ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

ASSESSMENT ON OCCUPATIONAL INDUCED HEALTH PROBLEMS IN FLORICULTURE WORKERS IN WEST SHEWA, OROMIA, ETHIOPIA

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Dedication

This paper is dedicated to My Family that brings me Joy.

Especially my father Defar Deghebo, he had great contributions, morally and in advice to the life of this paper and my mother Wubit Awoke, who provided me with everything, I needed and wanted.

Acronyms

ADC:-*Agricultural development Center*

AJPH: - *American Journal of Public Health*

AOR: - *Adjusted Odds Ratio*

CI: - *Confidence Interval*

COR: - *Crud Odds Ratio*

EIA:-*Ethiopian Investment Agency*

GH:-*Green House*

IDRC: - *International Development Research Center*

IDI: - *In-depth Interview*

ILO: - *International Labor Organization*

IPMP: - *Integrated Pest Management Program*

IRB: - *Institutional Review Board*

KII: - *key Informant Interview*

MoARD: - *Ministry of Agricultural and Rural Development*

OR:-*Odds Ratio*

PACE: - *Prevention and Control Exchange*

PI: - *Principal Investigator*

PPE: - *Personal Protective Equipment*

PPRC:-*Plant Protection Research Center*

SAB:-*Spontaneous Abortion*

SD:-*Standard Deviation*

SPSS:-*Statistical Package for Social Science*

WHO:-*World Health Organization*

Abstract

Background: Currently floriculture is a booming sector in Ethiopia; nevertheless, there is a serious issue that comes in contradiction to the expansion, which is the workers health. As a result, an effort has been made to outline the outstanding health problems that are manifested in some of the floriculture industry.

Objectives: To assess the health problems encountered in the farm, prevalence of and determinant factors and workers perception towards hazards and hazard prevention in the work place.

Methods: A Cross-Sectional both quantitative and qualitative study was conducted among floriculture workers in Sebeta Town and surrounding areas from December 01, 2010 to February 30, 2011. A sample of 612 workers was selected from the farms roster by means of systematic sampling techniques. Data were collected through pre-tested structured questionnaire, key informant interview and working environmental check list also used to assess the working condition. Then, content analysis was used for the qualitative data after themes were formed and coded. Quantitative data were entered by using EPI Info version 3.5.1 and exported to SPSS for analysis. Logistic regression analysis was conducted using SPSS version 16 statistical package for univariate, Bivariate and multivariate analysis to determine the determinant factors. Significances were considered at P -value less than 0.05($P<0.05$).

Results: Majority, 74.9% of the workers were females, there was no difference on the occurrence of health symptoms amongst the different sections of the farm, with 93% of study subjects showing at least one health symptom in the last 12 month prior to the study period, 67.8% had at least one skin problem and 81.1% had at least one respiratory health symptom in the last 12 months. The highly prevalent disease symptoms were fatigue (76.5%), followed by head ache (73.4%) and sleepiness (63.5%). A *3.16 (95%: CI 1.28-7.80)* odds of having symptoms of disease was observed after adjusting for confounders among those who did not have full Personal protective equipment. There was also *4.93 (95% CI 1.44-16.91)* times odds of symptoms of disease amongst workers who did not use Personal protective equipment properly, and odds of reported symptoms of disease were *2.75 (95% CI 1.15- 6.61)* higher on those who had not pre-employment safety training. Though, majority of respondents were aware of hazard causing risk in the farm, they did nothing to prevent the resulting effect.

Conclusion: Prevention interventions were generally neglected, with only 345 (59.3%) employees reporting having and (62.39%) properly using of personal protective devices. In view of this, adequate supply of Personal protective equipment, pre-employment safety training and use of Integrated Pest Management are highly recommended.

1. INTRODUCTION

1.1. Background

Occupational health is about the effect of work on health. It plays a vital role in helping employers care for and understand the need of their employees enabling businesses to reduce sickness absence levels and optimize staff performance and productivity **[1]**. Occupational health remains neglected in developing countries because of competing social, economic, and political challenges **[2]**.

Agriculture is one of the most hazardous sectors in both developing and industrialized countries. Compared to workers in other sectors, agriculture workers are under–protected and suffer markedly higher rates of accidents and fatal injuries than workers found in other industries **[3]**. The most vulnerable groups are daily labors in plantation, seasonal workers and temporary workers.

Horticulture is the industry and science of plant cultivation including the process of preparing soil for the planting of seeds, tubers, or cuttings [4]. Additionally, the word horticulture comes from the Latin hortus or horti, meaning garden, and cultus, meaning to cultivate. Floriculture is the one among the eight areas of horticulture. It includes the production and marketing of floral crops.

This contributes directly to the country's economic development through increased employment and foreign exchange earnings [5]. In Ethiopia, this sector created employment opportunities for 16,626 workers (directly), and 66,504 others indirectly [6].

Since floriculture workers are exposed at numerous stages of plant growth, worker exposure is of particular concern in greenhouses, where up to 127 different chemicals are used in enclosed spaces-increasing risk of exposure through the skin and by inhalation **[7].** Health problems are associated with all phases of the handling of agricultural pesticides, but most cases of overt poisoning occur in workers applying these agents **[8]**.

The occupational pesticide exposure of the floriculture workers is intense and acute in closed plastic greenhouses without ventilation. They are, therefore, considered as high exposures. The risk is even highest since they do not use special work clothes in their activities in the greenhouses, and they wear their pesticide impregnated clothes outside of work. The wide spread use of pesticides and the long and persistent exposure of floriculture worker make a great public health concern **[9].** Though in most countries the incidence of serious health effects could be low, a high incidence of minor signs and symptoms are reported in a few countries, especially in Africa **[10]**.

1.2. Significance of the Study

Currently, floriculture is a booming sector in Ethiopia; nevertheless, there is a serious health issue that comes in contradiction with its expansion. The workers health condition produced by intensive farming with pesticides under major artificial conditions endanger the workers involved **[11]**.

Study on occupational health effect among workers in floriculture is useful in the development of occupational epidemiology. This study will also help to identify possible health effects and provide with statistical evidence and it will serve as base line information to undertake studies on similar setting. Since it is on expansion and one of the country's economic area, information on occupational health and safety services specifically on floriculture industries is helpful in raising awareness at all levels and making the problem of occupational health problems more visible to policy makers and managers.

2. LITRATURE REVIEW

2.1. Occupational safety and health

Occupational Health is the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs **[12]**. It is also a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goal of all occupational health and safety programs is to foster a safe work environment. As a secondary effect, it may also protect co-workers, family members, employers, customers, suppliers, nearby communities, and other members of the public who are impacted by the workplace environment **[12]**.

The safety of work varies enormously between countries, economic sectors and social groups **[3]**. Deaths and injuries take a particularly heavy toll in developing nations, where large numbers of people are engaged in hazardous activities such as agriculture, construction, logging, fishing and mining. Throughout the world, the poorest and least protected – often women, children and migrants are among the most affected.

The effect that occupation may have on a worker's health is dependent on the exposure (expressed quantitatively) to relevant agents, and on host factors. Taking a history is often very important in identifying relevant exposures and linking them to ill-health, the concept of "cumulative exposure" i.e. a quantitative measure of the intensity of exposure and the duration of exposure is important, since generally it is the main determinant of risk **[12]**.

ILO places special importance on developing and applying a preventative safety and health culture in workplaces worldwide, in 2003, ILO began to observe World Day stressing the prevention of illness and accidents at work on 28th April **[3]**.

2.2. Common occupational induced disease symptoms and other Work-Related Ill- Health in floriculture industry

Occupational exposures to pesticides and adverse reproductive effects have been reviewed **[13]**. Many pesticides known to have reproductive effects are no longer used in the United States, but employment in agriculture appears to be associated with specific morphologic abnormalities in sperm, and studies suggest that parental employment in agriculture could increase the risk of congenital malformations in offspring, particularly orofacial cleft, as well as musculoskeletal and nervous system defects **[13]**. The authors also report that studies are unequivocal on a relationship between occupational exposure to pesticides and infertility.

A survey done in Ecuador revealed that health symptoms reported include headaches, dizziness, hand-trembling and blurred vision **[7]**. Reproductive problems are also a concern; studies of the largely female workforce in Colombia found moderate increases in miscarriages and birth defects among children conceived after either parent started working in floriculture **[14]**.

Well-known acute health problems in cut flower industry with pest side exposure, such as nausea, dizziness, vomiting, headache, abdominal pain, and skin and eye problems were reported 12 months prior to the study period, it is also associated with chronic health problems or health symptoms such as respiratory problems, memory disorders, dermatologic conditions, cancer, depression, neurologic deficits, miscarriages, and birth defects **[13]**.

Greenhouse workers are more likely to be exposed to higher levels of plant material; plant pests and plant protection products than general horticulture workers like pesticides, herbicides and fungicides **[15].** The principal potential effects expected include irritation, asthma, allergic aleveolitis and dermatitis. Although biological control agents are widely used, there were no reports of their having caused ill-health in greenhouse workers.

A study done on health issues of migrant and seasonal farm workers showed that, acute organophosphate pesticide exposure causes increased salivation, tearing, blurred vision, nausea, vomiting, abdominal cramps, urinary and fecal incontinence, increased bronchial secretions, coughing, wheezing, and sweating **[16]**. In rare cases, "involving more severe acute intoxication, dyspnea, bradycardia, heart block, hypotension, pulmonary edema, paralysis, convulsions, or death may occur.

2.3. Magnitude of occupational disease symptoms

Developing countries use only 20% of the world's agrochemicals, yet they suffer 99% of deaths from pesticide poisoning **[17]**. A study of fern and flower workers in Ecuador found that over 50% of respondents had at least one symptom of pesticide poisoning, such as headache, dizziness, nausea, diarrhea, skin eruptions or fainting **[18].**

Study done on adverse reproductive outcomes among women working in Colombian floriculture, suggested that working in floriculture is associated with a higher occurrence of spontaneous abortion and birth defects **[14]**. However, these effects are not necessarily associated with pesticide exposure. Other risk factors requiring further study are levels of physical activity and high temperature in greenhouses.

A 2.6 (95% CI: 1.03- 6.7) fold increase in the odds of pregnancy loss among exposed women was observed after adjusting for age **[18].** Odds of reporting SAB increased with duration of flower employment, increasing to 3.4 (95% CI: 1.3- 8.8) among women working 4 to 6 years in the flower industry compared to women who did not work in the flower industry

Exposure to pesticide causes different symptoms **[9].** A study done to assess cytogenic bio monitoring in Mexico floriculture worker group exposed to pesticides among 30 participants 22(73.33%), female floriculturists showing acute intoxication and occasional cephalea, skin and nasal mucosa irritations and nausea when they were in contact with the pesticides. In Ecuador, nearly 60% of workers surveyed showed poisoning symptoms **[7].**

2.4. Determinants or Risk factors related to occupational health problems

Lack of protective clothing and absence of hand-washing facilities at the worksite all contribute to skin conditions. Since occupational dermatitis often occurs on the hands, migrant workers may suffer a reduction in their work capability and/or income **[16]**.

A study conducted on occupational behaviors and farm workers' pesticide exposure in Monterey County, California indicated that 40% of participants reported that they had never received any information or training about how to protect themselves from pesticides **[11]**. Lack of safe management of agrichemicals Farmer's knowledge, values, and beliefs were also the concerns of the study.

Pesticide poisoning is a significant problem in developing countries primarily because of unsafe pesticide application and handling practices **[17]**. Safety is further exacerbated by the illiteracy and poverty that prevails in most farming communities of developing countries.

A disproportionate number of incidents occurred during insecticide and pesticides use relative to the time that they were sprayed **[10]**. Failure to exercise caution also indicated and lacks of confidence in their practices were the most important predictors of agrochemical-related incidents.

