ADDIS ABABA UNVERSTIY COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUPLIC HEALTH

ASSESSMENT OF THE UTILIZATION OF PERSONAL PROTECTIVE EQUIPMENT AMONG TEXTILE INDUSTRY WORKERS IN DUKEM TOWN

A RESEARCH THESIS SUBMITTEDTO ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE, SCHOOL OF PUBLIC HEALTH; INPARTIAL FULFILLMENT FOR THE REQUIREMENT OF MASTER DEGREE IN PUBLIC HEALTH

by:

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Adviser

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ADDIS ABABA, ETHIOPIA

DECLARATION

I hereby declare that this thesis is my own work and that to the best of my knowledge it contains No materials previously published by other person and that all sources of materials used for this Thesis has been properly acknowledged.

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Date of submission: _____

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

Name: D/r Abera Kumie

Signature: _____

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ABBREVIATION

ERC	Ethical Review Committee
GDP	Gross domestic product of the country
GNP	Gross National Product
ILO	International Labor Organization
OSH	occupational Safety and Health
PI	Principal Investigator
PPE	Personal Protective Equipment
SRS	Simple Random Sample
WHO	World Health Organization
METEC	Metal and Engineering Corporation

ABSTRACT

Background_: Utilization of personal protective equipment is one of the most important measures to protect workers from exposure to occupational hazards, especially in developing countries. However, there is a limited studies describing personal protective equipment utilization in our country

Objectives_: To assess the utilization of personal protective equipment and associated factor in textile industry workers, in Dukem town

Methods_: Institutional based cross-sectional study was conducted among two textile industries (Almehadin and Alasr) from June- Dec, 2016 in Dukem town. Stratified sampling followed by simple random sampling technique was used to select a total of 456 textile industry workers. Information regarding participants Practice, work-related and socio-demographic factors was collected by face to face interview using structured questionnaire. Data were checked for its completeness, cleaned, coded and entered into Epinfo version7 and exported to SPSS version 21 for analysis. Data analysis were done using logistic regression. Strength of association was measured using odds ratio, at 95% confidence intervals.

Results: The utilization of personal protective equipment were 62.3 % (95%CI) at the time of data collection. The study showed availability of personal protective equipment[AOR(1.817, 95%CI(.82-4.05)], ventilation [AOR(2.25,95%CI (1.4-3.6)], 0rientation given[AOR[(0.56, 95%CI(0.32-0.95.)] and Sex [AOR1.67,95%CI(1.02-.2.71)].were independent predictors of personal protective equipment utilization on multivariate analysis.

Conclusion: The proportion of PPE utilization was found 62.3%.(95%CI) unavailability of PPE, poor ventilation, orientation given, and sex were significantly predictors of PPE utilization

Recommendation: The use of PPE by workers at workplace is essential element to prevent their exposure to work hazard, injuries, illness, and death.

Both governmental and private sectors found in Dukem town and managers of industries should address the problem of unavailability of PPE, poor ventilation, and orientation for workers..

INTRODUCTION

1.1 Background:- World Health Organization (WHO) estimates that due to inconvenient working environment and poor occupational safety and health workers may lose 10-20% of Gross National Product (GNP) of the country. Globally occupational diseases, illnesses and death account for an estimated loss of 4% of the Gross Domestic Product (GDP[1].

International labor organization (ILO) estimates that 2.34 million people die each year from work-related accidents or diseases and 317 million suffer from work-related injuries we see the commitment to solve the existing problem by improving safety and health at work and preventing human suffering, but it was often difficult to see this stated commitment being translated into practice[2].

By using personal protective equipment (PPE) the workers can protect themselves from different risky condition. However workers do not use PPE unavailability of PPE, improper use of available PPE or negative attitude and lack of knowledge how to use PPE were the main factors for not using and occupational hazard would be the result.

Less awareness about PPE and over dependence of other control measures of occupational saftey and health(OSH) makes the occupational hazard more and occupational work place injuries become high[3].

According (ILO) estimation there will be a high number of occupational accidents and work related deaths each year especially in developing countries where there is no proper data to know the scale of the problem for interventional activities. Sub-Saharan African countries will make the problem more followed by Asia[4].

In Africa, Many countries such as Botswana, Egypt, Ethiopia, Kenya, Lesotho, and Zambia have now developed their own national OSH profiles or programme, ILO collaboration projects funded by European union (EU) and Sweden have facilitated the publication of training and guidance materials on the development of national OSH programme and on conducting audits to implement the ILO Guidelines on OSH management system[5].

Only 5-10% of workers in developing countries and 20-50% of workers in industrial countries (with a few exceptions) are estimated to have access to adequate occupational health services. In the USA, for example, 40% of the workforce of some 130 million employees does not have such access[6].

1.2 Statement of the problem

Textile industries are technologically complex industries which predispose workers to occupational hazards from processing unite to the man factoring, finishing, coloring and packaging where workers are exposed to cotton dust, noise, accidents, and injuries[7].

As a result of exposure to chemical, biological, dust, fibers, and physical agents, as well as accidents there will be direct and indirect loss of cost. The direct cost include compensation and treatment costs for injured workers and the indirect costs was related to loss of time spent by injured and family members to take care the ill or injured worker and additional cost for training for the new workers[8].

Employers are responsible to provide and instruct the workers in utilization of PPE for their workers to protect from occupational hazards and to prevent unnecessary costs the workers has to accept the instruction given by employers to make safe and healthy working atmosphere but most of the time workplace hazards were not followed properly in developing countries [9].

In Ethiopia there is occupational safety and health (OSH) law and Article 92 clearly states that every employers has the obligation to make safe, healthy and free of any danger workplace to the well-being of workers and this condition has to be insured by assigning safety officers..

Few studies done in Ethiopia showed there is a great difference in utilizing of PPE the gap in using available PPE, lack of information given shortage of clear guideline regarding employer in providing PPE makes the works not using PPE and become exposed to different hazards [9].

1.3 Rationale and significance of the study

The movement of capital and technology, and changes in work organization appear to have outpaced the systems for protecting workers' health.

Studies done in our country about utilization of PPE are very few on the other hand progress of industerlization makes the problem more complex to prevent occupational hazards preparing a clear guideline, and further investigation to increase the knowledge, and change the attitude of PPE utilization is very important.[10].

Investigating the source of occupational health problem in industries would help both the employer and employees to know about the risky conditions. The employer has to provide important PPE and the worker has to be motivated to utilize it properly. So this study was conducted to fill the gap in PPE utilization in textile industries found in Dukem town.

Using different PPE protects the worker from occupational hazards it is not the only means for protection against occupational hazards but, it is easily available and it is fundamental right of the worker [11].

The aim of this study was focusing how to solve the existing problem regarding personal protective equipment utilization and to evaluate the associated factors in Dukem town textile industries which hinder PPE use those are working in industry especially in production area .Finally to discuss findings with the industries representative and concerned government officials for interventional activities as well as further investigations.

