ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF OCCUPATIONAL HEALTH RISKS, OUTCOMES AND ASSOCIATED FACTORS AMONG FLORICULTURE FARM WORKERS, EAST SHOWA, OROMIA REGION

Cross sectional study

By:

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A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDISABABA UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIRENMENTS FOR THE DEGREE OF MASTER IN PUBLIC HEALTH

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Abbreviations & Acronyms

ADC:- Agricultural Development Center

AJPH: - American Journal of Public Health

EHPEA- Ethiopian Horticultural Producers & Experts Association

ILO: - International Labor Organization

CI: - Confidence Interval

EIA:- Ethiopian Investment Agency

GH:- Green House

IDRC: - International Development Research Center

IDI: - In-depth Interview

IRB: - Institutional Review Board

KII: - key Informant Interview

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 : Floriculture industry is a new agro-industry activity in Ethiopia. The expansion and growth of the industry magnified the economic significance of the sector, but the social and health implication of the sector was not given due attention.

Objectives: This study aimed to assess occupational health risks, health outcomes and associated factors among floriculture farm workers, in East Showa Zone , Oromia Region.

Methods : A mixed method research was conducted combining both quantitative survey & qualitative research methods from December 01,2012 to March 15, 2013. For the survey, 331 workers from four floriculture farms of the surrounding areas of Bishoftu town were selected using purposive sampling method based on proximity of farms from Addis Ababa. Data were collected through pre-tested structured questionnaire, key informant interview and working environmental check list. The qualitative data were coded and categorized using Open Code 3.6 software and analyzed using content analysis. The quantitative data were entered by using EPI Info version 3.5.1 and analyzed using SPSS and results were presented in tables and figures and odds ratio (OR) was taken as a measure of effect with 95% confidence interval to assess the level of significance. Ethical clearance was obtained from the School of Public Health Research and Ethics Committee and interviews were conducted after an informed consent.

Result: Three hundred thirty workers participated in this study where 249(75.6%) of the workers had primary education or below. Two hundred seventy eight workers (84.24%) had at least one sign of occupational health symptoms. The most prevalent occupational health symptoms were fatigue 260(79.3%) followed by musculoskeletal health problems 209(63.3%), headache 193(58.7%), skin problems 189(57.3%), respiratory problems 148(45.5%), dizziness 86(26.2%), sleepiness 78(23.6%), kidney problem 77(23.3%), fainting 45(14%) and reproductive problems 10(3.4%).

There was no job safety training given for workers at employment. This study found that workers who work as sprayers [AOR = 6.6, 95% CI (1.11-39.19)] had higher risk of occupational health symptoms and workers who were not satisfied by their job were less likely [AOR = 0.11, 95% CI (0.03-0.43)] to have had those disease symptoms.

Conclusion: There were inadequate health and safety provisions such as health and safety education programs, personal protective equipments, health and safety instructions and first aid facilities, which make the workers at risk of occupational hazards. Pre-employment and periodic medical checkup, regular work area supervision, adequate supply of personal protective equipment, pre-employment and on-job health & safety training and use of Integrated Pest Management are recommended.

1 Introduction

1.1 Background

Horticulture is the science, technology, and business involved in intensive plant cultivation for human use. It is practiced from the individual level in a garden up to the activities of a multinational corporation. It is very diverse in its activities, incorporating plants for food (fruits, vegetables, mushrooms, culinary herbs) and non-food crops (flowers, trees and shrubs, turf-grass, hops, medicinal herbs). It also includes related services in plant conservation, landscape restoration, landscape and garden design/construction/maintenance, horticultural therapy, and much more [1]. Floriculture, or flower farming, is a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and for floristry, comprising the floral industry. The development plant breeding of new varieties is a major occupation of floriculturists [2].

Within the span of less than a decade, Ethiopia emerged as a global player in the cut flowers business ranking only second to Kenya. With a good mix of incentives and active facilitation, the Government of Ethiopia took a non-existing flower sector and developed it into a USD $200 million export sector with more than 85,000 jobs created. This contributes directly to the country‟s economic development through increased employment and foreign exchange earnings [3].

Occupational health and safety should be one of the most important aspects of human concern in this sector. It aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical, mental and social well being of workers in all occupations [4]. Occupational health remains neglected in developing countries because of competing social, economic, and political challenges [5].

In floriculture industry there is extensive use of toxic pesticides, including those belonging to class I (extremely or highly hazardous) and II (moderately hazardous) as designated by the World Health Organization [6]. Global economic forces on this industry have contributed to pressure for

production of high yields for export and have resulted in limited attention to the environmental and health effects of pesticide use on floriculture workers and neighboring rural communities [7].
Pesticides can cause cancer, birth defects, reproductive and nervous system damage, and 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. According to a study from Mexico's state of Morelos indicated that some flower greenhouses , used 36 different pesticides, including the persistent organochlorines DDT, aldrin and dieldrin [8] .

A wide range of pesticides are used on the farms and there is limited knowledge among the workers regarding the classes of chemicals used, safe practices and proper application.[9] Workers are directly exposed to pesticides through skin contact, inhalation, and/or ingestion while working in the greenhouses, trimming and classification rooms, and refrigerated rooms where the flowers are preserved and packaged for export [9].

1.2 Statement of the problem

Floriculture industry is a new agro industry activity in Ethiopia. The expansion and growth of the industry magnified the economic significance of the sector, but the social and health implication of the sector was not given due attention even though the sector was still blamed for the health impacts on the workers worldwide.

