ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF MEDICAL LABORATORY SCIENCES

ASSESSMENT OF KNOWLEDGE, ATTITUDE, PRACTICE AND ASSOCIATED FACTORS TOWARDS OCCUPATIONAL HEALTH AND SAFETY AMONG MEDICAL LABORATORY PROFESSIONALS IN SELECTED GOVERNMENT HEALTH CENTERS IN ADDIS ABABA,ETHIOPIA.

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A THESIS SUBMITTED TO THE DEPARTMENT OF MEDICAL LABORATORY SCIENCES, COLLEGE OF HEALTH SCIENCES, ADDISABABA UNIVERSITY, IN PARTIAL FULFILLMENT OF MASTER OF SCIENCE DEGREE IN CLINICAL LABORATORY SCIENCES. (CLINICAL LABORATORY MANAGEMENT AND QUALITY ASSURANCE)

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This is to certify that the thesis prepared by WalensuHabte:

Assessment of Knowledge, Attitude, Practice and Associated Factors towards Occupational Health and Safety among Medical Laboratory Professionals in Selected Government Health Centers in Addis Ababa. And submitted in partial fulfillment of the requirements for Master of Science degree in Clinical Laboratory Sciences (Clinical Laboratory Management and Quality Assurance) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

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Abbreviation/ Acronyms

AIDS	Acquired Immunodeficiency Syndrome
BBP	Blood-borne pathogens
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCWs	Health Care Workers
HIV	Human Immunodeficiency Virus
ILO	International Labor Office
IP	Infection Prevention
KAP	Knowledge, Attitude and Practice
LSP	laboratory standard precautions
MLPs	Medical Laboratory Professionals
OHS	Occupational Health and Safety
PEP	Post Exposure Prophylaxis
PPE	personal protective equipment
WHO	World Health Organization
SLIPTA	Stepwise laboratory quality improvement process towards accreditation

Abstract

Background:Current knowledge of laboratory workforce on safe working environment leaves much space for improvement and need to be explored further. Common laboratory risks and hazards are numerous but can be minimized with better knowledge, attitude and simple safe working practices. Worker absence due to Work related injuries is an important phenomenon across all countries, industries, and occupations.

Objective: To assess knowledge, attitude, practice and associated factors towards occupational health and safety among medical laboratory professionals in selected government health centers in Addis Ababa from January to May 2020.

Methods:A cross sectional study wasconducted between January to May 2020 among 333 MLPs working in selected government health centers in Addis Ababa. Data was collected using self-administered structured questionnaire; it is also supported by in-depth interview andphysical observation checklist. Data entry, analysis was performed by SPSS version 23 software. Level of statistical significance was set at $p<0.05$

Results: Of the 333 participants, 171(51.4%) were female. The participant's age ranged between 20 and 50 years. The mean knowledge score of respondents was 4.76 ± (SD 1.19) and according to this evaluation 112(33.6%) MLPs were categorized as having high level of knowledge, 161(48.3%) moderate level and 60(18%) had low level of knowledge on occupational health & safety (OHS). Mean attitude score was 17.95± (SD 3.32) and mean practice score was 26.83 ± (SD 5.64). There were strong association between training on bio-safety, work experience, marital status, monthly income, risk assessment training and knowledge score ($p<0.001$). Likewise, orientation on OHS ($p<0.009$) and risk assessment training ($p<0.049$) was significantly associated with attitude score .In addition, work experience ($p<0.001$), training on OHS ($p<0.001$) and risk assessment ($p<0.004$), monthly income ($p<0.022$), educational level ($p<0.024$) and orientation ($p<0.037$)were significantly associated with practice score of laboratory professionals.

Conclusion: Orientation on OHSissue during first employment, Training on OHS or Bio-Safety training and risk assessment training should be given for MLPs to boost as well as get better their knowledge and practice on occupational health and safety at working environment.

Keywords:knowledge,attitude, practice andOHS.

1. Introduction

1.1 Background

Workers usually are faced with numerous occupational hazards and their health and safety may be severely jeopardized if appropriate protective practices are not taken. Among such workers are the clinical laboratory personnel, who areexposed on a daily basis to various hazards and risks from human samples, infectious aerosols, spills, broken glass, cuts from sharp objects, needle stick injuries, chemical agents, centrifuge accidents and others [1].

Laboratory workers should familiarize themselves with universal work precautions[2].Prevention against any disease is proportional to knowledge, attitude and practice (KAP) of the population and reflection of the importance that is paid to health related issue by the society. Universal precaution as defined by Center for Disease Control and prevention (CDC), are a set of precautions designed to prevent transmission of Human immunodeficiency virus (HIV),hepatitis B virus (HBV), and other blood borne infections when providing first aid or health care [2].

Occupational hazards are conditions surrounding a work environment that increase theprobability of death, disability, or illness to workers[3]. Current knowledge of safe working practice in laboratories leaves much to be desired and there are an urgent need for both nationally and internationally agreed codes of safe practice and the development of guidelines for the medical surveillance of laboratory workers [3, 4].

The World Health Organization (WHO) is developing such guidelines in an attempt to protect the health of workers employed in the investigation of ill-health in others. Laboratory hazards are something which may cause injury or damage.These hazards fall generally into one of five categories- Biological, Chemical, Physical, Electrical/Mechanical, high voltage apparatus, machinery with moving parts, and psychological. Every Laboratory worker should be aware of the potential hazards in their workplace. It is important for them to ensure safety in their practice. Personnel must be trained in safe working, provided with appropriate protective clothing, and subjected to agree monitoring procedures to ensure that they are healthy when they start work and remain so during the course of their employment. Safety in laboratory is responsibility of all the employees and employer. Common laboratory risks and hazards are numerous but can be avoided with knowledge, safe working practices and simple rules [4, 5].

The level of compliance with universal precautions by healthcare workers may differ from one type of healthcare workers to another. The differences in knowledge of universal precautions by healthcare workers may be influenced by their varying type of training. The absence of an enabling environment in the health institution, such as a lack of constant running water or a shortage of personal protective equipment (PPE), would lead to poor compliance with universal precautions [6].

Safety during work and handling of laboratory materials is important for prevention of laboratory-acquired infections and exposures among laboratory staff, particularly among those who are working in microbiological laboratories. Without laboratory standard precautions (LSP) and proper training of laboratory staff, the laboratory environment can become very hazardous, [7].

The safety culture reflects the attitudes, values, and priorities of management and employees and their impact on the development, implementation, performance, oversight, and enforcement of safety and health in the workplace. The components of safety culture includes attitudes, environment, and organization system that is able to influence the development of safety culture in the workplace or an organization [8]. The effectiveness of safe work culture is influenced by the management roles, hazard anticipation, and safety training. Inadequate OSH knowledge and awareness, behavior, practices, safety training, and information provided by the organization [8].

In health institution settings, injuries due to needles or sharps pose a great risk towards occupational transmission of blood infections to healthcare workers (HCWs).These injuries are usually caused by hypodermic needles, blood collection needles, intravenous cannulas, etc. during use, recapping, transferring samples, post procedure cleaning, or disposal in non-puncture proof containers [9].

A number of occupational exposures to the patients' blood and body fluids occur each year in health-care settings. Workers and employers are urged to take advantage of available engineering controls and work practices to prevent exposure to blood and other body fluids [10].

The multiplying effects of occupational injuries and diseases among providers of health care include economic loss, physical loss and psychological disorders such as depression and stress. Consequently, these have negative effect on the employees, their families and the nation at large. Occupational health and safety is an important issue because of increased incidence of morbidity

and mortality of exposed employees. An estimated 100,000 people die from occupational hazards, while about 400,000 new cases of occupational diseases are diagnosed every year [11]. Prevention against any disease is proportional to knowledge, attitude and practice (KAP) of the population and reflection of the importance that is paid to health related issue by the society, (12).

1.2 Statement of the problem

Globally, an estimated 2.3 million workers die every year from occupational accidents and work-related diseases. [12]. The human, social and economic costs of occupational accidents, injuries and diseases and major industrial disasters have long been cause for concern at all levels from the individual workplace to the national and international [13].

Occupational hazard is a hazard experienced in the workplace. Laboratory workers are at risk of infection with blood-borne pathogens (BBP) through occupational exposure to blood and infectious body fluids. Laboratoryworkers responsible practices and techniques are required when working with hazardous materials**.** Laboratories mainly have pathological (including some anatomical), highly infectious waste (small pieces of tissue, microbiological cultures, stocks of infectious agents, infected animal carcasses, blood and other body fluids), sharps, some radioactive and chemical waste. Special precautions must be taken to reduce the potential release of these agents. Each laboratory that is using an infectious agent must perform an additional lab specific training [14].

According to available evidences medical laboratory professionals have less awareness and engagement with occupational health and safety (OHS) process. In addition they do not 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 utilization system and orienting them before starting their new 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, [15, 16, 17].

Occupational health and safety OHS practice inappropriately applied in Health Institutions. According to International Labor Organization (ILO) member States and 2011 data from the World Health Organization (WHO) regarding the global burden of disease annually, occupational accidents and work-related diseases cause over 2.3 million fatalities, out of which over 350,000 are caused by occupational accidents and close to 2 million by work-related diseases. As a result, approximately 6,300 people die every day due to these Occupational health and safety problem, [18].

Assessment of Health care workers (HCWs) in Ethiopia suggested that annual prevalence of needle stick injury was 17.5%. Regular update on knowledge, attitude and practice of medical laboratory professionals on occupational health hazards and associated factors will helpresponsible body to take measures to protect them [19].

1.3 Significance of the study

Occupational health and safety is important to safely implement daily routine activities in a given workplace. This study willgenerate the overall information about the level of knowledge, attitude and practice of occupational health and safety among Medical laboratory professionals, which will be used to identify gaps the study sites. This willhelp to make the necessary corrective actions and provide locally or to undertake ongoing work place training based on known gaps. Mainly the study will facilitate to lead safer work place practices by organizations. It will also contribute for guideline revision and also serve as a referencedocument to researchers for further studies on the subject, and it gives updated information for health care policy makers to give more attention to the health facilities' safety aspects as well as for reevaluating of professional risk status.

2. Literature review

Over worldwide million of the workers exposed to the work place accidents and hazardous substances. Almost one million work related deaths and 250 million occupational accidents occur annually. In Pakistan developing county, there is worsening condition due to some reasons that each year many workers suffered with injuries, lack of education, inadequate medical facilities, lack of correct information, and literacy at work place. According to World Health Organization“Occupational hazards is the 10th leading cause of diseases and death at work place.According to International Labor Organization (ILO) member States and 2011 data from the World Health Organization (WHO) regarding the global burden of disease annually, occupational accidents and work-related diseases cause over 2.3 million fatalities, out of which over 350,000 are caused by occupational accidents and close to 2 million by work-related diseases. As a result, approximately 6,300 people die every day due to these Occupational health and safety problem [18,20].