2 LITERATURE REVIEW

2.1 Utilization of personal protective equipment

The use of PPE usually implies that the worker is expected to operate in a potentially hazardous environment with the protective device as one of the key means of preventing exposure

The most commonly used are: Eye and Face Protection, Respiratory Protection, Head Protection, Foot Protection, Electrical Protective Equipment and Hand Protection. By wearing PPE the wearer can protect from different occupational hazards[12].

Study done to assess utilization Pattern of Personal Protective Equipment in five Industrial Workers of Nawalparasi, Nepal showed among 187 respondents (68.1%) regularly used all relevant PPE in work. More than half (57%) of the respondents used PPE when they needed, 35% used PPE all the time during working and 8% used PPE only in the starting time of the work. Most of the workers (83.9%) were incourged to use PPE by their co-staffs and officers (10.7%) were not incourged to use PPE. Main reasons for not using PPE were unavailability of PPE (33.3%) and no necessity of using PPE felt (66.7%) .[13].

Study done in Vietnam also showed there was a big gap of knowledge, attitude and practice in using PPE depending on the working condition. The study was done by gathering secondary data in different counters with different study seating to compare the knowledge, attitude and practice of the workers.

The main focusing area in this study was why the workers didn't use PPE the study showed knowledge of the workers in relation to PPE use the highest score in knowledge was (3.7%) moderate,(18.1%) and (78.2%) low. Regarding attitude of the respondent(4.2%) have positive attitude,(69%) neutral, and(26.8%) negative attitude .The study concluded that for proper utilization of PPE inceasining the workers knowledge, and changing attitude was the most important.[14].

Another study done in South Africa to assesses knowledge, attitude and practice of workers showed out of 206 respondents only (47%) have good knowledge the rest 53% has no knowledge about PPE use, and the attitude of the respondents (59%) have negative attitude, and only (41%) has positive attitude on the other hand (38%) of the respondents were using PPE the rest didn't use PPE[15].

Study done to Assesses the knowledge, attitude and practice of using PPE in Metal and engineering corporation (METEC) Ethiopia showed among 422 respondents (47.6%) used

different types of PPE .the rest do not use lack of PPE ,fear of saftey hazard and discomfort were suggested reasons. In this study (79.16%) of the respondents were having high knowledge (13.27%) have moderate knowledge, and (7.58%) low knowledge. Regarding attitude of the respondents (76.5%) have positive attitude,(6.13%) neutral and (17.37) have negative attitude the study concluded that giving emphasis to training increases workers knowledge [16].

2.2 Associated factors

As a result of lack of awareness about the rule of OHS, lack of trained man power, absence of modern PPE, limited resource in research and development, occupational hazards became the main factor in industries [9].

Institutional based cross-sectional study done in ArbaMinch Textile Factory, Southern Ethiopia: showed the one year prevalence of occupational injury was (31.4%). Lower monthly salary was associated with higher odds of injury among the socio-demographic factors

Work environment related factors like extra hour duty, health and safety training and workplace supervision had significant association after adjusting all factors.

Among the behavioral factors, (77%) encountered sleeping disturbance and working in the evening shift(71.6) followed by working more than 8 hours without shifting (12.6%) were the main reasons for sleeping disturbance and Personal Protective Equipment use and job stress showed significant association with injury[17].

The other study which was done in Adowa Ethiopia Textile industry showed the associated factors for knowledge level and safe practice of workers are gender, work experience, safety training, work regulation and list of workers' right and obligation towards respondent's knowledge.

The study showed the respondents knowledge on saftey information was (69%) out of this (54%) of the participants were using PPE saftey training and regular supervision were the main factors [18] .

Study done to assess the magnitude of PPE utilization in Hwasa Ethiopia showed out of the total 660 participants magnitude of PPE was ()82.42%) the rest (17.58%) don't use PPE

Lack of access to PPE (43%) lack of practice (20.0 %) uncomfortable to use 20.0% and lack of safety education(17.0%) were the reasons for not using PPE.

Regarding associated factors with PPE Alcohol drinking, cigarettes smoking, and service duration were the main factors.

In this study even though the magnitude of PPE high compared to other countries the investigator mentioned that there might be a methodological difference and data collection and workplace

conditions, like employees' level of awareness on hazard control and disease prevention and accessibility to safety services.[19].

A cross-sectional study done in Addis Ababa Tobacco industry to assess the magnitude and associated factors influencing to compliance to use PPE among factory workers showed the overall reported and actual PPE use were 53.4% and 8.7% respectively and the overall reported availability of PPE was76.5% the reason for not using PPE was discomfort during using, particularly for Gloves. In this condition we see that the actual use of PPE was very low compared to reported [20]

Conceptual frame work

Methodological approaches towards scientific inquiry characterize a particular discipline. It is also important to articulate the pathways by which an intervention is expected to cause the desired outcomes and provides evaluator with specific elements to assess the relationship between utilization of PPE and factors that affect the use of PPE. It develops by referring different literature considering the past study to fill the gap in present investigation the main components of this conceptual framework are

1 Work related factors.

2 Socio-demographic characteristics

3 Behavioral related factors

By observing this core components we can conceptualize how PPE utilization determined by these core factors..