Floriculture industries extensive use of toxic pesticides and fungicides has caused work-related health problems including skin rashes, respiratory problems, eye problems, and miscarriages affecting over half of Colombian flower workers [10]. In Colombia, according to the Victoria International Development Education Association, doctors in flower-producing regions report up to 5 cases of acute poisoning per day, and a study by the Colombian National Institute of Health found an elevated rate of miscarriages, premature births, and congenital malformations among flower workers [11]. In a study conducted on floriculture farms in ethiopia showed that 76.5% had fatigue & 73.4% had headache [12].

1.3 Rational of the Study

Floriculture industry in Ethiopia had provided employment for 85,000 people directly, 70% of whom are women & 30% male who had previously had few employment opportunities. A further 200,000 people are thought to benefit from the industry indirectly [13]. There are now 89 exporting farms and almost all of the original farms have expanded their area under production. This industry put a lot of problems on workers health, since it uses extensively toxic pesticides. Information on occupational health risks & associated health problems of this fastest growing industry is helpful for raising awareness at all level and making the problem more visible to policy makers and managers. However there is a scarcity of information in this area in Ethiopia.

This study tries to identify the available health risks in those industries. In addition, it is useful in the development of prevention strategy so that morbidity, disability and death among workers due to available health risks in the floriculture industry is minimized and promote production opportunity. Besides it can also serve as baseline information to undertake studies on similar settings.

2 Literature review

2.1 Floriculture Development in Ethiopia

Floriculture development in Ethiopia blooming in recent years, it started for commercial purpose in 1980/81 which is now twenty six years ago. The first fresh cut flowers production was commenced in 1981 /82 crop season. The Derge regime had established Horticulture development corporations where government was responsible both for regulation and production even for marketing of horticultural products including flowers. During that time the production and export of cut flowers in Ethiopia was not established with well planned and aiming of profit seeking but foreign exchange earnings [14].

As a result of this, the industry was one of the highly subsidized sub-sectors during the *Derge* regime. Floriculture was started to show modest increase in 1990s by 2-3 % from the agricultural output of the country. In 2001 it contributed $ 4.7 million to the country‟s foreign currency earnings. But it was not as such significant enough to be an important sector to develop the country‟s economy. In five years the total export earnings increased at least five times that figure. Because of the Government of Ethiopia gave more attention for favorable investment condition and a more enabling atmosphere for private sector development the floriculture sector started to grow incredibly for the last few years. The first private floriculture producer started around 1997, a second in 1999. From 2001 onwards, other growers started coming in and according to Trade and Industry floriculture industries under production reached 65 in the year 2006 [15].

In 2006 Ethiopia was the second largest exporter of large roses (after Kenya) and the third largest supplier for small roses (after Kenya and Uganda) [14].

Table 1- Major Statistics of Floriculture Development in Ethiopia

Year	Number of Farms	Cultivated Area(ha)	Number of Export stems	Export value(USS)
2001/02	-	-	-	305000
2002/03	-	-	16000000	2900000
2003/04	-	-	32000000	5500000
2004/05	30	150	83000000	12700000
2005/06	69	345	186000000	26900000
2006/07	80	645	113000000	113000000

Source: Ministry of Trade & Industry (Oct 2006)

2.2 Occupational health & Safety

According to WHO (1995), occupational health and safety can be defined as a multidisciplinary activity aiming at:

• Protection and promotion of the health of workers by eliminating occupational factors and conditions hazardous to health and safety at work

• Enhancement of physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work

• Development and promotion of sustainable work environments and work organizations.

The ILO/WHO definition of occupational health is "The promotion and maintenance of the highest degree of physical, mental social well- being of workers in all occupation" and the WHO considers occupational health service to be responsible for the total of worker and, if possible, his or her family [4].

The positive impact of occupational health service locally may be observed in reducing morbidity and work-related injuries. In addition, this also means fewer losses to employer and worker as there will be a reduction of wage losses and decreased compensation costs. The reduction of absenteeism is of great importance concerning skilled labor, especially so in countries where there is a shortage

of skilled labor [4]. The ILO estimated about 80% of occupational injuries and deaths could be prevented [16].

The Ministry of Labour and Social Affairs is the Federal Governmental Agency who"s effective and healthy and peaceful Industrial Relations through promoting dialogue and to ensure good labour administration that ensures occupational safety and Health services, both at national, regional and undertake levels are put in place. Within the ministry, administratively, there is the Department of Occupational Safety, Health and Working Environment dealing with the two inspection functions i.e. commonly called the technical and non technical labour Inspections. The department has three teams responsible to undertake the major functions of Labour Inspection as per the provisions of Labour Law Proclamation 377/2003 and the principles set by the ILO Labour Inspection Conventions (Convention No. 81/1947, Convention No 129/69). The teams are: occupational Safety Team, occupational Health Team, the minimum Labour Conditions Team [38].

2.3 Health risk factors of floriculture workers

According to a study done in Philippines certain behaviors and practices were identified to predispose to pesticide exposure and illness. Incorrect work practices noted among study participants such as re-entering recently sprayed area (79.3%), wiping sweat off the face (66.8%). Despite the high risk and frequency of exposure, farmers did not wear proper personal protection while working with pesticides. Boots were the only protective equipment worn by majority of the farmers, and practically no one used aprons or gauntlet gloves. Cloth face masks which do not offer adequate coverage for some chemicals were used by a number of respondents (41%) [17].

According to a study done in America the number of substances affecting respiratory health to which a worker is exposed while working in an agricultural setting is enormous: pesticides, including insecticides, herbicides, and fumigants; other agricultural chemicals, including fertilizers and plant growth regulators; the crops and related allergens, such as pollens, pests, and microorganisms; and the land itself, including organic and inorganic dusts. Further complicating the issue, the likelihood that an individual worker has been exposed to but a single identifiable agent is small [18].