A cross sectional study was conducted in a period of one month in November 2017 to assess the knowledge, attitude and practices regarding Hepatitis B among first, second and third year undergraduate medical students at Amrita Institute of Medical Sciences in south India.Among 230 medical students, 79.1% of students had good knowledge about hepatitis B infection whereas 84.3% of the respondents had the right attitude towards hepatitis B infection. The practice component was low with only 44.8% of the respondents having correct practice towards hepatitis B prevention [21].

Cross-sectional study of health care workers was conducted in the year 2009, which enquired about knowledge, attitude and practices of universal work precautions at a city of at various private hospital of Ahmedabadcityin India. The study administered 200 questionnaires to laboratory technicians and 154 of them were returned giving a response rate of 77%. All the participants wear gloves during laboratory work with81.2% of them wearing a single pair. About 17.5 % of the participants claimed to know what to do if exposed to infection. The study noted that 45.6% of the participants eat in the laboratory, 47.0% of them store foods and water in the refrigerators, 31.5% of them put on cosmetics in the laboratory, 12.6% smoke in the laboratory, 10.0% cut their finger nails with teeth in the laboratory. About 91.5% are not immunized against hepatitis B virus (HBV). About 82.0% of the participants do not feel that the use of masks is necessary in laboratory [2].

A cross-sectional study of medical laboratory staff was conducted in 2010 at various private and public hospitals and clinics of Al-Madinah city, Saudi Arabia. A total of 208 workers participated in the study. About 68% of the workers were trained in laboratory safety. The majority (> 80%) wereknowledgeable for disposing medical wastes, decontamination of sample spills, and use of protective lab coats, gloves, etc. However, among participants, 24.2% used to eat, drink or chew gum, 18.3% used cosmetics and 24.6% used the mobile phone in the laboratory. About 18.4% reported that they continued working with a finger cut, whereas 67% reported that they used to recap needles after blood withdrawal [1].

Astudy was conducted to assess the knowledge and practices of laboratory standard precautions (LSP) among laboratory staff working in Yemen clinical laboratories. In this cross-sectional study which was conducted between September and October 2015 all laboratory staff in main public and private laboratorieswere recruited. A total of 362 participants had filled the study questionnaires with a response rate of 94%. Of the private and public laboratory staff, 67% and 32%had received training on biosafety, respectively. Only 18% of respondents had received the biosafety manual (49% in private laboratories and 11% in public laboratories). Overall, only 38% of respondents had good knowledge of LSP, 49% had fair knowledge, and 13% had poor knowledge. Only 32% of respondents had good practice of LSP, 59% had fair practice level, and 9% had poor practice [7].

A cross sectional self-administeredand responsive questionnaire was provided to HCWs Lady Hardinge Medical College, New Delhi in India.Out of 138 questionnaires evaluated who acquired injury, only 19.6% HCWs have completed hepatitis B vaccination and maximum (93.5%) have post exposure prophylaxis for less than 24 h. Post exposure, only 42% HCWs reported to HIV screening center. After injury, spirit application and squeezing was done by 44.2% HCWs. About 24% HCWs did not follow the universal precautions at work and 38.4% showed ignorance towards standard precautions. The results indicate ignorance and casual approach towards the universal precautions after occupational injuries which might be due to overworked or lack of awareness [9].

A descriptive cross-sectional study was conducted at the ObafemiAwolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Nigeria, in the month of July, 2014.Consenting 400 health workers completed a semi structured questionnaire that assessed participants' general knowledge, attitude, and control and management practice of Ebola virus disease (EVD). The

majority had practiced<73.8% and were aware of the EVD outbreak in the West African sub region 85.5%. Only 42% had good knowledge while 27% knew that there was no vaccine presently to prevent EVD. About one-quarter (24.2%) had low risk perception. The majority (89%) felt the hospital infection control policy was inadequate to protect against Ebola virus Disease [22].

A cross sectional study was carried out from December 2014 to February 2015 to assess knowledge, practice and factors associated with poor compliance with universal precautions among healthcare workers at Buganda Medical Centre, Mwanza, Tanzania. Among 200 participants more than three quarters (82%) of participants had adequate knowledge of universal precautions and out of 200 HCWs, 154 (77.0%) practiced universal precautions. Factors associated with poor practice with universal precautions included lack of personal protection equipment 69.5%, lack of knowledge 65.0%, emergency situations 63.0%, presumption that patient is not infected with HIV or HBV 59.0%, time constraints 53.0%, heavy workload 48.0% and absence of penalties 34.0% [23].

Institution based cross sectional study was conducted in April, 2012 to assess knowledge, attitude and practice of health care workers on infection prevention of health facilities found in Bahir Dar city administration in Ethiopia. A total of 354 healthcare workers were interviewed yielding the response rate of 97.8%. Overall knowledge score of respondents were 84.5% and about 55.6% had positive attitude and 54.2% of respondents' had safe infection prevention practice [24].

Institution based cross-sectional study was conducted in Dessie Referral Hospital from February 2016-June 2016. The study was done on 208 healthcare workers with response rate of 208(100%). All respondents 208(100%) knew about personal protective equipment. Among respondent 182(87.5%) of health care workers knew use of an alcohol based antiseptic for hand hygiene is as effective as soap and water. All of the respondents 208(100%) used glove and wearwhite gown. Nearly all of respondents 205(98.6%) told that they wash hands with antiseptics/soap after work. Generally, the results of the study revealed that 198(95.19%) of health care workers had good knowledge and 182(87.5%) had good practice of infection prevention. Less than one fourth of health care workers (17.7%) were trained on infection prevention [25].

A cross sectional study design was carried out from February to March, 2018. A total of 195 health workers participated in study from Jimma university medical centers in Jimma town to know extent of occupational health and safety (OHS). Among these 129 (63.9%) of health care workers had adequate knowledge, 143(73.33%) of them had strong believe and regarding the attitude most of the respondents, 147 (75.4%), was favorable whereas 48 (24.6%) had unfavorable attitude [26].

As far as my literature search goes there is no published study on knowledge, attitude, and practice with their associated factors towards occupational health and safety in laboratory professionals in Addis Ababa.

2.1 Conceptual frame work

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. The conceptual framework for this study which was 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 as shown in Figure 1 below

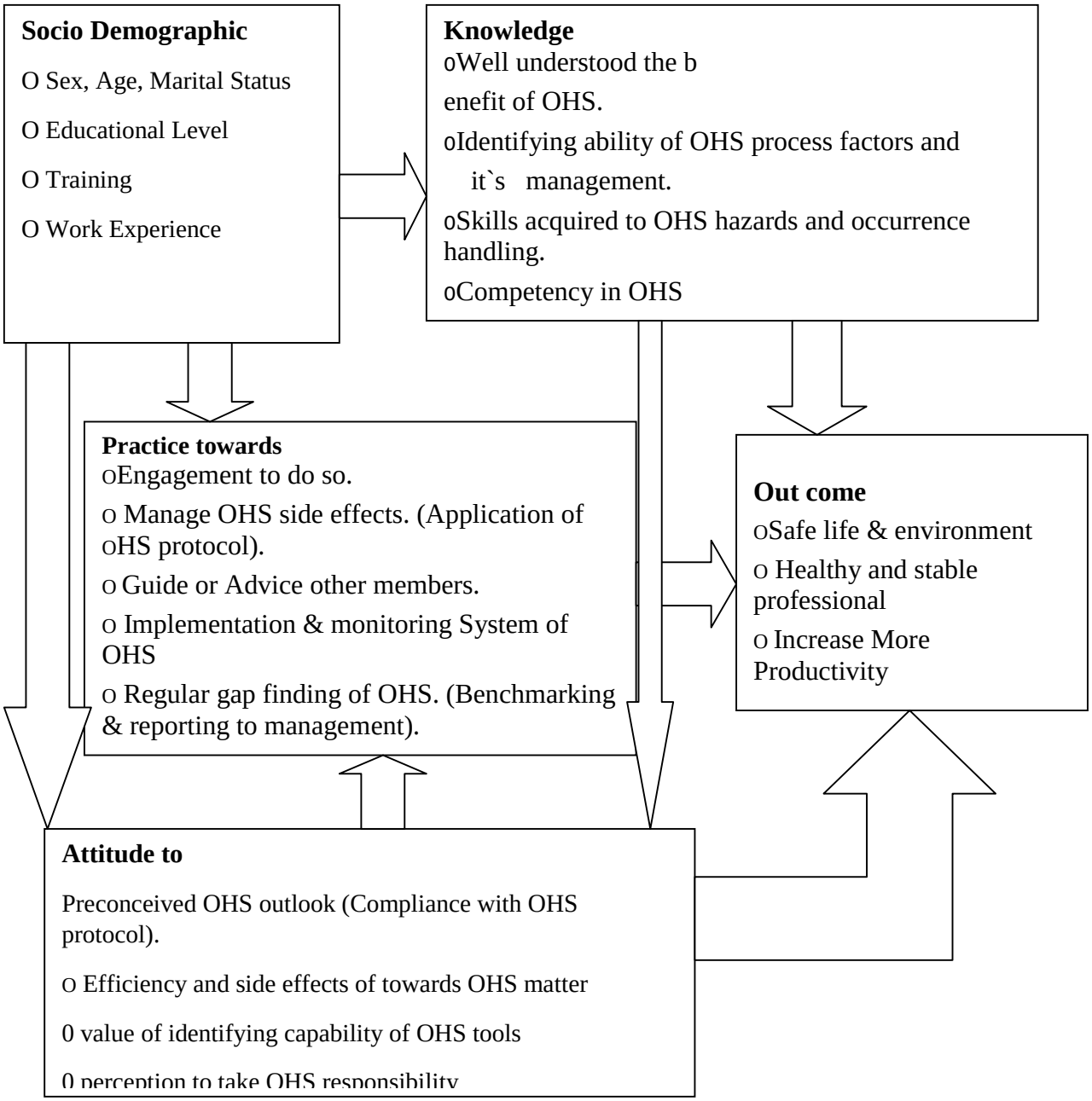

Figure :1 conceptual work of the study.

3. Objectives

3.1 General Objective

To assess the level of knowledge, attitude, practice and associated factors of occupational health and safety among medical laboratory professionals working in selected Government health centers in Addis Ababa from January to May 2020**.**

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
- ✓ To identify factors associated with knowledge, attitude and practice of medical laboratory professionals towards occupational health and safety

4. Materials and methods

4.1. Study Area

This study was conducted at the selected government health centers under the Addis Ababa Health Bureau administration.Addis Ababa health bureau was established in 1985 E.C pursuant to the proclamation number 311/95 Addis Ababa city proclamation of municipality service no. 2/1995.The bureau is authorized to organize, coordinate and regulate public health activities in the city. Addis Ababa health bureau governs ten sub cities.Among these the study was conducted in all health centers in five randomly selected sub cities. These lists ofsub cities are Gulele sub city, Yeka sub city, kolfekeraniyo sub city, Addis ketema sub city and Aradasub city. [Table 1]below describes the health centers in the selected subcities including their location, year of establishment, the number of patients they serve, and number of lab professionals they have.

4.2. Study Period

The study was conducted from January to May 2020.