2.5. Conceptual frame work for occupational induced health problems

The conceptual framework of this study is best illustrated below:-

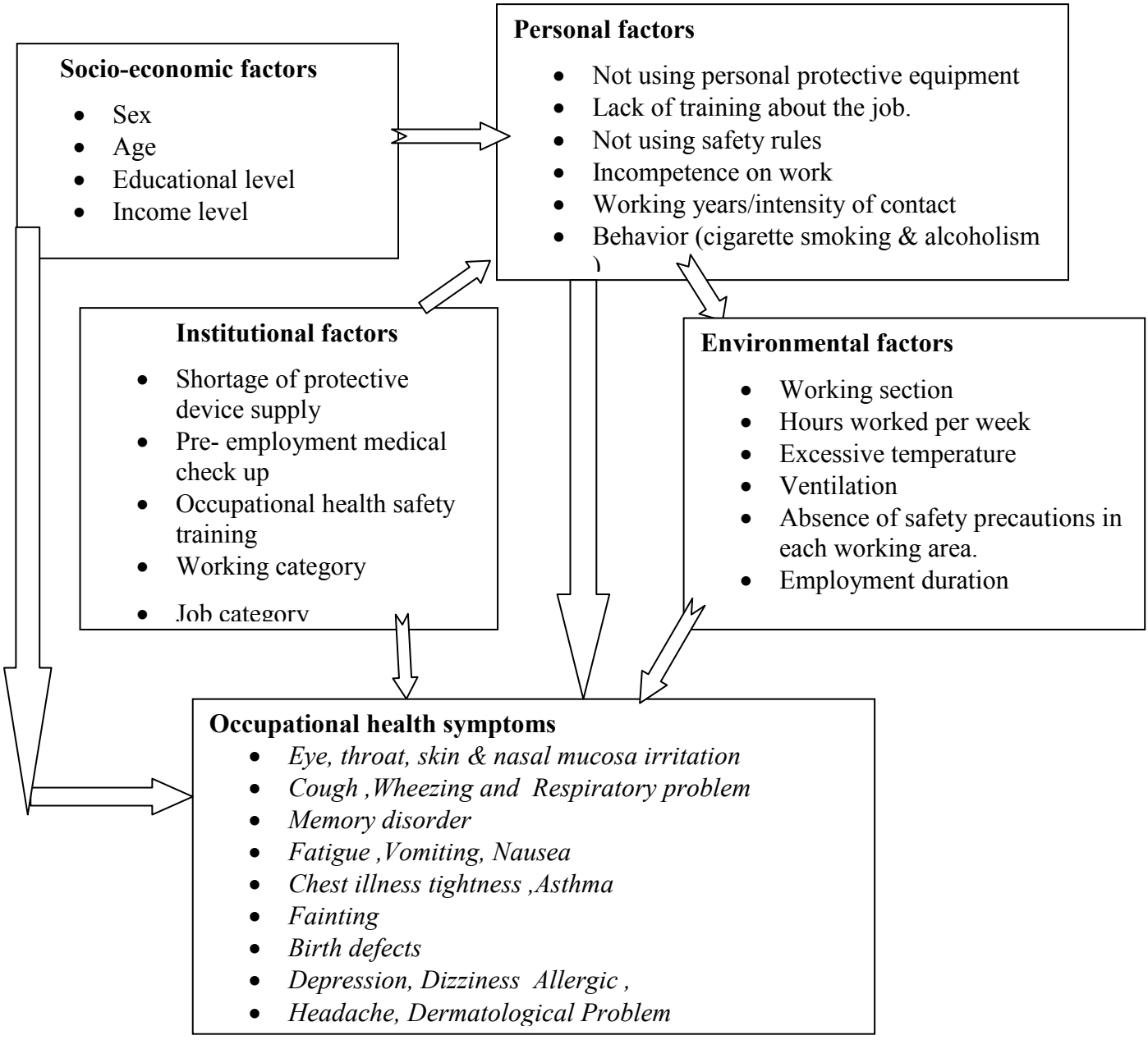

Figure 1- Conceptual frame work for occupational induced health problems

3. OBJECTIVES

3.1. General objective

- To assess occupational induced symptoms of diseases in floriculture industry.

3.2. Specific objectives

- To identify the potential occupational induced symptoms of diseases ever encountered with there prevalence in the farm.
- To assess the determinants for the occurrences of occupational induced symptoms of disease.
- To assess people's perception and knowledge towards occupational hazards and prevention methods.

4. RESEARCH METHODS AND MATERIALS

4.1. Geographical location of the study area

The study was conducted from December 01, 2010 - Feburary 30, 2011 in floriculture farms in Sebeta Town and surrounding areas, West Showa, Oromia, Ethiopia. Sebeta is found in the Western part of Addis Ababa, located 25kms far from Addis. Data found from Sebeta Investment Office indicted that in Sebeta there are 17 registered floriculture industries having a total of about 2000 employees.

4.2. Study Design

A **Cross-Sectional** both qualitative and quantitative study was conducted to assess occupational induced symptoms of disease among floriculture workers in Sebeta Town and surrounding areas from December 01, 2010 to February 30, 2011.

4.3. Source population

All floriculture workers found in Sebeta Town and surrounding areas, West Shewa, Oromia, Ethiopia.

4.4. Study Population

Selected floriculture workers found in Sebeta Town and Surrounding areas.

4.4.1. Inclusion Criteria

Farm that had been functional for the last 12 months, and workers who have worked at least for the last 12 months in the farm. This was on the assumption that workers at this level have been sufficiently exposed to the work related hazards.

4.4.2. Exclusion Criteria

Farms that had been functional for lower than 12 months were not included. In addition workers exposed for lower than 12 months were not included, since they had not been exposed sufficiently.

4.5. Sampling method and sample size estimation

To determine the sample size, the formula for single population proportion was used. Based on the reported causes and types of health effects **[10]** during the uses of crop protection chemicals in cut- flower industry, the prevalence of 63% of health problems among agriculture workers was used, With 4% degree of precision,

$Z_{1-ά/2}$ is a standard Z score and 1.96 corresponding to 95% CI the sample size was calculated

$$n = \frac{(Zα/2)^2 P(1-P)}{d^2} \qquad n = \frac{(1.96)^2 0.63(1-0.63)}{(0.04)^2} = 556$$

In consideration of 10% Non response rate, which was 56, then the total sample was about 612.

n = 612

d = 4%

Z =1.96 corresponding to 95% CI

p = 63%

4.6. Sampling Procedures

Based on the inclusion and exclusion criteria among the 17 Floriculture farms found in Sebeta Town and surrounding areas, 9 out of 17 were selected; giving a total sample size of 612 which was allocated proportionally with respect to the number of each farm's staff. The study units were selected again with the consideration of inclusion and exclusion criteria systematically using random starting point from the workers roster to capture sample sizes in the given specific farm. For qualitative data Key Informant Interview was conducted on purposely selected individuals based on their experience and position in the farm.

4.7. Data Collection Procedures

First for qualitative data, Key Informant Interview (KII) was conducted on purposely selected individuals. Who are supervisors in the green house and having experience of more than three years were selected to get detailed information. Chemical safety data sheet was also used. For quantitative data pre-tested structured questionnaire was used including questions adopted from similar studies **[19]** to capture relevant data. Further, check list for the observation of working environment was also used **[20]**. The questionnaire was administered by six MPH-1 data collectors who were trained for two days before starting data collection and two MPH supervisors were involved. First questionnaire were written in English and then translated to Amharic by legal translator and then translated to English again to check the consistency of translation by other legal translators. Five percent of the questionnaires were pre-tested on farms which were not selected, to identify potential problem areas, unanticipated interpretation and cultural objections to any of questions.

4.8. Variables of the study

4.8.1. Dependent variable

Symptoms of disease

4.8.2. Independent variables

Socio-Demographic factors, Socio-Economic factors, use of personal protective equipment, smoking, alcohol drinking, pre-employment safety training, awareness on hazards and Health behavior to health service.

4.9. Operational Definitions of terms

Hazard: - Anything that potentially cause harm on workers in the farm.

Floriculture:-is a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and for floristry, comprising the floral industry**.**

Definition of terms on the check list for Environmental observation

Excessive heat: - A yes requires, that a worker is found sweating when naked or with light clothing or if investigator feels as sudden heat wave when entering in to the plastic green house especially in the afternoon.

Excessive dust: - A yes requires, if the environmental assessor experiences sudden sneezing up on entering the farm or if the workers eye brows, hair, nostrils and cloths are observed by assessor to be covered with dust particles.

Working sign and safety rule:-A yes requires no lack of such management at inspection around.

Preventive measure: - A yes requires no lack of implementing preventive measures in the farm. Like personal protective equipment**,** posted precautions and so on.

4.10. Data processing and Analysis

For the analysis of qualitative data content analysis was used. First complete transcription of data of in-depth interview was done. Data were coded in categories. Themes were taken based on the meaning of whole texts. Finally quotation was used for each theme to justify conclusion.

Quantitative data were entered by EPI Info version 3.5.1 then exported to SPSS version 16 statistical package for cleaning and analysis. About 10% data were double entered to check consistency. Frequency count and percentage were used to clean and check the accuracy of data entry. Similarly, frequency distribution, percentage, tables and charts were used to present results of Univariate analysis. Data were analyzed to determine the overall prevalence of health symptoms. Data on educational status, total service year, age, sex and exposure status (experience), job category, use of PPE and proper usage and safety training were examined for association. Cross tabulation, and odds ratio (OR) using 95% confidence interval (95% CI) were done on SPSS version 16.0 statistical packages. First bivariate analysis was done by logistic regression model then variable which shows statistically significant were used as covariates to see the relative effects of independent variable on dependent variables by controlling for potential confounders. Differences were considered to be significant, when P-Value was less than 0.05($P < 0.05$).

4.11. Data quality management

Two days training on data collection procedures, how to keep the quality, its completeness and timely recording of data for data collectors was given. Pre-testing of the questionnaire was done to assure the quality of data and for improvement of data collection tool. Then some modification of the tool was done. Irrelevant questions were removed. Some questions were rewrite again to make them clear. Supervision during data collection was done to understand how the data collectors were handling the questionnaire and each filled questionnaire was checked for its completeness, accuracy, clarity, consistency on daily basis. Corrective measures were given accordingly if there was any gap, then special care was given during data entry, and cleaning and the whole data were cross checked for reliability before analysis. Finally, it was analyzed by the principal investigator.

4.12. Ethical issues

There were no invasive procedures entertained in this particular study. Cases were advised to visit the nearby health services regarding health problems they encounter.

1) Ethical clearance was obtained from the Research and Publication Committee, School of Public Health Addis Ababa University
2) Official letters were written from the School of Public Health to the respective farms.
3) The purpose of study was explained to the study subjects.
4) Informed consent was secured from each participant. Employees surveyed were told that the information provided would be confidential and that their identities would not be revealed in association with the information they provided.
5) Health education related to occupational hazards was given to the whole workers immediately after data collection.
6) For bad Working environment assessment findings recommendation were given to farm managers for improvement.
7) There is a plan to give copy of the result to the respective study farms. Dissemination of findings to journals and concerned bodies

5. RESULTS

5.1. QUANTITATIVE RESULT

A total of 578 (94.44%) participated in this study. Among the 34 non respondents, 21 were from the green house and 13 from pack house, of which only three were males. No specific reasons were reported for their refusal to participate in the survey despite intense sensitization effort made by the data collectors.

5.1.1. Socio demographic characteristics

Table 1 shows the result of analysis of the socio-demographic characteristics of the study population. Of the total respondents, 409(70.8%) were living in rural part of the study area.

Majority 433(74.9%) of the study participants were females, with 3:1 female to male ratio. The age of study subjects ranged from 15 to 55 with a mean age of 23.48(SD=6.08). The age group 18-25 years, with a total of 398 study subjects (68.9%), constituted majority of respondents. Respondents in the age group of 26-33 years constituted the second largest group with 105 subjects (18.2%), while those aged below 17 were 35 (6.1%) persons aged between 34-41 were 28(4.8%) and persons aged above 41 made up the lowest proportion of subjects in the population, with only 12 (2.1%).

Among the study population, majority the study subjects were married 314 (54.3%). There were also a high proportion of single subjects 246(42.6%) and the rest 16(2.8%) and 2(0.3%) were divorced and widowed respectively.

The dominant ethnic group in the study participants was Oromo, accounting for 51.6% of the study population, followed by Amhara (28.0%), (13.7%) and (1.7%) were Gurage and Tigray respectively, the remaining constituting 5.0% others, like Kembata, Hadiya and Sidama (Table 1).

Regarding the educational status, most of the respondents, 335(58%) had primary education, while 23.7% Illiterate and 12.5% completed secondary school (9-12). Those with technique and vocational education were only 2.4%.

Four hundred and sixty four (80.3%) of the study subjects belonged to followers of the Orthodox Christian religion, seventy nine (13.7%) were Muslim and the rest (6.1%) were made up of Protestants.

Four job categories were described by the respondents and the majority 298(51.6%) were working in Green houses (which included supervisors, coordinators and cleaners in the GH), 156(27.0%) Pack house, 92(15.9) Spraying and 32(5.5%) were Irrigation (Table1 and Figure 2).

From the green house workers two hundred ninety (97.32%) were females. One hounded forty (92.31%) of the pack house workers were also females, while all sprayers and irrigation workers were males (Figure 3).

Pattern of employment were categorized in to three as the majority 203(52.4%) were contractual, 129(22.3%) were permanent and the rest 146(25.3%) were daily laborers. Among the 578 respondents, 219(37.9%) signed job agreements.