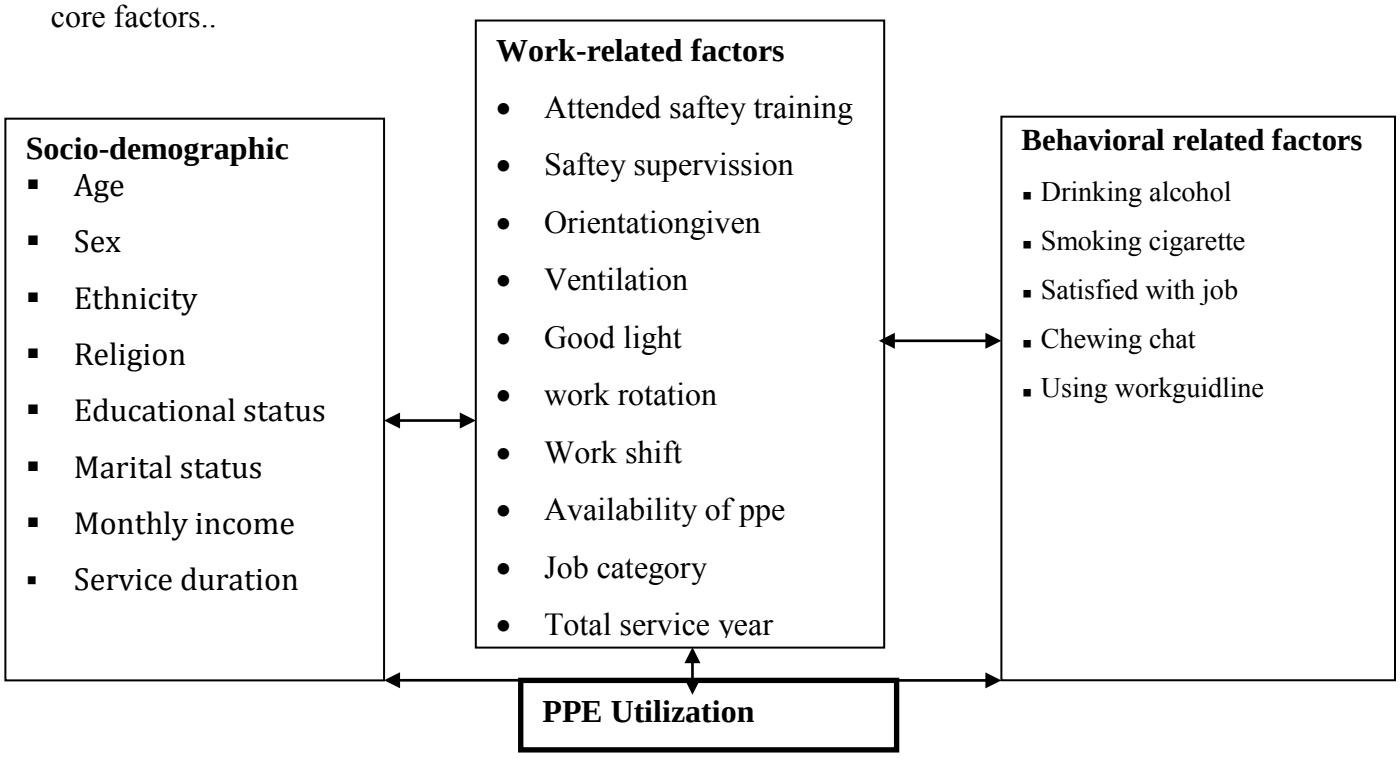

Fig1. Schematic presentation of conceptual frame work.

3. OBJECTIVES

3.1. General objective:

To assess personal pr otective e quipment utilization and as sociated f actors among textile industries in Dukem town East, Ethiopia2017

3.2. Specific objectives:

1. To identify the proportion of personal protective equipment utilization.
2. To identify factor associated with personal protective equipment utilization

4. METHODS

4.1 Study area

The study was conducted in Dukem town, Special Zone Surrounding Finfine of Oromiya Regional State, which is located at a distance of 37 km from Addis Ababa in the East. Its astronomical location is 8º45'25''-8º50'30'' North Latitude and 38º51'55- 8º56'5'' East Longitude. Dukem is one of the reform towns in the region and has a city administration municipality and four kebeles. The estimated population of the town is 56,678. Out of this, 27,768 (49%) are males and 28,910 (51%) females. The area of Dukem town is 3,586 hector. Its altitude is 1800-2100 m above sea level. The town is mainly commercial center. This makes it a special place for many people to migrate to this town.

There were small and large industries which accounts more than 22,000 in 43 industries so that all textile industry workers in Dukem town that lasts at least six months prior to undertaking this study were included there are also 32 wholesale trades, 586 retail trades, 530 service trades, one governmental health center and 8 private clinics; and 1 private general hospital. Dukem has economic linkages with the surrounding areas, towns, region and Addis Ababa.

4.2. Study period

The study was conducted from June 30 – December, 30, 2017 G.C

4.3 Study design

Institutional based Cross-sectional study design was conducted

4.4 Population

4.4.1 Source Population

The source of population were all textile industry workers found in Dukem town

4.4.2 Study population

Selected textile industry workers who are working in production section

4.5 Inclusion and exclusion criteria

4.5.1 Inclusion criteria:

Industrial workers who stayed in production section and working in the process area.

4.5.2 Exclusion criteria:

Industrial workers who were critically sick and who were working in the office

Sample size and Sampling technique

4.6.1 Sample size determination

For the first specific objective

The required sample size for the study was determined using single population proportion formula for the 1st specific objectives as follows: According to the available literature taking prevalence of PPE actual use 8.7% [20].

$$\mathbf{n} = \frac{(Z\ a/2)^2 p\ (1-p)}{d^2} = \frac{(1.96)^2\ 0.0.087\ (1-.0.087)}{(0.03)2} = 339$$

339, and by adding 10% non-response rate the sample size = 373

Assumption:

Where n=the required sample size

P = proportion of PPE use is hardly available, and it was 8.7% [20].

D = Margin of sampling error tolerated (desired precision) 3% (0.03)

Zα = Critical value at 95% CI of certainty (1.96)

For the second specific objective sample size was calculated using Epi-info

Version 7 a two population proportion equation was used with the following assumption

n=p (1-P1) +p2 (1-p2)/ (p1-p2)

P1=8.7%-Proportion of PPE use[19].

P2=76.5% =abalblity of PPE

Where ∝= the level of significance=0.5

$\mathbf{Z}_{1}$-β=80% is the power of the study to determine sample size which has a value of 0.765 [20]..

Design effects 1.5

Confidence level for 95% of certainty: 1.96;

Odd ratio = 2.4;

Ratio of exposed to unexposed: 1:1

The calculated sample size with 10% non-response rate is 456.

The final sample size for this study was **456** which is the largest to satisfy the two specific objectives.

4.6.2 Sampling technique

This study was conducted in two industries, which have high large work force:

1. **Almehadin textile industry** which has a total workers of **594** working in different sections-weaving-24, S pininning-91, D eyining-51, E nginering-18, P acking-34, C ircular kni fing a nd ironing-35, Finshing-21, garmenting-262
2. **Alasr textile industry** total workers **915** Weaving-156, S pinning-98, E ngenering-164, Packaging-52, Knifing-45.Garment-350, Dyining-50=**915** +**594**=**1509**

A visit was conducted before data collection to get the number of industrial workers that were working in two textile industries and it was used as a sampling frame to know the number of workers who were working in different sections stratified sampling followed by Simple random sampling (SRS) technique was used to improve the representativeness of each member of the sections and to select the study participants who are involved in weaving, spinning, dyeing, Engineering, packing, circular knintg, finishing, and garmenting.

Permanent workers who were stayed in production and processing area were included managers and those are working in the office are excluded from the study**.**

The total sample size was calculated using a single population formula for the 1stobjective and Epi-info version 7 was used to calculate the 2nd objective by considering different parameters, and finally by comparing the sample size of two specific objectives we take the highest number which was **456** in the 2nd objective

Table1. Calculated sample size 456 using proportional sampling according to the population size of each textile industry workers in Dukem town 2017