4.3. Study Design

A descriptive cross-sectional study was designed employing both qualitative and quantitative approach. Self-administered structured questionnaire was applied to assess the status of medical laboratory professional's knowledge, attitudes, practice, and associated factors towards OHS.

Table 1: Background of health centers under Addis Ababa health bureau.

No	Name of health centers(H/C)	Location /sub city	Year of Establishment	Capacity to serve community/year	No. staffs	No.of lab professionals
1	Maychew	Gulele	2005e.c	28400	141	7
2	Entotofana	Gulele	2004e.c	38108	144	6
3	Selam	Gulele	1995e.c	43716	135	6
4	Gutomeda	Gulele	2005e.c	23000	138	6
5	Tebebbekechene	Gulele	2005e.c	35270	130	6
6	Shegole	Gulele	2004e.c	31647	134	6
7	Shiromeda	Gulele	1967 e.c	31843	157	7
8	Hidase	Gulele	2004e.c	50508	162	6
9	Addisugebeya	Gulele	2005 e.c	42590	172	7
10	Addis hiwot	Gulele	2006e.c	40100	147	6

11	Janmeda	Arada	2004e.c	31976	159	7
12	Arada h/c	Arada	2004e.c	33509	161	6
13	Kebena	Arada	2004e.c	39978	144	7
14	Bata /09	Arada	2005e.c	22796	139	6
15	Afinchober	Arada	2004e.c	36597	160	6
16	Churchill	Arada	2005e.c	28513	142	6
17	RasImru	Arada	2004e.c	e30766	139	6
18	Semegnkebede	Arada	2007e.c	18435	138	6
19	Semen h/c	Arada	1960e.c	42987	150	8
20	Wereda 09	Arada	2006e.c	33420	133	6
21	Entotokutir 01	Yeka	2003e.c	45217	147	6
22	Entotokutir 02	Yeka	1988e.c	847073	163	8
23	Faransayakebab	Yeka	2002e.c	38349	135	7
24	Korea Zemach	Yeka	2002e.c	16891	132	6
25	Yeka h/c(w-05)	Yeka	2004e.c	34280	144	6
26	Aware	Yeka	2006e.c	31000	140	6
27	Wereda 07	Yeka	2004e.c	35220	137	6
28	Chaffee (08)	Yeka	2007e.c	3400	143	6
29	Kotebe (09)	Yeka	2001e.c	35240	142	7
30	Wereda 10	Yeka	2006e.c	33230	145	6
31	Rai h/c(w-11)	Yeka	2000e.c	31078	140	6
32	Wereda 12	Yeka	2007e.c	42194	152	6
33	Wereda 13	Yeka	2005e.c	44000	154	6
34	Sara ampoule	Yeka	2009e.c	33420	118	6
35	Yekaabado	Yeka	2008e.c	31264	123	6
36	Wereda 03	Addis ketema	2004e.c	36073	138	7
37	Addis ketema h/c	Addisketema	1973e.c	41988	168	8
38	Felegemeles	Addisketema.	2005e.c	31370	134	5
39	Wereda 10	Addisketema	2007e.c	21202	114	5
40	Addis rai	Addisketema	2005e.c	37755	126	6

41	Abyssinia	Addisketema	2005e.c	34275	130	6
42	AbebeBikila	Addisketema	2005e.c	33641	128	5
43	Millennium	Addisketema	2006e.c	37937	144	6
44	Ginbot 20	Addisketema	2007e.c	28489	123	6
45	Kuasmeda	Addisketema	1994e.c	33357	146	5
46	Wereda 03	Kolfekeraniyo	2006 e.c	28700	129	6
47	Keraniyo h/c	Kolfekeraniyo	2005e.c	30090	150	6
48	Alembank h/c	Kolfekeraniyo	2000e.c	48376	163	8
49	Wereda 09	Kolfekeraniyo	1994e.c	41100	163	8
50	Mikililand	Kolfekeraniyo	2006e.c	37350	157	6
51	Wereda 06	Kolfekeraniyo	2005 e.c	36760	134	7
52	Wereda 05	Kolfekeraniyo	2006e.c	36480	149	6
53	Kolfe h/c	Kolfekeraniyo	1979 e.c	70009	241	13
54	Wereda 01	Kolfekeraniyo	2007e.c	32376	152	6
	Total					340

4.4. Population

4.4.1. Source Populations

The source of population for this study was all medical laboratory professionals working in Addis Ababa city government health centers.

4.4.2. Study Populations

The total number of medical laboratory professionals who were working in selected government health center laboratories during the study period and fulfilling the eligibility criteria.

4.5. Inclusion and Exclusion Criteria

Based on censes method all MLPs who were working actively (currently on job) in the selected study sites were included in the study. Other supportive workers and nonprofessional staff members were excluded from the study.

4.6. Sample Size

The sample size taken based on census sampling method. The sample size was calculated using a finding from Jimma to give the maximum possible sample size. Accordingly, a total number of333medical laboratory professionals that found in all the selected government health centers wereincluded in the study [26].

$$n = \frac{(Z_{1-\alpha/2})^2 \times p \times (1-p)}{d^2} \quad = \frac{(1.96)^2 \times 0.73 \times 0.27}{0.05^2} = 303$$

Adding 10% of non-response rate=303/10=30

n = 303+30=333

n = the desired sample size

p = expected prevalence.

Zα/2 = confidence value for normal distribution at 95% Confidence level which is equal to 1.96 (z value at=0.05)

d = the margin of error taken as 0.05

4.7. Sampling Technique

Fifty four (54) governmental health centers were selected through random sampling of the subcities first and then essential data collected from the total number of 333 MLPs who were actively working in the selected health facilities.

4.8. Data Collection Methods

Self-administered semi-structured questionnaire wasdeveloped in English language 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 which includes in-depth interview questions. It was prepared in English version by considering of all medical laboratory professionals were 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 in nonparticipating health centers. The intent of these pretesting was to check ambiguities and as it was easily understandable to the participants. Data collection wascarried out during January to May 2020.

4.9. Study Variables

4.9.1. Dependent Variables

Level of KAP participants towards OHS.

4.9.2. Independent Variables

Age, sex, gender, educational level, working experience, PPE availability, facility, PPE use, availability of waterand training of participants wereindependent variables.

4.10. Variable Measuring and Scoring Method

Part I Socio-Demographic Data

It includeseleven questions that consists of sex, age, marital status, income , employment condition , educational level, work experience in the health facility, and whether orientation as well as trainings are provided or not.

Part II: Knowledge towards OHS

In this section there were thirteen questions 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 has scores of 8-10 out of 10 questions categorized high level, 5-7 scores moderate level and low level of knowledge about OHS are those who has scores of 0-4. This scoring system has been usedin an earlier studies [27, 29, 30].

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 added up for total and calculated for mean. The scoring defined as Positive for who scores 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 [27, 28].

Part IV: Practice towards OHS

All eighteen questions contain multiple choices that ask regarding to how often the MLPs perform required tasks for the successful implementation of OHS in their working areas. For those who answer Yes Always is given 2 point, for Yes Sometimes 1 and for Not at All is scored 0 respectively. The scores vary from 0–36 points. The scores measuring practice of MPLs towards OHS are with 3 levels classification; good practice 32-36 points, fair practice 19-31 and poor practice level 0–18 points [29].

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4.12. Data Quality Assurance.

The following precautions were considered to assure the quality of the data. The questioner was pretested at Kazanchis and Meshewalekya health centers before collecting the actual data to undertake and ensure its clarity and easily understandability for each respondent. After the required refinement taken place questionnaire wasdistributed to each study participants. Data

collection wasby trained and well experienced personnel with the necessary proper supervision or under control. The principal investigator was recheckedthe 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 wasperformed by the principal investigator, it follows by data entry in to the designed data base SPSS software version 23for 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 were used where appropriate to identify if relationships exists between categorical variables. P value set as $p<0.05$ was considered as used to ascertain significant associations between demographic variables and level of KAP. Regarding to qualitative study the principal investigator was executed observation checklist during data collection.In addition to that, in-depth interview was conducted, transcribed, and the descriptive summary was prepared.

4.14. Ethical Considerations

Before conducting the research, ethical clearance was obtained from the Department Research and Ethical Review Committee (DRERC) of Department of Medical Laboratory Sciences College of Health Sciences Addis Ababa University. 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 was completed the result was delivered to Addis Ababa University department Medical Laboratory Science and relevant bodies or stake holders. It will available in the library to serve as a reference material for students, researchers, experts or policy makers for intervention. This result will also be disseminated for publication in peer reviewed local and international journals and presenting in related conferences.

4.16. Operational Definition

Occupational Health and Safety: is the study subject who 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.

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. Result

Assessment of knowledge, attitude and practice towards OHS among MLPs study was conducted from Januaryto May 2020. All finding results presented based on their sequential order. Out of 333 administered questionnaires a total of 333 MLPs responded the questionnaire. There was no any missed value on the result.

5.1. Socio-Demographic Characteristics of the Study Population

The frequency distribution of 333 laboratory professionals according to demographic related variables was as follows. As shown in Table 2, slightly over half (171/333, 51.4%) were females.The participant's age range was 20 up 50 with mean age of 29.87 and x̄±SD 4.97 (years). The majority of the participants were in the age group 25-29 years (39.9%)In this age category 65(48.9%) male and 68(51.1%) female were existed, followed by 30-34 years (31.8%) and 20-24 years (12%).In terms of marital status, 177 (53.2%) participants were single (55.9%) male and 44.1% female) and 146 (43.8%) participants were married (41.1% male and 58.9% female) (Table 2).

The study participants had different educational level. The largest number of respondents 200(60.1%) had first degree BSc (47% male and 53% female), 127(38.1%) diploma and 6(1.8%) had MSc. From allparticipants 237 (71.2%) have got orientation on OHS issue during first employment time. Regarding training 209 (62.8%) were trained on OHSor biosafety.About risk assessment,majority 195 (58.6%) were trained. Table 2 displays the details.

Table 2: Socio demographic characteristics of Medical Laboratory professionals working in selected Government health centers in Addis Ababa (n=333), January to May 2020

Variables	Category	Numbers	Percent %
Gender	Male	162	48.6
	Female	171	51.4
Age (Years)	20-24	40	12
	25-29	133	39.9
	30-34	106	31.8
	35-39	37	11.1
	40 and above	17	5.1
Marital status	Single	177	53.2
	Married	146	43.8
	Divorced	9	2.7
	Widowed	1	0.3
Educational level	Diploma	127	38.1
	First degree BSc	200	60.1
	MSc	6	1.8
Employment condition	Contract	4	1.2
	Permanent	327	98.2
	Other /free service	2	0.6
Monthly income (Birr)	≤ 4609	47	14.1
	4700 – 5358	75	22.5
	5400 – 6193	49	14.7
	6200 – 7071	66	19.8
	7100 – 8017	56	16.8
	≥ 9056	40	12
Department	Hematology	58	17.4
	Chemistry	66	19.8
	Serology	65	19.5
	Parasitology	78	23.4
	Other	66	19.8
Orientation on OHS	Yes	237	71.2
	No	96	28.8
Training on OHS/bio-safety	Yes	209	62.8
	No	124	37.2
Risk assessment training(those trained how to do risk assessment)	Yes	138	41.4
	No	195	58.6

Majority of the study participants, 155(46.5%) had 5-8years work experience, 100(30%) respondents had 1-4yearswork experience, 56(16.8%) respondents had 9-12 years ,15(4.5%) had 13-16yearswork experience and 7(2.1%) respondents had served 17 yearsand above.(Figure 2).

