ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF MEDICAL LABORATORY SCIENCES

Assessment of Knowledge, Attitude and Practice towards Occupational Health and Safety among Medical Laboratory Personnel in selected Governmental Teaching Hospitals of Ethiopia.

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A thesis submitted to the school of Allied Health Science, Department of Medical Laboratory Science, Addis Ababa University, in partial fulfillment of the requirements for the Degree of Master of Science in Medical Laboratory Sciences (Clinical Laboratory Management and Quality Assurance Specialty Track)

October, 2015

Addis Ababa, Ethiopia

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Approved by the Examining Board

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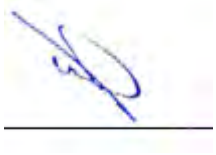
_____	
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Acronyms and Abbreviation

AIDS Acquired Immunodeficiency Syndrome

CLSI Clinical and Laboratory Standard Institute

HBV Hepatitis B Virus

HBsAg Hepatitis B Surface Antigen

HCV Hepatitis C Virus

HCWs Health Care Workers

HIV Human Immunodeficiency Virus

ILO International Labour Office

ISO International Standardize Organization

KAP Knowledge Attitude and Practice

MLPs Medical Laboratory Professionals

NGO Non-Governmental Organization

OHS Occupational Health and Safety

OSHA Occupational Safety and Health Agency

PEP Post Exposure Prophylaxis

WHO World Health Organization

Abstract

Background: Medical laboratory is one of the most at risk place where a range of occupational hazards can occur. Workplace related health impairments, injuries and illnesses which cause great human suffering and incur high costs of capital as a whole intended to identify and prevented by the establishment of Occupational Health and Safety. To avoid these occupational hazards individuals who are working in the laboratory should be aware of safety practice, monitored and evaluated employees information gap, knowledge as well as attitudinal behavior.

Objective: To assess knowledge, attitude and practices towards occupational health and safety among Medical laboratory professionals in selected government teaching hospitals in Ethiopia.

Method: A cross sectional study was conducted between March and May 2015 among 173 Medical laboratory professionals working in government teaching hospitals. Data was collected using self-administered structured questionnaire; it was also supported by in-depth interview and physical observation checklist. Data entry, analysis and quality of data were maintained by SPSS version 20 software. Level of statistical significance was set at $p<0.05$.

Result: Of 173 total respondents, 112(64.7%) were male and the age of participant's lies between18 - ≥ 46. The overall mean knowledge score of participant was 6.0 ± (SD 1.29), mean attitude score was 18.7± (SD 4.2) and mean practice score was 20.4 ± (SD 2.31). There were strong association between occupational health & safety training, risk assessment training and knowledge score ($p=0.000$). Similarly, orientation on occupational health & safety was significantly associated with attitude score ($p= 0.002$). In addition, work experience ($p= 0.000$), training on occupational health and safety ($p=0.000$) and risk assessment ($p=0.004$) were significantly associated with practice score of laboratory professionals.

Conclusion: Training on occupational health & safety as well as risk assessment training were significantly associated with level of knowledge and practice. Moreover, orientation was statistically associated with attitude. Thus intervention that should focus on training occupational health & safety, risk assessment and positive attitude creation are required to strengthen occupational health and safety knowledge, attitude and practice in medical laboratory professionals.

1. Introduction

1.1. Background

A number of professionals are spending their times and lives at work place and exposing their health to different workplace related hazards. Hazards in working surroundings can challenge for workers' capability to care for their health wellbeing and append to the improvement of risk behaviors. [1].

It is very critical to every worker, whether paid by an employer, casual, self-employed, volunteer or apprentice. Especially in a lot of healthcare activity, it is easier to see the work that needs high attention regarding exposure to health hazard [2].

Medical Laboratory Professionals (MLPs) have greater potential and variety risks of exposure in workplace that includes infectious materials and contaminated wastes, different type of body fluid, radiation, toxic, flammable chemicals, biological agents, aerosols, sharps, injuries, mechanical and electrical hazards [3,4,5] as well as musculoskeletal stresses [5,6].

With extended exposure and weak infection control mechanisms, unorganized and poor infectious waste management system are seriously associated with increased risk of work-related acquired infections [7,8]. In addition, insufficient spacing, unavailability of appropriate and sufficient personal protective equipment, lack of awareness of occupational health and safety has more contributions to workplace related diseases transmission and other health complications [9].

Such type of workplace related health impairments, injuries and illnesses which cause great human suffering and incur high costs of capital as a whole intended to identify and prevented by the establishment of Occupational Health and Safety (OHS) [10].

OHS is involved in work place related hazards which has a general multidisciplinary field of scientific subject matter like toxicology, ergonomics, economics and other subject areas of various organizational activities. Poor OHS scheme may drive challenges as well as pessimistic impact on sustainable economic and social development. World-wide workplace hazards and exposures cause greater than 160 million employees down to ill annually, in the same conditions higher than 1.2 million estimated workers dies as a result of working accidents and diseases. In

addition, there are more than 250 million work- related accidents every year. Furthermore the rate of occupational fatalities and accidents in India and China is 10.4 and 10.5 per 100,000 for fatalities; 8,700 and 8,028 for accidents respectively. Similarly, in Latin America and the Caribbean countries, about 30,000 fatalities occurred each year and 22.6 million occupational accidents. Correspondingly, in sub-Saharan Africa, the fatality rate per 100,000 workers is 21 and the accident rate is 16,000. It means in each year 54,000 workers die and 42 million work-related accidents take place in worldwide [11].

Different Federal State and countries by understanding the value of OHS try to have Knowledgeable, good attitude, trained stable personnel and secured working environment in their healthcare laboratory or related various organizations. These Federal State and countries strive to govern with structured published rules and regulations by establishing OHS [6]. International Labour Organization (ILO) has vast support for the development of OHS especially every worker to have knowledge, attitude also carry out the scheme with safe practices. Ethiopia is also one of a member of ILO plus signed conventions related to health and safety of factory workers since 1923 [12] which announces in proclamation to undertake work hazards and injury measures [13, 14, 15, 16].

In regards of effectively managing or ruled for health and safety, the success of whatever a process or system is in place still hinges on the knowledge, attitudes, practice (KAP) and behaviors of people in the organization [17].

All employees provided required knowledge and skills to perform their work safely and meet the organization's safety and health goals properly. In addition, enhancing awareness and understanding of workplace hazards, such as how to identify risks, report risks, and eliminate risks and adhering practical safety measurement have great value for human and economical development [18].

The government, employers and workers need adequate capacity to develop, process and disseminate knowledge concerning international standards, national legislation, technical guidance, accident, disease statistics, positive attitude, best practice, educational and training tools, hazard and risk assessment data, everything in an understandable language on OHS[19].

Staff member's OHS knowledge, attitude, practice, method of communication skill, documenting laboratory incidents, injuries, occupational illnesses, potential recurring hazards plus other related information are critical. Along with all of these should be supported by administrative control mechanism and legislation associated risk assessment actively through medical attention and sustainable regular follow up [4, 20].

1.2. Statement of the Problem

OHS issue is a crucial value in every organization and community. Failure or unsustainable of OHS program may lead to several work place related short or lifelong disaster that threatening a life of professionals each year. Furthermore workplace hazards and injuries lead to a huge failure to organizational and social development, and it has serious impact for countries' economy, productivity. WHO estimates about 2.5% of HIV cases and 40% of HBV and HCV cases among HCWs worldwide as a result of work place hazard exposure [11]. HCWs have poor perception of basic OHS principles and risk of infections. Hence, workplace should be safe in relation to every aspect, such as psychological, social, value and safety of physical environment, feeling about work, surroundings, effective productivity with competitiveness, conditions of working organization and its atmosphere [21].

MLPs who are working in health care laboratories, involving with human body fluids and liquid compositions, biological specimen agents that cause infections, and different type of highly flammable or explosive chemical substances which can produce or cause poisoning of diverse skin cancer infections. Furthermore all these infectious agents and toxic substances increase exposure to other many kinds of hazards, physical injury, musculoskeletal disorders and numerous disease consequences [22].

According to available evidences medical laboratory professionals have less awareness and engagement with OHS process. In addition they don't have further risk assessment practice and enforced attitude in their health facility other than doing their daily tasks Updating their OHS understanding and risk assessment skill, support in required essential safety materials with proper using system and orienting them before starting their recruited job is not taken as one of the vital requirement tasks by organizational management. Their current knowledge, practice and

attitude towards OHS and risk assessment must be maintained by regular operational assessment, that supported with strong follow up system [23, 24, 25].

OHS practice inappropriately applied in Health Institutions [26]. HCWs in Ethiopia suggested that annual prevalence of needle stick injury was 17.5% [27].

1.3. Significance of the Study

OHS is important to safely execute daily routine activities in a given workplace. So significance of the study is to generate the overall information about the level of knowledge, attitude and practice of OHS among MLPs, used to indentify gaps in each study sites regarding to safety and help to make necessary corrective action, provide locally or to ongoing work place training based on known finding gaps, directly or indirectly lead to safer work place practices by the study result for many organizations, serve as a baseline document to researchers or students offering various information for further studies on the subject, and it gives a prompt ideas for health care policy makers to present more attention the health facilities safety aspects as well as for reevaluating of professional risk status.

2. Literature Review

The World Health Organization (WHO) estimates 3 million HCWs face occupational exposure to blood borne viruses each year. About 90% of the infections that result from these exposures are high in low income countries [22, 23]. Developing countries, especially in sub-Saharan African countries, that account for the highest prevalence of Human Immuno Deficiency Virus (HIV) infected patients in the world and reported the highest incidence of workplace exposures [28, 29, 30].

According to the latest ILO data, every year 337 million people work place fall victim to work accidents. Two million and 300 thousand persons lose their lives as a result of accidents or diseases related to their occupation. These figures suggest that every day 6,300 persons die because of insufficient measures in ensuring OHS [31].

Cross-sectional study was conducted in September and October 2007 to assess knowledge, awareness and compliance of occupational safety measures among 200 HCWs at the University Hospital of the West Indies, Jamaica. Among these participants fifty seven (28.5%) of the workers reported have no knowledge of general occupational safety and nearly 15 (7.5%) respondents had low level of knowledge and almost two-third 64.0% of respondent were had high level of knowledge OHS. About three-quarters of the studied sample (70.8%) reported that personal protective equipment (PPE) provided by the health organization was inadequate [26].

A descriptive cross-sectional study was carried out during 2007 in Iran to determine the level of knowledge, attitude and behavior of workers toward occupational health and safety. According to the study out of 210 employees the result found 52.9% of workers had low level, 36.7% moderate and 10.5% high level of OHS knowledge. Furthermore about 75.7% of the participant shown positive attitude towards OHS; 30% of workers had low safety behavior and 70% had safe behavior [32].

A Health and Safety survey was conducted in March 2009 among laboratory workers at King Abdulaziz Medical City, Riyadh, Saudi Arabia to investigate the laboratory work environment health and safety. From the total of 154 study subjects result shown that 73% of participants had sufficient training to handle biological materials and to conduct safety measurements. In addition only 61% of respondents washed their hands after removing gloves, safe sharp disposal in sharps

container was done by 92% and not practiced by 8%. Moreover 19% thought there was not adequate PPE. From the total received different occupational exposure 2% were not reported [33].

A cross-sectional KAP study was conducted from January to February 2011 in India Krishna Institute of Medical Science, Karad about OHS awareness among MLPs which were working in pathology, microbiology and biochemistry departments. From these 19 study participants knowledge of laboratory technicians working in pathology 50% were having moderate and 50% were having high knowledge; while in biochemistry 25% had moderate but 75% had high and laboratory technicians working in microbiology 100% of study subjects had high knowledge. Concerning to attitude, MLPs working in pathology 16.7% had positive. Differently in biochemistry 12.5% had negative, 12.5% had positive; but in microbiology 100% had positive attitude. About the practice issue; MLPs running in pathology 16.7% had poor, 66.7% had fair and 16.7% had good practice. Also in biochemistry department 81.5% had fair and 12.5% had good practice [34].