Meyer in reviewing the work of the University of California Agricultural Ergonomics Research Center for the past decade has cited three general risk factors as both endemic and of highest priority throughout the agricultural industry. They are: lifting and carrying heavy loads (over 50 lb.); sustained or repeated full body bending (stoop); and very highly repetitive hand work (clipping, cutting) [17] .

The production of cut flowers has two essential components:

1. The process of production, which involves all activities directly related to the generation and the development of the product up to the moment of packing. This itself can be divided into three basic parts: germination, cultivation and post-harvest procedures.
2. The various activities that aid in the production and promote the marketing and distribution of cut flowers.

Secondary activities include monitoring the health of the plants to detect pests and to diagnose plant illnesses early, obtaining raw materials from the warehouse, and maintaining the furnaces.

During all this stages the most important risk factors in each of the different areas of work are chemical substances, extreme temperature/heat, non-ionizing radiation, infectious disease, ergonomic factors, mechanical factors, Psychosocial factors[19].

Table 2- Pesticides used in Colombian flowers, indicating WHO classification.

Insecticides	
Aldicarb	Ia
Cypermethrin	II
Deltamethrin	II
Dichlorvos	Ib
Endosulfan	II
Fenvalerate	II
Lambada cyhalothrin	II
Malathion	III
Methamidophos	Ib
Mevinphos	Ia
Fungicides	
Acephate	III
Benomyl	III
Aptan I	II
Chiorothalonil	III
Copper hydroxide I	II
Copper oxychloride	III
Mancozeb	III
Methyl bromide fumigant	Ia

Ia= extremely hazardous Ib= highly hazardous II= moderately Hazardous III=slightly hazardous (Meer and Vander, 1997)

2.4 Associated health problems of floriculture workers

The study of female workers in Ecuador‟s flower industry and their children found that a mother‟s work exposure to pesticides during pregnancy was associated with neurological impairment, including a significant decrease in visuospatial performance. After accounting for other factors such as malnutrition, the researchers concluded that "prenatal pesticide exposure may adversely affect brain development [20].

Another study also found that children whose mothers were exposed during pregnancy tended to have higher blood pressure than children who have unexposed children, a finding with broader implications, "Increased blood pressure, when present in childhood, is a risk factor for cardiovascular disease in later life," the researchers noted[20].

When women breast feed pesticides may pass on to nursing infant. In addition, effects of certain pesticides on human hormones may affect women and men differently and can have negative impacts on developing fetuses[21].

Of all floriculture workers over 50% of workers have symptoms of organophosphate pesticide exposure (cholinergic symptoms). There are other symptoms also Other common health problems: Allergic reactions, heat stroke, pneumonitis, RSI, cellulitis, UTIs, neuropathies, mental health problems, cancers, reproductive problems (low sperm counts, spontaneous abortions, fetal anomalies, etc.) [22]. A survey done in Ecuador revealed that health symptoms reported include headaches, dizziness, hand-trembling and blurred vision[23].

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 [24].

Well-known acute health problems in cut flower industry with pesticide 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, miscarriages, and birth defects [25].

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**.** 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 [26].

2.5 Magnitude of occupational diseases

The process of production flowers has two components, which involves all activities directly related to the generation and the development of the product up to the moment of packing & the various activities that aid in the production and promote the marketing and distribution of cut flowers. The production process itself can be divided into three basic parts: germination, cultivation and post-harvest procedures. The production process include monitoring the health of the plants to detect pests and to diagnose plant illnesses early, obtaining raw materials from the warehouse, and maintaining the furnaces at this time there is application of large amount of pesticides which has high risk for workers health.