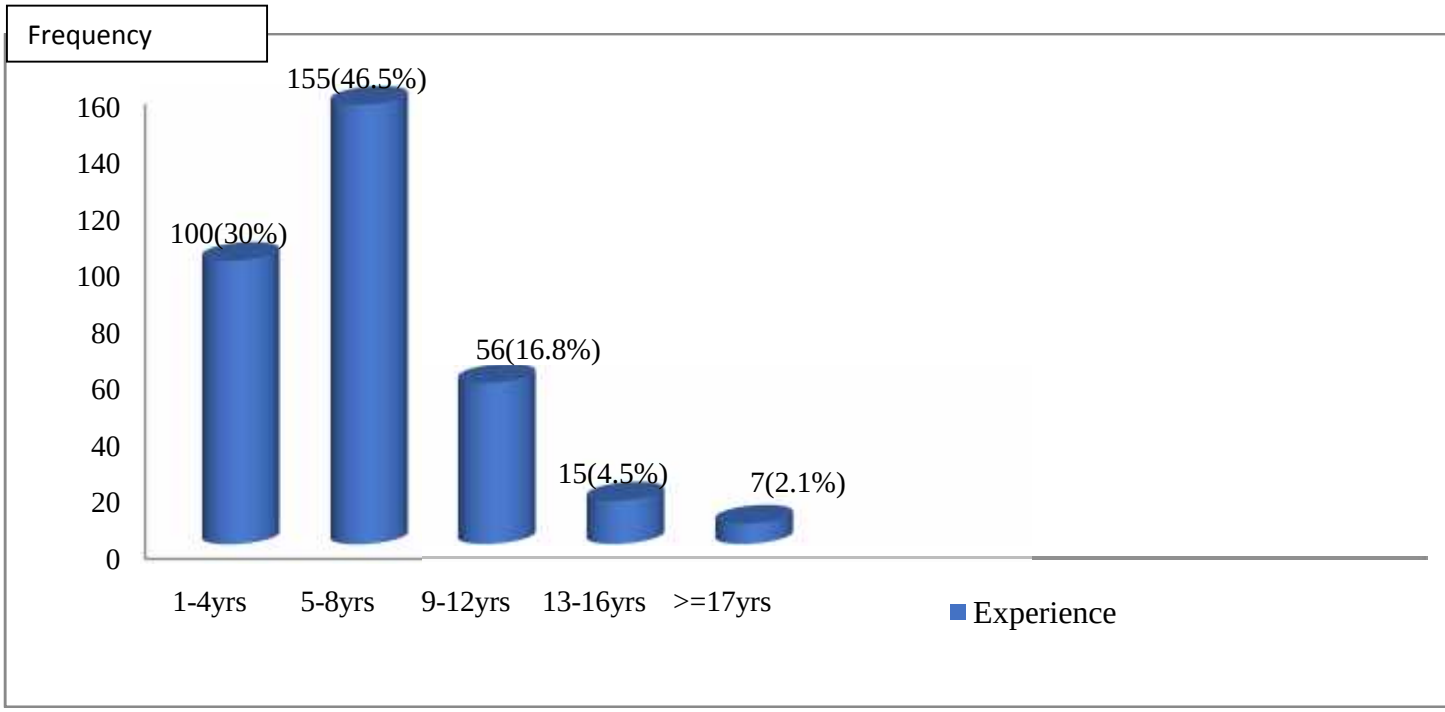

Figure 2. Frequency of participant's based on work experience distribution (n=333), January to May 2020

5.2 Knowledge, Attitude and Practice of Medical Laboratory Professionals towards OHS

5. 2.1. Knowledge of Medical Laboratory Professionals towards OHS

Majority of participants 254(76.3%) formally orinformally haveinformation about occupational health and safety. Many respondents 179(53.8%) main source of information about OHS was Academic, 154(46.2%) had information from training, 140(42%) got information from books or journals and the least 28 (8.4%) have got source of information from mass media.

About 113(33.9%) respondentshad two and above different source of information, 32(9.6%) had three and above, 14(4.2%) had all source of information on occupational health and safety and others have got from one source. Almost all participants 325 (97.6%) have knowledge about type of personal protective equipments when and how to use.Concerning knowledge of personal protective equipments, 312 (93.7%) respondents were able to identify glove, 302(90.7%) know

laboratory coat, 227(68.2%) identify facemask, 119(35.7%) familiar with goggleand 68(20.4%) recognize face shield.

According to participants that gave response about diseases or infectionsthat could be acquired from laboratory hazard or specimen, TB was stated by 267(80.2%), 265(79.6%) was HIV, 257(77.2%) was HBV and HCV, 182(54.7%) was corona virus and 131(39.3%) was Ebolavirus. On the otherhand, 211(63.4%) had the knowledgeon how to use or wear N95 face mask and185(55.6%) had the awareness on how to perform risk assessment.Many participants were 296(88.9%) aware that needle stick injury isthe highest health hazard at work place. Whereas the least identified laboratory related health hazards at work place were fall or slip43(12.9%) and musculoskeletal disorder 48(14.4%).

The knowledge of laboratory professionalsregarding the cause of laboratory related infection transmission routes was injection by 282(84.7%), inhalation 160(48%) and ingestionby 91(27.3%) of the participants.Majority of participants 287(86.2%) from these 143(42.9%) males and 144(43.3%) femaleshad concern that facility management and employee should take the primary responsibility of occupational health and safety improvement at work place, while 46(13.8%) had no concern about it (Table 3).

Table 3: Knowledge of Medical Laboratory Professionals towards OHSworking in selected Government health centers in Addis Ababa (n=333), January to May 2020

Knowledge evaluation item	Category	Numbers	Percent (%)
Information about occupational health and safety	Yes	254	76.3
	No	79	23.7
Source of your information	Academic	179	53.8
	Training	154	46.2
	Books or Journal	140	42
	Internet	61	18.3
	Mass Media	28	8.4
	Friends	114	34.2
Knowledge about type of personal protective equipments when and how to use	Yes	325	97.6
	No	8	2.4
Identify type of personal protective equipment	Laboratory Coat	302	90.7
	Glove	312	93.7
	Face Mask	227	68.2
	Goggle	119	35.7
	Face Shield	68	20.4
Laboratory related health hazards at work place	Needle Stick	296	88.9
	Splash	238	71.5
	Musculoskeletal Disorder	48	14.4
	Electrical Hazard	109	32.7
	Chemical Hazard	272	81.7
	Fall	43	12.9
	Sound hazard	68	20.4
Diseases (infections) could be acquired from laboratory hazard or specimen	HIV	265	79.6
	Hep.B& C Virus	257	77.2
	TB	267	80.2
	Corona virus	182	54.7
	Ebola virus	131	39.3
Cause of laboratory related infection transmission routes	Inhalation	160	48
	Ingestion	91	273
	Injection	282	84.7
	Physical Contact	93	27.9
Laboratory associated infection or causative source of disease	Blood	230	69.1
	Body cavity Fluid	206	61.9
	Cerebrospinal Fluid	91	27.3
	Discharge	94	28.2
	Sputum	243	73
	Stool	181	54.4
	Urine	174	52.3
Occupational health and safety is to be	Yes	322	96.7

major and basic subject for any organization	No	11	3.3
Facility management & employee should take the primary responsibility of occupational health and safety improvement at work place	Yes	287	86.2
	No	46	13.8
Know how to use (wear) N95 face mask	Yes	211	63.4
	No	122	36.6
Know how to perform risk assessment	Yes	185	55.6
	No	148	44.4

Relating to occupational health and safety self knowledge rating conditions, 72(21.6%) rated as excellent, 121 (36.3%) answer as sufficient, the rest 117 (35.1%) and 23 (6.9%) were very good and poor grading to themselves correspondingly (Figure 3).

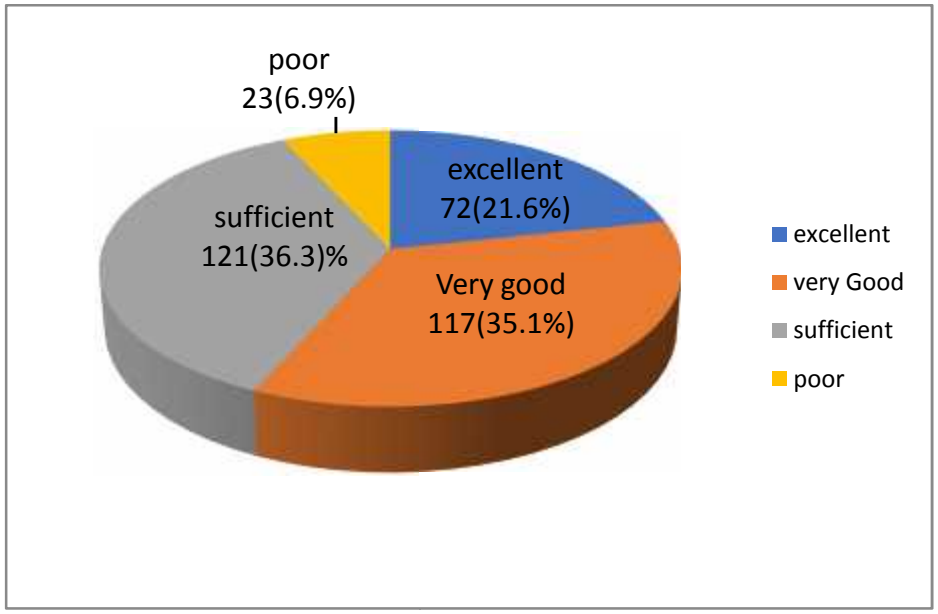

Figure 3: Study participant`s self-Knowledge rating onOHS (n=333)

5.2.2Mean score 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 mean (x̄)4.76 and standard deviation (SD)1.19of knowledge score. According to the study evaluation 112 (33.6%) MLPs were categorized as having high level of knowledge, great number of respondents 161(48.3%) were scored moderate level of knowledge, whereas 60 (18%) had low level of knowledge on OHS.

5.2.3 Associated factors affecting knowledge level of MLPs towards OHS

Regarding associated factors that affecting knowledge level; age (P=0.000), marital status (P=0.000), educational level (P=0.003), work experience (P=0.000), monthly income (P=0.000), Training of OHS or Bio-Safety (P=0.000) and Risk Assessment training (P=0.000) were strongly associated with knowledge level of OHS among medical laboratory professionals. [Table 4]. However the study finding did not show that significant association with gender, employee condition, Orientation on OHS during employment time and their current laboratory department.