Another cross-sectional study was undertaken from March to June 2011 in a tertiary private teaching hospital in Gulbarga District of Karnataka state, South India. A total of 120 study subjects were participated to assess the awareness of OHS as well as its compliance of safety in their daily practice. About 12(10%) participants have taken formal training in occupational safety. A complete lack of knowledge about the OHS measures made 10 (15%) which were vulnerable to risks. Awareness on adequate hand washing was 106 (88.3%). Regarding the presence of bodily wounds or compromised skin on hands and exposed parts of the body, 28 (33%) of the participants covered the wounded site properly with bandage and wear gloves before handling specimen & contact the patient [35].

A cross-sectional study was undertaken between August and October 2012 in four national public hospitals in Kabul, Afghanistan. A number of 300 participants were involving to assess the knowledge and practice of HCWs towards OHS subject. The result shown that, 79.2% had low level of knowledge on OHS among the HCWs; and the high level knowledge was found 20.8%. Similarly, 84.3% and 15.7% of the HCWs shown good, and poor practice respectively. Likewise wearing of gloves and PPE found 92.6% of HCWs worn gloves and PPE, proper disposing sharps into sharps boxes were 90.3% and 88.6% of participants washing hands after the end of their activities [36].

Other cross-sectional study conducted in 2005 at two Colleges of Medicine and their Teaching hospitals in Lagos State, Nigeria to determine the knowledge, attitude, and practice of OHS amongst MLPs. Out of 154 study subjects 93.5% of participants were aware of the risk of being infected and they could only recognize Hepatitis B Virus (HBV) and HIV as potential workplace exposures as well as route of infections. About 32 (20.8%) participants had high knowledge level on OHS. Moreover 28.6% participants did not put on laboratory coats, 4.2% did not wash their hands after the removal of the gloves. Almost 96.5% had never been participated in bio safety training, 6.5% do not know the route of infection in the laboratory and of 99.0% of them did not take shower immediately after laboratory work. [37]

Descriptive cross sectional study was conducted at Irrua Specialized Teaching Hospital, in Edo State, Nigeria in 2012. From a total of 207 respondents 193 (93.2%) respondents ever heard about safety practice. The majority 100 (52.1%). respondents have got the source of information from school, fellow colleagues 17 (8.9%), about 28 (14.6%) on training, 40 (20.3%) through internet and 8 (4.2%) from other sources. In addition 139 (72.0 %) respondents knew safety practice aims to protect both HCWs and patients from transmission of infection. Eleven (5.7%) respondents have low level of knowledge, 85(44.0%) moderate and 97(50.3%) have high knowledge level. About 168 (81.2%) wash hands after contact with contaminated instruments or surfaces, and 171 (82.6%) after patient contact. Concerning to safety practice 8 (3.9%) respondents found poor, 103 (49.8%) fair and 96 (46.8%) good safety practice and 176 (91.2%) improper sharps and waste disposal was practiced [38].

A cross-sectional survey conducted from February to May 2010 among 475 HCWs working in 30 health facilities in two administrative regions of Ethiopia, Harari and Dire Dawa to investigate occupational health exposures and behavior of HCWs in eastern Ethiopia. About 188 (39.6%) participants have taken training on occupational health infection prevention and 213. (44.8%) HCWs were dissatisfied by the supply of infection prevention materials and PPE. Besides 384 (80.8%) HCWs were regularly following the standard safety measurements as well as obey to safety signage. About 233 (46.9%) participants shown poor safety practice [27].

Another cross sectional study was conducted from January to February 2012 in eight public health facilities HCWs of Mekelle Special Zone in Ethiopia. It was carried out among 483 HCWs to assess their general OHS practices. The result shown only 297(61.5%) always practice

hand washing after any direct contact with patient. Nearly 384 (79.5%) discard used needles and other sharp materials in a safety box, and 50 (10.4%) constantly wore mask and goggle. Only 207(42.9%) of the HCWs had good practice on OHS oppositely about 276 (57.1%) participants were found poor practice and never have got training on safety [39].

Cross-sectional study was conducted from May to December, 2010 in five health facilities in Gondar city. A total of 344 subjects were participated. Only 27% of the respondents had ever received any training on OHS. About 95.6% shows high levels of knowledge regarding to disease transmission through needle stick and sharps injuries as well as about occupational exposures. Nearly 60% of the HCWs who sustained needle stick and sharps injuries (laboratory incident) in the earlier 12 months had officially reported their injury to their respective managements, while 60.5% respondents were not reporting or recording because of different lack of awareness. Most of the respondents (91.6%) used at least one type of the PPE. Alike, 44 (12.8%) participants were having low, moderate 76 (22.1%) and 224 (65.1%) high risk perceptions [40].

Institution based cross sectional study was conducted from January up to April, 2012 in 15 health facilities found in Bahirdar city administration, in Ethiopia among 354 HCWs. The result shown that 299(84.2%) respondents had high knowledge level regarding OHS infection prevention and 55 (15.8%) showed poor knowledge level in all health care facilities. Furthermore 197(55.6%) of the study participants had positive attitude while 157(44.4 %) shown negative attitude towards OHS infection prevention. The overall hand hygiene was practiced by the 69.0 % respondents. About 190 (53.7%) participants use safety box for needle collection after injection whereas 192 (54.2%) indicate good practice and 162 (45.8 %) had poor safety practice [41].

A cross-sectional study was carried out during October 2012 in Ethiopia, Bahir Dar town, the capital city of Amhara Regional State to investigate the extent of OHS among 317 HCWs. Correspondingly 71 (22.4%) participated on training of occupational health infection prevention but 246 (77.6%) not trained. Also 62.5% respondents reported they wash their hands before and after any health care procedure or handling of wastes and half of the study participants (50.8%) reported enough supplies of PPE. Furthermore, 35% of HCWs had a positive attitude towards universal safety practices on OHS [42].

3. OBJECTIVES

3.1. General Objective

- ✓ To assess the level of knowledge, attitude, and practice of occupational health and safety among medical laboratory professionals working in selected Government Teaching Hospitals of Ethiopia.

3.2 Specific Objectives

- ✓ To assess the level of knowledge towards occupational health and safety among medical laboratory professionals.
- ✓ To assess the level of attitude towards occupational health and safety among medical laboratory professionals.
- ✓ To describe the level of practice towards occupational health and safety among medical laboratory professionals.

4. METHODOLOGY

4.1. Study Design

Teaching hospital based descriptive cross sectional study was designed in both qualitative and quantitative approach. Self-administered structured questionnaire was applied to assess the status of medical laboratory professional's knowledge, attitudes, and practice towards OHS. During data collection in-depth interview was conducted as well as physical observation checklist also used to assess the working environment of the selected study site laboratories along with their behavior and practice regarding to OHS.

4.2. Study Period

The study was conducted from March to May 2015 at the selected university teaching hospitals

4.3. Study Area

The study was conducted in four University Hospitals namely; Gondar University Hospital, Hawassa University Hospital, Jimma University Hospital and Mekele University Hospital. The major reason to select these study sites; due to long service year in educating of MLPs than

others educational history dedicated own hospital to serve for educational purpose, as well as have pre-service apparent attachments for several their own and others MLPs student, offer laboratory diagnostics service for high number of public society clients as well found in high populated big regional state in their geographical area.

Jimma University Specialized Hospital is one of the oldest public hospitals in the country. It was established in 1937(1930 E.C) by Italian conquerors for the service of their soldiers. It was called by different name but currently become 'Jimma University Specialized Hospital'. Geographically, it located in Jimma city 350 km southwest of Addis Ababa. Currently it is the only teaching and referral hospital in the southwestern part of Oromia region in the country. It provides specialized health services through its medical and other clinical and diagnostic departments for approximately 9,000 inpatients and 80,000 outpatients each year with bed capacity of 450 and a total of more than 550 staff. It has numerous professional staffs which serve the community and add an important value on teaching of different medical experts [43].

Gondar Hospital is one of the oldest and most well established hospital and higher education institutions in the country. It is believed that it established in 1954 and found in Northern part of Ethiopia in Amhara National Regional State and is far from Addis Ababa by 745 km. Gondar University Hospital has is a 400 bed capacity to serve the community, which acts as the referral centre for four district hospitals in the area. It has a range of specialties in different profession. Within its 715 estimated staff number serves more than 125, 000 patients per a year & a population of four million across the region. As a university hospital, it plays an important role in teaching medical and nursing students [44, 45].

Ayder Referral Hospital found in Mekele the capital city of Tigray, began rendering its referral and non-referral services in 2008 to the 8 million populations in its catchment areas of the Tigray, Afar and South-eastern parts of the Amhara Regional States. It is located in Mekele city 784 km from Addis Ababa. It provides a broad range of medical services to both in and out patients of all age groups. With a 500 capacity of inpatient beds in four major departments and other specialty units it also used as a teaching hospital for the College of Health Sciences of Mekelle University. It has more than 650 staff members and above 100,000 clients per year. The Hospital provide & runs different medical services; including surgical, emergency, laboratory, pharmacy, pathology & so on [46, 47].

Hawassa University college of Health Science was established in1996 at Dilla town Gedeo zone by the name of Dilla College of teacher's education and health sciences. From December 22/1999 it comes part of Debub University on the basic of decision made by the council of ministers regulation number 62/1999 from Dilla and shifted to Hawassa with its name of college of Health Sciences and Referral Hospital on Hawassa University. The University Referral Hospital fully started giving service in November 2005 and faraway 276 km from Addis Ababa. The hospital has 350 beds for admitted patients that provide different service for all over the Regional State and the surrounding Oromia zones which is estimated to more than 13 million people. The laboratory is one of the major departments of the institution. It has about 800 staff members & the service providing figure is estimated to 80,000-90,000 people annually for different tests from all over the regional state directions and from neighbor regions. It provide & diagnose different medical services; including surgical, emergency, laboratory, pharmacy & so on [48, 49].

These university teaching hospitals have their own different historical back ground conditions, common or similar characteristics such as lot of different departments, diversity academic & administrative staffs, setting achievable goals to deliver societal needs, growing in number of outstanding skilled staff members, maintained and strengthened their connection and commitment to serving the community as a core task, invested heavily in developing infrastructure, research publications on peer reviewed national/international journals and develop strong national and international links to build relationships with different organizations and university hospitals.

4.4. Population

4.4.1. Source of Populations

The source of population for this study was all medical laboratory professionals working in Ethiopia hospital laboratories.

4.4.2. Study Populations

The total number of medical laboratory professionals who were working in selected teaching hospital laboratories during the study period.

4.5. Sample Size

The sample size taken based on census sampling method. To attain the sample size & its purpose a total number of 173 MLPs that found in all the selected teaching hospitals were included in the study.

4.6. Sampling Technique

Four governmental teaching university hospitals were selected through purposive sampling techniques and the essential data collected from the total number of 173 MLPs who are actively working in the selected health facilities.

4.7. Inclusion and Exclusion Criteria

Based on censes method all MLPs who are working actively in the selected study sites were included in the study. Other supportive workers and non professional's staff members are excluded from the study.

4.8. Data Collection Methods

Self-administered semi-structured questionnaire was developed in order to collect the study data from participants. The data collection questionnaire was prepared in consulting with advisor, program managers, literatures reviewed and referring different recent guidelines and other documents on OHS. It was prepared in English version by considering of all MLPs are diploma and above educational level. The questionnaire consisted of four parts; which include socio-demographic, knowledge, attitude and practice questions. It was pretested to evaluate its clearness and applicability according to the objective of the study. Data collection was carried out during March 15, 2015 up to May 30, 2015. The final used English version questionnaire found on Annex III.

4.9. Study Variables

4.9.1. Dependent Variables

Dependent variables of the study were knowledge, attitude and practice of participants towards OHS.

4.9.2. Independent Variables

Age, sex, gender, educational level, working experience and training of participants were independent variables.

4.10. Variable Measuring & Scoring Method

Part I Socio-Demographic Data

It included twelve questions that consists of sex, age, marital status, religion, educational level, work experience in the health facility, and whether orientation as well as trainings were provided or not.