The mean monthly income of the respondents was 505±248.8 birr/month and, 200 and 3000 were the minimum and maximum monthly salary of the study participants respectively. The majority (87%) of the respondents had monthly salary of between 200 and 600 birr/month.

Average working experience recorded in the farm was 30.78±17.67 months. Three hundred eleven (53.8%), of the workers had experience from one year to two years and 112(19.4%) were between two to three years. The mean total working experience in floriculture industry was 33.11±18.97 months.

Five hounded thirty (91.54) of the respondents were not satisfied with their current job (Table 1).

Table 1-Socio-demographic characteristics of selected floriculture industry workers in West Shewa, Oromia, Ethiopia, Dec 2010-Feb 2011 (n=578)

Characteristics		No of subjects	% of study Population
Residence	Rural	409	70.8
	Urban	169	29.2
Gender	Male	145	25.1
	Female	433	74.9
Age	<17	35	6.1
	18-25	398	68.8
	26-33	105	18.2
	34-41	28	4.8
	>42	12	2.1
Marital status	Married	314	54.3
	Single	246	42.6
	Divorced	16	2.8
	Widowed	2	0.3
Ethnicity	Oromo	298	51.6
	Amhara	162	28.0
	Gurage	79	13.7
	Tegreay	10	1.7
	Others	29	5.0
Educational status	Primary (1-8)	335	58.0
	Illiterate	137	23.7
	Secondary (9-12)	72	12.5
	Reading & writing	20	3.5
	Vocational	10	1.7
	College	4	0.7
Religion	Orthodox	464	80.3
	Muslim	79	13.7
	Protestant	35	6.1
Pattern of employment	Contractual	203	52.4
	Daily labor	146	25.3
	Permanent	129	22.3
Working agreement	Yes	219	37.9
	No	359	62.1
Monthly income	<600	503	87
	601-800	46	8.0
	801-1000	19	3.3
	>1000	10	1.7
Service year in the farm(months)	<24	311	53.8
	25-37	112	19.4
	38-50	75	13.0
	51-63	54	9.3
	>64	26	4.5
Total service year in same job (moths)	<24	280	48.4
	25-37	122	21.1
	38-50	80	13.8
	51-63	54	9.3
	>64	42	7.3
Satisfaction with current job	Satisfied	48	8.46
	Not satisfied	530	91.54

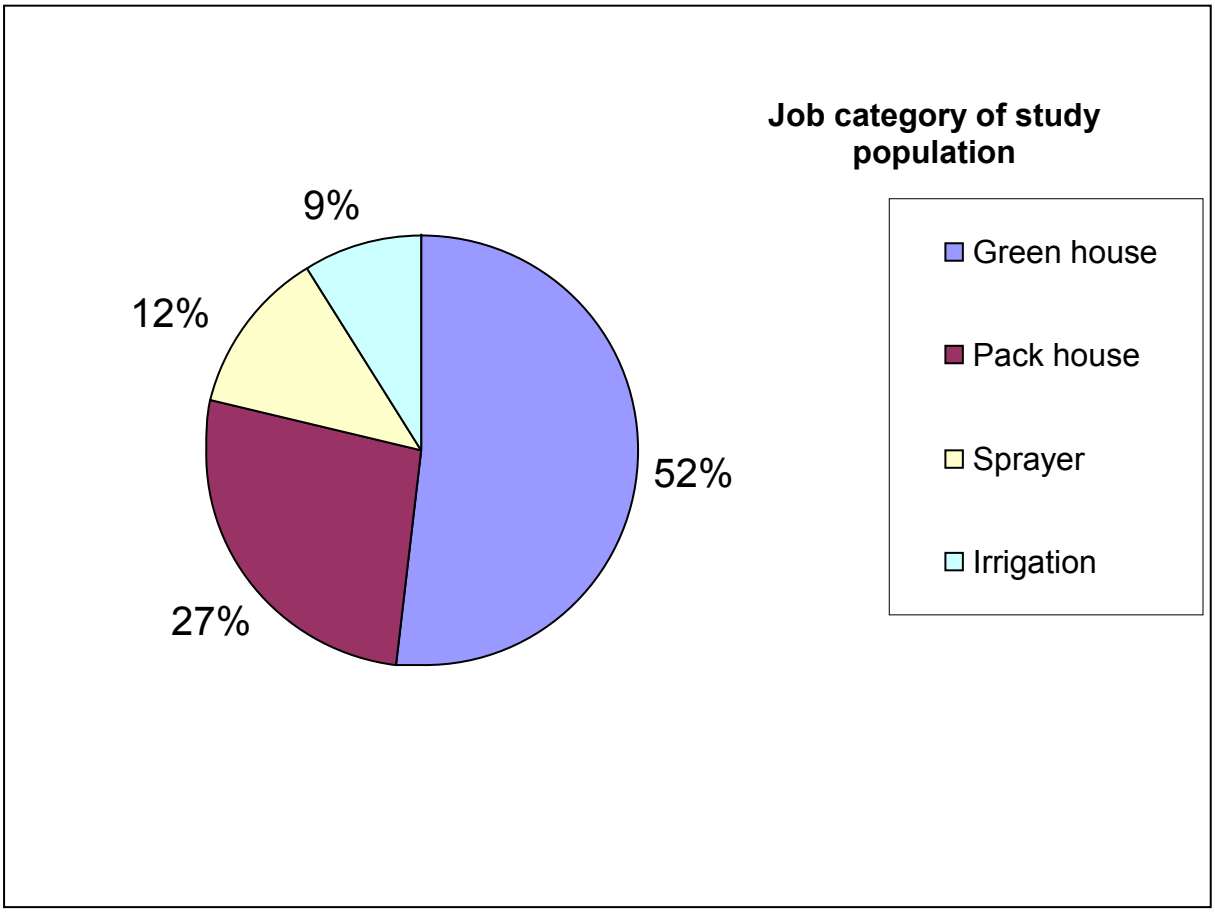

Figure 2- Occupational classification of study respondents of floriculture workers West Shewa, Oromia, Ethiopia Dec 2010-Feb 2011 (n=578)

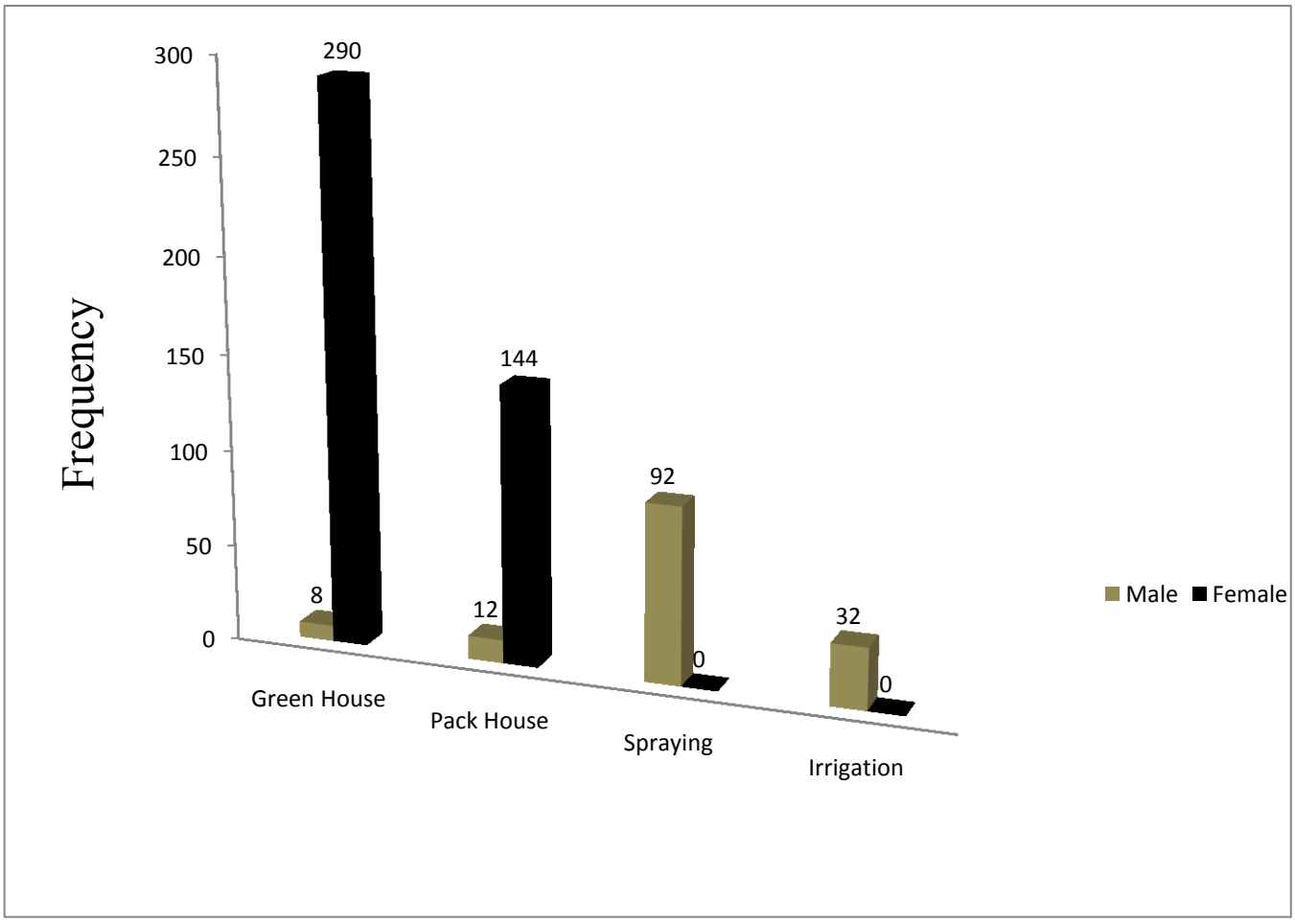

Figure 3- Proportion of Gender by occupational category of respondents in floriculture workers in West Shewa, Oromia, Ethiopia Dec 2010-Feb 2011(n=578)

5.1.2. Behavioral characteristics

Table 2 depicts the description of selected behavioral characteristics. Data showed that the majority of respondents, 343(59.3%) did not have full personal protective equipment. Among the respondents who did not have full personal protective equipment (343), but had partial PPE, 129(37.61%) were using the equipment properly. Regarding the reasons for not using PPE properly, 128(59.81%) responded inadequate supply, 86(40.18%) reported as the equipment not comfortable for work.

Five hundred thirty three study participants (92.2%) had pre-employment safety trainings. Five hundred nine (88.1%) of the respondents were aware of the risk involved working in flora industry.

All most all participants did not smoke cigarettes 568(98.3%) and did not drink alcohol (93.94%).Three hundred sixty four (63.0%) cooked their food in the main room. The type of fuel was, mainly wood or charcoal (55.9%), butane gas (37.2%), animal dung (5.5%) and electricity (0.3%) (Table 2).

Table 2-Behavioral characteristics of selected workers in floriculture industry West Shewa, Oromia, Ethiopia, Dec 2010- Feb 2011 (n=578)

Characteristics		No of study units	% of study population
Full Personal protective	Yes	235	40.70
	No	343	59.30
Properly using (n=343)	Yes	214	62.39
	No	129	37.61
Reason for not to use properly (N=129)	Not provided	68	52.71
	Not comfortable for work	61	47.29
Awareness on the risk involved	Yes	509	88.1
	No	69	11.9
Smoke cigarette	Yes	10	1.70
	No	568	98.3
Frequency of smoking(n=10)	Sometimes	4	40.0
	Usually	4	40.0
	1-3 per week	2	20.0
Alcohol drinking	Yes	35	6.06
	No	543	93.94
Cooking and living in the same room	Yes	214	37.0
	No	364	63.0
Type of fuel using	Wood/charcoal	323	55.9
	Butane gas	215	37.2
	Animal Dung	32	5.5
	Electricity	2	0.3
	Other	6	1.0

As shown on Table 3, Three hundred eighteen participants (56.78%) had medical checkup after the symptoms happened. Majority of those who took medical service reported that, the cost was covered by the staff 222(69.81%). Among respondents who had medical services, one hounded sixty eight (52.84%) reported that there was no break for medical process. Regarding the length of the sick leave, seventy one (47.33%) reported that they were working while taking medication, 50(33.33%) leave until recovery and the remaining 19.33% considered different options. Reasons for not visiting health facility, 66 (27.27%) stated lack of heath facility in the farm, 61(25.25) lack of money and 58 (23.96%) unavailability of leave and the remaining 57(23.55%) reported different reasons (Table 3).