Almehadin textile					Alasr textile				Total sample size
NO	Departments	Tw	PA	SS	Departments	Tw	PA	SS	
1	Weaving	24	0.30	6	weaving	156	0.30	47	53
2	Spinning	91	"	25	Spinning	98		30	55
3	Dyeing	51	''	14	Dying	50	''	15	29
4	Engineering	18	''	6	engineering	164	''	50	56
5	Packing	34	''	10	packing	52	''	16	26
6	Circular knitting	93	''	27	Garment	350	''	105	132
7	Ironing	35	''	8		45	''	14	22
8	Finishing	21	''	5	finishing,		''		5
9	Garment	262	''	78			''		78
10	Total	594	''	179		915	''	277	456

n1=n (N1/N1=456(594/1509) =179.5 = 179

n2 =n (N2/N1) =456(915/1509) =276.5 = 277

NB: Tw=Total workers PA=Proportionate allocation SS= Sample size

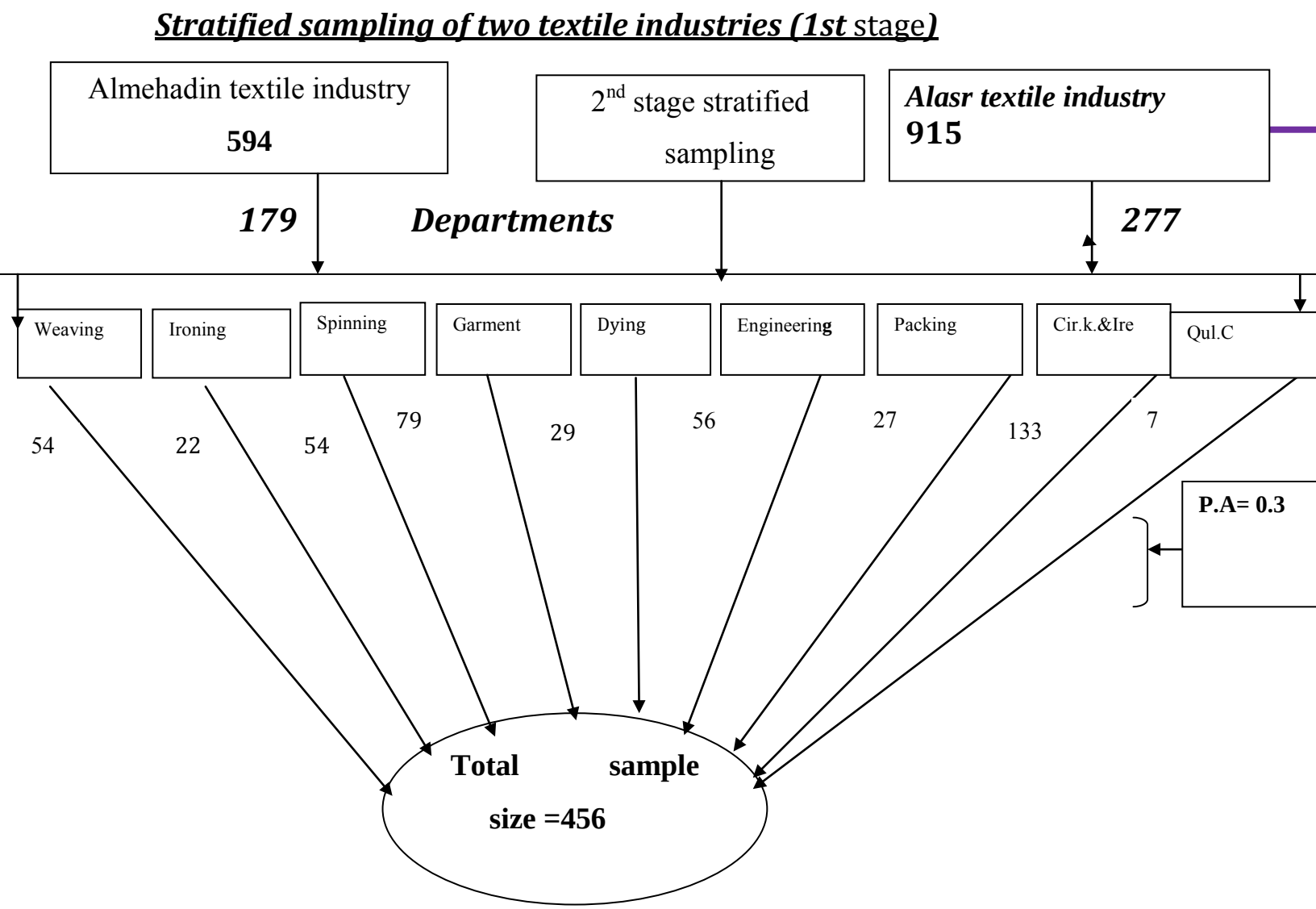

Figure 1: Schematic presentation of sampling technique

4.7 Data collection

Data collection process was conducted from September –December/2016 during working hours and collected by using questionnaire developed by reviewing related literatures.**[**16-20**].**

The questionnaire contents have been included socio-demographic/economic characteristic work related and behavioral factors, which have relationship with PPE utilization. And magnitude of the problem in utilizing it

The questionnaire was prepared initially in English language then translated to local language Amharic. Data were collected by face-to-face interview technique using structured questionnaire

Pre testing of the questionnaire was done on 5% of the sample size in similar areas of Glean town at **(Textile factory)** before the actual data collection.

4.7.1 Study variables

4.7.2 Dependent variable

Utilization of personal protective equipment (Those workers which use PPE at the time of investigation) and verified by observation.

4.7.2 Independent variables

- **Socio-demographic/economic characteristics** such as (age, sex, ethnicity, religion, educational status, marital status)
- **Behavioral related factors** such as (Drinking alcohol**,** Smoking cigarette and satisfied with job, chewing chat)
- **Work related factors** such as (work experience**,** work status**,** types of occupation**,** duration of work and availability of PPE, attend safety training, orientation given, safety supervision, Work.shifit, work rotation, good light. well ventilated)

4.7.3: Operational definition.

Personal protective equipment:-PPE (Personal Protective Equipment) is defined as "all equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work and which protects them against one or more risks to their health or safety[15].

Utilization of personal protective equipment: Use of all the necessary worker-specialized clothing or equipment by workers for protection against health and safety hazards in the workplace the necessary worn PPE at the time of data collection noted by observation were.

1) Respirator, gloves, eye protector, boot shoes, overall, ear plugs and /respirator/mask at spinning section

2) Respirator, gloves, eye protector, boot shoes, ear plugs and overall at weaving section

3) Respirator, gloves, mask, ear plugs, boot shoes and overall at finishing section

4) Respirator, gloves, boot shoes, eye protector, overall, reflector, mask and helmet at engineering Section,

5) Gloves, boot shoes, mask and overall at garmenting section.

6) Respirator, gloves, boot shoes, eye protector, overall, reflector, mask and helmet at dyeing section

7) Respirator, gloves, eye protector, boot shoes, overall, ear plugs and /respirator/mask at knitting section

4.8: Data management

Four diploma holder data collectors and one supervisor who are public health professional were recruited. Two days training was given for data collectors and supervisor giving emphasize to the purpose of the study, data collection instruments, field methods the, questionnaire, process of assigning study participants, and ethical concerns during data collection**.**

The supervisor and investigator were carrying out close supervision of the data collection. Data were checked for its completeness by supervisor and investigator daily

4.9 Data analysis

1^{t} specific objective

Data were checked for its completeness, edited, cleaned, coded and entered into EPI-Infov7 exported to SPSS version 21 for analysis. Frequency distribution, mean, standard deviation, and percentage, were used for descriptive analyses Principal investigator was performed Descriptive analysis and tables, graphs and charts present the results

2nd objective

All independent variables were put separately into bivariate logistic regression model to evaluate the degree of association with utilization of PPE.

