identify deficiencies which could be addressed by education and training, it is useful to measure KAP of medical students towards standard precaution.

Methods: Institution based descriptive cross sectional study was conducted on 217 students from Addis Ababa university medical college using convenient sampling technique. Descriptive statistics, binary and multi-variate logistic regression were employed to assess the predicators of knowledge, attitude and practice of medical students.

Result: The overall knowledge score showed that 71(32.9%) good, 118(54.6%) fair and 27(12.5%) had poor knowledge. The mean knowledge score was 13.37 $\pm$2.42 out of 18. The average knowledge score on different aspects varied from 32.9% good (for PPE) to 13.5% good (for hand hygiene).

Overall attitude score of the respondents showed that 180(83%) scored above half. The score ranges from 10-24 out of 25. The overall practice score of standard precaution showed that 15(6.9%) had good practice to PPE and hand hygiene. The major practice issue was hand hygiene: i.e. 28(12.9%) students only had good practice.

Conclusion: This study shows that medical students had a better Knowledge and acceptable level of attitude towards PPE but had poor knowledge and practice towards hand hygiene. Overall they had poor practice to all components of SP .Medical students are at high risk for sharp injuries and blood borne pathogen exposure .Strengthen and integrate standard precaution with the routine services and provide training for medical students in the Hospitals and health centers they are attached is recommended.

BACKGROUND

Standard precautions are meant to reduce the risk of transmission of blood borne and other pathogens from both recognized and unrecognized sources. They are the basic level of infection control precautions which are to be used, as a minimum, in the care of all patients. It comprises of hand hygiene, the use of PPE, respiratory hygiene/cough etiquette, environmental cleaning, prevention of needle stick injuries and safe waste management [1]. Globally, WHO estimates that every year unsafe injections and needle stick injuries cause at least 8-16 million cases of hepatitis B infections, 2.3-4.7 million hepatitis C infections and 160,000 HIV/AIDS (acquired immuno-deficiency syndrome) infection? These chronic infections lead to a high burden of morbidity and mortality .In many countries for many years' health care workers have been infected with HIV as a result of their work [2]. The WHO estimates that about 2.5% of HIV cases and 40% of HBV and HCV cases among HCWs worldwide are the result of these exposures [3]. HCWs are at risk for blood-borne infections through sharps injuries. One factor which might increase the risk in low and middle income countries is low adherence to universal precautions. Much research has been conducted concerning this topic globally, but little in Indonesia [4]. Concern about occupational exposure to blood borne pathogens exists and medical students who lack experience and who are involved in patient care procedures involving sharps may be at an increased exposure risk. Injuries from sharp devices have been associated with the transmission of more than 40 pathogens including hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV [5]. The reported incidence of needle stick injury among all medical students thorough out clinical attachment (4-6 year) was high i.e. 20.9%. This study also revealed that the incidence of episodes of needle stick injuries according to clinical posting was high in obstetrics and gynecology (13.2) followed by medical (4.7) and surgery (1.6) [6]. A study conducted in the US, University of California, among medical students towards exposure to body fluids identified that 119 of 1022(11.64%) medical students sustained 129 exposures. Of these exposures, 82% occurred on four services: obstetrics-gynecology, surgery, medicine and emergency medicine during course of training. The probability of exposure was not related to graduation year, clerkship location, previous clerkship experience, or training site. Surveys of two graduating classes at the beginning and end of the study showed that the percentage of exposures reported increased from 45% to 65% over the 7-year study period. Thus, the reported injury rates represent minimum estimates of actual occurrences. Human immunodeficiency virus infection and hepatitis were not reported, although follow-up was limited [7]. Few studies have reported on medical students' knowledge of standard precautions or sharp injuries.