Table 4: Medical laboratory professionals' knowledge and associated factors on OHS in selected health center of Addis Ababa, (n=333), January to May 2020

Variables	Knowledge			Chi-square	P value	Df	Fisher exact test
	Low	Moderate	high				
Gender							
male	26 (16%)	85 (52.5%)	51 (31.5%)	2.221	.345	2	2.212
Female	34 (19.9%)	76 (44.4%)	61 (35.7%)				
Age							
20-24	19(47.5%	15(37.5 %	6(15%)	38.364	0.000	8	36.926
25-29	25(18.8%)	65(48.9 %	43(32.3%				
30-34	16(15.1%)	52(49.1 %)	38(35.8%)				
35-39	0(0.0%)	21(56.8 %)	16(43.2%)				
>=40	0(0.0%)	8(47.1%	9(52.9%)				
Marital status							
Single	44 (29.9%)	94 (53.1%)	39 (22%)	28.791	0.000	6	28.621
Married	16 (11%)	63 (43.2%)	67 (45.9%)				
Divorced	0	4(44.4%)	5(55.6%)				

Widowed	0	0	1(100%)				
Educational level							
Diploma	37 (29.1%)	59 (46.5%)	31 (24.4%)				
First degree BSc	23 (11.5%)	99 (49.5%)	78 (39%)	20.061	0.003	4	19.112
MSc	0	3(50%)	3(50%)				
Employee condition							
Contract	0	1(25%)	3(75%)	5.372	0.221	4	3.713
Permanent	60 (18.3%)	158 (48.3%)	109 (33.4%)				
Other	0	2(100%)	0				
Work experience							
1-4	37((37%)	42(42%)	21(21%)				
5-8	21(13.5%)	76(49%)	58(37.4)	41.877	0.000	8	39.704
9-12	2(3.6%)	32(57.1 %)	22(39.3%)				
13-16	0(0.0%)	8(53.3%	7(46.7%)				
>=17	0(0.0%)	3(42.9%	4(57.1%)				
Monthly income							
≤ 4609	19 (40.4%)	17 (36.2%)	11 (23.4%)				
4700 – 5358	18 (24%)	36 (48%)	21 (28%)	35.226	0.000	10	32.826
5400 – 6193	6(12.2%)	29 (59.2%)	14 (28.6%)				
6200 – 7071	9(13.6%)	37 (56.1%)	20 (30.3%)				
7100 – 8017	7(12.5%)	23 (41.1%)	26 (46.4%)				
≥ 9056	1 (2.5%)	19 (47.5%)	20 (50%)				
Current working							

department							
Hematology	6(10.3%)	33(56.9 %)	19(32.8%)				
Chemistry	9(13.6%)	26(39.4 %)	31(41%)	14.350	0.078	8	14.260
Serology	14(21.5%)	26(40%)	25(38.5%)				
Parasiotology	16(20.5%)	41(52.6 %)	21(26.9%)				
Other	15(22.7%)	35(53%)	16(24.2%)				
Orientation on OHS							
Yes	40 (16.9%)	109 (46%)	88 (37.1%)	4.527	0.123	2	4.635
No	20 (2o.8%)	52 (54.2%)	24 (25%)				
Training on OHS /biosafety							
Yes	14 (6.7%)	100 (47.8%)	95 (45.5%)	63.260	.000	2	64.643
No	46 (37.6%)	61 (49.2%)	17 (13.7%)				
Risk assessment training							
Yes	9 (6.5%)	57 (41.3%)	72 (52.2%)	43.790	0.000	2	45.109
No	51 (26.2%)	104 (53.3%)	40 (20.5%)				

5.2.4Attitude of Medical Laboratory Professionals towards OHS

About 93.7(312%) participants male 153(45.9%) and female 159(47.8%) agree that occupational health and safety is important for any organization, whereas 1(0.3%) disagree and 20(6%) were undecided or neutral about it. RegardingtoOccupational health and safety or Bio-Safety 314(94.3%)respondents belief that training is helpful for laboratory professional's behavioral change, while 17(5.1%) undecided and 2(0.6%) disagree on the issue. Many participants 259(77.8%) agree on occupational health injuries or any laboratory incident should be recorded in laboratory occurrence (incident) log sheet, but 33(9.9%) disagree and 41(12.3%) undecided.Just about 221(66.4%) participants disagree on the availability of all personal protective equipments at laboratory working environment. Majority of participants 311(93.4%) agree that Occupational health and safety or Bio-Safety guideline and manuals are helpful for laboratory work place and others 22(6.6%) were neutral. Most of the participants 263(79%) believed that medical laboratory professionals are among higher risk of exposure health professionals, while 11(3.8%) participants were disagree and 59(17.8%) neutral. Majority of respondents 153(45.9%) were agreed on the decline of occupational hazards & injuries from time to time in laboratory work place; however ,100(30%) were against the reducing of occupational hazards and injuries from time to time in laboratory work place. Among all respondents 300(90.1%) thought that risk assessment is a back bone for occupational health and safety though the least figure 4(1.2%) disagree and 29(8.7%) were had a neutral idea. In relation to Individual workplace risk exposure 269(80.8%) participants believed that it should be taken (counted) as a crisis of community. Therefore;188(56.5%) assumed that every medical laboratory professional should be examinedhis/her health status each year, while 64(19.2%) disagree about examining their health status each year[Table 5].

Table 5: Attitude of medical laboratory professionals towards OHS in selected Governmental health centers in Addis Ababa (n=333). January to May 2020

Attitude questions	Agree	Undecided	disagree
Occupational Health and Safety is important for any organization	312(93.7 %)	20(6%)	1(0.3)
Occupational health and safety or Bio-Safety training is helpful for laboratory professional's behavioral change.	314(94.3)	17(5.1%)	2(0.6)
Occupational health and safety or Bio-Safety guideline and manuals are helpful for laboratory work place.	311(93.4 %)	22(6.6%)	0%
Laboratory working environment may expose you to occupational hazards or risks.	318(95.5 %)	14(4.2%)	1(0.3%)
Medical laboratory professionals are among highest risk of exposure health professionals.	263(79%)	59(17.7%)	11(3.8%)
All personal protective equipments are available at laboratory working environment.	75(22.5%)	37(11.1%)	221(66.4 %)
Number of occupational hazards and injuries are reducing time to time in laboratory work place.	153(45.9 %)	80(24%)	100(30%)
Every medical laboratory professional should be examined his/her health status each year.	188(56.5 %)	81(24.3%)	64(19.2)
Occupational health injuries or any incident occurrence should be recorded in laboratory occurrence (incident) log sheet.	259(77.8 %)	41(12.3%)	33(9.9%)
Individual workplace risk exposure should be taken (counted) as a crisis of community.	269(80.8 %)	46(13.8%)	18(5.4%)
Risk assessment is a back bone for occupational health and safety.	300(90.1 %)	29(8.7%)	4(1.2%)

5.2.5 Mean score Attitude level of MLPs towards OHS

To calculate the status of participant's attitude towards Occupational health and safety among medical laboratory professionals, a total of 11 questions were asked with a simple Likert-scale method. The attitude mean ($\bar{x}$) value with 17.95 and standard deviation(SD) were ± 3.32.

According to the study data finding large amount of subjects 242 (72.7%) are found in positive Attitude, 77(23.1%) found neutral and 14 (4.2%) negative attitude.

5.2.6Associated factors affecting attitude level of MLPs towards OHS

The study finding indicated that associated factors which affect the attitude level of medical laboratory professionals towards OHS, Orientation of OHS during employment (P=0.009) was found significantly associated and risk assessment training (P=0.051) was slightly associated with attitude of OHS among MLPs .Other socio demographic characteristics did not show any significant association with the attitude level [Table 6].

Table6: Medical laboratory professionals' attitude and associated factors on OHS in selected government health center of Addis Ababa, (n=333)

Variables		Attitude			Chi-square	P value	df	Fisher exact test
		Negative	Neutral	Positive				
Gender	Male	3(1.9%)	37(22.8%)	122(75.3%)	4.465	0.108	2	4.421
	Female	11(6.4%)	40(23.4%)	120(70.2%				
Age	20-24	3(7.5%)	13(32.5%)	24(60%)				
	25-29	4(3%)	30(22.6%)	99(74.4%)	6.308	0.615	8	6.155
	30-34	5(4.7%)	21(19.8%)	80(75.5%)				
	35-39	2(5.4%)	10(27%)	25(67.6%)				
	>=40	0(0%0	3(17.6%)	14(82.4%)				
Marital status								
Single		8(4.5%)	45 (25.4%)	124 (70.1%)	4.814	0.480	6	6.022
Married		6(4.1%)	28 (19.2%)	112 (76.7%)				
Divorced		0	4(44.4%)	5(55.6%)				
Widowed		0	0	1(100%)				
Educational level								
Diploma		4(3.1%)	30(23.6%)	93(73.2%)				
First degree BSc		10 (5%)	47(23.5%)	143 (71.5%)	2.963	0.547	4	2.212
MSc		0	0	6(100%)				
Work experience								
1-4		2(2%)	29(29.%)	69(69%)	8.744	0.343	8	7.061
5-8		11(7.1%)	31(20%)	113(72.9%				
9-12		1(1.8%)	12(21.4%)	43(76.8%)				
13-16		0(0%)	3(20%)	12(80%)				
>=17		0(0%)	2(28.6%)	5(71.4%)				
Monthly income								
≤ 4609		1(2.1%)	13(27.7%)	33(70.2%)				

4700 – 5358	4(5.3%)	19(25.3%)	52(69.3%)	3.626	0.313	10	3.792
5400 – 6193	2(4.1%)	12 (24.5%)	35(71.4%)				
6200 – 7071	3(4.5%)	11 (16.7%)	52(78.8%)				
7100 – 8017	3(5.4%)	12 (21.4%)	41(73.2%)				
≥ 9056	1(2.5%)	10(25%)	29(72.5%)				
Employment condition							
Contract	0	0	4(100%)				
Permanent	14(4.3%)	77(23.5%)	236(72.2)	2.298	0.492	4	2.296
Other	0	0	2(100%)				
Current working department							
Hematology	3	12	43	7.942	0.429	8	7.861
Chemistry	3	21	42				
Serology	2	10	53				
Parasitology	5	18	55				
Other	1	16	49				
Orientation on OHS							
Yes	8(3.4%)	52(21.9%)	177(74.7)	2.297	0.330	2	2.440
No	6(6.3%)	25(26%)	65(67.7%)				
Training on OHS /bio-safety							
Yes	6(2.9%)	40(19.1%)	163(78)	8.411	0.009	2	8.333
No	8(6.5%)	37(29.8%)	79(63.7%)				
Risk assessment training							
Yes	4(2.9%)	24(17.4%)	110(79.7)	5.910	0.051	2	5.830
No	10(5.1%)	53(27.2%)	132(67.7%)				

5.2.7 Practice of MLPs towards OHS.

From the total participants 153(45.9%) always used occupational health and safety manual or safety manual at work place, 147(44.1%) used sometimes and 33(9.9%) used not at all. About 258 (77.5%) wear gloves all the time during contact with blood, body fluid, non-intact skin and mucus membrane specimen,70(21%) seldom put on and 5(1.5%) not at all. A number of 176(52.9%) occasionally clean or disinfect their working area after end of each activity accomplished, but 142(42.6%) did always and 15(4.5%) not at all. Just about 161(48.3%) respondents often recorded all occurring hazards (incidents) in occurrence log sheet and report to the responsible person, while 152(45.6%) done sometimes and 20(6%) did not.