Part II: Knowledge towards OHS

In this section there were thirteen questions and were asked to sort out the knowledge of MLPs on OHS. Three of them were requesting if they ever heard about the subject, source of information and how they rate their own OHS knowledge. For the remaining 10 questions, each inquiry correct answer was given 1 score and 0 score for incorrect response. The score varied from 0 - 10 points and based on the distribution of the responses, study participants who had scores of 8-10 out of 10 questions categorized high level, 5-7 scores moderate level and low level of knowledge about OHS were these who had scores of 0-4. This scoring system has been used in an earlier study [37, 50, 51, 52, 53, 54]

Part III: Attitude towards OHS

This component includes the attitude of MLPs towards OHS perceptions. There were a total of eleven questions using by simple Likert scale options of choice. The rating scale was measured as for agree response given 2, undecided 0 & to disagree 1 respectively. And every individual answers were adding up for total and calculated for mean. The scoring defined as Positive for who scored 17-22 out of 22 points, 12-16 score Neutral Attitude and 0-11 categorized as Negative Attitude. This categorizing system was used in prior studies [51, 52, 53, 54].

Part IV: Practice towards OHS

All eighteen questions contain multiple choices that asked regarding to how often the MLPs perform required task for the successful implementation of OHS in their working areas. For those who answered Yes Always was given 2 point, for Yes Sometimes 1 and for Not at All was scored 0 respectively. The scores varied from 0–36 points. The scores measuring practice of

MPLs towards OHS were with 3 levels classification; good practice 32-36 points, fair practice 19-31 and poor practice level 0–18 points [37, 51, 52, 53, 54].

4.11. Conceptual Framework

A conceptual framework is a structure of connected idea or concept that indicates how it is put together. It guides the researcher during the development of the study and enables the researcher to link the findings to the body of knowledge [55]. The conceptual framework for this study which tried to show by using the arrows; the socio-demographic characteristics and others main study part level of knowledge, attitude and practice have directly or indirect relation one to the other as well as on the outcome.

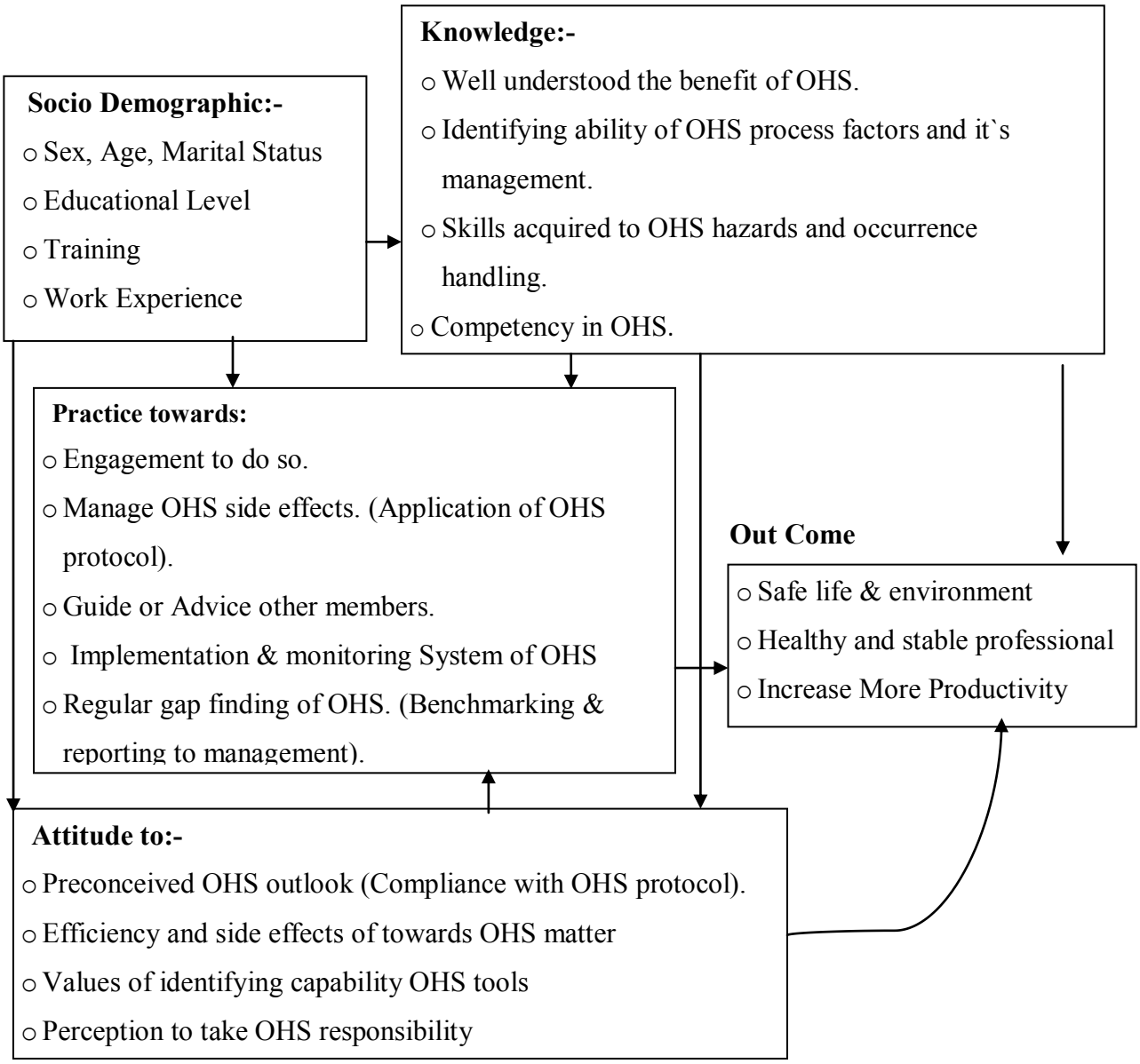

Figure 1 Conceptual framework of the study

4.12. Data Quality Assurance

The questioner was pretested before collecting the actual data to undertake and ensure its clarity and easily understandability for each respondent. After the required refinement taken place questionnaire was distributed to each study participants. Data was collected by trained and well experienced personnel with the necessary proper supervision or under control. The principal investigator was rechecking the completeness of the questionnaire and its clarity. Each questionnaire was given different identification number and validated by double data entry.

4.13. Data Management and Analysis

After evaluation of the response completeness, coding was performed by the principal investigator, it followed by data entry in to the designed data base SPSS version 20 software (IBM Corporation, Chicago, IL, USA) for cleaning and analysis purpose. Descriptive statistical values such as; frequencies, percentage, mean and standard deviations were used primarily to summarize as well as describe the data. A chi-square and Fischer's Exact test was also used where appropriate to identify if relationships exists between categorical variables. p value set as < 0.05 considered as used to ascertain significant associations between demographic variables and level of KAP. Regarding to qualitative study the principal investigator executed observation checklist during data collection (Annex IV). In addition to that, in-depth interview was conducted, transcribed, and the descriptive summary prepared (Annex VI).

4.14. Ethical Considerations

Before conducting the research, ethical clearance was obtained from the Department Research and Ethical Review Committee (DRERC) of Addis Ababa University College of Health Sciences School of Allied Health Sciences Department of Medical Laboratory Sciences (Annex VII). Beside this, formal and official letter of cooperation was written from Department of Medical Laboratory Sciences to the study sites. Written consent was obtained from each individual participant prior to conducting the study.

4.15. Dissemination and Utilization of Result

After the study is completed the result will be submitted to Addis Ababa University School of Medical Laboratory Science. Final result report will be sent to health facilities if the department needs the research result finding. It will be available in the library to serve as a reference material for students, researchers, experts or policy makers for intervention. This result also will be disseminated for publication in peer reviewed local and international journals and presenting in related conferences and seminars.

4.16. Operational Definition

Occupational Health and Safety: is the study subject which concerned with protecting health, welfare & safety of organization workers at workplace.

Hazard: is something that has potential to cause harm, i.e. an activity such as lifting and carrying, using machine, moving Laboratory supplies using chemicals and so on.

Risk Assessment: is taken as any possibility of a potentially hazardous situation causing injury, illness or disease and death to people in the workplace.

Health Care Workers: those who are involved in health institution or organization and provide training, treatment, laboratory diagnosis for the society. These are health officers, nurses, physicians and medical laboratory

Knowledge: knowledge of OHS is theoretical or practical understandings, and skill obtained by education or through experience, ability of sorting out different occupational exposures that potentially cause infection of disease, physical as well as other sickness of the study.

High Level Knowledge: the level of knowledge categorized as High level for those who scored 8-10 out of 10 points.

Moderate Level Knowledge: the level of knowledge categorized as Moderate level for those who scored 5-7 out of 10 points.

Low Level Knowledge: the level of knowledge categorized as Low level for those who scored 0-4 out of 10 points.

Attitude: is state of mind tendency or affinity to respond MLPs are among high risk group, infection prevention and control methods positively, negatively or neutral towards on the OHS study.

Positive Attitude: is classified as Positive Attitude for those scored 17-22 out of 22 points.

Neutral Attitude: is classified as Neutral Attitude for those scored 12-16 out of 22 points.

Negative Attitude: is classified as Negative Attitude for those who scored 0-11 out of 22 points.

Practice: Is the actual observable actions (application of knowledge or practical approach) of an individual study subject in a real situation day to day response to a motivation activities to prevent or protect others or own body from workplace hazard exposure and promote OHS.

Good Practice: it categorizes as a Good Practice for those who scored 32-36 out of 36 points

Fair Practice: it categorizes as a Fair Practice for those who scored 19-31 out of 36 points.

Poor Practice: scored from 0-18 out of 36 points.

5. RESULTS

Assessment of knowledge, attitude and practice towards OHS among MLPs study was conducted from March to May 2015. All finding results presented based on their sequential order. Out of 178 administered questionnaires a total of 173 MLPs responded the questionnaire with 97.2% response rate. There is no any missed value on the result.

5.1. Socio-Demographic Characteristics of the Study Population

Among the total participants 112 (64.7%) were male and 61 (35.3%) female [Figure 2]. The participant's age range was 18 up to greater than or equal 46 years. From this range the large amount of participants 95 (54.9%) were found to be 26 up to 30 years old. In this age category 54(31.2%) male and 41(23.7%) female were existed. Mean of age 27.79 and x̄±SD 4.61. The marital status, one hundred twelve (64.7%) participants were single (47.9% male & 16.8% female). [Table 1].

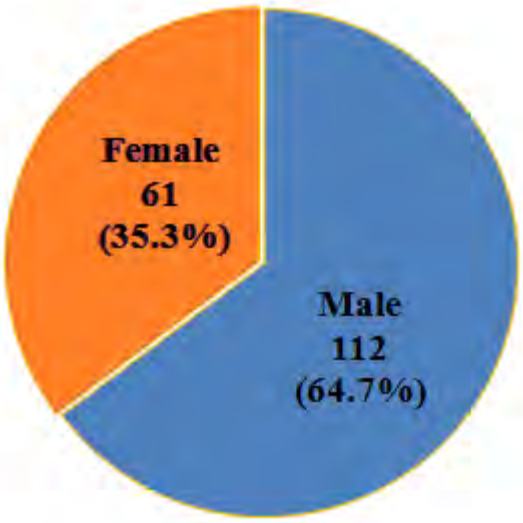

Figure2: Frequency and percentage of study participants in gender group 2015 (n=173)

Majority of the laboratory professionals 86 (49.7%) had 2 – 5years work experience; on the other side 8 (4.6%) professionals served more than fourteen years. The least work experience was 5(2.9%) less than or equal one year [Figure 3].