Many factors are responsible for non-adherence to the basic principles of standard precautions among health care providers. Paramount to the prevention of infectious disease is the strict adherence to standard precautions for all patients [8]. It is observed that better knowledge of standard precaution among HCWs was one of the correlations of good compliance. It was observed the same among physicians, that knowledge of standard precautions by HCWs may be influenced by their type of training [9]. A study conducted in Iran to assess the level of knowledge, attitude, and practice among Iranian dental health care professionals towards standard precautions showed that Practice of standard isolation precautions is poor among dental professionals in Shiraz University of Medical Sciences. This study showed that knowledge of infection control measures and a positive attitude towards them alone does not have an impact on adherence to recommendations [10]. Up to 40% of nosocomial infections among immune compromised patients is connected with HCWs hand contamination and is a challenging problem in the modern hospitals. One of the ways for workers to overcome this problem is conducting correct hand-hygiene procedures; this is why the WHO launched in 2005 the GLOBAL Patient Safety Challenge [11]. The observance of hygiene recommendations by students is reported as being weak: medical students rarely keep their hand hygiene after examining patients [12,13]. In Ethiopia, medical students practice in all clinical settings where health care is performed and they are potentially exposed to risks. Therefore assessing their knowledge, attitude and practice on standard precaution in health care facilities as early as possible can give way to minimize the risks that students face and manage the limited resource available in the sector.

MATERIALS AND METHOD

Institution based descriptive cross-sectional study was conducted from March to April 2014 on 217 students recruited from 4th ,5th and 6th clinical year medical students using convenient sampling technique. The study was conducted at TASH, Addis Ababa, Ethiopia.

The sample size was determined using a single population proportion sample size estimation method by assuming that the prevalence of knowledge of is 50% to obtain the maximum representative sample size since no similar study was found in the area with 95% confidence interval. The measuring instrument was a tool utilized in Iran and Ethiopia which was utilized to asses KAP of HCWK's towards standard precaution in North wollo, Ethiopia and utilized in Iran to assess KAP of medical students towards standard precaution. Participants' response was rated on a Likert scale. The questionnaire had 41 questions subdivided into four categories: socio-demographic, knowledge of standard precautions, attitude towards standard precautions and practice of standard precautions. The questionnaire included questions in domains related to occupationally transmitted blood borne infections, safe injection practices, standard precautions, hand hygiene and hepatitis B vaccination.

Knowledge assessed using 25 questions which include multiple choice and "yes" or "no" questions. We assigned 1 point for each 'correct' answers and 0 point for the 'incorrect' ones. A higher score in the questions concerning (PPE, hand hygiene, nosocomial infections) considered good knowledge of SP. Attitude was measured using 10 questions by a scale from strongly

agree to strongly disagree. Each item scored from 0 to 4 which is 1 point for 'disagree', 2 for 'neutral', 3 for 'agree', 4 for 'strongly agree' and 0 for 'strongly disagree'. A higher score presents positive attitude on standard precaution. Practices were assessed using 6 questions covering hand washing practice, sharp injury, use of PPE.

A score of 80% and above was considered good, 60-79% moderate and less than 60% poor. Different Knowledge Attitudes and Practices (KAPs) studies have used different analytic methods. The cut off values to determine good, moderate and poor levels were taken from previously published studies with some modification to suit our purpose. A higher total score indicates a better KAP towards standard precaution; a score of ≤60 suggests that further evaluation of standard precaution and infection prevention strategies needed. SPSS version16 was used for data entry, cleaning and analysis. Using double entry, the data was cross checked for consistency and accuracy. Responses and observations given points and recorded to obtain means. The results are presented by employing frequency tables, percentages, means, odds ratio and 95% confidence limit. P- Values are reported as statistically significant if <0.05 or 5%. Moreover, to determine the association between variables, correlation, chi square, bivariate and multi-variate logistic regression analysis were used as necessary. The ethical approval and clearance obtained from the Department Emergency Medicine, Faculty of Medicine (Addis Ababa University) Research and Publication Committee. Written consent taken from each selected participant and head of the health facility to confirm willingness and those given the rights to do so. Confidentiality was ensured throughout the process. Before starting the interview date collectors was informed the study subjects about the purpose and Significances of the survey to get the consent of the respondents

RESULTS

Socio Demographic Background of Students

A total of 238 medical students were sampled: of these 217 responded with 91% response rate. The age of the respondents ranges from 20 to 32years with a mean age of 23.5 and the median age of 23 years. **(Table 1)**.