Table 3-Health behaviors of selected workers in floriculture industry West Shewa, Oromia, Ethiopia, Dec 2010-Feb 2011 (n=578)

Characteristics		No of study subjects	% of study population
Medical check up After symptoms	Yes	318	56.78
	No	242	43.21
Medical cost covered by (n=318)	Staff	222	69.81
	Farm	96	30.19
Sick leave for medical checkup (n=318)	Yes	150	47.16
	No	168	52.84
Length of break (n=150)	Till recovery	50	33.33
	Work while on treatment	71	47.33
	Other option	29	19.33
Reason for not taking medical checkup (n=242)	The farm has no health facility	66	27.27
	The farm do not give break	58	23.96
	Lack of money	61	25.20
	Other reason	57	23.55

5.1.3. Overall health symptoms

The major proportion of subjects with different health symptoms in the survey population 560(95.85%) had at least one sign and symptom in the last 12 months prior to the study period. Of those 539(93.25%) develop after join the work and 407 (75.51 %) were females. About three hounded ninety two (67.70%) had at least one skin problems and 469 (81.10%) had at least one respiratory health symptom in the last 12 months prior to the study period. Of these (78%) developed after join the work (Table 4).

Table 4-Prevalence of different symptoms of disease among floriculture workers in West Shewa, Oromia, Ethiopia, Dec 2010- Feb 2011 (n=578)

Health problems		No of subjects	% of study population
Overall health symptom	Yes	560	95.85
	No	28	4.15
Develop after join the work	Yes	539	93.25
	No	39	6.75
Skin problems	Yes	392	67.70
	No	186	32.30
Respiratory problems	Yes	469	81.10
	No	109	18.90
Respiratory problem developed after join the work	Yes	452	78.2
	No	136	21.8

As shown on table 5 distribution of respiratory health problems with sex and occupational category of study participants, 272(93.79%) females and 6(75%) males from green house, 135(93.75%) females and 9(25%) males from pack house and 89(96.73%) and 28(87.50) males from spraying and irrigation department respectively had health symptoms (Table 5).

Table 5- Distribution of Sex and Occupational category of study subjects with health symptoms in floriculture workers in West, Shewa, Oromia, Ethiopia, Dec 2010- Feb 2011 (n=578)

	Health Symptoms					
	Male		Female		Both	
Job category	**Yes # (%)**	**No # (%)**	**Yes # (%)**	**No # (%)**	**Yes # (%)**	**No # (%)**
Greenhouse	6(75)	2(25)	272(93.79)	18(6.21)	278(93.28)	20(6.72)
Pack house	9(25)	3(25)	135(93.75)	9(6.25)	144(92.30)	12(7.7)
Spraying	89(96.73)	3(3.27)	0(-)	0(-)	89(96.73)	3(3.27)
Irrigation	28(87.50)	4(22.50)	0(-)	0(-)	28(87.50)	4(2.50)

5.1.3.1 Skin Problems

The proportion of subjects with skin problem was 392(67.8%).They had at least one sign and symptom of skin problem in the last 12 months prior to the study period. 295(75.25 %) were male. The distributions were Eczema 335(58%), Itching 290 (50.20%), Redness 250 (43.3%) and Burning 216(37.4%) (Figure 4).

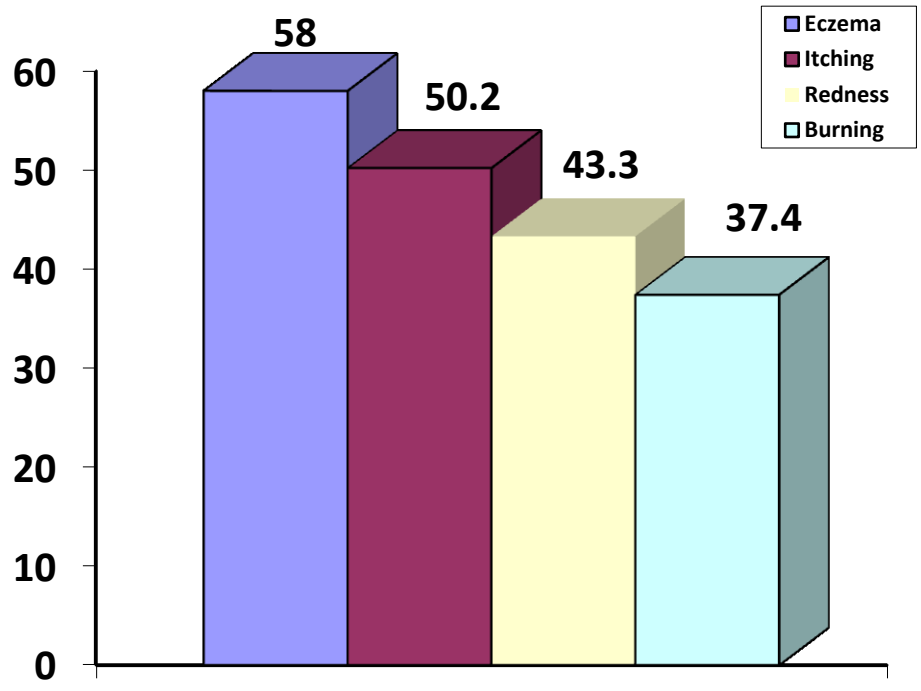

Figure 4- Prevalence of skin problems among selected floriculture workers in West Shewa, Oromia, Ethiopia, Dec 2010- Feb 2011 (n=578)

As shown on Table 6 age and occupational category of study participants with distribution of skin problems, among < 17 age group, 20(76.92%) green house, 7(100%) pack house and 2(100%) spraying workers had skin problems. From age 18 to 25,150(73.17) green house, 68(55.73%) pack house, 39(78%) spraying and 16(76.19%) irrigation workers had at least one sign and symptoms of skin problems. In the age category of 26-33, thirty three (75%) green house, 10(43.47%) pack house, 18(64.80%) spraying and 10(100%) irrigation workers had also at least one skin problems. Nine (56.25%) green house and 8(100%) spraying workers in the age group 34 to 43 had skin problem in the last 12 months prior to the study period. One (14.29%) and 1(25%) from green house and spraying department respectively had skin problems.

Table 6- Distribution of Age and Occupational category of study subjects with skin problems in floriculture workers in West Shewa, Oromia, Ethiopia, Dec 2010-Feb 2011 (n= 578)

	Skin problem							
Age	Green house		Pack house		Spraying		Irrigation	
group	Yes # (%)	No# (%)	Yes # (%)	No # (%)	Yes # (%)	No # (%)	Yes # (%)	No # (%)
<17	20(76.92)	6(23.08)	7(100)	0(-)	2(100)	0(-)	-	-
18-25	150(73.17)	55(26.83)	68(55.73)	54(45.27)	39(78)	11(22)	16(76.19)	5(23.71)
26-33	33(75)	11(25)	10(43.47)	13(56.53)	18(64.28)	10(35.72)	10(100)	0(-)
34-41	9(56.25)	7(43.65)	0(-)	3(100)	8(100)	0(-)	0(-)	1(100)
>42	1(14.29)	6(85.71)	0(-)	1(100)	1(25)	3(75)	-	-
Total	213(71.47)	85(28.52)	85(54.48)	71(45.51)	65(73.03)	24(26.96)	26(81.25)	6(18.75)

5.1.3.2. Respiratory problems

The great proportion of subjects with respiratory problem 469 (81.1%), had at least one respiratory health symptom in the last 12 months prior to the study time. 452(78.2%) developed the symptoms after they join the work. Three hundred thirty six (74.3%) were females. The distribution of symptoms were, Cough 264(45.7%), Shortness of breath 312 (54%), Wheezing 240(41.5%), Sneezing 352(60.9%), Asthma 30(5.2%) and Chest tightness 234(40.5%) (Figure 5).

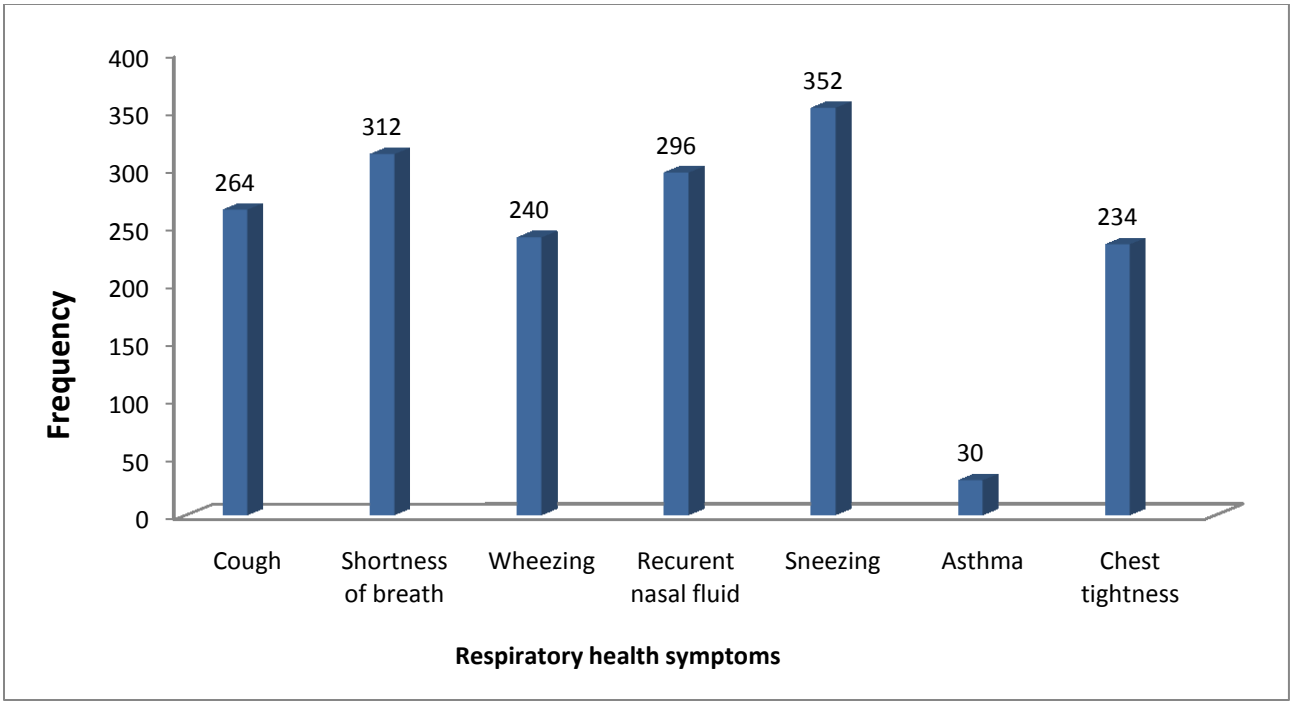

Figure 5- Prevalence of respiratory health symptoms among selected floriculture workers in West Shewa, Oromia, Ehtiopia Dec 2010-Feb 2011(n=578)

As shown on Table 7 sex and occupational category of study participants with distribution of respiratory health problems, 223(76.09%) females and 6(75%) males from green house, 113(78.47%) females and 7(58.33%) males from pack house and 77(83.69%) and 26(81.25) males from spraying and irrigation department respectively had also respiratory health symptoms .

Table 7- Distribution of Sex and Occupational category of study subjects with respiratory health symptoms in floriculture workers in West Shewa, Oromia, Ethiopia, Dec 2010- Feb 2011 (n=578)

	Respiratory health symptoms					
	Male		Female		Both	
Job category	**Yes # (%)**	**No # (%)**	**Yes # (%)**	**No # (%)**	**Yes # (%)**	**No # (%)**
Green house	6(75)	2(25)	223(76.09)	67(23.91)	229(76.84)	69(23.16)
Pack house	7(58.33)	5(41.67)	113(78.47)	31(21.53)	120(76.92)	36(23.08)
Spraying	77(83.69)	15(16.31)	0(-)	0(-)	77(81.52)	15(18.48)
Irrigation	26(81.25)	6(18.65)	0(-)	0(-)	26(81.25)	6(18.75)

5.1.3.3. Other health symptoms

Proportion of study participants with different health symptoms were, Headache 424 (73.4%), Fatigue 442 (76.5%), Irritation of the nose 233(40.3%), Irritation of the eye 218(37.7%), Irritation of the throat 116(28.2%), Sleepiness 367(67.5%), Loss of appetite 205(35.5%), Back pain 327 (56.6%), Kidney problem 243(52%), Dizziness 329 (56.9%) and Fainting 79(13.7) (Figure 6).