Logistic regression: Bivariate and multivariate analysis has been run using logistic regression to identify candidate variables for multivariate analysis. Variables with p-value ≤ 0.25 in bivariate logistic regression have been considered as candidates for multivariate logistic regression. **Multivariate logistic regression:-**Has been used to adjust the effects of potential confounding variables and showed dependent effect of each independent variable. It also could describe mediating, or interaction effect of independent variables. Strength of association has been measured using odds ratio, and 95% confidence intervals. P-value ≤ 0.05 will be considered as

statistically significant multivariate logistic regression was performed using back stepwise method to identify factors independently associated with dependent variables.

4.10 Ethical consideration

Ethical clearance has been obtained from the Research Ethical committee (REC) of the school of Public Health, Addis Ababa University. After obtaining ethical approval, written permission has been obtained from Dukem town health office and Dukem town administration Office, and verbal informed consent has been obtained from each study participants. The information sheet and consent was provided for respondents to read for those who can read and the interviewer was read the paper for those respondents who can't read.

Before each interview, the aim of the study's; possible benefit and side effects (if any) was clearly explained and has no any risk and no direct benefit to their participation to each respondents to be assured that the information provided was confidential and used only for the purpose of research.

The information obtained from the respondents was identified by their code numbers and participants were informed about purpose of the study and requested to provide accurate & honest response.

By assuring that the answer given was completely confidential, and if at any time during the interview you want to stop answering questions, you are free to do so. If you are willing to participate, you would be requested to provide written informed consent before the interview. Anonymity & confidentiality of the information will be maintained throughout the data collection process.

4.11 Dissemination of study results

At first the thesis would be presented to the School of Public Health as partial fulfillments of the requirements for the Master's Degree in Public Health. then finding obtained from this project is in progress t o s ubmit f or pe er r eviewed j ournals f or publ ication a nd a fter a pproved b y approval committee the abstract will be disseminated to the study population textile industries, and Dukem town Administrative office, Health Office, for interventional activates

5 RESULTS

5.1 Socio-demographic Characteristics of participants

A total of 446 valid questionnaires were collected, giving a response rate of 97.8%. Of the total 446 participants, 326 aged between 20 and 25 years (mean age: 24.62±5.3 years). Out of this 318 (713%) were females and 128 (28.7%) were males.

The majority were Oromo (71.1%) followed by Amara (20.9%) and others (9%). With regards to educational status, only 35.4% had secondary education and above. Regarding to marital status, 237(53.1%) were married and 199(41.6%), were single.

Of the total participants, 285(63.9%) earns an average family monthly income of less than 1500.00 ETB.

Socio demographic characteristics of the study subjects are presented in (**Table 2)**

Table 2:_Distribution of socio-demographic characteristics of respondents in the two textile factory Workers at Dukem Town, Eastern Ethiopia, 2017

Variables	Frequency	Percent (%)
Sex		
Female	318	71.3
Male	128	28.7
Age (Year)		
20-25	326	73.09
26-30	88	19.73
31-35	9	2.02
>35	23	5.16
Educational. Status		
Illiterate	48	10.8
Literate	154	34.5
Primary	90	20.2
Secondary	80	17.9
Above secondary	74	16.6
Ethnicity		
Oromo	313	70.2
Amara	94	21.1
Other	39	8.7
Monthly.income.in Birr		
1-1000	285	63.9
1001-1500	120	21.9
>1501	41	9.2
Service. Duration		
6 Month -1 Year	176	39.5
2 Year-3 Year	177	39.7
>4 years	93	20.8
Marital status		
Single	199	41.6
Married	237	53.1
Widowed/Separated	10	2.2

5.2 Work related factors

Most of the workers 412(92.4%) were permanent with total service year 317(71.1%), of greater than 2 year 261(58.5%), have not got the chance of saftey. training and 311(69.7%) were not supervised 316(70.9%) of the participants no orientation given, respectively.

263(59%) of the participants reported about unavailability of PPE. 272(61%) and 208 (46.6%) were informed that there were no work shift and work rotation.

Regarding environmental condition 35 (7.8%) and nearly half of the participants 212(47.5%) were reported that there were no enough light and well ventilated working area

Work related factors of the two textile industry workers is presented in (**Table 3)**

Table 3:_Work related factors in two textile industry Workers at Dukem Town Eastern Ethiopia 2017

Variable	Frequency	Percent(%)
Job category		
Permanent	412	92.4
Temporary	34	7.6
Total.service		
6month-1 year	129	28.9
>2 year	317	71.1
Safety supervision		
Yes	135	30.3
No	311	69.7
Attend safty.training		
Yes	185	41.5
No	261	58.5
Work shift		
Yes	174	39
No	272	61
Work rotation		
Yes	238	53.4
No	208	46.6
Ventilation		
Yes	234	52.5
No	212	47.5
Light		
Yes	411	90.2
No	35	7.8
Avilability.ofppe PPE		
Yes	183	41
No	263	59
Orientation given	130	29.1
Yes	130	29.1
No	316	70.9

5.3 Behavioral related factors:-Most of the workers were not drink alcohol, smoke cigarettes, chew chat more than three-fourth 351(78%)of the participants were not satisfy with their job **(Table 4)**

Table 4:_ Behavioral Related Factors of workers in textile industry At Dukem town east Ethiopia 21017

Characteristics	Frequency	Percent(%)
Drink alcohol		
Yes	32	7.2
No	414	92.8
Chew chat		
Yes	20	4.5
No	426	95.5
Smoke cigarettes		
Yes	6	1.3
No	440	98.7
Satisfied with job		
Yes	142	31.8
No	304	68.2
Used working guideline		
Yes	95	21.3
No	351	78.7

Factors affecting the use of Personal protective Equipment

Section 1:_ Bivariate Analysis

Bivariate logistic regression was conducted for all independent variables to evaluate the degree of association with utilization of PPE. Out of this sex and educational status were candidate variables from socio-demographic characteristics with COR1.795, 95 %(1.182-2.726) for sex and COR2.29,95%(1.154-4.529) for educational status above secondary.Table-5presents factors associated with Sociodemographic characteristics **(Table 5)**

Table 5:_ Factors associated with socio-demographic characteristics of respondents in the two textile factory Workers at Dukem Town, Eastern Ethiopia, 2017

Variables	PPE utilization		Crude OR(95%CI)	P=value
	Yes	No		
Sex				
Yes	211	107	1.795,(1.18-2.73)	**0.006***
No	67	61	1.0	
Educational status				
Illiterate	44	46		
Primary	42	32		
Secondary	100	54		
Above secondary	42	32	2,29,(1.15-4.53)	**0.018***
Monthly income				
1-1000	170	175	. 850 ,(.43-1.6)	
Above 1001 Birr	108	53	1.245 ,.(.59-26)	
Service duration				
6month-1 year	2	2	1.697 ,(.22-12)	
2 year-3 year	47	42	2.11 ,.(21-15)	
4 year and above	229	124	1,12,.(.15-8.29)	

***Candidate variables for multivariate analysis**

Bivariate logistic regression was conducted to evaluate degree of association of PPE utilization with work related factors showed significant for attend safety training COR 0.55,95 % (.37-.83), work s hift COR:1.93,95%(1.302-2.854),ventilation COR: 3.03,95%(2.02-4.53) .M ost of w ork related factors were significant in bivariate logistic regression analysis. work related factors of the respondents in two textile factories. **(Table 6)**