**Table1.** Socio demographic characteristics of respondent medical students 4th, 5th and 6th year, Addis Ababa, 2014

Characteristics	Frequency	No (%)
Sex		
Male	138	63.60%
Female	79	36.40%
Age		
20-25	193	88.90%
26-30	22	10.20%
30 and above	2	0.90%
Ethnicity		
Amhara	93	43.30%
Orormo	39	18.10%
Gurage	24	11.20%
Tigray	12	5.50%
Others	49	22.50%
Religion		
Orthodox	126	58.30%
Protestant	49	22.70%
Muslim	22	10.20%
Catholic	7	3.20%
Others	12	5.60%
Year of study		
4th year	59	27.20%
5th year	55	25.30%
6th year	103	47.50%

Knowledge about Standard precautions

The results showed that only 71/217(32.9%) of students had a 'good' knowledge score. A further 118/217(54.6%) had a fair knowledge score: whilst 27/217(12.5%) had poor knowledge. The majority, 200/217(92%) of the respondents scored greater than half Knowledge of PPE was better than overall scores with 132/217 (61.1%) having good knowledge. However, 46/217 (21.3%) of students indicated erroneously that hand hygiene was not necessary between different patient contacts. 45/217(20.7%) medical students had participated in any training program dedicated to infection prevention; 172(79.3%) hadn't any such training program. Hepatitis B vaccination status of the students showed that 49(22.7%) have been vaccinated 167(77.3%) have not been vaccinated. The reasons not to be vaccinated were 36(23.1%) due to lack of availability 12(7.7%) due to lack of awareness 45(28.8%) being costly and 55(35.3%) due to other reasons such as negligence, fear of side effects and without reasons. 31(14.3%) respondents knew five of the diseases that could potentially transmitted through dirty needles and sharp instruments listed in the questionnaire i.e (HIV, hepatitis B ,hepatitis C, malaria and tetanus mentioned. 85 (39.2%)

knows four of the disease 63(29%) knows three 10 (4.6%) knows two and 1(0.5%) respondent knows nothing at all. Almost half, 94(43.3%) respond "i don't know" about the presence of infection prevention guideline in their health facility 58(26.7%) respond "yes "and 65(30%) respond "No".

Figure 1.
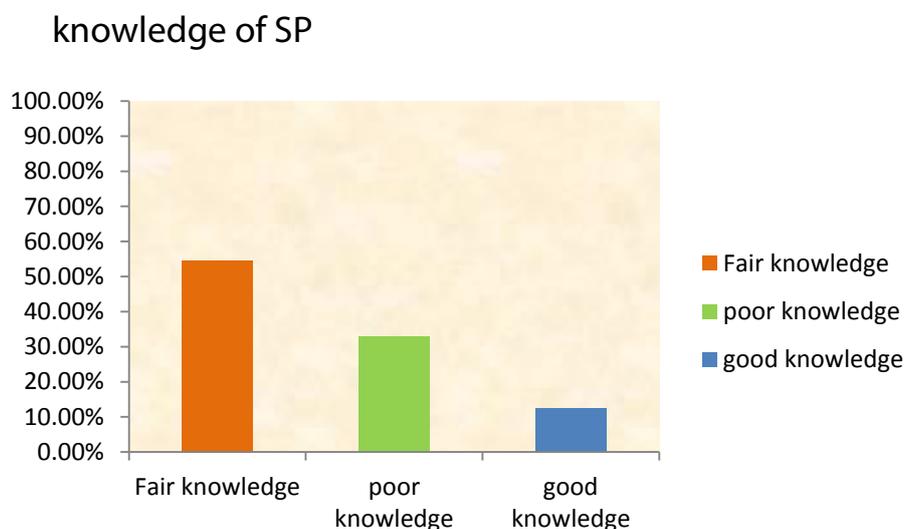
knowledge of SP

Figure 1. Distribution of overall knowledge score of medical students, TASH, 2014