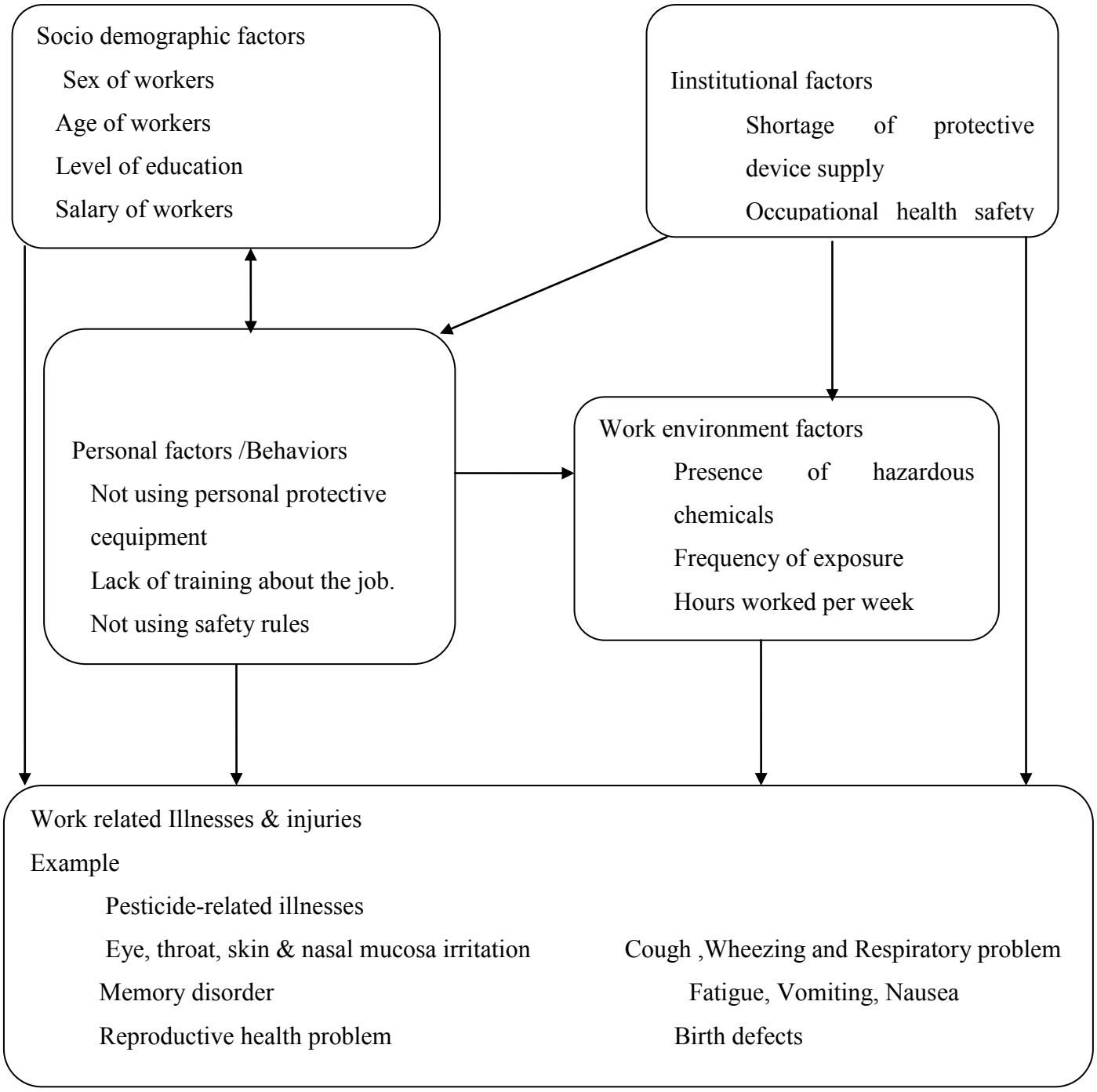
Globally, millions of men and women work in poor and hazardous conditions. According to International Labor Organization, 1.2 million working peoples die of work related accident and diseases every year. More than 160 million workers fall ill each year due to workplace hazards.
UN estimates 10,000,000 occupational disease cases occur each year globally, severity and frequency is greatest in developing countries. Women, children and migrant workers are least protected and most affected. Micro and small enterprises account for over 90 % of enterprises where conditions are often very poor and the workers particularly in the informal sectors are often excluded from all legal protection[4].

A study of fern and flower workers in Costa Rica found that over 50% of respondents had at least one symptom of pesticide poisoning, such as headache, dizziness, nausea, diarrhea, skin eruptions

or fainting. In Ecuador, nearly 60% of workers surveyed showed poisoning symptoms, including headaches, dizziness, hand-trembling and blurred vision [8].

A study of Colombian flower workers concluded that female floriculture workers had reduced ability to become pregnant, and that sperm concentrations were 40% lower in male workers with long term exposure (more than 10 years). Indications of genetic damage were also found in studies of workers exposed to organochlorines in greenhouses in Mexico. Globally roughly 19% of all cancers are estimated to be attributable to the environment, including work settings[8].

2.6 Conceptual frame work for occupational induced health problems



3 Objective

3.1 General objective

To assess occupational health risks, associated factors and outcomes among floriculture farm workers, East Showa, Oromia Region

3.2 Specific objectives

1. To identify & describe the health risk factors.
2. To identify the magnitude of health outcomes.
3. To assess factors associated with work related health problems.

4 Research methods & materials

4.1 Geographical location of the study area

The study was conducted in floriculture farms in Bishoftu town and surrounding areas, East Showa, Oromia, Ethiopia. Bishoftu is located 50 kms far from Addis Ababa. According to the data from Ethiopian Horticulture Producers & Exporters Association, there are 13 member floriculture industries in Bishoftu.

4.2 Study Design

A cross-sectional survey and qualitative study methods was conducted.

4.3 Source population

All floriculture workers found in the surrounding areas of Bishoftu town, East Shewa, Oromia, Ethiopia.

4.4 Study Population

Selected floriculture workers found in selected farms of the surrounding areas of Bishoftu town, East Shewa, Oromia, Ethiopia.

4.4.1 Inclusion criteria

All permanent or temporary employees who are directly engaged in the production process such as green house workers, chemical store keepers, flower handlers etc… in the selected farms that had

been functional for the last 1 year, and workers who have worked at least for the last 1 year 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

Employees who were not directly involved in the production process such as management staff were not included in the study because by virtue of their occupation they had less exposure to occupational health and safety hazards relative to others. In addition farms that had been functional for lower than 1 year & workers exposed for lower than 1 year were not included, since they had not been exposed sufficiently.