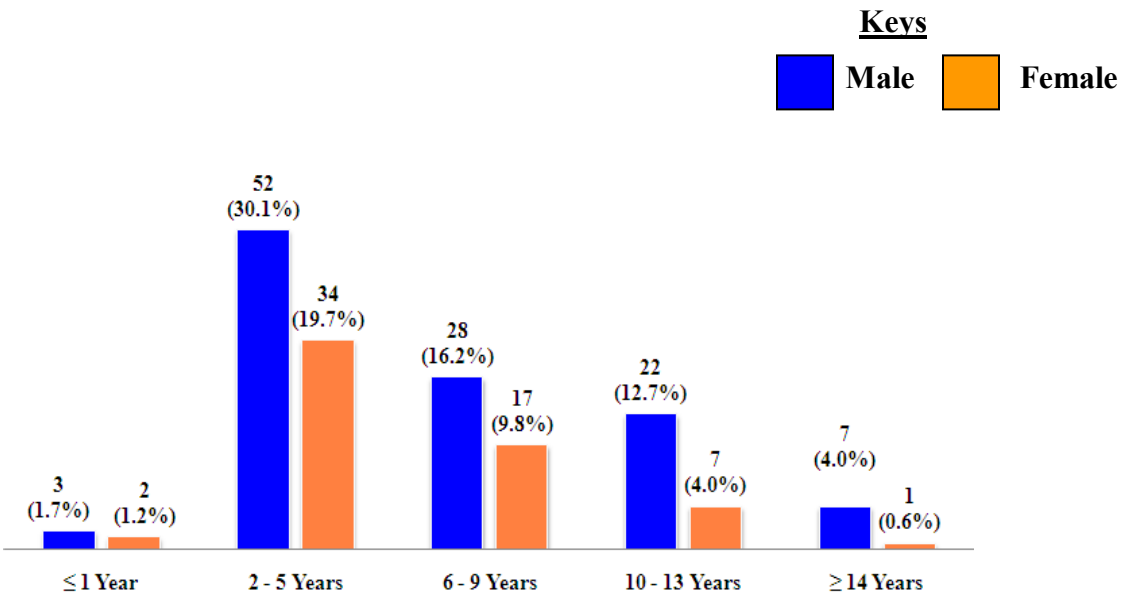

Figure 3: Frequency of participant's based on work experience distribution 2015 (n=173)

The study participants were having different educational level with various service experiences. The largest number of respondents 137 (79.2%) had first degree (Bachelor of Science) level, whereas 25 (14.5%), 11(6.3%) diploma and second degree (Masters of Science) level respectively. From all participants 67 (38.7%) have got training on OHS or Bio-safety subject. Whereas the majority number 106 (61.3%) have never got the training. Regarding to risk assessment issue 21 (12.1%) trained but 152 (87.9%) respondents were not trained. Fifty nine (34.1%) respondents have got orientation on OHS during their first employment period, but 114 (65.9 %) have not [Table 1].

Table 1: Socio demographic characteristics of Medical Laboratory professionals towards OHS working in selected Governmental Teaching Hospitals of Ethiopia 2015 (n=173)

Variables	Category	Number	Percent (%)
	Male	112	64.7
Gender	Female	61	35.3
	18 - 25	48	27.7
	26 – 30	95	54.9
Age	31 – 35	22	12.7
	36 – 40	1	0.6
	41 – 45	4	2.3
	≥ 46	3	1.7
	Single	112	64.7
Marital Status	Married	58	33.5
	Divorced	3	1.7
	Diploma	25	14.5
Educational Level	First Degree (BSc)	137	79.2
	Second Degree (MSc)	11	6.3
	≤ 1	5	2.9
	2 – 5	86	49.7
Work Experience in years	6 – 9	45	26.0
	10 – 13	29	16.8
	≥14	8	4.6
	≤ 1500	3	1.7
Monthly Income	1600 - 3500	103	59.5
	3600 - 5500	55	31.8
	5600 - 7500	12	6.9
Orientation on OHS	Yes	59	34.1
	No	114	65.9
Training on OHS (Bio-Safety)	Yes	67	38.7
	No	106	61.3
Risk Assessment Training	Yes	21	12.1
	No	152	87.9

Risk Assessment Training	Yes	21	12.1
	No	152	87.9

5.1.1. Knowledge of Medical Laboratory Professionals towards OHS

Almost 163(94.2%) directly or indirectly have OHS information whereas 10(5.8%) responded as never ever heard about OHS. Majority of respondents 103 (59.5%) main source of information about OHS was Academic program and the least 19 (11.0%) have got from mass media. About 58(33.5%) participants had three and above different source of information on OHS and the remaining have got from one or two source. The remaining are from internet, colleagues and others sources. Majority participants 171 (98.8%) identify & familiar with what type of PPE when and how to use. Concerning to knowledge of PPE, all respondents were able to identify laboratory gown, glove and mask from listed items of PPE. Others 87(50.3%) distinguish that laboratory gown, glove, mask and goggle, the remaining 58(33.5%) recognize all types of PPE items by adding face shield. Diseases (infections) could be acquired from laboratory hazard or specimen answered by all study participants. In the other hand, knowledge of how to use (wear) N95 face mask as well as familiarity of risk assessment was answered by least respondents, 93(53.8%) & 38(22%) correspondingly. Few participants 39(22.5%) aware that Fall/Slip one of health hazard at work place. Out of the total participants 30 (17.3%) were identified musculoskeletal disorder as a work place hazard, while 143(82.7%) had not any information about this issue. Splash & needle stick injury are well known by all participants 173(100%) as a group of laboratory related hazards at workplace [Table 2].

Table 2: Knowledge of medical laboratory towards OHS in selected Governmental Teaching Hospitals of Ethiopia 2015 (n=173)

Knowledge Evaluation Item	Response	Number	Percentage (%)
Information about occupational health and safety	Yes	163	94.2%
	No	10	5.8%
Source of your information	Academic Program	103	28.5%
	Training	64	17.7%
	Books or Journals	60	16.6%
	Internet	58	16.0%
	Mass Media	19	5.2%
	Friends	58	16.0%
Rate your occupational health and safety knowledge status	Excellent	11	6.4%
	Very good	47	27.2%
	Sufficient	84	48.6%
	Poor	31	17.9%
Recognizing type of personal protective equipments when and how to use	Yes	171	98.8%
	No	2	1.2%
Identify type of personal protective equipment	Laboratory Coat	173	100%
	Glove	173	100%
	Face Mask	173	100%
	Goggle	145	83.8%
	Face Shield	58	33.5%
Laboratory related health hazards at work place	Needle Stick Injury	173	100%
	Splash	173	100%
	Musculoskeletal Disorder	30	17.3%
	Electrical Hazard	95	54.9%
	Chemical Hazard	151	87.3%
	Fall/Slips	39	22.5%

Diseases (infections) could be acquired from laboratory hazard or specimen	HIV	173	100%
	Hepatitis B & C Virus	173	100%
	TB	173	100%
Cause of laboratory related infection transmission routes	Inhalation	161	93.1%
	Ingestion	123	71.1%
	Injection	170	98.3%
	Physical Contact	116	67.1%
Laboratory associated infection or causative source of disease	Blood	173	100%
	Body Cavity Fluid	158	91.3%
	Cerebrospinal Fluid	173	100%
	Discharge	159	91.9%
	Sputum	173	100%
Occupational health and safety is to be major and basic subject for any organization	Yes	133	76.9%
	No	40	23.1%
Facility management & employee should take the primary responsibility of occupational health and safety improvement at work place	Yes	135	78%
	No	38	22%
Know how to use (wear) N95 face mask	Yes	93	53.8%
	No	80	46.2%
Know how to perform risk assessment	Yes	38	22%
	No	135	78%

Concerning to OHS self knowledge rating conditions, only 11(6.3 %) state as excellent, 84 (48.6%) respond as sufficient, the rest 47 (27.2%) & 31 (17.9%) were very good & poor grading to themselves respectively [Figure 4].

Figure 4: **Study participant`s rate their own OHS Knowledge 2015 (n=173)**

5.1.2. Knowledge level of Medical Laboratory Professionals towards OHS

The participant's knowledge evaluated by based on 10 potential request points and the study discovered that standard deviation 1.29 followed by 6.46 mean of knowledge score. According to the study evaluation 35 (20.2%) MLPs were categorized as having high level of knowledge, great number of respondents 113(65.3%) were scored moderate level of knowledge, whereas 25 (14.5%) had low level of knowledge on OHS

5.1.3. Associated factors affecting knowledge level of Medical Laboratory professionals' towards OHS

Regarding associated factors that affecting knowledge level; monthly income, training of OHS or Bio-Safety and Risk Assessment were found strongly associated with knowledge level of OHS among MLPs with result of (P=0.018), (P = 0.000) and (P=0.00) correspondingly [Table 3]. But the study data did not show other significant association with sex, educational status, work experience, and further socio demographic characteristics.

Table 3: Medical laboratory professionals' knowledge and associated factors on OHS in selected Governmental Teaching Hospitals of Ethiopia, 2015 (n=173)

Variables	Knowledge			Chi-Square	P Value	df	Fisher Exact Test
	Low	Moderate	High				
Gender							
Male	13 (52.0%)	77 (68.1%)	22 (62.9%)	2.405	0.300	2	2.440
Female	12 (48.0%)	36 (31.9%)	13 (37.1%)				
Age							
18 - 25	5 (20.0%)	31 (27.4%)	12 (34.3%)	8.742	0.557	10	8.202
26 - 30	17 (68.0%)	62 (54.9%)	16 (45.7%)				
31 - 35	2 (8.0%)	15 (13.3%)	5 (14.3%)				
36 - 40	0 (0.0%)	1 (0.9%)	0 (0.0%)				
41 - 45	1 (4.0%)	3 (2.7%)	0 (0.0%)				
≥ 46	0 (0.0%)	1 (0.9%)	2 (5.7%)				
Marital Status							
Single	17 (68.0%)	77 (68.1%)	18 (51.4%)	5.804	0.214	4	4.757
Married	8 (32.0%)	33 (29.2%)	17 (48.6%)				
Divorced	0 (0.0%)	3 (2.7%)	0 (0.0%)				

Variable	Knowledge			Chi-Square	P Value	df	Fisher Exact Test
	Low	Moderate	High				
Educational Level							
Diploma	2 (8.0%)	18 (15.9%)	5 (14.3%)	1.557	0.817	4	1.809
First Degree (BSc)	21 (84.0%	89 (78.8%)	27 (77.1%)				
Second Degree (MSc)	2 (8.0%)	6 (5.3%)	3 (8.6%)				
Work Experience							
≤ 1	1 (4.0%)	3 (2.7%)	1 (2.9%)	7.738	0.459	8	8.278.
2 - 5	17 (68.0%)	57 (50.4)	12 (34.3%)				
6 - 9	4 (16.0%)	28 (24.8%)	13 (37.1%)				
10 - 13	2 (8.0%)	20 (17.7%)	7 (20.0%)				
≥ 14	1 (4.0%)	5 (4.4%)	2 (5.7%)				
Monthly Income							
≤ 1500	0 (0.0%)	1 (0.9%)	2 (5.7%)	15.373	0.018	6	12.704
1600 - 3500	13 (52.0%)	73 (64.6%)	17 (48.6%)				
3600 - 5500	12 (48.0%)	33 (29.2%)	10 (28.6%)				
5600 - 7500	0 (0.0%)	6 (5.3%)	6 (17.1%)				
OHS Orientation							
Yes	5 (20.0%)	37 (32.7%)	17 (48.6%)	5.566	0.062	2	5.411
No	20 (80.0%)	76 (67.3%)	18 (51.4%)				

Variable	Knowledge			Chi-Square	P Value	df	Fisher Exact Test
	Low	Moderate	High				
OHS (Bio-Safety) Training							
Yes	2 (8.0%)	44 (38.9%)	21 (60.0%)	16.624	0.000	2.	17.780
No	23 (92.0%)	69 (61.1%)	14 (40.0%)				
Risk Assessment Training							
Yes	0 (0.0%)	10 (8.8%)	11 (31.4%)	16.811	0.000	2	14.383
No	25 (100%)	103 (91.2%)	24 (68.6%)				

5.1.4. Attitude of Medical Laboratory Professionals towards OHS

Almost 90(52%) believe that OHS important for any organization. About 94 (54.3%) agreed on occupational health injuries or any laboratory incident should be recorded in laboratory occurrence (incident) log sheet, where as 10(5.7%) disagree and 69(40%) undecided or neutral on this issues. Amount of 121(70%) participants disagree on the availability of all PPE at working environment. Most of the participants 100(57.8%) believed that MLPs are among higher risk of exposure health professionals, while 13(7.5%) participants were disagree. Nearly 70 (40.5%) trust OHS or Bio-Safety training is helpful to increase their attitudinal status of OHS or useful for laboratory professional's behavioral change. Some respondents 57(33.0%) were opposed on the decline of occupational hazards & injuries through time forward. Inversely a similar figure of 54(31.2%) have way of thinking hazards are reducing time to time. About 80(46.2%) supposed that they were examined their health status at least once a year, while 26(15.1%) were not believed to examined their health status at all [Table 4].