Attitude of Students towards Standard Precaution

The students attitude towards PPEs used to control hospital acquired infections showed that: 73(33.6%) agreed strongly 133(61.3%) agreed and 5(2.3%) were neutral. Among the respondents 83(38.4%) follow standard precautions regularly, 127(58.8%) follow some times and 6(2.8%) never follow at all. More than half 115(53%) of the respondents agreed on the use of infection prevention guidelines to minimize the risk of HAI reduce the risk of infection, 86(39.6%) agreed strongly and 6(2.8%) disagreed. Respondents attitude towards who will be at risk of infection from health facility waste depicts that, great majority 193(89%) respondents know at least one of among at risks, such as health professional, supportive staff, the patient, the community and children. 57(26.3%) knows all mentioned 39(18%) knows four of them 48(22.1%) knows two and 2(0.9%) knows none of them. Two/third of the respondents 140(64.5%) and one/third 66(30.4%) agree and strongly agree respectively in the absence of standard precautions health care facilities can be the source of infection and epidemic disease 3(1.4%) disagreed.

Standard Precaution

Among the respondents107 (53.5%) respond needles should be recapped whereas 93(46.5%) respond should not recapped Some of the reasons for not wearing any of the stated personal protective devices were 73 (33.6%) due to lack of facility 33(15.2%) due to shortage of time 57(26.3%) due to lack of awareness38 (17.5%) due to other reasons such as PPE were not convenient and considering not always necessary. Total attitude score of the respondents showed that 180(83%) scored above half.
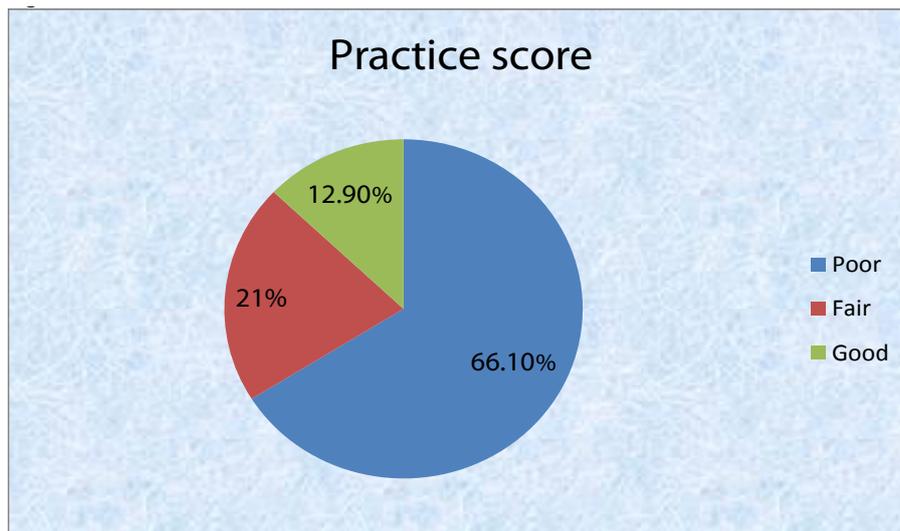
Practice of Students towards Standard Precaution

The overall practice score showed that 117(53.9%) had fair practice while 15(6.9%) had good practice and 85(39.2%) had poor practice. Total practice score of the respondents showed that 177(81.5%) score more than half the score ranges between2-13. The mean score of practice showed 8.96 with +- 1.8 and median of 9 .the mode 9 scored by 49(22.6%) Hand hygiene practice showed that 12.9% had good practice while 21% fair and 66.1% poor practice. The conditions that respondents wash their hands showed that 180(87%) washed their hands at least for a single condition among listed four i.e. even gloves are worn, between every patient encounter, thinking of hand washing affects clinical outcome and hand washing do not take too much time, 45(21.8%) wash at single moment 53(25.7%) wash at two moments 10(4.9%) wash their hand in all four conditions but 26(12.6%) don't wash even at single moment. When we determine based on the overall practice score117 (53.9%) had fair practice while 15(6.9%) had good practice and 85(39.2%) had poor practice.