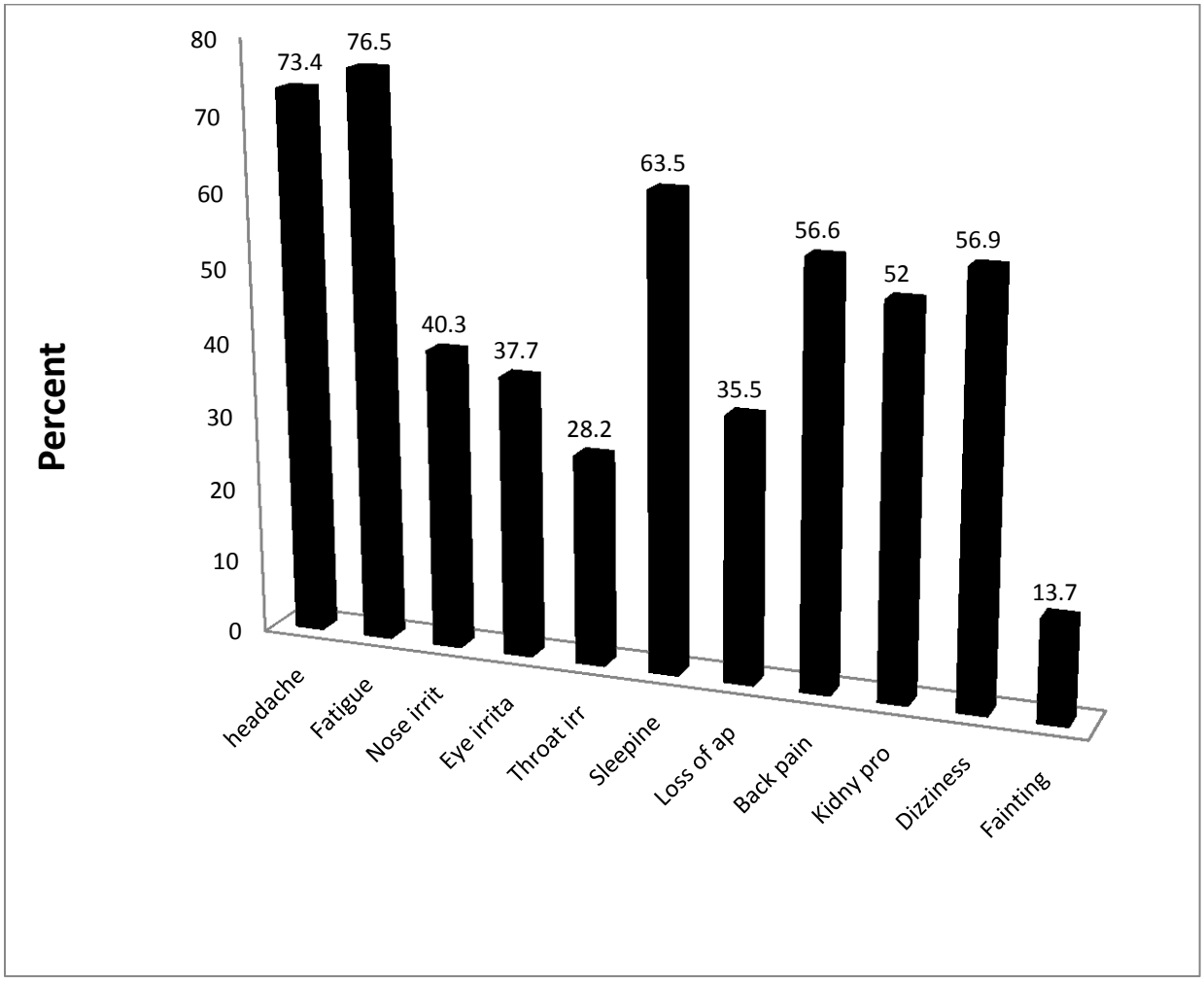

Figure 6- Prevalence of different health symptoms among selected floriculture workers in West Shewa, Oromia, Ethiopia, Dec 2010-Feb 2011(n=578)

5.2. QUALITATIVE RESULT

In depth interviews were conducted on purposely selected individuals in the farm. Most of the participants were supervisors having more than three years of working experience in the farm. According to the respondents

Common occupational symptoms of disease were encountered

In summary "*…fatigue, sleepiness, headache, back pain, abdominal crump, cough, skin problem, cutting by flower thorn, irritation of the eye and nose, sometimes fainting and, frequent sneezing, and irregular menstrual flow were experienced"*

One of the respondents stated "*I have experienced fainting in the farm when I get inside after immediate spraying in the plastic green house*" Another said *"when we enter after some hours of spraying everybody has a feeling of headache and sometimes our colleagues faint and eye, nose and throat irritation are also very common"*

During the data collection, one data collector experienced fainting after she entered in to sprayed plastic green house to interview workers.

Women working inside the green house are working isolated and reported to be subjected to sexual harassment. One 22 years old female green house supervisor stated that *"turnover of women workers in the farm is very high due to sexual harassment, including request for sexual intercourse by the supervisors"*

Work hours

One green house supervisor stated that "*during times of pick demand like Valentine's Day and Christmas workers are enforced in to overtime work to meet demand (more than 48 hours per week), cover long shift at one task without a break".*

Hygienic related issues

The other widely reported issue was the quality of available water for workers for drinking, showering and for other purposes as well. The administrator said that "*the water is safe for human consumption*".

On the other hand, one worker from irrigation department stated that *"you doubt the water is safe since the administrators do not drink the same water" and also the workers feel that well water is the safest of all."*
Another irrigation worker stated that "the water comes from well is treated with sodium hypochlorite so it is safe for consumption."

Factors for health symptoms (Hazards)

Most interviewed subjects mentioned *"Most health problems occur because of high stress in the work area, the heat in the green house and primarily the chemical"*

Prevention of hazards

One main store keeper with 6 years of work experience said that *"There is a trial to address these appealing working conditions, like giving PPE, medical checkup; however, this trial is failing to protect workers adequately for reasons such as an absence of unions and strong management support…"*

One sprayer said that *"We have blood medical checkup every six months on private clinics, but I have never seen the result. I don't know why? I think they are doing it for protection of the name of the farms"* in contrary one farm manager stated that *"we have periodical blood check up for sprayers if it the result deviate to the standard we assign them on other working section"*

Pre-employment safety training

Considering new employees, equipment and other changes, one sprayer stated that *"the supervisor may tell you how to prepare the solution, and guide you how often and from where to where you are going to spray…in general, there is no formal pre-employment safety training"*

Job security

One woman, commenting on employment pattern stated *"…after you give birth, if you have not signed contractual agreement you will not be paid for two to three months, but if we sign an agreement we may have a chance to get our salary during our maternity leave, being contractual and daily laborer make a difference on the social security and union membership and so on..."*

5.2.1. Work Environment Observation

The working environmental observation check list revealed that in all Farms' green houses there was excessive heat and dust. There were no any safety signs and rules posted like danger sign except some farms. Most of the workers did not have the necessary personal protective equipment. There was no any measure taken to prevent hazards, except some farms that implemented electronic controlling methods to adjust the temperature inside the green house, farms that give milk for sprayers and breakfast for all farm workers. Most farms did not have copy of most important safety and health regulation. They did not have safety personnel, except one farm that employed a nurse but others assign one individual with another commitment. All farms were not following written health and safety plan of action in work place in general. Most farms are located in the out skirt of towns, due to this; there was no health facility near the farms. Even though most of the farms had first aid kit, it was not accessible easily.

5.3. DETERMINANTS FOR THE OCCURRENCE OF SYMPTOMS OF DISEASE

In the bivariate analysis of the socio demographic variables with different health symptoms, working agreement, having full PPE, proper usage of PPE, pre-employment safety training and awareness on health risk of working in flora industry were significantly associated with the occurrence of disease symptoms (Table 8).

No statically significant differences were found in the prevalence of health symptom amongst different sex of the study population. Similarly residence, age, marital status, ethnicity, educational status, religion, occupational category, pattern of employment, monthly salary and service year did not show any statistically significant association with the prevalence of overall health symptoms.

The odds of health symptoms were three times more on who sign working agreement than who did not (OR=3.18, 95% CI (1.61, 6.25). Those who did not have full PPE had four times odds of health symptoms than who did have (OR=4.06, 95% CI (1.67, 9.86). In addition those who did not use the PPE properly had (OR=6.85, 95% CI (2, 05, 22.92) odds of health symptoms than who did use properly.

Three and half fold odds of health symptoms were found among who had not pre-employment safety training than who had (OR=3.50, 95% CI (1.50, 8.16). Those who were aware on health risk of working in the farm had also (OR=2.40, 95% CI (1.09, 5.29) odds of health symptoms than who were not aware (Table 8).

Table 8-Distribution of selected factors of health symptoms among respondents in floriculture industry, West Shewa, Oromia, Ethiopia, Dec 2010- Feb 2011

Characteristics	Presence of symptom		OR(95% CI)
	Yes # (%)	No# (%)	
Residence			
Urban	388(93.72)	26(7.28)	1.00
Rural	156(92.31)	13(7.69)	1.23(0.62,2.45)
Sex			
Male	132(91.67)	12(8.23)	1.37(0.68,2.78)
Female	407(93.78)	27(6.22)	1.00
Age			
=<17	34(97.14)	1(2.86)	1.00
18-25	375(94.22)	23(5.78)	2.09(0.27,15.92)
26-33	94(89.52)	11(10.48)	3.98(0.50,31.99)
>34	36(90.00)	4(10.00)	3.78(0.40,35.52)
Marital status			
Single	231(93.90)	15(6.10)	0.52(0.11,2.47)
Married	292(93.00)	22(7.00)	0.60(0.13,2.79)
Divorced&Widowed	16(88.89)	2(11.11)	1.00
Ethnicity			
Oromo	279(93.62)	19(7.38)	0.94(0.40,2.20)
Amhara	150(92.59)	12(7.41)	1.10(0.44,2.78)
Others	110(93.22)	8(6.78)	1.00
Educational level			
Illiterate	115(95.04)	6(4.96)	0.64(0.19-2.17)
1-8	307(91.64)	28(8.36)	1.48(0.55,3.95)
9-college	81(94.18)	5(5.82)	1.00
Religion			
Orthodox	434(93.53)	30(7.47)	0.54(0.18,1.62)
Muslim	74(93.67)	5(6.33)	0.36(0.13,2.08)
Protestant	31(88.57)	4(11.43)	1.00
Job category			
Green house	278(93.29)	20(6.71)	0.50(0.16,1.58)
Pack house	144(92.30)	12(7.60)	0.58(0.18,1.94)
Sprayer	89(96.73)	3(3.27)	0.24(0.05,1.12)
Irrigation	28(87.50)	4(12.50)	1.00
Pattern of employment			
Permanent	117(97.50)	13(2.50)	1.00
Contractual	282(93.38)	20(6.62)	0.64(0.31,1.33)
Daily labor	140(95.89)	6(4.11)	0.39(0.14,1.05)

Working agreement			
Yes	194(88.58)	25(11.42)	***3.18(1.61,6.25)****
No	345(96.10)	14(3.90)	1.00
Monthly salary			
=<450	260(92.52)	21(7.48)	1.25(0.65,2.40)
>450	279(93.93)	18(6.07)	1.00
Service year			
=<48	461(92.57)	37(7.43)	1.00
>48	78(97.50)	2(2.50)	0.32(0.08,1.35)
Total service			
=<48	445(90.63)	36(9.37)	1.00
>48	94(96.90)	3(3.10)	0.40(0.12,1.31)
Full PPE			
Yes	229(97.44)	6(2.56)	1.00
No	310(90.37)	33(9.62)	***4.06(1.67,9.86)****
Properly using			
Yes	126(97.63)	3(2.37)	1.00
No	184(85.98)	30(14.02)	***6.85(2.05,22.92)****
Pre-employment safety training			
Yes	502(94.18)	31(5.82)	1.00
No	37(82.22)	8(17.78)	***3.50(1.50,8.16)****
Knowledge on risks of working in the farm			
Yes	479(94.10)	30(5.90)	1.00
No	60(86.96)	9(13.04)	***2.40(1.09,5.29)****

Indicators * Significance P<0.005

5.3.1. General Health symptoms

Using binary logistic regression analysis working agreement, having full PPE, properly using and pre-employment safety training were independently significantly associated with the prevalence of health symptoms among the surveyed population. The odds of symptom of disease were three times more on who signed working agreement than who did not signed 2.89, 95% CI (1.45, 5.78) (Table 9).

Having full PPE also showed that preventive; the odds of symptoms of disease were three times more on who did not have full PPE 3.16, 95%CI (1.28, 7.80) than who did have. In addition those who did not use the PPE properly had 4.93, 95% CI (1.44, 16.91) times' odds of symptom of disease than those use properly.

Respondents who had not pre-employment safety training had 2.75, 95% CI (1.15, 6.61) more odds of symptom of disease than who had pre-employment safety training. Awareness on the health risk of working in the farm proved to have not an independent significant association on the occurrence of symptoms of diseases (Table 9).