Table 4: Attitude of medical laboratory professionals towards OHS in selected Governmental Teaching Hospitals of Ethiopia, 2015 (n=173)

Attitude Subject	Agree	Undecided	Disagree
Occupational Health and Safety is important for any organization.	90 (52%)	56 (32.4%)	27 (15.6%)
Occupational health and safety or Bio-Safety training is helpful for laboratory professional's behavioral change.	70 (40.5%)	78 (45.1%)	25 (14.5%)
Occupational health and safety or Bio-Safety guideline and manuals are helpful for laboratory work place.	62 (35.8%)	61 (35.3%)	50 (28.9%)
Laboratory working environment may expose you to occupational hazards or risks.	95 (55%)	71 (41%)	7 (4%)
Medical laboratory professionals are among highest risk of exposure health professionals.	100 (57.8%)	60 (34.7%)	13 (7.5%)
All personal protective equipments are available at laboratory working environment.	38 (21.9%)	14 (8.1%)	121 (70%)
Number of occupational hazards and injuries are reducing time to time in laboratory work place.	54 (31.2%)	62 (35.8%)	57 (33%)
Every medical laboratory professional should be examined his/her health status each year.	80 (46.2%)	67 (38.7%)	26 (15.1%)
Occupational health injuries or any incident occurrence should be recorded in laboratory occurrence (incident) log sheet.	94 (54.3%)	69 (40%)	10 (5.7%)
Individual workplace risk exposure should be taken (counted) as a crisis of community.	70 (40.5%)	80 (46.2%)	23%) (13.3%)
Risk assessment is a back bone for occupational health and safety.	44 (25.4%)	80 (46.3%)	49 (28.3%)

5.1.5. Attitude level of Medical Laboratory Professionals towards OHS

To estimate the status of respondent's attitude towards OHS among medical laboratory professionals, a total of 11 questions were asked with a simple Likert-scale method. The attitude mean value with the standard deviation was 19.8 and ± 3.16. According to the study data finding large amount of subjects 92 (53.2%) are found in Neutral Attitude, least amount 7(4.0%) found positive and 74 (42.8%) negative attitude respectively.

5.1.6. Associated factors affecting attitude level of Medical Laboratory Professionals' towards OHS

The study result indicated that associated factors which affect the attitude level of participants, Orientation of OHS during employment was found significantly associated with attitude of OHS among MLPs with a result of (P=0.002). Other socio demographic characteristics did not show any significant association with the attitude level [Table 5].

Table 5: Medical Laboratory professionals' Attitude and associated factors on OHS in selected Governmental Teaching Hospitals of Ethiopia, 2015 (n=173)

Variables	Attitude			Chi-Square	P Value	df	Fisher Exact Test
	Negative	Neutral	Positive				
Gender							
Male	46 (62.2%)	63 (68.5%)	3 (42.9%)	2.247	.325	2	2.302
Female	28 (37.8%)	29 (31.5%)	4 (57.1%)				
Age							
18 - 25	20 (27.0%)	26 (28.3%)	2 (28.6%)	3.954	.949	10	6.152
26 - 30	42 (56.8%)	49 (53.3%)	4 (57.1%)				
31 - 35	10 (13.5%)	11 (12.0%)	1 (14.3%)				
36 - 40	0 (0.0%)	1 (1.1%)	0 (0.0%)				
41 - 45	2 (2.7%)	2 (2.2%)	0 (0.0%)				
≥ 46	0 (0.0%)	3 (3.3%)	0 (0.0%)				
Marital Status							
Single	54 (73.0%)	54 (58.7%)	4 (57.1%)	5.672	.225	4	5.790
Married	20 (27.0%)	35 (38.0%)	3 (42.9%)				
Divorced	0 (0.0%)	3 (3.3%)	0 (0.0%)				
Educational Level							
Diploma	13 (17.6%)	12 (13.0%)	0 (0.0%)	2.619	.624	4	1.590
First Degree (BSc)	56 (75.7%)	74 (80.4%)	7 (100%)				
Second Degree(MSc)	5 (6.8%)	6 (6.5%)	0 (0.0%)				

Variable	Attitude			Chi-Square	P Value	df	Fisher Exact Test
	Negative	Neutral	Positive				
Work Experience							
≤ 1	1 (1.4%)	4 (4.3%)	0 (0.0%)	4.441	.815	8	4.140
2 - 5	38 (51.4%)	44 (47.8%)	4 (57.1%)				
6 - 9	20 (27.0%)	24 (26.1%)	1 (14.3%)				
10 - 13	13 (17.6%)	14 (15.2%)	2 (28.6%)				
≥ 14	2 (2.7%)	6 (6.5%)	0 (0.0%)				
Monthly Income							
≤ 1500	3 (4.1%)	0 (0.0%)	0 (0.0%)	7.522	.275	6	7.184
1600 - 3500	48 (64.9%)	51 (55.4%)	4 (57.1%)				
3600 - 5500	18 (24.3%)	34 (37.0%)	3 (42.9)				
5600 - 7500	5 (6.8%)	7 (7.6%)	0 (0.0%)				
OHS Orientation							
Yes	36 (48.6%)	21 (22.8%)	2 (28.6%)	12.268	.002	2	12.160
No	38 (51.4%)	71 (77.2%)	5 (71.4%)				
OHS (Bio-Safety) Training							
Yes	30 (40.5%)	34 (37.0%)	3 (42.9%)	.274	.872	2	.386
No	44 (59.5%)	58 (63.0%)	4 (57.1%)				

Variable	Attitude			Chi-Square	P Value	df	Fisher Exact Test
	Negative	Neutral	Positive				
Risk Assessment Training							
Yes	11 (14.9%)	9 (9.8%)	1 (14.3%)	1.025	.599	2	1.335
No	63 (85.1%)	83 (90.2%)	6 (85.7%)				

5.1.7. Practice of Medical Laboratory Professionals towards OHS

From the total participants 168(97.1%) wear glove during contact with blood, body fluid and mucus membrane specimen. Just 39(22.2%) were frequently recorded every laboratory hazards on occurrence log sheet, but 32(18.5%) were not practiced at all. About 104(60.1%) regularly clean or disinfect their working area after end of each activity management. A number of 27(15.6%) respondents that, they were always active to aware laboratory visitors on the subject of general safety precautions. Nearly 55(31.8%) adopt to sharing their OHS knowledge with other new staff members, but 88(50.9%) perform sometimes and 30(17.3%) never did. Only 42(24.3%) respondent always advising clients on OHS problems whereas 29 (16.8%) were not advising at all. About 120(69.4%) willing to accept comment of colleagues on their OHS practice gaps, while 41(23.7%) were not willing to accept totally. Almost 68(39.3%) assured that always properly obey for posted safety signage, but 10(5.8%) not practiced at all [Table 6].

Table 6: Practice of medical laboratory professionals towards OHS in selected Governmental Teaching Hospitals of Ethiopia, 2015 (n=173)

Practice Subject	Yes Always	Yes Sometimes	Not at All
Using occupational health and safety manual or safety manual at work place	48 (27.7%)	104 (60.1%)	21 (12.1%)
Wear glove during contact with blood, body fluid, non-intact skin and mucus membrane specimen	168 (97.1%)	4 (2.3%)	1 (0.6%)
Take shower after completing your laboratory work.	5 (2.9%)	44 (25.4%)	124 (71.7%)
Wash your hand with proper detergent at the end of occupation as well as after any contact with clients.	92 (53.2%)	80 (46.2%)	1 (0.6%)
Always using appropriate personal protective equipment during your job.	116 (67.1%)	57 (32.9%)	0 (0%)
Record all occurring hazards or incidents in occurrence log sheet and report to the responsible person.	39 (22.5%)	102 (59.0%)	32 (18.5%)
Clean or disinfect your working area after end of each activity management	104 (60.1%)	55 (31.8%)	14 (8.1%)
Monitor your working area waste system until its final disposal end stage.	3 (1.7%)	24 (38.7%)	146 (15.1%)
Practicing general safety precautions awareness for your laboratory visitors.	27 (15.6%)	84 (48.6%)	62 (35.8%)
Not reuse sharp material for laboratory activities.	171 (98.8%)	1 (46.20.6%)	1 (0.6%)
Always accomplish separate safe collection and disposal of sharps.	147 (85%)	23 (13.3%)	3 (1.7%)
Share your occupational health and safety knowledge with other new staff members.	55 (31.8%)	88 (50.9%)	30 (17.3%)

Advising clients on occupational health and safety problems.	42 (24.3%)	102 (59%)	29 (16.8%)
Willing to accept comment of colleagues on your occupational health and safety gaps or practices.	120 (69.4%)	41 (23.7%)	12 (6.9%)
Check your health status at least every two years.	33 (19.1%)	70 (40.5%)	70 (40.5%)
If you have a cut, covering all cuts and abrasion with a water proof dressing.	91 (52.6%)	72 (41.6%)	10 (5.8%)
Obey appropriately for posted safety signage.	68 (39.3%)	95 (54.9%)	10 (5.8%)
Ever done risk assessment in your laboratory.	3 (1.7%)	13 (7.5%)	157 (90.8%)

5.1.8. Practice level of Medical Laboratory Professionals towards OHS

To determine each individual MLPs practical characteristic towards to OHS, level of practice was classified in to poor, fair and good categories. The mean & standard deviation value was 21.4 & ±2.31 respectively. The overall study finding indicated about 24(13.9%) participants were found with poor practice, while 81(46.8%) and 68(39.3%) were fair as well as good respectively.

5.1.9. Associated factors affecting practice level of Medical Laboratory Professionals' towards OHS

The study result revealed that work experience, training of OHS (Bio-Safety) and Risk Assessment were strongly significantly associated with practice of OHS among MLPs with a result of (P = 0.000), (P = 0.000) & (P =0.004) respectively. In the same condition monthly income and orientation about OHS were found slightly significant (P = 0.043), (P = 0.036) correspondingly [Table 7].

Table 7: Medical Laboratory professionals' Practice and associated factors on OHS in selected Governmental Teaching Hospitals of Ethiopia, 2015 (n=173)

Variables	Practice			Chi-Square	P Value	df	Fisher Exact Test
	Poor	Fair	Good				
Gender							
Male	14 (58.3%)	51 (63.0%)	47 (69.1%)	1.114	.573	2	1.166
Female	10 (41.7%)	30 (37.0%)	21 (30.9%)				
Age							
18 - 25	5 (20.8%)	26 (32.1%)	17 (25.0%)	7.304	.696	10	6.754
26 - 30	16 (66.7%)	39 (48.1%)	40 (58.8%)				
31 - 35	3 (12.5%)	12 (14.8%)	7 (10.3%)				
36 - 40	0 (0.0%)	1 (1.2%)	0 (0.0%)				
41 - 45	0 (0.0%)	1 (1.2%)	3 (4.4%)				
≥ 46	0 (0.0%)	2 (2.5%)	1 (1.5%)				
Marital Status							
Single	17 (70.8%)	54 (66.7%)	41 (60.3%)	1.845	.764	4	1.638
Married	7 (29.2%)	25 (30.9%)	26 (38.2%)				
Divorced	0 (0.0%)	2 (2.5%)	1 (1.5%)				
Educational Level							
Diploma	0 (0.0%)	12 (14.8%)	13 (19.9%)	6.876	.143	4	7.409
First Degree (BSc)	23 (95.8%)	65 (80.2%)	49 (72.1%)				
Second Degree (MSc)	1 (4.2%)	4 (4.9%)	6 (8.8%)				

Variables	Practice			Chi-Square	P Value	df	Fisher Exact Test
	Poor	Fair	Good				
Work Experience							
≤ 1	3 (12.5%)	2 (2.5%)	0 (0.0%)	29.613	.000	8	25.986
2 - 5	16 (66.7%)	43 (53.1%)	27 (39.7%)				
6 - 9	3 (12.5%)	13 (16.0%)	29 (42.6%)				
10 - 13	1 (4.2%)	19 (23.5%)	9 (13.2%)				
≥ 14	1 (4.2%)	4 (4.9%)	3 (4.4%)				
Monthly Income							
≤ 1500	0 (0.0%)	1 (1.2%)	2 (2.9%)	13.029	.043	6	12.239
1600 - 3500	13 (54.2%)	53 (65.4%)	37 (54.4%)				
3600 - 5500	10 (41.7%)	26 (32.1%)	19 (27.9)				
5600 - 7500	1 (4.2%)	1 (1.2%)	10 (14.7%)				
OHS Orientation							
Yes	7 (29.2%)	21 (25.9%)	31 (45.6%)	6.662	.036	2	6.511
No	17 (70.8%)	60 (74.1%)	37 (54.4%)				
OHS(Bio-Safety) Training							
Yes	3 (12.5%)	26 (32.1%)	38 (55.9%)	16.890	.000	2	17.125
No	21 (87.5%)	55 (67.9%)	30 (44.1%)				
Risk Assessment Training							
Yes	0 (0.0%)	6 (7.4%)	15 (22.1%)	11.290	.004	2	10.662
No	24 (100%)	75 (92.6%)	53 (77.9%)				

5.2. Observational Assessment Result

To maintain and support the evaluation of qualitative data, the study area facilities were assessed by observational checklist during data collection moment. This observational assessment was covered the health facilities setup, cleanness, organized, waste disposal situations, documents and records including similar issues which related to OHS.