4.5 Sample size determination

Two scenarios were sue for sampling:

Scenario 1- For the second objective, the formula for single population proportion was used. Based on a study of an assessment of the Occupational Health of Greenhouse Workers [27], a prevalence of 29% of respiratory problems among floriculture workers was used, With 5% degree of precision, Zά/2 is a standard Z score and 1.96 corresponding to 95% CI the sample size is calculated

$$n_i = \frac{(Z\alpha/2)2\ p(1-p)}{d2}$$

$$n_i = \frac{(1.96)2\ 0.29(1-0.29)}{(0.05)2} = 323$$

$$n_f = \frac{n\ i\ .}{1 + (n_i/N)} \qquad n_f = \frac{323}{1+ (323/6500)} \text{ . = 308 + 5\% non-response rate}$$

$$n_f = 324 \text{ workers}$$

Where

n = the desired sample size

N : Source population

P = Proportion of respiratory problem

Zα/2 = critical value at 95% confidence level of certainty (1.96)

d = the margin error between the sample and the population = 5%

Scenario 2: For the third objective to assess associated factors for the occurrence of work related disease the formula for double population proportion was used. To do that the following assumptions are made, percent t of ill respondents who were satisfied by their job as non exposed & percent of ill who were not satisfied by their job as exposed group, based on assessment of prevalence of work related injuries among small & medium scale industrial workers(28). Taking the most significant factor which is job satisfaction with prevalence of 26.6% among non-exposed.

$$n = \frac{(Z_{\alpha/2}\sqrt{(1+1/r)p(1-p)} + z\beta\sqrt{p_1(1-p_1)+p_2(1-p_2)/r})^2}{(P_1+p_2)^2}$$

Where p1= % of ill respondents who are satisfied by their job (Non-exposed) which is 26.6%.

P2= % of ill who are not satisfied by their job (Exposed).

P = pooled proportion

r= 1 (the proportion of n1 to n2 is 1 to 1)

Zα/2 = critical value at 95% level of significance, α is type 1 error with a value of 5%.

Assumption

-Two sided CI 95% (1.96)

- power 80% (0.84)

- P2 = % of ill respondents who are not satisfied by their job (Exposed) is 42.02% at 2.00 odds ratio.

- Calculating EPI info version 3.5.1 then the sample size = 320 + 5% Non response rate = 336

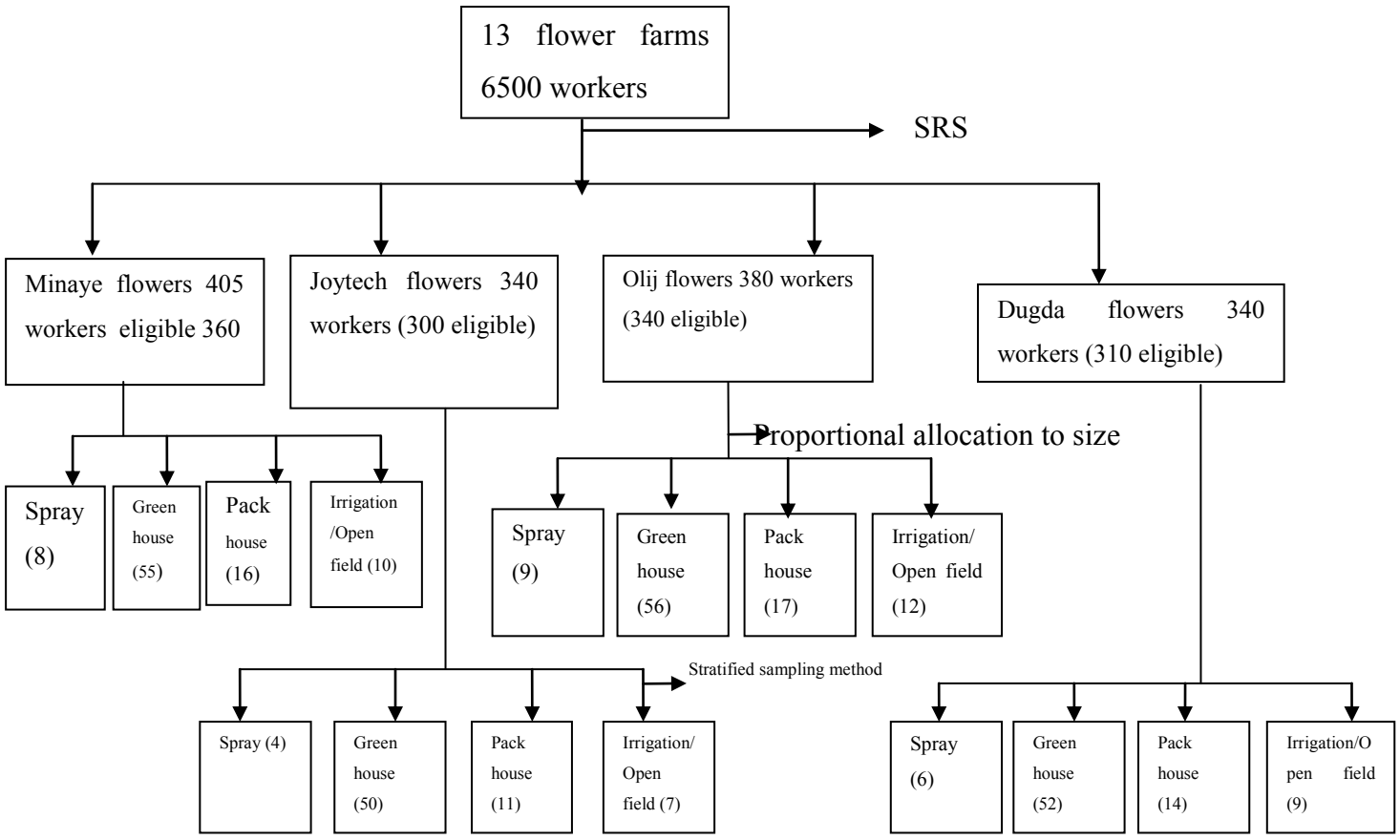
Using the above two sample size use the larger one the total sample size used for the study will be **336.**

4.6 Sampling Procedures

4.6.1 Quantitative survey

Using purposive sampling method based on proximity of farms from Addis Ababa 13 Floriculture farms around Bishoftu town giving a total of 6500 workers were selected. Out of this four farms were selected randomly, then based on the inclusion and exclusion criteria 1310 workers were selected and allocated proportionally to the number of staff in each farm. Participants were again selected using stratified sampling method after stratifying by their department in their farm. Finally the sample is allocated proportionally with respect to the number of workers in each department randomly.