Table 9-Distribution of independent factors of health symptoms among respondents by determinant at floriculture industry, West Shewa, Oromia Ethiopia, Dec 2010-Feb 2011(n=578)

Characteristics	Presence of symptom		COR(95% CI)	AOR(95% CI)
	Yes # (%)	No# (%)		
Working agreement				
Yes	194(88.58)	25(11.42)	***3.18(1.61,6.25)****	***2.89(1.45,5.78)****
No	345(96.10)	14(3.90)	1.00	1.00
Full PPE				
Yes	229(97.44)	6(2.56)	1.00	1.00
No	310(90.37)	33(9.62)	***4.06(1.67,9.86)****	***3.16(1.28,7.80)****
Properly using				
Yes	126(97.63)	3(2.37)	1.00	1.00
No	184(85.98)	30(14.02)	***6.85(2.05,22.92)****	***4.93(1.44,16.91)***
Pre-employment safety training				
Yes	502(94.18)	31(5.82)	1.00	1.00
No	37(82.22)	8(17.78)	***3.50(1.50,8.16)****	***2.75(1.15,6.61)****
Awareness on health risks of working in the farm				
	479(94.10)	30(5.90)	1.00	1.00
Yes	60(86.96)	9(13.04)	***2.40(1.09,5.29)****	2.21(0.97,5.04)
No				

Indicators * SIGNIFICANCE **Adjusted by n=343 P<0.005

5.3.2. Skin Problems

Using binary logistic regression model to explain the relationship between skin problem and selected socio demographic variables, Age, occupational category, pattern of employment , working agreement, total service year, having full PPE and awareness on health risk of working in the farm proved to have independent significant association (Table 10).

An increase in the prevalence of skin problem with increasing age was noted on binary logistic regression with adjustment, age group >34 years were found to be five times more odds of skin problems than lower age groups with 5.51 ,95 % CI (1.76,17.24).

Working in Pack house meant having 5.74, 95% CI (2.12, 15.55) more odds of skin problems than irrigation section workers. Odds of skin problem also 1.78 higher on workers signed working agreement than who did not signed 1.78, 95% CI (1.12, 2.83).

Pattern of employment, total experience in the farm, properly using of PPE and Pre-employment safety training had not independent significant association on the occurrence of skin problem after adjusting confounders.

Respondents that did not have full PPE had 2.5 times more odds of skin problem than those who did have full PPE 2.50, 95% CI (1.64, 3.81). Who were not aware on the health risk involved in working in the farm had 2.5 times odds of skin problem than who were aware 2.50, 95% CI (1.64, 3.81) (Table 10).

Table 10-Distribution of independent factors of skin problems among respondents in floriculture industry, West Shewa, Oromia, Ethiopia, Dec 2010-Feb 2011 (n=578)

Characteristics	Presence of symptom		Odds ratio with 95% CI	
	Yes #	No #	Crude	Adjusted
Age				
<17	29(82.86)	6(17.14)	1.00	1.00
18-25	273(68.59)	125(31.41)	2.21(090,5.47)	1.74(0.67,4.51)
26-33	71(67.62)	34(32.38)	2.32(0.88,6.10)	2.32(0.82,6.57)
>34	17(60.71)	11(39.29)	***5.34(1.82,15.67)****	***5.51(1.76,17.24)****
Occupational category				
Green house	213(71.48)	85(29.71)	1.28(0.46,3.53)	1.78(0.57,5.54)
Pack house	85(51.92)	71(48.08)	***2.91(1.01,8.41)****	***5.74(2.12,15.55)****
Sprayer	68(73.91)	24(26.09)	0.86(0.28,2.59)	1.06(0.31,3.60)
Irrigation	26(81.25)	6(18.75)	1.00	1.00
Pattern of employment				
Permanent	75(57.69)	55(42.31)	***3.28(1.69,6.36)****	1.76(0.80,3.89)
Contractual	205(67.88)	97(32.12)	1.73(0.99,3.01)	0.89(0.39,2.03)
Daily labor	112(76.71)	34(23.29)	1.00	1.00
Working agreement				
Yes	126(57.53)	93(42.47)	***2.47(1.59,3.86)****	***1.78(1.12,2.83)****
No	266(74.09)	93(25.91)	1.00	1.00
Total service				
=<48	335(69.65)	146(30.35)	1.00	1.00
>48	57(58.76)	40(41.24)	***1.61(1.03,2.52)****	1.30(0.80,2.12)
Full PPE				
Yes	186(79.15)	49(20.85)	1.00	1.00
No	206(60.06)	137(39.94)	***2.52(1.72,3.70)****	***2.50(1.64,3.81)****
Properly using (n=343)				
Yes	89(68.95)	40(30.05)	1.00	1.00
No	117(54.67)	97(45.33)	***1.85(1.16,2.92)****	1.60(0.95.2.69)
Pre-employment safety training				
Yes	368(69.04)	165(30.96)	1.00	1.00
No	24(53.33)	21(46.67)	***1.95(1.06,3.61)****	1.86(0.95,3.64)
Awareness on risks of working in the farm				
Yes	335(68.51)	154(31.49)	1.00	1.00
No	37(53.62)	32(46.38)	***1.88(1.20,3.32)****	***2.50(1.64,3.81)****

*Significance ** Adjusted on n=343 P<0.005

5.3.3. Respiratory problems

In binary logistic regression the respondents having full PPE, properly using of PPE and awareness on the health risk of working in farm proved to have independent significant association with the prevalence of respiratory health symptoms (Table 11).

Those who did not have full PPE had 2 times more odds of respiratory health symptoms than those who did have 2.10, 95% CI (1.33, 3.30).Similarly those who did not use PPE properly had 2.62, 95% CI (1.48, 4.62) odds of respiratory problem than those using PPE properly.

Signing working agreement had not an independent significant association with the prevalence of respiratory health symptom. On the other hand respondents who were not aware the health risk of working in the farm had three times 3.30, 95% CI (1.93, 5.65) odds of respiratory health symptom than those who were not aware (Table 11).

Table 11-Distribution of independent factors of respiratory health symptoms among selected respondents in floriculture industry, West Shewa, Oromia, Ethiopia Dec 2010- Feb 2011 (n=578)

Characteristics		Presence of symptom		COR (95% CI)	AOR (95% CI)
		Yes #	No #		
Working agreement					
	Yes	161(73.52)	58(26.48)	***1.54(1.03,2.30)****	1.50(0.99,2.27)
	No	291(81.06)	68(18.94)	1.00	1.00
Full PPE					
	Yes	203(86.38)	32(13.62)	1.00	1.00
	No	249(72.59)	94(27.41)	***2.39(1.54,3.72)****	***2.10(1.33,3.29)****
Properly using (n=343)	Yes	109(84.45)	20(15.55)	1.00	1.00
	No	140(65.42)	74(34.58)	***2.88(1.66,5.01)****	***2.62(1.48,4.62)***
Awareness on risks of working in the farm					
	Yes	417(81.44)	95(18.56)	1.00	1.00
	No	38(55.07)	31(44.93)	***3.56(2.11,6.01)****	***3.30(1.93,5.65)****

*significance ** Adjusted by n=343 P<0.05

6. DISCUSSIONS

The study was conducted primarily to assess occupational induced symptoms of diseases in floriculture industry in West Shewa, Oromia, Ethiopia; nevertheless, it provides valuable information about the general condition of workers in the farm.

In this study, women workers take the majority (79.9%) of the employees of flower industries. Similarly, in the study done in Uganda 54% and Colombia 65% were females **[5, 16].**

The qualitative data of this study shows that "…*fatigue, sleepiness, headache, back pain, abdominal crump, cough, skin problem, pricking by flower thorn, irritation of the eye and nose, sometimes fainting and frequent sneezing and irregular menstrual flow"* were the most common symptoms of disease. In line with this, a study done in Uganda found that general ache and pain (stomach, head and back aches), rashes, allergies, ulcers, septic wounds and coughing were all considered minor problems, while low cholesterol level and incidents of chemicals found in blood stream were both considered as a major problems**[5]**. Head ache/dizziness and nausea/vomiting, often smell related were the most common symptom reported **[10].**

Similarly, increased salivation, tearing, blurred vision, nausea, vomiting, abdominal crump, urinary and fecal incontinent, increased bronchial secretion, cough, wheezing and sweating **[16]**, Additionally, on the study of mutation, a careful medical examination showed that pesticide exposed workers did not show health problems like cancer or respiratory and digestive disturbance; acute intoxication and occasional cephalea, skin and nasal mucosal irritation and nausea when they were in contact with the pesticides**[18]**.

Most respondents from green houses reported that *"dizziness, blurring of vision and loss of weight attributed to the high heat in it".* Another study indicated that prenatal pesticide exposure was significantly associated with a slight decrease in body mass index of 1.1 kg/m2 of their school children **[21]**, but in this study majority of the respondents related the case with the heat and work stress in the Green House.

In this study the most prevalent symptoms of disease were fatigue 76.5% followed by head ache 73.4% and sleepiness 63.5%. Similarly, in another study the most prevalent signs and symptoms manifested were weakness followed by fatigue and muscle pain then by chills and fever **[22].**

Based on this study, 95.85% of study respondents had at least one symptoms of disease in the last 12 months, supporting the finding with a bit lower rate 2/3(66.66%) of symptoms of disease in the last 12 months prior to the study period**[10]**. Moreover, findings in Philippines showed that 32% were symptomatic or had experienced pesticide related illness since their first use of pesticides **[22]**.Other studies in Latin America have found that 50-60% of flower workers exhibit at least one symptom of pesticide poisoning **[16**], the difference could be due to sample size and the working area condition that might not expose workers for different determinant factors.

In this study there was no significant difference on the occurrence of symptoms of diseases with respect to age. However, (AOR=5.51 95% CI 1.76, 17.24) more odds of having skin problems on older (>34 age) than the younger's (<17) was found. In contrary, younger farmers or workers more likely experienced agro-chemical related incidences than older ones elsewhere **[5].** This could be due to more susceptibility nature of extremes of age groups.

Majority (92.2%) of the respondents in this study reported that, they had pre-employment safety training which is congruent with the study done in Uganda, where 82% of all employees surveyed indicated that they had received job related training **[5].** However, the qualitative result of this study revealed that all participants had never been engaged on occupational health and safety training in the last 6 months which is contradicting to the quantitative result, the reason could be fear of job insecurity following disclosing the information.

Conflicting results have been reported in the literature about the influence of cigarette smoking, alcohol consumption and confounding factors in the occupationally exposed people **[17]**. However, in this study, possible influence was avoided since all most all individuals (98. 3%) of do not smoke and (93.94%) do not drink alcohol.

In this study 59.3% had not full Personal Protective Equipments. This is relatively higher compared with the findings reported in Uganda and Tanzania, which were 56% and 35 % respectively **[23]**. In this finding, those who did not have full PPE had three fold odds of symptoms of disease than those who had (Adjusted OR=3.16, 95%CI (1.28, 7.80). In addition, those who did not use the PPE properly had Adjusted OR=4.93, 95% CI (1.44, 16.91) more odds of having symptoms of disease than those properly using it. Similar results were found in the study of different countries, that confident users were less likely to experience serious or moderate incidents (0.60(95% CI 0.44, 0.84)**[9].** Therefore having and using PPE properly is a preventive factor**.**

The qualitative assessment of this study shows that most symptoms of disease, especially skin problems were reported during contact; due to lack of PPE and volatile nature of chemicals in use. A study done in La Trinidad, Philippines showed that individuals who re-entered a recently sprayed area were 20 times more likely to get ill during the past 12 months and those who had spills of chemicals on their bodies while applying pesticide were 26 times more likely to get ill **[22].** Having contact with the chemicals and immediate entrance after spraying are the main situation that expose workers for different disease symptoms.

This study shows that, principles are often disregarded; many workers are forced to enter in to the green house right after fumigation. With the exception of one farm that has poster which shows spraying time and entry duration of 2.5 hours, the environmental observation check list confirmed that most farms have no safety signs and rules. Therefore, the immediate entrance to the sprayed GH could be a causative factor for different symptoms of disease manifested. In this regard, Concentration of air born pesticide after spray decreased by 95% during 12 hours after application, so recommendations were at least 12 hours to re-enter Green houses **[24]**.

7. STRENGTH AND LIMMITATIONS OF THE STUDY

7.1. STRENGTHS

- The study covers most farms found in the study area.
- The response rate was 94.5%.
- The study utilized pre-tested structured questionnaire and well trained data collectors with health background (MPH-1 students) who were already familiar with the process.
- The environmental check lists were done by qualified professionals.
- Data were entered and analyzed by the principal investigator.
- Since no earlier studies were conducted on health issues of floriculture workers, this study will serve as at least a base line data.