Practice score of utilizing PPE showed that 125(56.8%) had fair 69(32.6%) poor and 23(10.6%) good practice Among respondents who ever worn personal protective devices, 216 (61.9%) used apron, 101 (28.9%) worn utility glove, 166(47.6%) head cover, 107 (30.7%) boots or shoes which cover toes, 59 (16.9%) eye protectors, 244(69.9%) mask, 278 (79.7%)examination glove and 345 (98.9) gown. The availability of water resources 40(18.4%) respond yes whereas 177(81.6%) respond no concerning disinfectant alcohol 138(63.9%) respond yes 78(36.1%) respond not available 61(28%) of the respondents had blood or body fluid splash among these only 7(12.5%) had got appropriate services including wash with soap and water, use antiseptics, visiting VCT, seek PEP and report to the head person 10(17.9%) only washed with water and kept silent. 53(24.5%) of the respondents had needle stick or sharp related injury among these almost half 22(44.9%) sustained during recapping 11(22.4%) sustained during collection of sharp instruments in OR and other procedure rooms 7(14.3%) sustained at movement of the patient during

different procedures. Almost all 215 (99%) of the respondent had ever wore at least one type of personal protective equipment, 17(7.9%) wore only gown 31% (14.4%) wore gown and glove 67(31.2%) wore gown, glove and mask 33(15.3%) wore gown, glove mask and goggle33 (15.3%) wore five of the components Concerning glove use 198(92%) respond correctly when glove should be used but 15(7%) respond incorrectly. Half of the respondents 108(50%) reported that they wash their hands always after touching environment surface near to the patient 92(42.6%) wash some times and 16(7.4%) never at all 45(20.7%) of the respondents use plain soap and water to clean their hands 64(29.5%) use alcohol hand rub and 31(14.3%) use both together. Multinomial logistic regression was taken to see the association between dependent variable, practice score and covariates of sex, year of study, training on IP, department attached knowledge score and attitude score. Significant association hasn't been seen among practice and covariates such as sex, year of study, training and department attached Weak association was found between knowledge and attitude (r = 0.354; P<0.001); knowledge and practice to UP standards (r=0.201; P<0,001); attitude and practice towards UP (r=0.425; P<0.001).

Figure 2.

Figure 2. graph of students 'overall practice score towards standard precaution, TASH, 2014

DISCUSSION

Knowledge of Standard Precaution

Medical students had a better Knowledge and acceptable level of attitude towards standard precaution but poor practice towards hand hygiene. Knowledge of standard precaution is good which showed 87.5% had fair knowledge; it was better than a study conducted in Saudi Arabia which was 26.7%. overall mean score of knowledge of standard precaution 13.37 +2.42 out of 18 is less than the study conducted in Chicago, USA showed mean score of knowledge (21.1 _+2.35) out of 25. Knowledge level was different among domains of standard precaution which is better for PPE than hand hygiene. This is because of PPE being routine task and applied by medical students during clinical set up. Whereas ignorance and giving less emphasis for hand hygiene by considering inherited knowledge might be the reason. The knowledge on standard precaution is almost comparable with a study done in Malaysia that revealed the percentage of students who had acquired knowledge of standard precaution was slightly low (70.3%) but it was better than the study conducted in Nigeria among HCW's towards KAP on standard precautions, one third (37%) of the respondents had fair knowledge of universal precautions while 13% had good knowledge. Better score was results of standard precautions when compared to hand hygiene practice, this might be use of PPE being routine task that applied by medical students during clinical practice. Whereas ignorance and giving less emphasis for hand hygiene by considering inherited knowledge might be the reason.

Training and education have been found to be of paramount importance to develop awareness among health care workers, as well as improving adherence to good clinical practice [14]. But significant correlation was not seen between training and knowledge on standard precaution. The level of knowledge in this study is moderately acceptable even though small number of students don't know about it at all.

The knowledge score in our study concerning hand hygiene leveled as follows i.e. 29(13.5%) had good knowledge 107(49.8%) had fair and 79(36.7%) poor knowledge.This might show less attention has given for hand hygiene practice in prevention of infection.