Almost 168(50.5%) regularly practicing general safety Precautions awareness for their laboratory visitors whereas, 149(44.7%) were practiced sometimes and 16(4.8%) were not practice. Majority of 271(81.4%) always not reuse sharp material for laboratory activities While, 18(5.4%) were not at all. Among all participants 240(72.1%) frequently share their occupational health and safety knowledge with other new staff members, but89(26.7%) sometimes discus and 4(1.2%) never. Just 197(59.2%) respondent always advising clients on OHS problems whereas 119 (35.7%) were occasionally counsel and 17(5.1%) were not at all. A greater part of respondents 243(73) willing to accept comment of colleagues on their OHS practice gaps or practices,but 6(1.8%) were not willing to accept entirely. Concerning their health status 46(13.8%) were not checked at least every two yearsand among respondents 66(19.8%) had never done risk assessment in the laboratory. Majority of participants183(55%) were sometimes abide to posted safety signage, 129(38.7%) obey frequently but 21(6.3%) not practiced at all.

Table 7: Practice of medical laboratory professionals towards OHS in selected Governmental health centers in Addis Ababa, (n=333), January to May 2020

Questions	Yes always	Yes sometimes	Not at all
Are you using occupational health and safety manual or safety manual at work place?	153(45.9%)	147(44.1%)	33(9.9)
Do you wear glove during contact with blood, body fluid, non-intact skin and mucus membrane specimen?	258(77.5%)	70(21%)	5(1.5%)
Do you take emergence shower as soon as splash?	116(34.8%)	155(46.5%)	62(18.6%)
Do you wash your hand with proper detergent at the end of occupation or any contact with clients?	176(*52.9%)*	140(42%)	17(5.1%)
Are you always using appropriate personal protective equipment during your job?	212(63.7%)	110(33%)	11(3.3%)
Do you record all occurring hazards (incidents) in occurrence log sheet and report to the responsible person?	161(48.3%)	152(45.6%)	20(6%)
Do you clean or disinfect your working area after end of each activity?	142(42.6%)	176**(**52.9%)	15(4.5%)
Do you monitor your working area waste management system until its final disposal end stage?	194(58.3%)	118(35.4%)	21(6.3%)
Do you practicing general safety Precautions awareness for your laboratory visitors?	168(50.5%)	149(44.7%)	16(4.8%)
Do you not reuse sharp material for laboratory activities?	271(81.4%)	44(13.2%)	18(5.4%)
Do you always perform separate safe collection and disposal of sharps?	268(80.5%)	61(18.3%)	4(1.2%)
Do you share your occupational health and safety knowledge with other new staff members?	240(72.1%)	89(26.7%)	4(1.2%)
Are you advising clients on occupational health and safety problems?	197(59.2%)	119(35.7%)	17(5.1%)
Are you willing to accept comment of colleagues on your occupational health and safety gaps or practices?	243(73%)	84(25.2%)	6(1.8%)
Do you check your health status at least every two years?	102(30.6%)	185(55.6%)	46(13.8%)
If you have a cut, do you covering of all cuts and abrasion with a water proof dressing?	188(56.5%)	121(36.3%)	24(7.2%)
Do you obey appropriately for posted safety signage?	129(38.7%)	183(55%)	21(6.3%)
Have you ever done risk assessment in your laboratory?	133(39.9%)	134(40.2%)	66(19.8%)

5.2.8 Practice level of MLPs towards OHS

To decide eachrespondent of medical laboratory professional's practicalattributes towards to occupational health and safety, level of practice was classified in to poor, fair and good categories. The mean (x̄)26.83and standard deviation (SD) value was5.64. Generally the study finding indicated thatabout 33(9.9%) respondents were found with poor practice, whereas 224(67.3%) fair practice and76(22.8%) had good practices.

5.2.9 Associated factors affecting practice level of MLPs towards OHS

The study finding showed that training on OHS/bio-safety (p=0.000), risk assessment training (p=0.004) and work experience (p=0.000) were strongly significantly associated with practice of OHS among medical laboratory professionals, whereas marital status (p=0.014), educational level (p=0.024), monthly income (p=0.022) and orientation on OHS during employment (p=0.037) were indicated slightly significant [Table 8].

Table 8: Medical laboratory professionals' practice and associated factors on OHS in selected health center of Addis Ababa, (n=333), January to May 2020

Variables		Practice			Chi-square	P value	df	Fisher exact test
		Poor practice	Fair practice	Good practice				
Gender	Male	20 (12.3%)	104 (64.2%)	38 (23.5%)	2.386	0.312	2	2.371
	Female	13 (7.6%)	120 (70.2%)	38 (22.2%)				
Age	20-24	8(20%)	27(67.5%)	5(12.5)				
	25-29	11(8.3%)	97(72.9%)	25(18.8)	13.799	0.087	8	13.582
	30-34	8(7.5%)	69(65.1%)	29(27.4%)				
	35-39	3(8.1%)	23(62.2%)	11(29.7%)				
	>=40	3(17.6%)	8(47.1%)	6(35.3%)				
Marital status								
Single		26 (14.7%)	122 (68.9%)	29 (16.4%)				
Married		6(4.1%)	96 (65.8%)	44(30.1%)	16.915	0.014	6	18.643
Divorced		1(11.1%)	5(55.6%)	3(33.3%)				
Widowed		0	1(100%)	0				
Educational level								
Diploma		21 (16.5%)	75(59.1)	31 (24.4%)				
First degree BSc		12 (6%)	145 (72.5%)	43 (21.5%)	11.977	0.024	4	11.266
MSc		0	4(66.7%)	2(33.3%)				
Work experience								
1-4		20(20%)	61(61%)	19(19%)	29.108	0.000	8	24.378
5-8		7(4.5%)	107(69%)	41(26.5%)				
9-12		3(5.4%)	42(75%)	11(19.6%)				
13-16		0(0%)	11(73.3%)	4(26.7%)				
>=17		3(42.9)	3(42.9%)	1(14.3%)				
Monthly income								
≤ 4609		11 (23.4%)	24 (51.1%)	12(25.5%)				
4700 – 5358		9 (12%)	51 (68%)	15(20%)	20.602	0.022	10	19.469
5400 – 6193		4(8.2%)	30 (61.2%)	15(30.6%)				
6200 – 7071		3(4.5%)	48 (72.7%)	15(22.7%)				
7100 – 8017		1(1.8%)	44	11(19.6%)				

		(78.6%)					
≥ 9056	5(12.5%)	27(67.5)	8(20%)				
Employment condition							
Contract	0	3(75%)	1(25%)	1.430	0.919	2	1.044
Permanent	33 (10.1%)	219 (67%)	75 (22.9%)				
Other	0	2(100%)	0				
Current working department							
Hematology	4(6.9%)	36(62.1%)	18(31%)	9.775	0.280	8	9.769
Chemistry	5(7.6%)	42(63.6%)	19(28.8%				
Serology	9(13.8%)	40(61.5%)	16(24.6%				
Parasitology	9(11.5%)	58(74.4%)	11(14.1)				
Other	6(9.1%)	48(72.7%)	12(18.2%				
Orientation on OHS							
Yes	23(9.7%)	151(63.7)	63(26.6%	6.670	0.037	2	6.93
No	10(10.4%)	73(76%)	13(13.5%				
Training on OHS /biosafety							
Yes	8(3.8%)	144(68.9 %)	57(27.3%)	26.043	0.000	2	25.235
No	25(20.2%)	80(64.5%)	19(15.3%)				
Risk assessment training							
Yes	6(4.3%)	92(66.7%)	40(29%	11.291	0.004	2	11.613
No	27(13.8%)	132(67.7)	36(18.5%				

5.3Observational Assessment Result

To keep and support the evaluation of qualitative data, the selected health centers were assessed by observational checklist during data collection time. This observational assessment covered the health centers setup (space adequacy and safe workflow), cleanness, arrangement /appropriateness, waste disposal system, documents and records related to occupational health and safety.

Regarding the establishment of these health facilities a few of them have along service year while, almost all of them have 10-15 service years. All these health centers served for many clients by delivering different types of laboratory tests per day. Almost all study facilities the layout of laboratory have good setup , specimen collection and client waiting areas distinctly separate from one another as a result of stepwise laboratory quality improvement process towards accreditation (SLIPTA). All waste containers labeled with the type of waste for disposal; Sharp containers are properly used and not filled more than 3/4th of the container, each room name was labeled to differentiate for what purpose it stands for.

Majority of the laboratory professionals used PPE during their routine activities, but some of them didn't buttoneduplaboratorycoat and used uncovered shoes in the laboratory.All staffs had hepatitis B vaccination evidence and major safety signage posted and the application of such as no eating; no drinking, no smoking, and so on were a major gap. Majority of respondents at study areas had personal identifying badge, but many staffs did not use it during service delivery time.

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.

During observation conducted majority of health centers have specific hand washing stations, hand washing procedure is available, manual eye washing is existed, but in many study area emergency shower was not functional.

In many site there was 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 occurrences. Unavailability of supply transport trolley expired hazardous chemical disposal policy and procedure were major gaps of the laboratories. Some facilities havelack of comfortable sitting chair matched with appropriate working bench height and suitable for testing. This could create discomfort on work; stress on worker and also may expose the professionals for musculoskeletal disorder illness through time.
Risk assessment practice, safety inspection gaps follow- up, corrective action document availability at least for the last one year, consistent recording of laboratory hazard occurrences andreporting to upper management were somewhat practiced in all study sites.

5.4 Finding of in-depth interview

In order to strengthen quantitative study part and to spot extending of the laboratory professional safety practice and attitude, in-depth interview was conducted with the study areas environmental andoccupational health personnel. The interviewees were twofemale and three male, had four to twelve years of work experiences and had 25 up to 39 years of age range. The interview was focused about OHS issues how far strengthens and associated to the workplace safety based on their personal opinion as well as responsibility. The inquiry was including relevant issues based on the study subject.

Availability of OHS Committee form

Structuring of occupational health and safety committee in an organization is a system to improve workplace safety progress. Interviewees described theavailability of committee formally, but the job description of the committee was not briefly identified. It consisted ofdifferent combination of professional from each department with a variety of educational level.In all study sites the chairman of the committee is a medical director. The entire interviewee agreed that by means of various reasons the existing committee was not active and inconsistenton its responsible task.