7.2. LIMMITATIONS

- The study focused on frequency of health symptoms associated with exposure difference of causative agents in different sections of the cut-flower industry and relied on an indirect exposure measurement (i.e., interview and observation), which does not detail the specific potential pathways of pesticide exposure which may lead to exposure misclassification.
- The study design may be weaker to overlook the potential problems ever occurred in detail and determinants.
- Sometimes the study units were not willing to disclose the whole problems in fear of job insecurity following disclosing the information.
- There could be Biases, like recall, social desirability and measurement error.
- The result may be inflated, due to respondents' positive benefit feeling after the study finding.

8. CONCLUSIONS

In conclusion, most commonly identified health symptoms were skin problems, respiratory health problems and non specific health symptoms. The study has found prevalence of 93.25% health symptoms that was bit higher than studies done in Latin America and some African countries.

Prevalence of skin and respiratory problems were 67.8% and 81.1% respectively. In category of health, especially skin problems are prevalent in pack house and on older age groups. The most prevalent health symptoms were fatigue (76.5 %%) followed by headache (73.4 %%) and sleepiness (63.5%).

Lack of full PPE, improper use of PPE and absence of pre-employment safety training were observed as significant determinant factors for the occurrences of health symptoms. Most respondents stated heat, work load and chemicals as major causative agent for the occurrence of symptoms of diseases. Yet, though most of the respondents (88.1 %%) were aware of the hazards and prevention mechanisms, they did nothing to implement prevention measures.

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Prevalence's of different health symptoms were high due to lack of implementation of prevention measures. Especially non specific health symptoms were very high in relation to the heat in the green house and usage of chemicals.

9. RECOMMENDATIONS

Based on the above conclusion the following recommendations are forwarded:-

- Each farm management/administration should provide full personal protective equipment and try to enforce its usage like gloves, boots, gown and mask for sprayers.
- The farms should arrange pre-employment safety training and sensitization orientation regularly.
- The zonal social and labor office should follow the worker condition specially health and rights of the employees.
- The farms should arrange prevention mechanism to minimize the exposure of workers to the specified causative factors, like heat, work stress and chemical contact.
- The farms should employ occupational health and safety professionals to mentor their staff's health and to find out the common health problems.
- Using qualitative data may be advantageous to find more potential problems.
- Longitudinal study is highly recommended to examine the real cause and effect relationship of implicated determinants.

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11. ANNEXES

11.1. Annex-I English version of the Questionnaire

Questionnaire for the assessment of occupational induced health problem in floriculture industry workers, West Shewa Oramia, Ethiopia

Identification

Serial number ----------

Name of enterprise ----------

Introduction and consent form

Hello my name is ----------, I am here on behalf of the research team of the Addis Ababa University, School of Public Health. We would like to assess what health problems are encountered here, and also we would like to know the prevalence of occupational induced health problems and what causes the health problems. To get this information, we are caring out interview in this farm. The result from this project will be used to help policy makers and other responsible bodies to improve occupational safety and health service in this organization. I will ask you a few questions about the health symptom and outcomes encountered within the last years since you came here. The questions about occupational health problem that I would like to ask will take about 20 minutes of your time. What you tell me will be kept strictly confidential, your name will not be registered and your information will never be transferred, to another party or interpreted wrongly. Your participation is volunteer and you are not obliged to answer any question, if you do not wish to answer you are free to stop the interview at any point. So, may I continue? 1. Yes ☐ 2. NO ☐

Informed consent certified by

Interviewer Name_____ signature_____

Date of interview_____ Time started_____ Time completed_____

Result of interview - 1. Completed _____ 2. Respondent not available_____

3. Refused_____4. Incomplete_____

Checked by Supervisor_____ Signature _____Date _____

For any convenience and problem you can contact the principal investigator

Phone -0911088999 E-mails- atid1999@yahoo.com

NB: please use actual wording when ever interviewing

No	Question	Possible response	Skipping	Response code
Part I: Socio- Demographic Characteristics				
1	Residence	1.Urban 2.Rural		
2	Sex	1.Male 2.Female		
3	Age	_____years		
4	Marital status	1.Married 2.Single 3.Divorced/separated 4.Widowed		
5	Ethnicity	1.Oromo 2.Amhara 4.Tigrai 3.SNNPR 5.other specify____		
6	Educational level	1.Illiterate 2.Read & write 3.Primary(1-8grades) 4.Secondary(9-12) 5.Vocational 6.College/Diploma/Degree		
7	Religion	1.Orthodox 2.Muslim 3. Protestant 4.Other,specify		
8	Job category	_____		
9	Pattern of employment	1.Permananent 2.Temporary 3.Daily labor		
10	Have you signed employment agreement when you were employed?	1.Yes 2.No		
11	Monthly salary	_____Birr		
12	Total services year in the farm	_____Months/years		
13	Service duration in the same job	_____Months/years		
14	Are you satisfied by your current job	1.Yes 2.No		
15	Do you have full personal protective equipment?	1.Yes 2.No		
16	If the answer for Question number 15 is "No" do you use it properly?	1.Yes 2.NO		
17	If the answer for question number 16 is "No" why not use it properly?	1.Not provided by the organization 2.Not comfortable for work		
18	Have you taken pre employment occupational safety training?	1.Yes 2.No		
19	Do you think that working in the farm can expose to different health problems?	1.Yes 2.No		
20	If the answer for question number 19 is "Yes" please list some health problems?			

21	If the answer for question number 19 is "Yes" what could be the possible causes of the problems?	

Health problems mainly focus on symptoms that have occurred for the last 12 months

(22)	**Part II: Respiratory Health Problem related Questionnaires**			
	Cough			
A	Do you usually cough during working time(excluding clearing throat or single cough)	1.Yes 2.No		
	Shortness of breath **If disabled from walking by any condition, other than heart or lung disease, put "X" in the space and leave the question ( ) unasked.**			
B	Are you ever troubled by shortness of breath?	1.Yes 2.No		
	Chest tightness			
C	Does your Chest ever feel tight or Your breathing becomes difficult?	1.yes 2.No		
	Wheezing and asthma			
D	Have you ever had **wheezing** or whistling at any time in the past? If "No" please skip to next Question	1.Yes 2.No		
E	Have you ever had asthma?	1.Yes 2.No		
	Rhinitis, Sneezing, and **Recurrent nasal fluid** **All questions are about problems when you DO NOT have a cold or the flu.**			
F	Have you ever had a problem with **sneezing**, or runny or blocked nose when you DID NOT have a cold or flu?	1.Yes 2.No		
G	In the past 12 months have you had a problem with **Recurrent nasal fluid** or a runny or blocked nose when you DID NOT have a cold or the flu?	1.Yes 2.No		
23	The above sign and symptoms manifested	1. Before join the work 2. After join the work		
(24)	**Skin disorders related questions**			
	Eczema			
A	Have you ever had eczema which was coming and going for at least six months in the last 12 months?	1.Yes 2.No		
	Itching			
B	Have you had this itchy rash at any time in the last 12 months?	1.Yes 2.No		
	Redness			
C	Have you had this itchy rash at any time in the last 12 months?	1.Yes 2.No		
	Burning			
D	Have you had this burning at any time in the last 12 months?	1-Yes 2-No		
25	The above skin disorders Major attack at any of the following body places?	1. Hand 2. Face		

		3. Leg 4. Neck 5.Additional		

(26)	Part III: Other health symptoms			
A	In the past 12 months, have you had a problem with **headache** when you came into the work place?	1.yes 2.No		
B	In the past 12 months have you had a problem with **fatigue** when you were at rest?	1.yes 2.No		
C	In the past 12 months have you had a problem with **irritation** of the following? 1. Eyes 2. Noses 3. Throat	 1.Yes 2.No 1.Yes 2.No 1.Yes 2.No		
D	In the past 12 months have you had a problem with **sleepiness** during working time?	1. Yes 2. No		
E	In the past 12 months have you had frequent problem with **loss of appetite?**	1. Yes 2. No		
F	In the past 12 months have you had frequent problem with **Back pain**?	1. Yes 2. No		
G	Have you had **Kidney problem**?	1. Yes 2. No		
H	In the past 12 months have you had a problem with **Dizziness** when you were at work?	1. Yes 2. No		
I	Have you ever **Faint** in the farm during working hours?	1. Yes 2. No		
27	The above disease symptoms manifested	1. Before join the work 2. After join the work		
28	Did you visit health facility following disease symptoms?	1.Yes 2.No		
29	If "yes" for Question number 28 Who would cove medical cost?	1.The staffs 2.The farm		
30	Have you ever had sick leave for medical process?	1.Yes 2.No		
31	If "yes" for question number 30 for how long?	1.Till recovery 2. Work while on medication. 3.Other option		
32	If "no" for Question number 28 what was the reason?	1. The firm has no health facility 2. Lack of break 3. Lack of money 4. Other		
	Part IV: Related questions(worker's behavior information) **Tobacco smoking**			
33	Do you smoke cigarette	1. Yes 2.No		

34	If "Yes" to question 52, how often?	1.Every day 2.Occationaly 3.1-3days/week		
35	Alcohol Drinking	1.Yes 2.No		
	Cooking			
36	In your home is cooking and/or baking undertaken in the main house?	1. Yes 2. No		
37	If "Yes" to what type of fuel is in use? 1.Biomass 2.Butanga (Kerosene) 3.Animal dung 4.Electricity 4. Other specify ___			
38	Please list if you face other health problems during your stay in the farm?			

11.2. Annex-II Amharic Version Questionnaire

በአበባ ልማት ድርጅቶች ላይ ተቀጥረው በሚሰሩ ሰራተኞች ላይ ከስራቸው ጋር በተያያዘ የሚደርስባቸውን የጤና ችግር ለማጥናት የተዘጋጀ መጠይቅ ነው፡፡

መለያ _____

የድርጅቱ ስም _____

መጠይቁን መሞላት ከመጀመሩ በፊት የተሳታፊውን ፈቃደኝነት መጠየቅ ቅጽ

ሰላም እንደምን አሉ? እኔ ---------- እባላለሁ፡፡ እዚህ የመጣሁት ይህን ጥናት ከሚያካሂደው የአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና የትምህርት ክፍል ነው፡፡ ከስራ ጋር በተያያዘ በዚህ ድርጅት ውስጥ ምን አይነት የጤና ችግር እንዳለ ማጥናት ምን ያህል እንደሆነ እና በምን ምክንያት ሊከሰት እንደሚችል ለማዳት እንፈልጋለን፡፡ በመሆኑም ይህን መረጃ ለማግኘት በዚህ ድርጅት ውስጥ ይህን መጠይቅ በማከፋፈል ላይ እገኛለው፡ በመሆኑም የዚህ ጥናት ውጤት በሀገራችንና በዚህ ድርጅት ውስጥ የሚደረገውን የሰው ደህንነትና ጤንነት አገልግሎት ለማሻሻል ከፍተኛ እገዛ ይኖረዋል፤ ስለሆነም ከስራዎ ጋር በተያያዘ ላለፉት አመታት እዚህ ከማጡ ጀምሮ የተከሰተ የጤና ችግሮችን በተመለከተ የተወሰኑ ጥቄዎችን ለማነሳት እወዳለሁ፡፡ በአጠቃላይ መጠይቁ 20 ደቂቃ ያህል ይፈጃል የሚጠቅሙ መረጃም ለማንም ተላልፎ አይሰጥም በተጨማሪም በተቃረነ መልኩ ፈጽሞ አይተረጎምም ስምዎ መመዝገብ አያስፈልግኝም ፡፡ ተሳትፎዎ ሙሉ በሙሉ በፈቃደኝነት ላይ የተመሰረተ እንደመሆኑ መጠነ እንዲመልሱ ብለን በምንም አይነት መልኩ አንገፋፋዎትም መመለስ በሚፈልጉበት ሰዓት መጠይቁን የሚረጥ መቦት አልዎት፡ ፡