Table 6:_Work related factors of respondents in the two textile factory Workers at Dukem Town, Eastern Ethiopia, 2017

Variables	PPEutilization		Crude OR(95%CI)	P-value
	Yes	No		
Attend safety training				
Yes	148	130	0.55,(.372-.83)	**0. 004***
No	113	55	1.0	
Ventilation				
Yes	160	118	3.03, (2.02-4.53)	**0.001***
No	52	116	1.0	
Orientation given				
Yes	177	101	.37,(.23-.58)	**0.001***
No	139	29	1.0	
Safety supervission				
Yes	203	75	1.54, (1.02-2.33)	**0.039***
No	107	61		
Availability of PPE	189	89	2.70, (1.82-4.0)	**0.001***
Yes	74	94		
No				
Light				
Yes	255	156	1.17, (.57-2.42)	
No	23	12		
Total service				
Yes	196	121	.705, (.71-1.65)	
No	82	47	1.0	
Work.shifit				
Yes	186	92	1.93, (1.30-2.9)	**0.001***
No	86	82	1.0	

*** Candidate variables for multivariate analysis**

Behavioral related factors of respondents in the two textile factory workers were analyzed using bivariate logistic regression. The results showed association with satisfied with job COR 5.0,95 %(3.27-7.69) were found at the time of study as presented in (**Table below).**

Table7:_Behavioral related factors of respondents in the two textile factory Workers at Dukem Town, Eastern Ethiopia, 2017

Variables	PPE utilization		Crude OR(95%CI)	P-Value
	Yes	No		
Drink alcohol				
Yes	24	254	5, (.232-1.207)	
No	8	160	1.0	
Chew chat				
Yes	11	207	1.374, (.557-3.39)	
No	9	159	1.0	
Usedworkining guideline				
Yes	53	225	1.42,.(.89-2.24)	
No	42	126	1.0	
Satisfied with job				
Yes	226	92	5.0, (3.27-7.69.)	**0.001 ***
No	78	82		

*** Candidate variables for multivariate analysis**

Table 8:_ Factors associated with PPE utilization among textile factory workers in Dukem Town Ethiopia, 2017, using bivariate logistic regression analysis model for all factors

Variables	PPE utilization		Crude OR (95%CI)	P-Value
	Yes	No		
Attend safety training				
Yes	148	130	0.55, (.37-.83)	**0.004***
No	113	55	1.0	
Satisfied with job				
Yes	226	52	5.0,(3.27-7.69)	**0.001***
No	78	90	1.0	
Work shift				
Yes	186	92	1.93, (1.30-2.85)	**0. 001***
No	86	82	1.0	
Ventilation				
Yes	160	118	3.03, (2.02-4.53)	**0.001***
No	52	116	1.0	
Orientation given				
Yes	177	101	0.37, (.23-.58)	**0.001***
No	139	29	1.0	
Safety supervision				
Yes	203	75	1.54,(.1.02-2.33)	**0.039***
No	107	61	1.0	
Availability of PPE				
Yes	189	89	2.7, (1.817-4.01)	**0.001***
No	74	94	1.0	
Sex				
Female	211	107	1.80, (1.18-2.73)	**0.006***
Male	67	61	1.0	
Educational status	42	32	,2,29, (1.15-4.53)	**0.018***

Section 2:_ Multivariate analysis

Multivariable l ogistic r egression w as conducted f or variables found t o be c andidates i n bivariate logistic regression to identify variables independently associated with PPE utilization, ventilationAOR2.25, 95%CI (1.4-6.6) orientation given(AOR 0.59,95%CI(0.3240.951) Availability of PPE (AOR2.06,95%CI(1.32-3.25) Satisfaied.with.job (AOR4.02,95%CI(2.5-6,6) and sex AOR1.67,95%(1.02-2.73)were significantly associated with outcome variable in the final model as shown in the following. (**Table-9)**

Table 9:_ Factors associated with PPE utilization among textile factory workers in Dukem Town Ethiopia, 2017 using multivariate logistic regression analysis model

Variables	PPE utilization		AOR(95%CI)
	Yes	No	
Satisfied with job			
Yes	226	52	**4.02, 95% (2.5-6.6) ***
No	78	90	1.0
Availability of PPE			
Yes	189	89	**2.06,,95%(1.32-3.24) ***
No	74	94	1.0
Orientation given			
Yes	177	101	**0.56,95 %(0.32-0.95) ***
No	139	29	1.0
Ventilation			
Yes	160	118	**2.25, 95% (1.43-3.6) ***
No	52	69	1.0
Sex			
Female	211	107	**1.67,95%(1.02-2.71)***
Male	67	61	1.0
Attend safety training			
Yes	148	130	1.256,95%.763-2.067)
No	113	55	1.0
Work shift			
Yes	186	92	1.256,.95%(.763-2.07)
No	86	82	1.0
Educational status	42	32	2.14,95%(.993-4.61)

***variables which were significant in the final multivariate model**

6 DISCUSSION

6.1 utilization of PPE

Occupational hazard is a public health challenge all over the world both in industerlized and less industrialized countries where workers are exposed to different hazards.to minimize the risk, workers often need to wear PPE to be protected from injury, illness and death[21]

In this study, the magnitude of personal protective equipment utilization among textile factory workers, found in Dukem town was 62.3 %. The study showed significant association for sex with [AOR: 1.67, 95%CI: (1.02-2.73, 6.50)].and female workers utilize PPE two times more than male workers. These showed female workers were more conscious than male workers to protect them slave from occupational hazards.

This findings were consistent with the study done in Nepal, South Africa and, Addis Ababa Ethiopia in which female workers were using PPE more than male workers . In Addis Ababa female workers were using PPE two times more than male workers to the same as to this study but there was difference in study seating and sample size of their study. [12, 11, 20] .

The study done in Hwasa Ethiopia showed PPE utilization was about 82.4% which was higher than to this study the reason could be methodological difference in study population and data collection, and level of awareness of the employees about occupational hazards [18].

PPE utilization was(87.2%) in Nepal, in which (61.1%)of the participants were using all relevant PPE in work regularly and more than half (57%) used PPE when they needed .And (38%) in South Africa it showed higher utilization rate in Nepal and lower in South Africa which has no similarity to this study. In South Africa there was significance association in participant's knowledge, and practice of PPE utilization with the type of work done. Over (50%)of the respondents had no knowledge about PPE and have negative attitude about PPE utilization age, sex, and service duration were similar findings to this study it was concluded that formal information and training to increase the knowledge of the participants was the most important factor to prevent occupational hazards.[12-11]

Study done in Adwa Ethiopia showed use of PPE was (54%) among this, (84%) of the respondents were using PPE always, the rest (16%) used some times. And in Nigeria it was (50%) nearly similar to this study however, male workers were using PPE more than female workers in Adwa

Ethiopia which was in consistent with the above findings. Lack of knowledge to use PPE was suggested reason for low utilization which was similar to this study.[3-24].