Infrastructure

All the interviewed participants revealed that the laboratory infrastructure is not comfortable for the laboratory professional's health and for their working conditions. Especially microscopic working chair is not adjustable /fitted with table and it is not ergonometric. The room is not well

ventilated,the height of the window is not at ease of opening, no adequacy of tap water during acid fast bacilli staining time and blood film, emergency shower is for the sake of symbol/not functional. One participant said on the above comment that “The quality of service delivering is compromised due lack of comfortable infrastructure”.

Recording and Reporting of Laboratory Incident and Hazards to upper management

All respondents agreed on, it cannot be assured that all laboratory incidentoccurrence or hazards recorded on the recording log sheet, but not reviewed periodically as well as not reported to the upper management for decision making.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 except safety officer who delegated as whole safety officer.

Inspection and Availability of Personal Protective Equipment

All of the participants have the similar opinion that all personal protective equipments are not available at workplace, specially mask, apron, face shield and laboratory eye goggle because of no budget planning for PPE; lack of giving attention to it, no internal monitoring and evaluation system, require management awareness to predict risk and other similar things. Regarding to inspection, the reaction of participants indicated the inspection only done in the facility when there is external supervision, and inspection is limited a few items like availability of laboratory coat, glove, fire extinguisher and waste containers. But no inspections of expiry date and functionalityof fire extinguishers were done. Almost all health facilities have whistle instead of fire alarm.

Obeying Safety Policy, Rules and Safety Signage

All respondents revealed that no one obey, safety policy, rules and safety signageexcept hand washing area with glove and without glove.

Management support on OHS

Concerning management support,intervieweeshadsimilar idea about the management support to the laboratory section towards OHS improvement. The management support by supplying hepatitis B vaccination, renovating and repairing few working environments, procuring personal protectiveequipment and avail required safety materials for laboratory department and similarly for other departments as well. The laboratory department isnot satisfied by the quality, quantity and type of the procured PPE and safety materials as well as on this limited supportive condition. In the future this supportive gap have to be solved. Since, safe and healthy human resource is a vital value for every country organization.

OHSHazard Improvement Project Plan

In every institution infection prevention committee was organized, but they have no job description, no project plan and the aim of infection prevention (IP) is not stated.Entire personnel respond and confirmon the unavailability of OHS hazard improvement project plan with a budget. Because of not being proactive,lack of awareness, observe as minor thing, scarcity of budget and focusing on other daily 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

The study assessed knowledge, attitude, practice and associated factors towards occupational health and safety among medical laboratory professionals in selected government health centers in Addis Ababa. Occupational health and safety arevital concerns for developing countrieslike Ethiopia that have limited utilized human powerand inadequate resourceallocation in health institutions and other organizations.

In the currentstudy the respondents have got source of information about occupational health and safety from different sources such as mass media 8.4%, training46.2% ,academic53.8% and internet 18.5%.A study from Buganda Medical Centre, Mwanza, Tanzaniawhich was carried out in July 2016 among health care workers was consistent regarding traning as a source of information (41.5%) but three times more respondents have media as their sources in Tanzania (25% vs 8.4% in the current study). Relatively similar proportion of respondents mentioned internet as source of information in both studies (18.5% current study vs 13.5% in Tanzania) [23]. But in this study respondent which has got information from academic53.8% is higher than as compared to a study conducted at Bugando Medical Centre, Mwanza, Tanzania20%[23]**.**This might be due to sample size difference, curriculum differences in terms of addressing OHSand accessibilities of source of information in the health facilities as well as in the country.

The current study showed that the knowledge level in this study is rated of high level of knowledge in 33.6% of them; it was comparable with studies conducted in Yemen clinical laboratories 38% [7],Kuantan Pahang, Malaysia 29% [8],intertiary hospital in Ile-Ife,and lower than a study from Nigeria 42% [25].This finding result was lower than studies conducted in Nawaz sharif social security hospital Lahore Pakistan 67.5% [3], healthcare workers at Bugando Medical Centre, Mwanza, Tanzania82% [6],health care workers in Bahir Dar city administration, North Ethiopia 84.2% [24], at Dessie referral Hospital, South Wollozone ,Amhara region, North East Ethiopia Health Workers 95.19% [25], and at Jimma University Medical Center, Jimma Town, South West Ethiopia 63.9% [26].

However,this finding is higher than a study conducted in teaching hospitals in Lagos State, Nigeria on 154 workers which reported20.8% [29]. This could be due to different sample size, participant's professional difference, use of different definition to define knowledge levels, and difference of personal understanding on subject as well as level of the health institutions.

In this the finding shows that 48.3% were having moderate level of knowledge on occupational health and safety. This result was similar with the study conducted on knowledge and practice of biosafety among laboratory staff working in clinical Laboratories inYemen clinical laboratories which reported 49% [7]. But this study was higher than the study conducted in teaching hospitals in Lagos State, Nigeria on 154 workers that demonstrated moderate knowledge level in 37.5%of the respondents [29].This dissimilaritymight be due to sample size difference, level of health institution and knowledge responsiveness of professional respondents though differences in rating level of knowledge cannot be ruled out.

In this study conducted 18% laboratory professionals had low level in overall knowledge on occupational health and safety. This finding is related with a study conducted among healthcare workers at Bugando Medical Centre, Mwanza, Tanzania 18% [6]. In contrary this study result was lower when compared to studies conducted to determine predictors of knowledge, attitude and practices on work related injuries among laboratory staffs in a public university in Malaysia35.5%[5] and at Nawaz Sharif social security hospital Lahore, Pakistan 32.52%[3,5].Although, this finding was greater than the study done among laboratory staff working in clinical laboratories in Yemen which was 13% [7].This variation could occur as a result of, work experience, knowledge status of professionals and training opportunities in the countries.

Thecurrent study showed that 72.7% participant had positive attitude towards occupational health and safety. Thisresult is equivalent with research conducted on among health workers at JimmaUniversity medical center, Jimma town, South West Ethiopiathat reported 73.3%with positive attitude[26].However, the study finding was low when compared with research donein a private medical college in Kochi, India where 84.3%hadpositive attitude [21].In contrary this finding is greater than that was demonstrated by a research conducted on assessment of knowledge, attitude and practices regarding occupational hazards among nurses at Nawaz Sharif social security hospital Lahore,Pakistan which reported 58.9% positive attitude [3]. Predictors of knowledge, attitude and practices on work related injuries among laboratory staffs in a public University in Malaysia 51.1% positive attitude[5] andassessment of knowledge, attitude and practice of health care workers on infection prevention in health institution Bahir Dar city administration, Ethiopia 55.6% had positive attitude [24].This difference mightbe due to difference of study participants profession and the professional's readiness for attitudinal change.

The study conducted show that 4.2% participants had negative attitude on occupational health and safetywhich is less than study done on attitude regarding occupational hazards among nurses at Nawaz Sharif social security hospital Lahore, Pakistan 43.1% [3], among laboratory staffs in a public university in Malaysia 48.9% [5],in health institution Bahir Dar city administration, Ethiopia 44.4% [24] and among health workers at medical center, Jimma town, south west Ethiopia 24.6% had negative attitude [26].

On the other hand the current study found that 23.1% respondents score neutral attitude on OHS. This result is similar with the study conducted on attitude of health workers in a tertiary hospital in Ile-Ife, Nigeriawhich was 24.2% [22]. However, this finding was inferior thanthe research conducted toassess attitude towards HIV post-exposure prophylaxis among health workers at Jimma University medical center, South west Ethiopiain which 75% had neutral attitude[26]. This is due to difference in the type of professional health care workers and in the case of Jimma University medical center report a single disease was studied.

The present study found that 9.9% respondents had poor practice towards occupational health safety.This result wasclosely related with study conducted among laboratory staff working in clinical laboratories in Yemen 9% [7]. Comparatively this result was better than the studies conducted onpractice of laboratory technicians regarding universal work precaution in the College of medical sciences Amargadh Bhavnagar, India which reported 42.3% [2] and among healthcare workers at Bugando Medical Centre, Mwanza, Tanzaniawhich was 23% those practiced poorly [23]. This inconsistency could be due to respondent's qualification, sample size, difference of study sites as well as difference of study participant's profession.

According to this study 67.3% participants indicated that fair practice level on occupational health and safety. This finding was nearly similar with a study conducted on amonglaboratory staff working in clinical laboratories in Yemen where 59% had fair practice[7].

In the present study, participants who properly deal with occupational health and safety had a good practice level of22.8%. This result finding is slightly lower comparedto the research done on practice of bio-safety among laboratory staff working in clinical laboratories in Yemen (32%) [7]. However, this finding muchlower than studies conducted on practice of laboratory technicians regarding universal work precaution in India 57.7% [2], practices of work related injuries among laboratory staffs in a public university in Malaysia 64.4% [5],and a study on the assessment of OHS regarding hepatitis B among medical students in a private medical college in

Kochi, India 44.8% [21]. Is is also lower compared to a study on practice of universal precautions among healthcare workers at Bugando medical Centre, Mwanza, Tanzania[23] and health care workers in health institution Bahir Dar city administration, Ethiopia 54.2% [24] whish showed good practice level.This difference might be due to participant's professional difference and working environment conditions.

7. Strengths and Limitations of the Study

7.1. Strengths

- This study was the first in its kind to assess KAP level of laboratory professionals who are working in Addis Ababa government health center laboratories. Hence, the result of the study

will be used for further study in this or related areas. The findings are comparable with other studies carried on other countries in same and or other study topics.

- The study checked and assessed different documents and records during observation.
- In this study both qualitative and quantitative methodswere combined

7.2. Limitations

- Limited studies in medical laboratory professionalsin the literature in different countries for further discussion and comparing on the topic.
- The study was conducted on Medical laboratory professionals working in Addis Ababa health centerswhich may not generalize the whole country.

8. Conclusion and Recommendations

8.1. Conclusion

The general studyfinding about assessment of knowledge, attitude, practice and associated factors revealed that medical laboratory professionals who were participated in this study 33.6% had high level of knowledge, 48.3% moderate level of knowledge and 18% low level of knowledge towards occupational health and safety. About 72.7% respondent had positive attitude, 23.1% neutral, only 4.2% had negative attitude. About practical level, 67.3% hadfair practice, 22.8% good practiceand9.9% had poor practice towards occupational health and safety among medical laboratory professionals.

Training on OHS or Bio-Safety(p=0.000), educational level (p=0.003),work experience(p=0.000), marital status(p=0.000), age (p=0.000),risk assessment training(p=0.000) and monthly income (p=0.000) were strongly associated with knowledge of study participants .Likewise, Training on OHS /bio-safety(p=0.009) was found strongly associated and risk assessment training(p=0.05) was slightly associated with attitude of medical laboratory professionals .In addition to this, the study revealed that Training on OHS or Bio-Safety (p=0.000), risk assessment training(p=0.04) and work experience(p=0.000) were strongly associated with practice of occupational health and safety whereas, monthly income(p=0.022),educational level(p=0.024),marital status (p=0.014) and orientation (p=0.037) were slightly associated.

Hence, orientation on occupational health and safety issue during first employment, Training on occupational health and safety or Bio-Safety training and risk assessment training should be given for medical laboratory professionals to boost as well as get better their knowledge and practice on occupational health and safety at working environment.