All these health facilities served for many clients by delivering different types of laboratory tests per day. In all study facilities sharp containers properly used and not filled more than $3/4^{th}$ of the container, each room name was label to differentiate for what purpose stands for and majority of the laboratory professionals used PPE during their routine activities.

Only one study sites had given Hepatitis B vaccine for its laboratory professionals none of the others did. Strengthening of safety signage in type and in number as well obey to these signage with the same extent for other related subject was found as a gap. Some sites participants had personal identifiable badge, but it was not performed uniformly by all laboratory professionals. At all sites there were few in number professionals which are not using covered shoes and unbutton (unfasten) their laboratory gown during their usual activities.

Even though sites have safety manual, waste management SOP, other supplementary documents these documents were not revised based on their revision date. Any emergency contact personnel address waiting for update as well all respective contact lists shall be included. Fire extinguisher is one of hazard protective equipment on workplace. In each assessed health facility this equipment needs to be certified, increase in quantities and the professionals have to get training on how to use this equipment during fire hazard occurrence.

Almost in all site there is no evacuation procedure for any emergency or disaster; and also no specifically assigned (labeled) assembly point (place) where the laboratory professionals as well other worker to be gathered during any emergency occasions. Unavailability of supply transport trolley, expired hazardous chemical disposal policy and procedure were another gaps of the laboratories. Having good and comfortable sitting chair at work place is one of the important materials. Almost at each study site inadequate and uncomfortable chairs were found. This could create discomfort on work; stress on worker and also may expose the professionals for musculoskeletal disorder illness through time.

Risk assessment practice, consistent recording of laboratory hazard occurrences & reporting to upper management not practiced at all. Commonly each site has not specific shower bath room for the laboratory to obtain bath service after finishing their daily tasks.

5.3. Findings of In-Depth Interview

To fortify the qualitative study part and to spot extending of the laboratory professional safety practice and attitude, in-depth interview was conducted with the study areas environmental & occupational health personnel. The interviewees were one female and three male, had three to fourteen years of work experiences and had 26 up to 48 years of age range. The interview was enclosed about OHS issue how far strengthens and aligned to the workplace safety based on their point of view as well as responsibility. The inquiry was including relevant issues based on the study subject.

Availability of OHS Committee

Forming of occupational health and safety committee in organizational institution is one of a methodology to improve workplace safety progress. Regarding this issue all respondents described that unavailability of such entitled committee directly, but other committee which named infection prevention exist. It consisted by different combination of professional from each department with a variety educational level from diploma up to Medical Doctor. It leads by the organization higher official. The entire interviewee agreed that by means of various reasons the existing committee not active and inconsistency on its responsible task. One of the respondent said “there is a need & direction from Federal Ministry of Health to establish OHS committee for better workplace safety improvement.”

Infrastructure

All the interview participants have same beliefs on the laboratory infrastructure. They mentioned that the laboratory infrastructure is not comfortable for the laboratory professional’s health and for their working conditions. It is real and known that not well ventilated, not have enough width and size. It must be safe & healthy working environment, should have shower room, specific hand washbasin also very essential having sustainable running water. One respondent agreed on the above comment and said that “primarily our hospital is not purposely constructed for such high type treatment service. It was build for other emergency medical task. In the other

way when we answer this question, it should base on the laboratory reflection. The management constructed new building in collaboration with other partners for the laboratory & for other departments also. In the near future the laboratory transfer to another building and the problem will be solved." One of the participants responds as "The management has a great plan to solve this problem." Other personnel said that "now a day's such type of laboratory expected to do more tests and using high technologies with a number of skilled personnel. It is not standardized. So, the management understands and accepts the problem and planned to resolve the problem."

Recording & Reporting of Laboratory Incident and Hazards

All participants agreed on, it cannot be assured that all laboratory incident or hazards recorded on the recording log sheet as well as not reported to the upper management. This could be because of recording of such hazard incidents count as a minor thing, lack of awareness, fear of discrimination or no confidence, negative attitude, professional negligence, lack of commitment, weak monitoring system as well no proper assigned responsible person to control this subject.

Availability & Inspection of Personal Protective Equipment

Three of the participants have the same opinion that all PPE are not available at workplace. Cause of this; lack of awareness, lack of strong monitoring system, some safety materials need more budgets, need management consciousness and other similar things. In contrary one of the environmental & occupational health personnel said that "all required PPE are accessible at work place. Concerning to the inspection, the response from the interview participant indicates the inspection only done on the area, availability of laboratory coat, glove, fire extinguisher and waste containers. There is no inspection of fire extinguishers functionality." Regarding to numbers of fire extinguishers are not also sufficient for their organization. There is no fire alarm at all except in two health facilities laboratories found whistle as fire alarm. Three of study sites others sections including laboratory personnel were not trained how to use fire extinguisher. But one of the study site laboratory professionals tries to train themselves how to use the fire extinguisher. In this regard one personnel said that "we were discussing on these issues with fire brigade & Air port office to increase our fire extinguisher and to train our personnel to improve the facility fire protection status."

Obey for Safety Regulation & Safety Signage

Only one respondent believed that all laboratory professional ruled as well as governed by safety regulations, respect and follow for all posted safety signage in that health facility. The remaining personnel supposed to that "cannot say the laboratory personnel 100% directed by safety regulations also comply with posted safety signage. There are few resistant or reluctant staffs rather than doing proper safety practice follow in the wrong way (short cut) with negligence. It needs strong supervisions and monitoring."

Management Support on OHS

Total interviewees have identical remark about the management support to the laboratory section towards OHS improvement. The management support by renovate & repairing few working environments, procuring PPE and avail required safety materials for laboratory department and similarly for other departments as well. The laboratory section probably not satisfied by the quality, quantity and type of the procured PPE and safety materials as well as on this limited supportive conditions. In the future this supportive gap will be solved. Since, safe & healthy human resource is a vital value for every country organization.

Orientation

About providing of OHS orientation for new employee, two respondents reported similar idea that they were orient for new physicians & nurse employee not for laboratory professional. This is because of lack of awareness and undertakes to give the orientation for all professionals. One of personnel said that "we were providing general information about OHS. However it doesn't have continuity and sustainability the main reason is lack of awareness, lack of commitment as well as workload of other urgent incoming different tasks." The other professional described that "We have not given any orientation about OHS for new employee. It is because of lack of awareness and we don't have such trend. We will do this in the future"

Training

Regarding to OHS or Bio-Safety training the total interviewees were replied as "the training is not directly on OHS or Bio-Safety, it was a general information on Infection prevention. But one to the other way the subjects may have similar aim that every workers to prevent themselves from hazards at workplace. We have given the Infection Prevention training for the committee members and hospital cleaners not for the laboratory professionals. Because there is

assumptions that imply the laboratory workers have different opportunity of training by other organization."

OHS Risk Assessment

The respondents coincide on the risk assessment were done by infection prevention committee (exceptionally in one facility done by safety officer). "It is done once a time not a regular based. The main reason was these infection prevention committee members nominated from different departmental sections, have their own assigned duty, occupied by other extra commitment, in addition to that there is lack of strengthen and having weak controlling mechanism."

Motivational Reward

Providing of reward or any recognition to laboratory department for the achievement of organizational plan accomplishment or OHS improvement was unaccustomed. All interviewee were respond as until now there is no a reward for laboratory staff achievement of their organizational plan or progressing of OHS. Motivational incentive not addressed at all. There is no established system as well as no assigned assessor for such purpose. One respondent agreed on this response and told "here a reward offered to only for special selected hard workers not as a department competition technique."

Risk Exposures

HCWs are faced different hazards at workplace as well as might have high potential of risk of injuries. Regarding to the inquiry of 'Do you believe that laboratory personnel are highly risk than other HCWs?' one of the personnel respond "I think they are not highly at risk from other HCWs. Based on the exposure of hazard type and duration conditions, highly risk faced health professional are Physicians and Midwifes". The second personnel also respond "If you ask every professional concerning the risk exposure; has its own response. So, it is conditional, i.e. nature of exposure and time of exposing is main point. When we compare with physicians who perform a procedure and nurse who take care of patient, the laboratory professionals are not that much intimate. That means I am not saying they are not at risk".

The remaining two interviewees were responds inversely alike "Yes laboratory professional are more highly exposed to risk. Because, they are working in uncomfortable rooms, using by

different sharp materials, utilized various chemicals & reagent, work with blood as well as miscellaneous body fluids and specimens; have direct contact with non diagnosed patients and faced with highly risk disease."

OHS Improvement Project Plan

All personnel respond and conform on the unavailability of OHS improvement project plan with a budget. It come-up from lack of knowledge, observe as minor thing, shortage of budgeting and focusing only other routine basic tasks. If it was available, it has high main value like, minimize working environment hazards, improve health tensions, strengthening safety practices, initiate working sprit, effective productivity and develop site excellence.

6. DISCUSSION

This study assessed knowledge, attitude and practice of medical laboratory professionals towards OHS in selected teaching hospital in Ethiopia. Because OHS is an initiating concern for developing country and have limited utilized human or capital resources like Ethiopia in medical institutions and other organization.

In this study respondents have got source of information about OHS from different sources such as internet 10.0%, colleagues 7.0% and other source like books or journal as well as mass media16%, this result consistent with studies conducted in Edo State Nigeria 20%, 8.9% and 4.2% respectively which carry out 207 health care workers [37]. However in this study respondent which has got information from training 38.7% is higher than as compared to a study conducted in Nigeria Edo State 14.6% [37]. This could be due to sample size and opportunities of source of information in the health facilities as well as in the country.

Regarding to the knowledge level in this study 20.2% has high level of knowledge; it was similar with studies conducted in Kabul, Afghanistan 20.8% and Lagos State in Nigeria 20.8% [35, 36]. This result was lower than studies conducted in West Indies state of Jamaica 64.0%, at Edo State in Nigeria 50.3% as well as Bahir Dar City in Ethiopia 84.2% respectively [30, 37, 41]. In the reveres higher than a study conducted in Iran on 210 workers evaluation of knowledge, attitude and behavior of workers towards OHS was 10.5% [31]. This possibly was due to dissimilar of sample size, participant's professional difference and difference of personal understanding on subject as well as level of the health institutions.

In this study 65.3% were having moderate knowledge level on OHS. This result was higher than studies conducted in Jamaica 7.5%, study conducted in Iran 36.7% and in Edo state Nigeria 44.0% [30, 31, 37]. This difference could be due to sample size, level of health facilities and knowledge responsiveness of professional.