Our study result which is 13.5% and 49.8% for good and fair respectively better than study conducted in Nigeria Concerning the knowledge and practice of hand hygiene that revealed 56.7% of the health workers knew that their hands had to be washed before and after patient care. Concerning perceived risk of infection,95(44%) don't considered patients as source of infection prior to their diagnosis it is slightly higher than a study conducted in Nepal only 41.8% recognized all patients are sources of infection. This will have impact on practicing SPs by considering patients are free of infectious microorganisms.

Attitude towards Standard Precaution

Overall respondents have positive attitude .particularly, Students have acceptable level of attitude towards standard precaution i.e. 83 % have scored above half. Medical students showed positive attitude to the current curriculum compared to the study among medical students of Saudi university.

Practice of Standard Precaution

Reported Practice score of standard precaution is poor. It is consistent with A study conducted in Iran revealed that was poor. This is lower than a study conducted in Ethiopia among HCWK's where practice score was 9 out of 11 .This difference might be due to medical students have less experience than HCWK's who are frequently exposed to practice. The disparity between knowledge and practice could be due to high patient load per HCW, limited knowledge of risks, inadequate personal protective equipment (PPE), inconvenient place of work over crowed of patients and ignorance [10,15,16].This finding indicates medical students are providing poor medical service that will promote nosocomial infection. Practice score of utilizing PPE showed that 125(56.8%) had fair 69(32.6%) poor and 23(10.6%) good practice. A study conducted in Ghana assessing KAP of medical residents to wards SP showed that Forty-two (88%) of respondents indicated that they wore gloves routinely when performing invasive procedures on patients but 8 (16%) did not for the reasons such as breach of infection prevention guidelines, limited availability of basic supplies and infection control materials, poor supply of water , lack of facility , shortage of time and reasons PPE were not convenient and considering not always necessary [11].

The incidence of sharp and needle stick injury which is 24.5% is less when compared to A study conducted in America which was (30%) but higher than Malaysia which was 14%. Almost half 22(44.9%) of injury sustained during recapping of needles and 11(22.4%) sustained during collection of sharp instruments [6,17].

Reported hepatitis B vaccination of the students was low at 49/217(22.7%). This is lower than found in a similar Malaysian study which reported 93% vaccination rate.low vaccination in our study was due to the reasons that, 36(23.1%) due to lack of availability 12(7.7%) due to lack of awareness 45(28.8%) being costly and 55(35.3%) negligence, fear of side effects and without reasons [9].This study revealed that overall hand hygiene practice is poor Findings observed in our study shows that only 12.9% of respondents reported good practice while 21% fair and 66.1% poor practice. This compares to a study conducted in Srilanka which found reported hand hygiene practice of 53% had good practices, while 26.9% had moderate practices and the majority (67%) had poor hand hygiene practices (56). This study examined the factors that influence medical students' compliance with Standard Precautions in order to avoid occupational exposure to microorganisms. These are Lack of infection prevention guidelines, limited supplies and infection control materials, poor supply of water, PPE were not convenient and considered to not always be necessary.

CONCLUSION

This study shows that Medical students had a better Knowledge and acceptable level of attitude towards PPE but had poor knowledge and practice towards hand hygiene. Overall they had poor practice to all components. Knowledge of SP had a weak association with attitude, perceived adherence and suffering of occupational sharp injuries. Attitude on SP was weakly associated to perceived adherence. These results might lead to conclusion that other factors rather than individual knowledge such as attitude and adherence may play a role in the occurrence of occupational sharp injuries. Medical students are at high risk for sharp injuries and blood borne pathogen exposure Strengthen and integrate standard precaution with the routine services through providing training for medical students in the Hospitals and health centers they are being attached should be emphasized. This study identified factors that influence medical students compliance with Standard Precautions which are lack of basic supplies and infection control materials, poor supply of water, lack of facility, shortage of time and considering PPE were not convenient and not always necessary.

ACKNOWLEDGMENTS

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