Figure 1- Schematic presentation of sampling procedure



4.6.2 Qualitative study

For qualitative survey key informant interviewee individuals selected purposively based on their position and experience on the production process in the farm in order to generate information that can‟t be quantified to supplement the result of the quantitative data.

4.7 Data Collection Procedures

For quantitative survey data were collected using structured and pre-tested questionnaire developed based on related studies & international standards and a checklist for the observation of working environment & available health risks was used [28, 29].

Data collection was administered by 4 occupational health & safety professionals and 4 MPH-1 data collectors. Two MPH professional & the principal investigator who had experience in research work supervised the data collection process.

Training for data collectors was also given for one day. Five percent of the questionnaire was pre-tested to identify potential problem areas; unanticipated interpretations and cultural objections to any of questions then based on the pre test results, the questionnaire were additionally adjusted contextually and terminologically, and administered on the whole sample of workers. Chemical safety data sheet was also used to observe available chemicals. Training for data collectors, counter checking of daily filled questionnaire and regular supervision was made by supervisors & principal investigator. 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.

For qualitative survey using In-depth interview to get information on work environment issues 4 key informants one from each which was selected purposively based on their experience and position in the farm.

4.8 Study variables

4.8.1 Dependent variable

- Work-related health symptoms.

4.8.2 Independent variables

- **Socio demographic variables :** Sex, age, religion, educational level, marital status, monthly salary, area of residence.
- **Work environment variables**: hours worked per week, workplace supervision, job category, working experience, health and safety training & strengths of the chemicals.
- **Behavioral variable**: alcoholic drinking, chat chewing, and use of personal protective equipment.

4.9 Data analysis procedures.

Quantitative data were entered into Epi info version 3.5.1 then exported to SPSS version 16 software package for analysis. It was cleaned and analyzed based on the objectives of the study using the already planned explanatory and response variables using the mentioned computer software.

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, 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.

Bivariate analysis were done using logistic regression to see the relative effects of independent variables on the dependent variable (work related disease) by controlling the effect of confounding factors.

For the analysis of qualitative data content analysis using Open code 3.6 software was used. First complete transcription of the in-depth interview data was done then the data were coded in the software for analysis.

4.10 Operational definitions

Medical Checkup: is pre employment or periodical workers health status checkup which is sponsored by the employer.

Temporary worker: is a worker who works on a contractual agreement base for limited period of time & it may be extended as needed by the employer.

Daily laborer: is a worker who works on a daily payment base.

Risk factor: is any attribute characteristic or exposure of an individual that increases the likelihood of developing a disease or injury.

Good workplace: ergonomic workplace with the potential to increase workers‟ health, safety and work performance or productivity.

Previous health symptom: is a health symptom before starting the current job.

Determinant: risk factors that include exposure level and influences probability of cumulative exposures, peak or remote exposures, recent or lagged exposures according to duration, place, environment etc.

Reproductive health problem: is health problem related to reproductive health system which is confirmed by a physician.

Kidney problem: is any abnormal health condition of kidney which is confirmed by a physician.

Hazard: - It is biological, chemical, or physical agent in an environment that may have an adverse health effect on workers in the farm.

Risk: probability of an adverse endpoint (cumulative risk of hazards in workplace, for instance).

Acute: Health effects that show up a short length of time after exposure.

Chronic: Persistent, prolonged, and repeated.

Excessive heat: heat is recorded as excessive if a worker is found sweating when naked or with light clothing; if investigator feels as sudden heat wave when entering into the industry.

Excessive noise: noise that makes it difficult to communicate with your neighbor without shouting

Heat stress: a situation when human body feels thermal discomforts (e.g., heat load) in dissipating excess heat and sweating to the surrounding (nearby) environment.

4.11 Data quality management

To ensure the external validity (generalizability) of the study, appropriate size and representative type of study units was selected as described above. And to ensure the internal validity (accuracy and precision) of the study, maximum effort was taken to minimize bias and errors using the following strategies:

- Training of data collectors and supervisors,
- Principal investigator and supervisors made spot-checking and reviewing the completed questionnaires on daily bases,
- Data cleaned & entered by the principal investigator,
- Continuous and strict supervision and spot checking.
- Pre testing was conducted prior to data collection process,
- Questionnaires were prepared in English translated into Amharic which was the language of interview and translated again back to English to keep the consistency.

4.12 Ethical issues

Ethical clearance was secured from Addis Ababa University, School of Public Health and Research Ethics Committee. An official letters was written from the School to the respective farms. A written informed consent was secured from each participant.

The purpose of study was explained to the study subjects & participation was voluntarily and they can withdraw from the study at any time without explanation and without penalty or loss of benefit. The right of each respondent to refuse or answer for few or all questions was respected. Omitting names of the study subjects from the questionnaire help to assure confidentiality of the information and maximum effort was made to maintain privacy of the respondent during the interview. The right and autonomy of all participants was respected. Study participants were informed on common causes and methods of preventing occupational illnesses by the interviewer after completing interview.

4.13 Communication of results

Finding of the study will be submitted to School of Public Health Addis Ababa University & Ministry of Agriculture. It will also be communicated to respective study farms by preparing separate report and to those organizations concerned with the promotion of occupational health and safety at floriculture industries.