ስለዚህ ለመቀጠል ፍቃደኛ ነዎት 1. አዎ ☐

2. አይደለሁም ☐

የጠያቂው ስም_____ ፊርማ_____

መጠይቁ የተሞላበት ቀን_____ የተጀመረበት ሰዓት_____ የተጠናቀቀበት ሰዓት_____

የመጠይቁ ግምገማ 1. ተሟልቷል 3. ተጠያቂው አልተገኝም

2. ተቋወሞ 4. በከፊል ተሟልቷል

የአረጋገጠው ሱፐርቫይዘር ስም _____ፊርማ_____ ቀን_____

ለማንኛውም ችግር እና ግልጽ ላልሆነ ነገር ከታች ባለው አድራሻ ማጋገር ይችላሉ፡፡

ዋና የጥናቱ ተሳታፊ አትክሬ ደፋር

ስልክ - 09 11 08 89 99 ኢሜል- atid1999@yahoo.com

የተጠያቂው ሀሳብ ብቻ ይከበብ

ተ.ቁ	ጥያቄ	አማራጭ መልስ	(ይለፍ)	(ኮድ)
ክፍል አንድ፡ - ማህበራዊና ስነ - ሕዝባዊ ገጽታዎችን በተመለከተ (Socio Demography information related)				
1	የመኖሪያ ቦታ	1. ከተማ 2. ገጠር		
2	ጾታ	1. ወንድ 2. ሴት		
3	እድሜ	_____		
4	የጋብቻ ሁኔታ	1. ያገባ/ች 2. ያላገባ/ች 3. የፈታ/ች 4. የሞተባት		
5	ብሔር	1. ኦሮሞ 2. አማራ 3. ትግራይ 4. ጉራጌ 5. ሌላ ይጥቀሱ.....		
6	የትምህርት ደረጃ	1. ያልተማ ረ/ች 2. ማንበብና መጻፍ 3. የመጀመሪያ ደረጃ/1-8 / 4. ሁለተኛ ደረጃ /9-12/ 5. የቴክኒክና ሙያ 6. ኮሌጅና ከዚያ በላይ		
7	ሐይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ሌላ		
8	የስራ ድርሻ/ክፍል			
9	የቅጥር ሁኔታ	1. ቋሚ 2. ኮንትራት		
10	መጀመሪያ ስትቀጠሪ/ር የስራ ወል ፈርመሻል/ሃል?	1. አዎ **2.** የለም		
11	የወር ደመወዝ			
12	በድርጅቱ የቆይታ ጊዜ? (በአመት)			
13	በዚህ ስራ የቆይታ ጊዜ? (በአመት)			
14	በስራህ ደስተና ነህ	1. አዎ 2. የለም		
15	የተሟላ የሰዉነት መከላከያ መሳሪያ አለህ/ሽ?	**1.** አዎ **2.** የለም		
16	ለተራ ቁጥር 15 መልሱ የለም ከሆነ በአግባቡ ትጠቀማለህ/ሽ?	1. አዎ 2. የለም		
17	ለተራ ቁጥር 16 መልሱ የለም ለምን አትጠቀሚም/ምም?	1. ድርጅቱ አያቀርብም 2. ለሥራ አይመችም		
18	የስራ አካባቢ ደህንነት ስልጠና ከመቀጠሸ/ህ በፊት መስደሻል/ሀል?	1. አዎ **2.** የለም		

19	አበባ ድርጅት ወስጥ መስራት ለአደጋ ያጋልጣል ብለህ ታምናለህ/ሽ?	1. አዎ 2. የለም		
20	ለተራ ቁጥር 19 መልሱ አዎ ከሆነ ለምን ለምን የጠፍ ችሮች ያጋልጣል ብለህ/ሽ/ ታስባለህ/ሽ?			
21	ለተራ ቁጥር 19 መልሱ አዎ ከሆነ በድርጅቱ ወስጥ ለዚህ የጠፍ ችግር የሚጋልጡ ነገሮች ምንምን ናቸው ብለህ ታስባለህ/ሽ?			

(22) ከዚህ በታች የተዘረዘሩት የጠፍ ችግሮች ላለፉት 12 ወራት ለተከሰቱት ብቻ ነው፡፡				
ክፍል ሀለት :- የመኮንፈሻ አካል የጠፍ ችግሮች ላይ የሚተኩር ጥያቄዎች				
የመኮንፈሻ አካላት ችግሮች **(Respiratory problems)**				
	ሳል (Cough)			
ሀ	በስራ ወቅት በተደጋጋሚ የሚከል ስሜት አለብህ/ሽ ጉሮሮን ለሚከተካከል የሚረግን ሳጨሮ?	3. አዎ 4. የለም		
	የትንፋሽ ማጠር (Shortness of breath)			
ለ	በትንፋሽ ማጠር ተቸግረህ ታውቃለህ/ቂያለሽ?	1. አዎ 2. የለም		
	ደረት ክብድ ክብድ ማለት(Chest tightens)			
ሐ	**ደረት ክብድ ክብድ** ወይም **የአተነፋፍስ ችግር** ገጥሞህ ያውቃል?	1. አዎ 2. የለም		
	ደረት ላይ ሲጥ ሲጥ ማለት (Wheezing) እና **አስም** (Asthma)			
መ	**ደረት ላይ ሲጥ ሲጥ** የማለት ችግር ገጥሞህ ያውቃል የለም ከሆነ ወደማቁጥለው ይታለፍ?	1. አዎ 2. የለም		
ሠ	**አስም** አለብህ/ሽ?	1. አዎ 2. የለም		
	ማነጠስ (Sneezing) እና **የአፍንጫ ፈሳሽ** (Recurrent nasal fluids)			
ረ	**የማነጠስ** ችግር ነበረብህ/ሽ?	1. አዎ 2. የለም		
ሰ	ላለፉት 12 ወራት የአፍንጫ ፈሳሽ ችግር ወይንም የአፍንጫ ፍሳሽ መበዛት ወይንም መጂፍን ግትሞ ያውቃል?	1. አዎ 2. የለም		
23	ከላይ የተጠቀሱት የጠፍ ችግሮች የታዩብህ/ሽ	1. ከመጣባት በፊት **2.** ከገባህ/ሽ በኋላ		
(24)	**የቆዳ ላይ ችግሮች**			
	ሽፍታ (Eczema)			
ሀ	ላለፉት 12 ወራት ሄድ መጣ እየለ የሚስቸግር ሽፍታ ነበረብህ/ሽ?	1. አዎ 2. የለም		
	ማከክ (Itching)			
ለ	ላለፉት 12 ወራት በማንኛውም ጊዚ ቆዳህ ላይ ማከክ ኖሮብህ ያውቃል?	1. አዎ 2. የለም		
	መቅላት (Redness)			
ሐ	ላለፉት 12 ወራት በማንኛውም ጊዚ ኖሮብህ ቆደህ ላይ መቅላት ኖሮብህ ያውቃል?	1. አዎ 2. የለም		

	መቃጠል (Burning)			
መ	ላለፉት 12 ወራት በማንኛውም ጊዜ በቆዳህ ላይ መቃጠል ኖሮብህ ያውቃል?	1. አዎ 2. የለም		
25	የቆዳ ላይ ችግር በዋናነት የሚከቃው የሰውነትህ/ሽ አካል/ሽ	1. እጅ 2. ፊት 3. እግር 4. አንገት 5. ተጨማሪ ካለ		

(26) ከዚህ በታች የተዘረዘሩት የጠፍ ችግሮች ላለፉት 12 ወራት ለተከሰቱት ብቻ ነው፡ ክፍል ሦስት :- ሌሎች የጠፍ መታወክ ምልክቶች (Other health symptoms)

ሀ	ላለፉት 12 ወራት የራስ ህመም (Headache) ችግር ነበርበህ/ሽ?	1. አዎ የለም		
ለ	ላለፉት 12 ወራት የድካም ስሜት (Fatigue) ይሰማህ ነበር/ሽ?			
ሐ	ላለፉት 12 ወራት የሚቃጠል ስሜት (Irritation) ነበረብህ/ሽ ? 1.የአፍንጫ 2. የአይን 3. ጎሮሮን	1. አዎ 2. የለም 1.አዎ 2.የለም 1.አዎ 2.የለም		
መ	ላለፉት 12 ወራት የእንቅልፍ እንቅልፍ የሚለት ስሜት (Sleepiness) ነበረብህ/ሽ?	1. አዎ 2. የለም		
ሠ	ላለፉት 12 ወራት የምግብ ፍላጎት ማጣት(loss appetite) ወይንም መቀነስ በተደጋጋሚ ገጥሞህል/ሻል?	1. አዎ 2. የለም		
ረ	ላለፉት 12 ወራት የጀርና ህመም (Back pain) በተደጋጋሚ ነበረብህ/ሽ?	1. አዎ 2. የለም		
ሰ	የኩላሊት ችግር (Kidney problem) አለብህ/ሽ?	1. አዎ 2. የለም		
ሸ	ላለፉት 12 ወራት የድበርት ስሜት(Dizziness) በስራ ወቅት ገጥሞህል/ሽል?	1. አዎ 2. የለም		
ቀ	ባልታሰበ ሁኔታ ስራ ቦታ መወደቅ (Fainting) ገጥሞህ/ሽ ያውቃል?	1. አዎ 2. የለም		
27	ከላይ የጠቀስናቸው የጠፍ ምልክቶች የጀመረህ/ሽ?	1. እዚህ ከመገባትህ በፊት 2. እዚህ ከገባህ በኋላ		
28	ከላይ የጠቀስናቸውን የጠፍ እክሎች ባጋጠመህ/ሽ ጊዜ ወደ ህክምና ቦታ ሄደሃል/ሻል?	1. አዎ 2. የለም		
29	ለተራ ቁጥር 28 መልሱ አዎ ከሆነ የህክምናውን ወጪ የሚሸፈነው በማን ነው?	1. በሰራተኛው 2. በድርጅቱ		
30	ህክምናውን በምታደርግበት ጊዜ እረፍት ይሰጥህል/ሻል?	1. አዎ 2. የለም		
31	ለተራ ቁጥር 30 መልሱ አዎ ከሆነ ለምን ያህል ጊዜ?	1. ህክምናውን ተከታትለህ እስከምትጨርስ 2. ህክምና እየተከታተልክ ትሰራለህ 3. ሌላ ካለ		

32	ለተራ ቁጥር 28 መልሱ የለም ከሆነ ላለመታከምህ ምክንያትህ/ሽ ምን ነበር?	1. ድርጅቱ ህክምና አገልግሎት ስለሌለው 2. ደርጅቱ ለህክምና እረፍት ስለሚይሰጥ 3. የአቅም ችግር 4. ሌላ ምክንያት ካለ ----------		
ክፍል አራት :- ተዛማጅነት ያላቸው ጥያቄዎች፡ ሰራተኛው ስነ -ባሃሪ ላይ የሚያተኩሩ፡፡				
33	ሲጋራ ታጨሳለህ?	1. አዎ የለም		
34	ለተራ ቁጥር 33 መልሱ አዎ ከሆነ ለምን ያህል ጊዜ	1. አንዳንድ ጊዜ 2. ሁል ጊዜ 3. 1-3ቀን በሳምንት		
35	ማጨጥ ትጠጣለህ?	1. አዎ የለም		
36	በቤትህ /ሽ ወስጥ ምግብ የሚዘጋጀው በዋናው ከፍሎች ወስጥ ነው?	1. አዎ 2. የለም		
37	የምትጠቀመው የማዶ አይነት ስ?	1. እንጨት /ከሰል 2. ቡታጋዝ 3. ኩብት 4. ኤሌክትሪክ 5. ሌላ ካለ/የአበባ ቅጠል		
38	ሌላ ምን የጠፍ ችግር ገጥሞህ ያውቃል?			

11.3. Annex-III Key-Informant Interview Data Collection Tool.

1. Is there occupational health safety officer?
2. Is there a functional workers association?
3. Is there any place that helps the workers to take care of their hygiene?
4. In your experience what health problems have you observed? Most commonly encountered health problem in the farm?
5. Working hour per week?
6. How can you arrange your maternity leaves (only for woman) and sick leave?
7. Is there any arranged training considering new employment, equipment and other changes?
8. Do you know the major factors that expose you for health problems and what are you doing to prevent.
9. Is there any regular work area supervision?

11.4. Annex- IV Working Environmental Observation Checklist

Hazards in working environment

1. Is there **excessive heating** in the work place? 1.Yes_____ 2.No_____
   A yes requires that a worker is found sweating when naked or with light clothing if investigator feels as sudden heat wave when entering in to the industry.
2. Is there **excessive dust** in the work place? 1.Yes _____2.No_____
   A yes requires if the investigator experiences sudden sneezing up on entering the industry or if the workers eye brows, hair, nostrils and cloths is observed by investigator to be covered with dust particles
3. Is there **working sign and safety rule** in the work place? 1.Yes _____2.No____
   A yes requires no lack of such management at inspection around.
4. Do the employees use the necessary **personal protective equipment** (PPE)?
   1. Yes_____ 2. No_____
5. Was there any **preventive measure implemented** for hazards in the working environment?
   Yes requires specification of incident and preventive measure
6. Does the industry have copy of the most important **safety and health regulation**?
7. Does the farm follow written **health and safety plan of action** in the work place?
8. Does the working section have **first aid equipment**? 1. Yes_____ 2. No_____
9. Is there any **health service** near to the farm? 1. Yes 2 .No

Declaration

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

Name Atkure Defar

Sign: _____

Date: _____

Place: Addis Ababa University

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

Prof.Ahmed Ali (PhD)

School Of Public Health

Addi Ababa University

Signature _____

Date _____

Place Addis Ababa University