In this study 14.5% respondent had low level in overall knowledge on occupational health and safety. This result finding similar with a study conducted in Edo State in Nigeria 5.7% [37]. In contrary this study result lower than studies conducted in west indies city in Jamaica 28.5%, in Iran 52.9% and in Kabul city of Afghanistan 79.2% [30, 31, 35]. This variation may occur as a result of simple size, knowledge status of professionals and training opportunities in the countries.

This study showed that only 4.0% participant had positive attitude towards OHS. The result was lower than studies conducted by Sanaei NH et al in Iran 75.7%, a study conducted by Kelemua G et al in Ethiopia Bahir Dar town 55.6% and a study conducted by Muluken AY et al in Ethiopia Bahir Dar town 35% [31, 41,42]. This difference could be due to sample size, study site, difference of study participants profession and the professional's readiness for attitudinal transform

In other side the study found that 42.8% respondent had negative attitude on occupational health and safety it was consistent with a study conducted in Ethiopia Bahir Dar town by Kelemua G et al on 354 HCWs assessment of KAP of infection prevention in health institution 44.4% [41].

On the subject of safe and separate deposal of sharps and others wastes, this study found 85.0% and the result similar with studies conducted in Riyadh city of Saudi Arabia 92%, in Kabul city of Afghanistan 90.3% and in Ethiopia Mekele town 79.5% which always practiced safe sharp deposal [32, 35, 39]. It was higher than a study conducted in Ethiopia Bahir Dar town 53.7% on 354 [41]. This could be due to sample size, health professional's institutional improvement, availability of separate deposal sharp & other waste boxes and difference of individual's awareness.

In this study 53.2% participants had experience of hand washing practice after end of their routine activities or following direct contact of patient, blood and body fluids all the time. This result corresponding with studies conducted in Riyadh city Saudi Arabia 61.0%, in Mekele town of Ethiopia 61.5%, in Ethiopia Bahir Dar town 69.0% and another study in Bahir Dar town of Ethiopia 62.5% [32, 39, 41, 42].

Conversely this result is lower than studies conducted in South India 88.3%, Kabul city of Afghanistan 88.6% and Edo State of Nigeria 81.2% respectively [34, 35, 37]. This difference might be due to lack of the importance of hand hygiene awareness, availability of enough hand washing station and HCWs overstated of their reported practice of hand washing than the actual.

In this study 18.5% respondents did not record and report laboratory incidents or occurrences. This finding was higher than a study conducted in Saudi Arabia Riyadh city 2.0% [32]. The result was lower than a study conducted in Gondar city of Ethiopia on 344 HCWs 60.5% [40]. This

variation could be due to lack of awareness of professionals recording and reporting of any laboratory workplace injuries or incidents taking as unnecessary issue or valueless practice and difference of simple size.

This study found that 13.9% participants had poor practice towards OHS; almost it was consistent with studies conducted in Kabul city of Afghanistan 15.7% and Edo State of Nigeria 3.9% [35, 37]. On the other side it lower than studies conducted in Eastern Ethiopia Harari and Diredawa town among 475 HCWs towards standard precautions: occupational exposure and behavior 46.9%, in Mekele town of Ethiopia 57.1% and in Ethiopia Bahir Dar town 45.8% respectively [38, 39, 41]. This inconsistency could be due to sample size, difference of study sites as well as difference of study participant's profession.

About 46.8% respondents found that fair practice level on OHS. This result was consistent with a study conducted in Nigeria Edo State among HCWs 49.8% [37].

In this study 70% respondents believed that PPE provided by the health facility are inadequate and all types are not in place. This finding similar with a study conducted in West Indies state of Jamaica 70.8% [30]. However it is higher than as compared to a study conducted in Riyadh city of Saudi Arabia 19.0% and Eastern Ethiopia Harari and Diredawa town 44.8% [32, 38]. This variation could be due to the sample size and concern of the health management administrators.

In the present study, participants who properly deal with OHS and had a good practice level were 39.3%. It consistent with a study conducted in Edo State Nigeria 46.8% [37]. And it was lower than studies conducted in Kabul city of Afghanistan 84.3% as well as a study conducted in Ethiopia Bahir Dar town 54.2% respectively [35, 41]. This difference could be due to sample size, participant's professional difference and working environment conditions.

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1. Strengths

- The study checked & assessed different documents at the moment of observational moment.
- The study was using combined both qualitative and quantitative methods.

7.2. Limitations

- The study was conducted only in four selected teaching hospital MLPs of Ethiopia. Though; it may not be pertinent to generalize the result findings as the whole country.
- Lack of prior research studies literature for further discussion and comparing on the topic was other main confront.

8. CONCLUSION AND RECOMMENDATIONS

8.1. Conclusion

The overall study finding revealed that MLPs who were participated in this study 20.2% had high level of knowledge, 65.3% moderate level of knowledge and 14.5% low level of knowledge towards OHS. About 42.8% respondent had negative attitude, 53.2% neutral, only 4.0% had positive attitude. In regards of practice, 13.9% poor, 46.8% fair & 39.3% had good practice towards OHS.

OHS (Bio-Safety) and Risk Assessment training were strongly associated with knowledge of study participants (P = 0.000). Similarly, Orientation of OHS was found significantly associated with attitude of MLPs (P = 0.002). In addition to this, the study revealed that work experience, training of OHS (Bio-Safety) and Risk Assessment strongly associated with practice of OHS among MLPs (P = 0.000), (P = 0.000) & (P =0.004) respectively.

Thus, orientation about OHS, training of OHS (BioSafety) & risk assessment should be provided for MLPs to enhance as well as improve their knowledge & practice on OHS at working place.

8.2. Recommendations

Based on the study finding to improve the professional knowledge, attitude and practice as well as to minimize future workplace hazards the following ideas recommended

- Each health facility laboratory section and OHS committee better to work together to reduce workplace hazard.
- Facilities required providing proper type and adequate number of PPE.
- Proper and sustainable safety orientation should be given for each MLPs during his or her employment time.
- Every MLPs supposed to take OHS and risk assessment training.
- MLPs expected to be committed to adopt safe work practices to reduce self as well community risk exposure from work place.
- Enhance professional's laboratory hazard/ occurrence recording confidence and proper management.
- Further similar study among MLPs is required.

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ANNEXES

Annex I: English Version Subject Information Sheet

ADDIS ABABA UNIVERSITYS SCHOOL OF ALIAD HEALTH SCIENCE
DEPARTMENT OF CLINICAL LABORATORY SCIENCE

Questionnaire for Assessment of Knowledge, Attitude and Practice towards Occupational Health and Safety among Medical Laboratory Professionals in Selected Teaching Hospital of Ethiopia, 2015.

Identification: Type of Facility_____ Name of Facility_____
Institution code_____

Address: Sub City_____ Kebele_____ Telephone_____

My name is…… I am currently a student of Addis Ababa University, Department of Medical Laboratory Sciences going to conduct a research. I would like to collect information from you by self-administer questionnaires about knowledge, attitude and practice towards occupational health and safety among medical laboratory professional's in teaching hospitals. Objective of this study is to assess the level of knowledge attitude and practice of occupational health and safety in teaching hospital and identify factors that affect laboratory professionals. It will contribute a lot for laboratory professional's health in order to avoid exposure of disease or infection from blood & various infectious body fluids**,** physical and other hazards of occupational health. Your cooperation and willingness for answering the questionnaires will be very helpful in identifying the problems or gaps which related to the issue. I assure you all the collected information by these questionnaires will never release to any parties and kept strictly confidential. Your participation is voluntary and you are not obliged to answer any questions that you do not wish to answer. Please, be aware that all information you provide us is valuable and very important. Do I have your permission to continue?

If yes, continue to the next page for the interview

If no, continue to the next participant

For any information you can contact:

Mr. Tedla Mindaye E-mail:- tedlamin@yahoo.com,mindaye.tedla@gmail.com

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Annex II English Version Consent Format

Consent form to participants on the study of Assessment of Knowledge, Attitude and Practice towards Occupational Health and Safety among Medical Laboratory Professionals in Selected Teaching Hospital of Ethiopia.

I have read the information sheet on the topic above stated and verbal discussion from the supervisor and clearly understood the purpose as well as the anticipated benefit of the research. I hereby need to assure with my signature below that I have decided to voluntarily take part in the study without any coercion or forceful act by the research coordinators to contribute my part for the successful completeness of the research on knowledge, attitude and practice towards occupational health and safety among medical laboratory professionals in this teaching hospital.

Unique code no. _____ Signature _____ Date_____

Supervisor's Name_____ Signature_____

Thank you for your cooperation.

Annex III: English Version Questionner

Study Area Code : _____ **Participant Code : _____**

Structured self-administered questionnaire for Assessment of Knowledge, Attitude and Practice towards Occupational Health and Safety among Medical Laboratory personnel`s in selected Governmental Teaching Hospitals of Ethiopia, 2015.

Part I Socio-Demographic Characteristics of the Respondent

Dear participant, the following questions are targeted to differentiate your Socio-Demographic characteristics Please circle the best proper choice of answer code.

No	Questions	Coding Classification	Code
101	Gender	Male = 1 Female = 2	
102	Age in years	18 – 25 = 1 26 – 30 = 2 31 – 35 = 3 36 – 40 = 4 41 – 45 =5 ≥ 46 = 6	
103	Religion	Orthodox = 1 Muslim = 2 Protestant = 3 Catholic = 4 Other = 5	
104	Marital status	Single = 1 Married = 2 Divorced = 3 Widowed = 4	
105	Educational level	Diploma = 1 First Degree (BSC) = 2 Second Degree (MSc) = 3 Third Degree (PhD) = 4	

106	Employment condition	Contract = 1 Permanent = 2 Other = 3	
107	Monthly income earn	≤ 1,500 = 1 1,600 – 3500 = 2 3,600 - 5,500 = 3 5,600 - 7,500 = 4 7,600 - 9,500 = 5 ≥ 9,600 = 6	
108	Years of work experience	≤ 1 = 1 2 – 5= 2 6 – 9 = 3 10 – 13 = 4 ≥ 14 = 5	
109	Current working laboratory department	Department completed by name_____	
110	Do you have got orientation on occupational health and safety issue during your first employment time?	Yes = 1 No = 2	
111	Have you ever been trained on occupational health and safety or bio safety?	Yes = 1 No = 2	
112	Do you have taken risk assessment training?	Yes = 1 No = 2	

Part II. Knowledge Questions

Dear participants, the following questions are target to see your Knowledge towards occupational health and safety. Please circle the best choice of you answer code.

No	Questions	Coding Classification	Code	
201	Information about occupational health and safety * **If the answer is No go to Questions No 203.**	Yes = 1 No = 2		
202	Source of your information **(Multiple response is allowed)**	Academic	Yes	No
		Program	Yes	No
		Training	Yes	No
		Books or Journal	Yes	No
		Internet	Yes	No
		Mass Media	Yes	No
		Friends	Yes	No
203	Rate your occupational health and safety knowledge status	Excellent = 1 Very Good = 2 Sufficient = 3 Poor = 4		
204	Recognizing type of personal protective equipments when and how to use	Yes = 1 No = 2		
205	Identify type of personal protective equipment **(Multiple response is allowed)**	Laboratory Coat	Yes	No
		Glove	Yes	No
		Face Mask	Yes	No
		Goggle	Yes	No
		Face Shield	Yes	No

206	Laboratory related health hazards at work place **(Multiple response is allowed)**	Needle Stick	Yes	No
		Splash	Yes	No
		Musculoskeletal Disorder	Yes	No
		Electrical Hazard	Yes	No
		Chemical Hazard	Yes	No
		Fall	Yes	No
207	Diseases (infections) could be acquired from laboratory hazard or specimen **(Multiple response is allowed)**	HIV	Yes	No
		Hepatitis B & C Virus	Yes	No
		TB	Yes	No
208	Cause of laboratory related infection transmission routes **(Multiple response is allowed)**	Inhalation	Yes	No
		Ingestion	Yes	No
		Injection	Yes	No
		Physical Contact	Yes	No
209	Laboratory associated infection or causative source of disease **(Multiple response is allowed)**	Blood	Yes	No
		Body cavity Fluid	Yes	No
		Cerebrospinal Fluid	Yes	No
		Discharge	Yes	No
		Sputum	Yes	No
210	Occupational health and safety is to be major and basic subject for any organization	Yes = 1 No = 2		
211	Facility management & employee should take the primary responsibility of occupational health and safety improvement at work place	Yes = 1 No = 2		
212	Know how to use (wear) N95 face mask	Yes = 1 No = 2		
213	Know how to perform risk assessment	Yes = 1 No = 2		

Part III Attitude Questions

Dear Participant, the following questions are target to see your attitudes towards occupational health and safety. Please circle the best choice of you answer code.