Results

4.13.1 Socio demographic Characteristics

A total of 330 workers were included in the study with a response rate 98.2%. The mean age of the respondents was 26.6(SD=7.99) ranging from 16 to 58. More than half of the respondents were aged 15-24 years. Most of the respondents 284 (86.1%) were females, 149(45.2%) had primary education, 157 (47.6%) were currently married,250 (75.8%) came from urban areas.

Pattern of employment were categorized in to three where the majority 291(88.2%) were permanent, 25(7.6%) were temporary and the rest 14(4.2%) were daily laborers.
The socio demographic characteristics of respondents are summarized in Table 3.

Table 3- Socio demographic characteristics of floriculture farm workers, East Showa, Oromia, Ethiopia, Aug. 2013. (n=330)

Variables	Frequency	Percent
Age group		
15-24	166	50.3
25-34	107	32.4
35-44	44	13.3
45-54	7	2.1
>54	6	1.8
Sex		
Male	46	13.9
Female	284	86.1
Area of residence		
Urban	250	75.8
Rural	80	24.2
Educational level		
Can read & write	17	5.2
Can't read & write	83	25.2
Primary school (1 - 8)	149	45.2
Secondary school (9 - 12)	71	21.5
Higher education	10	3.0

Marital status		
Married	157	47.6
Never married	151	45.8
Divorced	14	4.2
Widowed/Widower	6	1.8
Separated	2	.6
Employment pattern		
Permanent	291	88.2
Temporary	25	7.6
Daily laborer	14	4.2

Most of the respondents 278 (84.24 %) had at least one sign and symptom of work related health problem prior to the study period, out of this 252(90.6%) developed after they joined their current work. About 209 (75.2%) of the respondents had at least one symptom of musculoskeletal health symptom and 189 (68%) had skin problem & 148(53.2%) had respiratory health symptom (Table 4).

Among the respondents who had health symptoms 157(56.47%) of the respondents went to hospital for medical checkup and 140(89.2%) of them covered the cost themselves, the rest 17(10.8%) was covered by the farm. Out of those who were not going for medical checkup 109(90.08%) of them didn‟t going because the symptoms were not worsened. Among respondents who had medical services, 144 (91.7%) reported that there was a sick leave for medical process. Regarding the length of sick leave 118(81.9%) reported that they had leave until recovery and the rest 26 (18.1%) got a permission for only five days (Table 4).

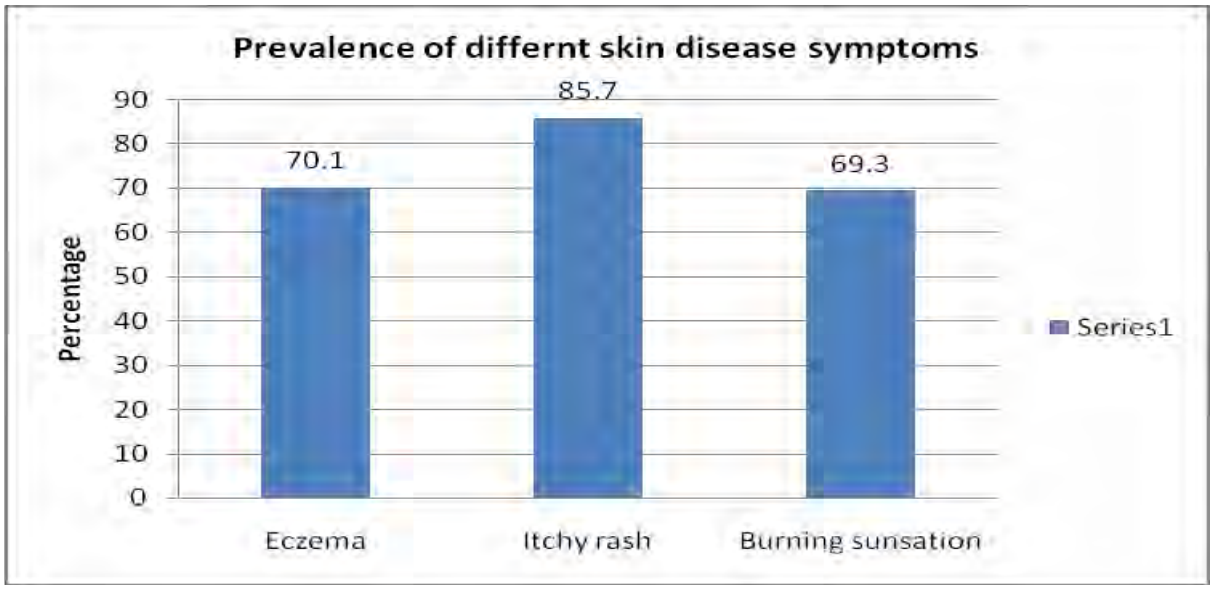
Table 4- Magnitude of different symptoms of disease among floriculture workers in West Shewa, Oromia, Ethiopia, Jul - Aug. 2013 (n=330).