6.2 Associated factors

Working environmental factor was one of the main factors which have a great role in PPE utilization . If the workers got orientation and enough provision of PPE their know ledge and practice of utilizing capacity increase .As the same time if working area would be well-ventilated the workers attitude towards PPE utilization became increased and they can be protected from occupational hazards..

In this study workers who were getting orientation during starting jobs were more likely to use PPE than those their counter parts [AOR: 0.59, 95%CI(0.32-0.95)]. It was consistent with study done in Addis Ababa Tobacco industry workers who were got training utilize PPE 0.7 times more than those who were not got the chance of training Study done in USA by Howyida et al confirmed that workers have to be trained to increase the knowledge of utilization capacity. Well trained staffs improves safety supervission and appropriate protective equipment utilization which is similar finding to this study [8,20].

Availability of PPE was one of significant factor for not utilizing of PPE with [AOR: 2.06, 95%CI (I.33-3.23)].and (59%)of the respondents reported about unabilability of PPE .It was 43% in Hwasa and 37% in Nigeria indicating that for proper utilization of PPE availability of PPE has to be improved the employer has to provide important PPE according to each specific task with improved quality and quantity ,the worn-out PPE has to be substituted with the new one this would help to enforce the workers to use properly and to prevent occupational hazards [3-17]

The other significant factor in this study was ventilation with [AOR: 2.5, 95%CI (1.4-3.6)].after adjusting for all variable there was similar finding in PPE utilization and associated factors with study done in kompolcha Textile Ethiopia the study reveals unabilability of PPE was 45.8% which was nearly the same to this study(59%) the main significant factor was ventilation . About212 (47.5%)are responding that as there was no well-ventilated working area and it was much more than to this study in Hwasa Ethiopia which was (72%). as a r salut of poor ventilated area the worker might be ignore to utilize PPE and become exposed to different hazards such as ergonomic, visual concentration of the task, confused, makes mistakes, or becomes panic to process, may commit error and become injured .that was significant in Kompolcha textile industry[25].

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7. STRENGTH AND LIMITATION

7.1 Strength

1 The result of the utilization of PPE among industrial workers is an endeavor that can be used by factory managers to impact injury.

2 Face to face interview supported by supervission should have minimized measurement error.

.7.2 Limitation

1 Reported unavailability of PPE could be a source of social desirability bias, hence might have undermined it as a factor.

2 A qualitative study might have improved reported findings in reference to availability of resources and work conditions such as ventilation

8. CONCLUSION AND RECOMMENDATION

8.1Conclusion

1 The proportion of PPE utilization was found 62.3%., 95%CI An unavailability of PPE, poor ventilation and orientation given were significantly predictors of PPE utilization.

2 The use of PPE by workers at workplace is essential element to prevent their exposure to work hazard injuries, illness and death.

3 Availability of PPE has to be improved both in quality and quantity, and giving the chance of orientation has to be incourged to capacitate workers knowledge

3 There would be comfortable well ventilated working area to help workers in changing attitude of PPE utilization.

8.2 Recommendation

1 The Administration of organization should work on promoting and supporting PPE utilization.

2 Governmental organization found in Dukem town (Health Bureau, labour and social affairs, Bureau and Town Administration) should discuss with industries representative, the problem of unavailability of PPE, poor ventilation, and giving orientation for the workers.

3 Managers of industries have to work in improving the unavailability of PPE to safeguard workers from occupational hazards

4 Emphasis have to be given in training to improve the workers knowledge in utilizing of PPE

5 The working area has to be more comfortable by making well ventilated atmosphere

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14. ANNEX 1 PARTICIPANT INFORMATION

Hello, my name is ……and i am going to conduct an interview with you on behalf of Mr. Aklilu Demeke postgraduate student at Addis Ababa university, school of public health. he is now conducting a research entitled assessment utilization of personal protective equipment in industry workers who are living in Dukem town .the purpose of this interview is to conduct scientific research that may help us to identify problems of the program and forward some recommendation to concerned bodies that will help to improve the existing efforts. you may not get additional benefits if you volunteered for the study.

I have received permission from the Town health offices and Dukem town administration Office, to conduct this study. The interview will just take a few minutes. Your responses will help the implementers to better understand the current situation of using personal protective equipment in industry to be free from hazards. Your answers will be completely confidential, and if at any time during the interview you want to stop answering questions, you are free to do so. If you are willing to participate, you will be requested to provide written informed consent before the interview. If you have any questions or if something is not clear please feel free to ask. You can contact the investigator and/or the advisor and ask any query you have at any time. Investigator's name and address:

Aklilu Demeke

Tel.: Office 251 0114320481

Mobile: 251 911400504 OromiaRegional state Dukem town Health office

Advisor's name and Address:

Dr. Abera Kumie, Addis Ababa University, School of Public Health, Addis Ababa Tel. (Mobile 0911882912: Office

15. ANNEX 2: ENGLISH QUESTIONNAIRE

Assessment of utilization of personal protective equipment among textile industry in Dukem town

2016

Questionnaire identification number-001

002 Almehadin textiles

003 Alas textiles

I, the undersigned participant, have been informed about the study that assessment of utilization of personal protective equipment in this industry ; I have been requested to reply answers for the questions asked by the data collectors, after I have been briefed that there are no direct benefits or incentives as well as no risks in participating in the study. I have been well informed that I have the right to withdraw from the study and this will not have any consequence (will not cause any harm on my future career). I have been given enough time to think over before I give my consent to participate in this study and I understand my personal information will be kept confidential and will be used solely for this study only. In addition, I have been well informed that my name will not be asked and unique identification is not required. My agreement to participate in this study is with the assumption that, the information that I provide will help to improve the practice of using personal protective equipment for all industry workers. Was the information/objective clear?

1. Yes 2. No

Are you willing to participate in the study?

1. Yes 2. No

For any convenience and problem you can contact the principal investigator

Phone -0911400504 E-mails- demekeakli@gmail.com

Thank you for your kind cooperation

16. 2 QUATERNARIES

NO	Question	Possible response	skipping	COIDN
	1 Socio-demographic characteristics			
1	Age in year	1 18–25_2 26–39_____3> 39_____		
2	Sex----	1 M--- 0 .F---		
3	Religion	1. Orthodox--- 2. Muslim--- 3 P rotestant ----4 C atholic E .--- other (Specify)--		
4	Educational status	1 Illiterate 2 Literate 3 Primary_____ 4 Secondary_____ 4 Above secondary_____		
5	Service duration	1 6-mont-1 Year 2 2 -Year-3-Year 4 4-Year-5 Year 5 >6 Year		
6	Marital status	1 Married ___ 2 Single_____ 3 Divorced/separated 4 Widowed-		
7	Ethnicity	1.Oromo ------2 Amara------- 3.Gurage-----4,Tigre-------- 4 .Other		
8	Monthly income (in Birr)	1. 1–1000____2. 1001–1500 .3 > 1500___		