No	Questions	Coding Classification	Code
301	Occupational Health and Safety is important for any organization.	Agree = 1 Undecided= 2 Disagree = 3	
302	Occupational health and safety or Bio-Safety training is helpful for laboratory professional's behavioral change.	Agree = 1 Undecided = 2 Disagree = 3	
303	Occupational health and safety or Bio-Safety guideline and manuals are helpful for laboratory work place.	Agree = 1 Undecided = 2 Disagree = 3	
304	Laboratory working environment may expose you to occupational hazards or risks.	Agree = 1 Undecided = 2 Disagree = 3	
305	Medical laboratory professionals are among highest risk of exposure health professionals.	Agree = 1 Undecided = 2 Disagree = 3	
306	All personal protective equipments are available at laboratory working environment.	Agree = 1 Undecided = 2 Disagree = 3	
307	Number of occupational hazards and injuries are reducing time to time in laboratory work place.	Agree = 1 Undecided = 2 Disagree = 3	
308	Every medical laboratory professional should be examined his/her health status each year.	Agree = 1 Undecided = 2 Disagree = 3	

309	Occupational health injuries or any incident occurrence should be recorded in laboratory occurrence (incident) log sheet.	Agree = 1 Undecided = 2 Disagree = 3	
310	Individual workplace risk exposure should be taken (counted) as a crisis of community.	Agree = 1 Undecided = 2 Disagree = 3	
311	Risk assessment is a back bone for occupational health and safety.	Agree = 1 Undecided = 2 Disagree = 3	

Part IV Practice Questions

Dear participants, the following questions are target to see your practices towards occupational health and safety. Please circle the best choice of you answer code.

No	Questions	Coding Classification	Code
401	Are you using occupational health and safety manual or safety manual at work place?	Yes always = 1 Yes sometimes = 2 Not at all = 3	
402	Do you wear glove during contact with blood, body fluid, non-intact skin and mucus membrane specimen?	Yes always = 1 Yes sometimes = 2 Not at all = 3	
403	Do you take shower after completing your laboratory work?	Yes always = 1 Yes sometimes = 2 Not at all = 3	
404	Do you wash your hand with proper detergent at the end of occupation or any contact with clients?	Yes always = 1 Yes sometimes = 2 Not at all = 3	

405	Are you always using appropriate personal protective equipment during your job?	Yes always = 1 Yes sometimes = 2 Not at all = 3	
406	Do you record all occurring hazards (incidents) in occurrence log sheet and report to the responsible person?	Yes always = 1 Yes sometimes = 2 Not at all = 3	
407	Do you clean or disinfect your working area after end of each activity?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
408	Do you monitor your working area waste management system until its final disposal end stage?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
409	Do you practicing general safety Precautions awareness for your laboratory visitors?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
410	Do you not reuse sharp material for laboratory activities?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
411	Do you always perform separate safe collection and disposal of sharps?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
412	Do you share your occupational health and safety knowledge with other new staff members?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
413	Are you advising clients on occupational health and safety problems?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
414	Are you willing to accept comment of colleagues on your occupational health and safety gaps or practices?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	

415	Do you check your health status at least every two years?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
416	If you have a cut, do you covering of all cuts and abrasion with a water proof dressing?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
417	Do you obey appropriately for posted safety signage?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	
418	Have you ever done risk assessment in your laboratory?	Yes Always= 1 Yes Sometimes = 2 Not at all = 3	

Thank you very much for your participation and genuine response!

Annex IV: English Version Observational Checklist

Study Area Code _____ **Date :** _____

No	Questions	Yes	No	Remark
501	Is the size of laboratory space adequate for better & safe possible workflow?			
502	Is the layout of the laboratory as a whole well organized and good setups at all work stations?			
503	Are patient care (specimen collection) and client waiting areas distinctly separate from one another?			
504	Is recording (clerical) area separate from testing stations?			
505	Is each working area free from clutter?			
506	Do all laboratory equipment have cover?			
507	Are the chairs/stools appropriate for working bench height and suitable for testing operations being performed?			
508	Are all laboratory reagents within the manufacturer expiry period?			
509	Does the laboratory room have adequate light?			
510	Are the rooms well ventilated?			
511	Is the room free from excess moisture?			
512	Are workers able to control incoming natural light?			
513	Are all air conditioning (AC) functional?			
514	Is the floor free from creating slip and fall condition?			
515	Are all waste containers labeled with the type of waste for disposal?			
516	Are sharp containers not filled above $3/4^{th}$ of the container?			
517	Are all electrical cords and plugs correctly protected?			
518	Is fire extinguisher available & properly placed?			
519	Is the fire extinguisher inspected?			
520	Is the work place free from noise problem?			

521	Is major safety signage posted and enforced such as No Eating, No Drinking, No Smoking,… and so on?			
522	Is the laboratory secured from unauthorized access with appropriate signage?			
523	Are major personal protective equipments adequately available?			
524	Are personal protective equipments easily accessible?			
525	Are all laboratory personnel use appropriate personal protective equipment?			
526	Is laboratory coat buttoned up when in use?			
527	Are all laboratory personnel use covered shoes?			
528	Does laboratory staff Hepatitis B vaccination evidence available?			
529	Is there specific hand washing station?			
530	Is hand washing detergent available?			
531	Is hand washing procedure available?			
532	Is eyewash station available?			
533	Is eyewash procedure available?			
534	Does emergency shower exist?			
535	Does emergency exit available with its appropriate signage?			
536	Is emergency exit key keeping as everybody knows?			
537	Is emergency alarm or waning bell available?			
538	Is the emergency evacuation procedure posted?			
539	Is the spill kit available with its procedure?			
540	Is First Aid Kit available with sufficient stock & its procedure?			
541	Is Post Exposure Prophylaxis system in place?			
542	Is a trained safety officer assigned?			

543	Is the store room clean, lightening, free from clutter and easily accessible in every direction?			
544	Is there a supply transport trolley?			
545	Are there working safety guideline, manual, policy procedure or records? a. Biosafety			
	b. Infection Prevention			
	c. Waste Management			
	d. Post Exposure Prophylaxis			
546	Are safety related laboratory equipments fully functional? a. Biosafety Cabinet			
	b. Autoclave			
	c. Incinerator			
547	Is emergency contact information posted? a. Post Exposure Prophylaxis Physicians or Nurse			
	b. Hospital guards			
	c. Ambulance			
	d. Fire brigade			
	e. Police station			
548	Are hazardous chemicals properly labeled?			
549	Are hazardous chemicals properly stored?			
550	Is there hazardous chemical & expired regents disposing policy or procedure?			
551	Does the laboratory staff have personal identifying badge?			
552	Are the laboratory personnel undressing their laboratory coat when leaving the laboratory?			
553	Is current safety inspection recording document available?			
554	Is there safety inspection gaps follow-up and corrective action document available at least for the last one year?			

555	Are laboratory workplace occurrences and injuries (incidents) recorded for the last one year?			
556	Are laboratory workplace occurrences or injuries (incidents) log sheet records supervise & action plan monitored at least for the last one year?			
557	Are all workplace occurrences and injuries reported to upper management evidences obtainable?			

Annex V: English Version In-Depth Interview information and Consent Form

I want to thank you for taking your precious time to meet with me today. My name is _____ and I am currently a student of Addis Ababa University, Department of Medical Laboratory Sciences going to conduct a research on assessment of knowledge, attitude and practice towards occupational health and safety among medical laboratory professional's in teaching hospitals. I would like to collect information from you by in-depth interview about occupational health and safety issues regarding to your organization specifically in medical laboratory department. The interview should take about an hour. I will be recording the interview session because I don't want to miss any of your ideas and comments. Although I will be taking some notes during the interview session, I can't possibly write faster enough to get it all down. Because we are on recording, please be sure to speak up loud and relax so that I don't miss your important and valuable comments. All responses will be kept confidential and secured not transfer to other third party. This means your interview responses will only be shared with research team members and we will ensure that any information we include in our report does not identify you as the respondent.

Remember, your participation is voluntary and you don't have to talk about anything you don't want to and you may end the interview at any time, if any dislike conditions happen during the interview. Please, be aware that all information you provide us is valuable and very important.
Are there any questions about what I have just explained?
Are you willing to participate in this interview?

Interviewee Code No. _____ Signature _____ Date_____

For any information you can contact:
Mr. Tedla Mindaye E-mail:- tedlamin@yahoo.com,mindaye.tedla@gmail.com
Tel: +251 911 63 43 24
Mr. Wondwossen Kassa E-mail: wkwv16@yahoo.com Tel: +251 911 45 30 57

Annex VI: English Version In-Depth Interview Questions

Deep interview questionnaire for Assessment of Knowledge, Attitude and practice towards occupational health and safety among medical laboratories in selected governmental teaching hospitals of Ethiopia.

1. Is there occupational health and safety committee?

2. Do you think the laboratory infrastructure is comfortable for the medical laboratory professional's health and working conditions?

3. Are all laboratory hazards and incidents reported to upper management?

4. Is every safety materials inspected and evaluated their functionality and fully availability?

5. Do you think all safety policy, rules and safety signage in place as well as totally respected and applied?

6. Does the management support the laboratory in OHS?

7. Does the health facility have workplace (OHS) hazards improvement project plan?

Thank you for your cooperation!

Annex VII. Addis Ababa University Departmental Research and Ethical Review Committee Proposal Approval

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Date: 03/02/2015

Ref.No. ጤሳኮ/173/15

Departmental Research and Ethics Review Committee (DRERC) decision

Meeting No: 009/2015

Protocol number: DRERC 113/14/MLS

Protocol title: Assessment of knowledge, Attitude and Practice towards occupational health and safety among Medical laboratory personnel in selected governmental teaching hospitals of Ethiopia.

Principal investigator: WONDWOSEN KASSA

Institute: AAU-MF CLS

Elements reviewed (AAUMF 01) [√] Attached [ ] Not attached

Review of revised application [√] Yes [ ] No

Date of previous review: _____

Decision of the meeting: [√] **Approved** [ ] Approved with recommendation

[ ] Approved on Condition (Major revision) [ ] Disapproved

Obligation of the PI-

1. Should comply with the standard international and national scientific and ethical guidelines
2. All the amendments and changes made in protocol and consent form needs DRERC approval
3. The PI should report DRERC within 10 days of the event.
4. End of the study, including manuscripts and thesis works should be reported to the DRERC

Departmental Research and Ethics Review Committee (DRERC) Approval period: from **February 03/ 2015 to February 02/2017**

Follow up report expected in

3 months_____ 6 months__√__ 9 months_____ one year_____

Chairperson, DRERC: GEBRU MULUGETA

Signature: _____

Date: Feb 03/2015

School head: TEDLA MINDAYE

Signature: _____

Date: _____

የሕክምና ላቦራቶሪ ቴክኖሎጂ ት/ቤት School of Medical Laboratory Technology ADDIS ABABA UNIVERSITY

DECLARATION

I, the under signed, declare that this thesis is my original work in partial fulfillment of the requirements for the degree of Masters of Science in Medical Laboratory Sciences (Clinical Laboratory Management and Quality Assurance Track). All the sources of the materials used for this thesis and all people and institutions who gave support for this work are fully acknowledged.

Name: Wondwossen Kassa (BSc)

Signature- ---------- Date: November--------, 2015

Place of submission: Addis Ababa University, school of Allied Health Science Department of Medical laboratory science.
Date of submission: ----------

Approval of the Primary Advisor

This thesis has been submitted for examination with my approval as a university Advisor.

Advisor's Name:

Tedla Mindaye (MSc, PhD fellow) Signature-  Date: November------, 2015