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8.2 Recommendation

Depending on the study finding, to advance the professional knowledge, attitude and practice and to reduce occupational hazards the following ideas recommended

- ✓ Each health center should run OHS committee effectively and efficiently to minimize occupational hazards.
- ✓ Health facilities should provide sufficient personal protective equipment.
- ✓ During employment time consistent OHS orientation should be given for medical laboratory professionals.
- ✓ All MLPs supposed to take OHS and risk assessment training.
- ✓ MLPs should bemotivated to adopt safe work practices and to reduce themselves as well as community risk exposure from occupational hazards.
- ✓ Enhance professional's laboratory hazard/ occurrence recording confidence and proper management
- ✓ The government should create motivated policy to enhance the capacity of medical laboratory professionals in order to reduce occupational hazard.
- ✓ Further largerstudy among MLPs is required

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Annexes

Annex I: English Version Subject Information Sheet

Addis Ababa Universitycollege of health science Departmentof medical Laboratory Science .

Questionnaire for Assessment of Knowledge, Attitude, Practice and associated factors towards Occupational Health and Safety among Medical Laboratory Professionals in Selected government health centers in Addis Ababa, 2020.

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 selected government health centers . Objective of this study is to assess the level of knowledge attitude and practice of occupational health and safety in health centers 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 and 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:

Dr. Aster TsegayeE-mail:-tsegayeaster@yahoo.comTel: +251 911696085

Mr. AlemayehuNigatu (MSc, MPH) E-mail:- alemayehu.nigatu43@gmail.com +251 929903436

Mr. WalensuHabte E-mail: -walensuhabte6@gmail.com Tel: +251 912350637

Annex II: Amharic Version Subject Information Sheet

በአዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ የ ሕክምና ላቦራቶሪ ሳይንስ ት/ክ ፍልበ ማስ ተርስ ድግሪ ተማሪ የ መመረቂያ ጥናትላይ እዲሳ ተፉተጋብዘዋል፡

እባክዎበዚህጥናትለመሳተፍከመስማማትዎበፊትከዚህቀጥሎየ ሚገኘዉን ምን ባብበጥሞና ያንብቡና ግልጽያልሆነ ልዎትን ማንኛዉምሃሳብይጠይቁ፡ ፡ የ ጥና ቱር ዕስ “Assessment of Knowledge, Attitude and Practice towards Occupational Health and Safety among Medical Laboratory Professionals in Selected government health centers in Addis Ababa, 2020”.

መለ ያ ቁጥር :የ ተሳ ምአ ይነ ት _____የ ተሳ መስ ም_____የ ተሳ መመለ ያ ቁጥር _____አ ድራሻ ፡ ክ /ከ ተ ማ_____ቀ በ ሌ_____ስ ልክ ቁ ._____

የ እር ስ ዎበዚህ ጥና ትላ ይየ ሚኖር ዎትተሳ ትፎመሉበ መሉበ በጎ ፈ ቃደኛነ ትላ ይየ ተመሰ ረተ ነዉ፡ ይህ መረ ጃየ ር ስ ዎን ማን ነ ትየ ሚገ ልጡመረ ጃዎችን ማለ ትምስ ም:አ ድራሻ ና የ ስ ልክ ቁጥር የ መሳ ሰ ሉት ን መረ ጃዎቹን አ ይጨምር ም፡ ፡

ይልቁን ምለዚህአ ገ ልግሎት ብቻየ ሚዉልእ ር ስ ዎን ለ ማወቅ የ ሚያ ስ ችል መለ ያ ቁጥር ጥቅ ምላ ይእን ዲዉ ልይደረ ጋል፡ ፡ ስ ለ ራስ ዎየ ሰ ጡት ማን ኛዉምመረ ጃ ዉጤት የ ሚዉለ ዉለ ጥና ቱአ ላ ማብቻነ ዉ፡ ፡

ይህ ጥና ትየ ማስ ተር ስ ዲግ ሪ መመረ ቂያ እን ደ መሆኑ መጠን በ ዚህ ጥና ትበ መካ ፈል ዎበ ገ ን ዘ ብየ ሚያ ገ ኙ ትጥቅ ምባ ይኖር ምከ ጥና ቱበ ሚገ ኝ ውውጤት ግ ን ተጠቃሚይሆና ሉ፡ ፡

በ ዚህ ጥና ትላ ይመሳ ተፍ በ ማን ኛ ዉምሰ ዓ ትና ቦ ታየ ማቋ ረ ጥመሉመብትየ ተጠበ ቀ ነ ው::ከ ዚህ ምበ ተጨማ ሪ ጥና ቱን በ ተመለ ከ ተማን ኛ ውን ምአ ይነ ትጥያ ቄየ መጠየ ቅ ና ገ ለ ፃ የ ማግ ኘት መብትአ ለ ብዎት፡ ፡

እር ስ ዎበ ሚሰ ጡን መረ ጃየ ችግ ሩን ስ ፋትለ መከ ላ ከ ልእ ና ለ መቆ ጣጠር ጠቃሚስ ለ ሆነ ለ ሚቀ ር ብልዎትጥ ያ ቄቀ ጥተ ኛ መልስ ይሰ ጡን ዘ ን ድበ ታላ ቅአ ክ ብሮ ትእ ን ጠይ ቃለ ን ፡ ፡

ጥያ ቄዉን ለ መቀ ጠልፍ ቃደ ኛነ ዎት?

አ ዎከ ሆነ ወደ ምቀ ጥለ ዉገ ፅ :አ ይደ ለ ምከ ሆነ ወደ ቀ ጣይተ ሳ ታፊ ይቀ ጥሉ፡ ፡

ይህ ን ን ጥና ትበ ተመለ ከ ተጥያ ቄካ ለ ዎትበ ሚመለ ከ ተውአ ድራ ሻ ይጠቀ መ፡ ፡

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ወሌን ሱህ በ ቴ ኢሜል ፡ -walensuhabte6@gmail.comTel: +251 912350637

Annex III 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 health centers in Addis Ababa**.**

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 selected health centers.

Unique code no. _____Signature _____ Date_____

Supervisor's Name_____ Signature_____ Date_____

Thank you for your cooperation.

Annex IV. Informed consent form in Amharic version

የ ጥና ትስ ምምነ ትማረ ጋገ ጫበ Assessment of Knowledge, Attitude and Practice towards Occupational Health and Safety among Medical Laboratory Professionals in Selected health centers in Addis Ababa.

የ ተሳ ታፊ ዉስ ም ----------

እ ኔ ስ ሜከ ላ ይየ ተ ጠቀ ሰ ውተ ሳ ታፊ “Assessment of Knowledge, Attitude and Practice towards Occupational Health and Safety among Medical Laboratory Professionals in Selected government health centers ”ጥና ትላ ይበ ቂገ ለ ፃ ና የ ጥና ቱን ምአ ላ ማዎ ች ምተ ረ ድቻ ለ ሁ፡ ፡

በ ቃለ መጠይ ቁላ ይየ ገ ለ ጽ ኳ ቸ ውመረ ጃ ዎች በ መሉ በ ሚስ ጥር የ ተ ጠበ ቁእ ን ደ ሚሆ ኑ ተ ነ ግ ሮ ኛ ል፡ ፡
በ ጥና ቱላ ይያ ለ መሳ ተ ፍ ና ማን ኛ ውን ም መረ ጃ ያ ለ መስ ጠት እ ን ዲ ሁ ም በ ማን ኛ ው ም ጊ ዜ ከ ጥና ቱ ራ ሴ ን የ ማ ግ ለ ል መብ ቱ የ ተ ጠበ ቀ እ ን ደ ሆነ ተ ገ ል ጾ ል ኛ ል፡ ፡

ስ ለ ዚ ህ ለ ዚ ህ ጥና ት መረ ጃ ና የ ስ ም ምነ ት ቃ ሌ ን የ ሰ ጠ ሁ ት በ አ ጠ ቃላ ይ ሁ ኔ ታ ውን በ መረ ዳ ት ና በ ፍ ፁ ም ፍ ቃ ደ ኛ ነ ት ነ ው።
በ ተ ጨ ማሪ ም ጥ ያ ቄ ለ መ ጠ የ ቅ ተ ፈ ቅ ዶ ል ኝ ለ ማ ወ ቅ የ ፈ ለ ኩ ት ን ያ ህ ል ማ ብ ራ ሪ ያ በ አ ጠ ቃላ ይ እ ኔ ከ ላ ይ በ መ ተ ማ መ ኛ ቅ ፅ የ ተ ጠ ቀ ሱ ት ን ሁ ሉ በ ሚ ገ ባ ና በ ተ ረ ጋ ጋ መ ን ፈ ስ አ ን ብ ቤ ዋ ለ ሁ ኝ፡ ፡
ስ ለ ዚ ህ በ ዚ ህ ጥና ት ለ መሳ ተ ፍ ፈ ቃ ደ ኛ መሆ ኔ ን በ ፊ ር ማ ዬ አ ረ ጋ ግ ጣ ለ ሁ፡ ፡

ስ ም_____ፊ ር ማ_____ቀ ን _____

የ ሱ ፐ ር ቫ ይ ዘ ር ስ ም_____ ፊ ር ማ _____ ቀ ን _____

Annex V: English Version Questionnaire

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 health centers, 2020

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	_____years	
103	Marital status	Single = 1 Married = 2 Divorced = 3 Widowed = 4	
104	Educational level	Diploma = 1, First Degree (BSC) = 2 Second Degree (MSc) = 3 Third Degree (PhD) = 4	
105	Employment condition	Contract = 1 Permanent = 2 Other = 3	
106	Monthly income earn	≤ 4609= 1 4700 – 5358 = 2 5400 - 6193 = 3 6200 - 7071 = 4 7100 - 8017 = 5 ≥ 9056= 6	
107	Years of work experience	----------years	
108	Current working laboratory department	Department completed by name_____	
109	Do you have got orientation on occupational health and safety issue during your first employment time?	Yes = 1 No = 2	
110	Have you ever been trained on occupational health and safety or bio safety?	Yes = 1 No = 2	
111	Have you 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
		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	Knowledge about 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
		Sound hazard	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
		Corona virus	Yes	No
		Ebola virus	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
		Stool	Yes	No
		Urine	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 emergenceshower as soon as splash?	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 VI: 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 3/4th 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 VII: 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 health centers. 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. The record will be destroyed after ensuring accurate translation of information.

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:

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Annex VIII: 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!

Declaration

I, the undersigned, declare that this M.Sc. thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been duly acknowledged.

M.Sc. candidate: **WalensuHabte (B.Sc.)**

Signature: _____

Date of submission: _____

This thesis has been submitted with our approval as advisors.

Advisor: **Aster Tsegaye (MSc, PhD)**

Signature: _____

Date: _____

Place: Addis Ababa, Ethiopia.

Advisor: **AlemayehuNigatu (MSc, MPH)**

Signature: _____

Date: _____

Place: Addis Ababa, Ethiopia