9	Job category	1.Permanent___2.Temporary_____		
10	Total, s ervice m onth. year i n this industry 2 Behavioral characteristics	1. 6 Month-1 year 2 >2 Year-		
11	Drink alcohol	1. Yes____ 0. No__		
12	Smoke cigarettes	1.Yes___ 0.No		
13	Chew khat	1. Yes ___ 0. No_____		
	3 work related factors			
14	Satisfied with job	1 Yes _____0. No_____		
15	Used work guideline	1. Yes____0. No_____		
16	Attended safety training	1.Yes____2 No_____		
17	Orientation given	1.Yes_____2 No__		
18	Safety supervision	1.Yes ____2.No		
19	Work shift	1.Yes _____ 2. No __		
20	Work rotation	1.Yes _____2No_____		

21	Ventilation	1.Yes_____. 2 No_____		
22	Light	1.No____ 2 No__		
23	Availability of PPE	1.Yes_____2 Not ____		1
24	Personal protective equipment utilization	1 Yes 2.No		

17. ANNEX 3 AMHARIC VERSION

ይህመጠየቅበአልመሀዲንእናበአላሣርጨርቃጨርቅፋብሪካየግልአክሲዮንማህበርውስጥከሚሰሩሠራተኞችመካከልከሥራጋርበተያ ያዘየስራላይየደህንነትናየጠናመከላከያመሣሪያያዎችሁኔታንለማጥናትየተዘጋጀነው፡

1. የፋብሪካውስም----------
2. የስራክፍሉ/ዲፓርትመንትስም----------
3. የስራክፍሉስም----------

<u>ዱከም</u>

ቃለመጠይቁንከማድረግምበላይየተሳታፊቆችፍቃደኝነትመጠየቂያቅጽሠላምእንደምንዋሉ; እኔ ---------እባላለው እዚህየመጣሁትይህንንጥናትየሚያካሄድየአዲስአበባዩንቨርሲቲየህብረተሰብጤናትምህርትክፍልቡድንአካልሆኜነሥራጋርበተ ያያዘየሥራላይአደጋመከላከያመሣሪያያዎችአጠቃቀምሁኔታቆችንለመረዳትእንፈልጋለን፡፡

በመሆኑም ይህንን መረጃ ለማግኘት በዚህ ድርጅት ውስጥ ይህንን መጠይቅ በመካሄድ ላይ እንገኛለን የዚህ ጥናት ውጤት በሀገራችንለሚካሄደውየደህንነትናጤንነትአገልግሎቶችንለማሻሻልከፍተኛእገዛይኖረዋል፡፡ስለሆነምከሥራጋርበተያያዘባለፉት 12 ወራት ውስጥ የሥራ ላይ አደጋ መከላከያ መሣሪያዎች አጠቃቀምና ለችግሩ መባባስ ምክንያት ይሆናሉ ተብለው የሚታሰቡ ጉዳዮች ላይ የተወሰኑ ጥያቄዎችን ልጠይቅዎት እፈልጋለሁ፡፡

በአጠቃላይመጠየቁ 30 ,ደቂቃ ያህን የሚወስድ ሲሆን በጥናቱ የምናሳትፎት የእርስዎን ሙሉ ፍቃደኝነት ሥናገኝ ብቻ ነው ከእርስዎ የምናገኘውን ማንኛውንም መልስ በሚስጥር እንጠብቃለን ::ከዚህ ጥናት ጋር በተያያዘ በማንኛውም ቦታና ጊዜ ሥምዎ እንደማይፃፍና እንደማይጠቀስ ልንገልፅሎት እንወዳለን በመጠይቁ ሂደት ለመመለስ የማይደረጉትን ጥያቄዎች ያለመመለስ መብትዎየተጠበቀነው::በጥናቱለማሣተፍፍቃደኛነዎት?

1. አዎ
2. አይደለሁም

የጠያቂውሥምናፊርማ----------

መጠይቁየተሞላበትቀን----------የጀመረበትሰዓትያጠናቀቀበትሰዓት

<u>ውጤት</u>

1. ተሟልቷል
2. ተቃዎሞ
3. ተጠያቂውአልተገኘም
4. በደንብተሟልቷል

የአረጋገጠውሱበርቫይዘርሥም----------ፊርማ---------- ቀን----------

18 .ANEXX 4 AMEHARIC QUESTIONNAIRE

ተ.ቁ	ጥያቄ	አማራጭመልስ	,ይለፍ	የመልስኮድ
	'	1. ወንድ---------- 2 ሴት		
2	እድሜ	1. 18-25 2. 26-39 3. >39		
3	ሐይማኖት	1. ኦርቶዶክስ 3. ፕሮቴስታንት 2. ሙስሊም 4. ካቶሊክ 99 ሌላካለይገለፅ		
4	ብሔረሰብ	1. ኦሮሞ 2. አማራ 3. ጉራጌ 4. ትግሬ 99 ሌላካለይገለፅ		
5	የትምህርት ደረጃ	1. ማንበብናመፃፍየማይችል/የማትችል 2. ማንበብናመፃፍየሚችል/የምትችል 3. የመጀመሪያደረጃ 4. ሁለተኛደረጃ 5. ከሁለተኛደረጃበላይ		
6	ያገልግሎትዘመን	1. ከ6ወር -- አንድዓመት 2. ከ2 አመት ---3 ዓመት 3. ከ4 ዐመት --5 ዓመት 4. ከ6 ዓመትበላይ		
7	የጋብቻሁኔታ	1. ያገባ 2. ያላገባ 3. የፈታች 4. የሞተችበት/ት		
8	የወርገቢበብር	1. 1—1000 2. 1001----1500 3. >1501		
9	የሥራቅጥርሁኔታ	1. ቋሚ 2. ጊዜያዊ		
10	በፋብሪካውስጥያገለገሉትዘመን	1. 6ወር---1 ዓመት 2. ከ2 ዓመትበላይ		
11	አልኮልመጠጣት	1. አዎ 2አልጠጣም		

12	ሲጋራማጨስ	1. አዎ 2አላጨስም		
13	ጫትመቃም	1. አዎ 2አልቅምም		
14	የሥራእርካታ	1. አዎ 2የለም		
15	የድህንነትመከላከያመሳሪያያእጠቃቀምመመሪያ	1. አዎ 2አልጠቀምም		
16	የድህንነትመከላከያመሣሪያያአጠቃቀምሥልጠና	1. ተሰቶኛል 2እልተሰጠኘም		
17	የድህንነትመከላከያመሣሪያያአጠቃቀምግንዛቤ	1. ተሰቶኛል 2እልተሰጠኘም		
18	የድህንነትመከላከያመሣሪያያአጠቃቀምንበተመለከ ተቁጥጥርናክትትል	1. ይደረጋል 2አይደረግም		
19	የሥራሰዓትመቀያያር	1. አለ 2ደየለም		
20	የሥራቦታመቀያየር	1. አለ 2የለም		
21	የሥራቦታውበቂአየር	1. አለው 2 የለውም		
22	የሥራቦታውበቂብርሃን	1. አለው 2የለውም		
23	የሥራቦታውየደህንነትመጠበቂያመሣሪያያአቅርቦት	1. በቂነው 2 በቂአይደለም		
24	የሥራቦታውየደህንነትመጠበቂያመሣሪያ.ትጠቀ ለህ/	1አዎ 2 አልጠቀምም		