Variable	Frequency	Percent
Health symptoms (at least one)		
Yes	278	84.24
No	52	15.76
Musculoskeletal symptoms (at least one) (n=278)		
Yes	209	75.2
No	69	24.8
Skin symptoms (at least one) (n=278)		
Yes	189	68.3
No	89	31.7
Respiratory symptoms (at least one) (n=278)		
Yes	148	53.2
No	130	46.8
Onset of disease symptoms (n=278)		
Before join the work	26	9.4
After join the work	252	90.6
Medical checkup after disease symptom(n=278)		
Yes	157	56.47
No	121	43.53
Medical cost cover (n=157)		
Worker	140	89.2
The farm	17	10.8
Sick leave (n=157)		
Yes	144	91.7
No	13	8.3
Duration of sick leave (n=144)		
Till recovery	118	81.9
For up to 5 days only	26	18.1

Reason for not going for medical check-up (n=121)		
Lack of permission	8	6.61
Lack of money	4	3.31
Not worsened	109	90.08

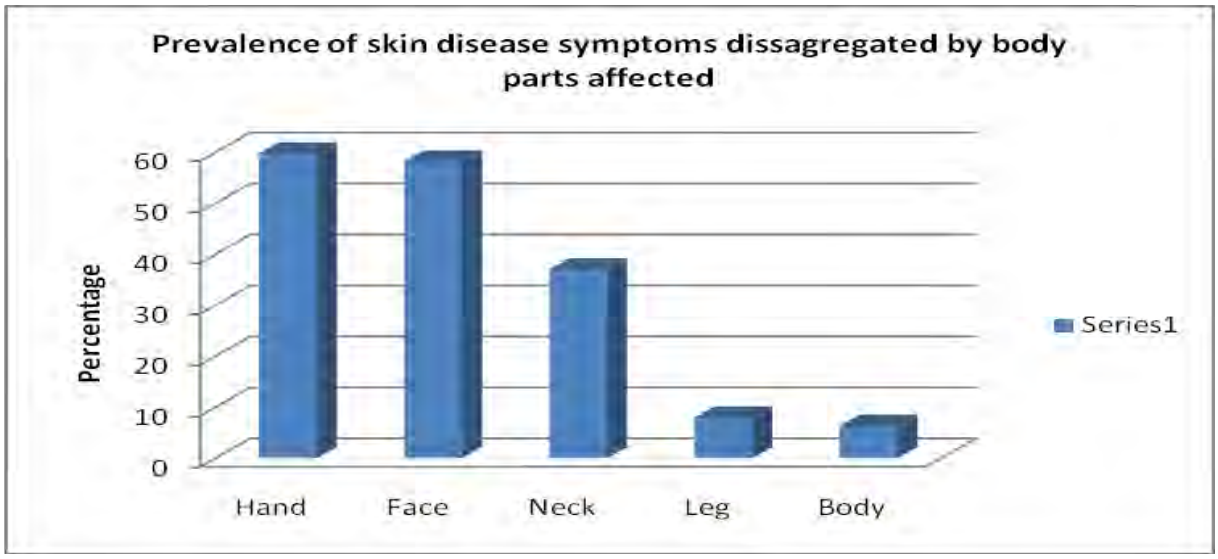
Among skin disease symptoms itchy rash is the most prevalent which is 162(85.7%) followed by 131(70.1%) eczema & burning sensation 131(69.3%) (Figure 2).

Hand 113(59.8%) were the body part with the highest frequency of work-related injuries, followed by face, neck, leg & hall body with a frequency of 110(58.2%), 70(37.0%), 15(7.9%) & 12 (6.3%) respectively (Figure 3).



Note : One respondent may have more than one disease symptom

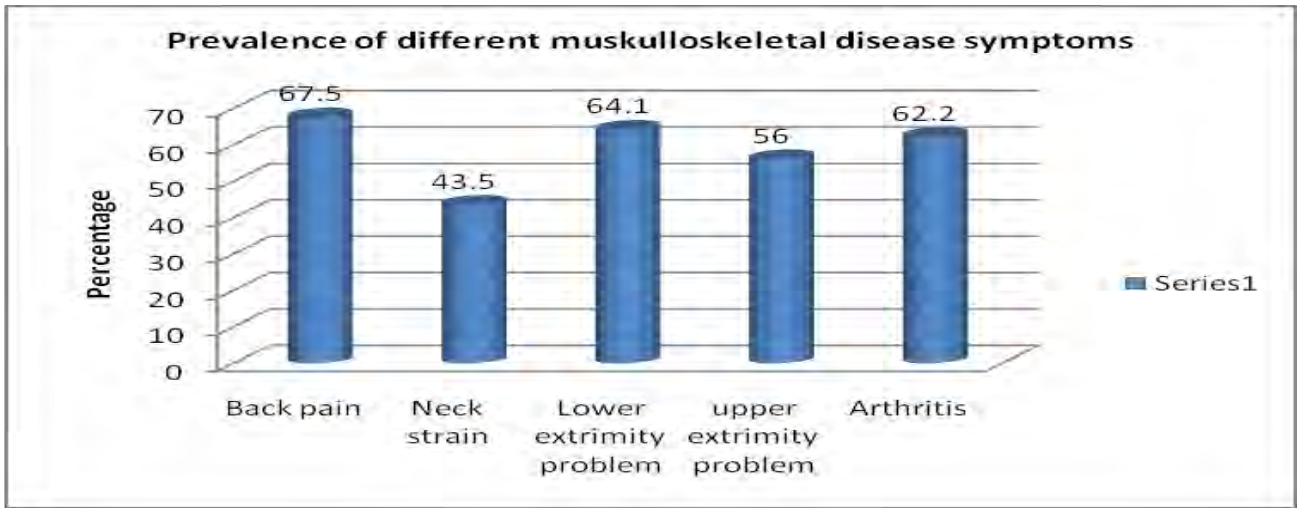
Figure 2- Distribution of skin health symptoms by type, among floriculture farm workers, East Showa, Oromia, Ethiopia, Jul - Aug. 2013 (n=189)



Note : One respondent may be affected on more than one body parts

Figure 3- Distribution of skin health symptoms disaggregated by body parts affected, among floriculture farm workers, East showa, Oromia, Ethiopia, Jul - Aug. 2013 (n=189)

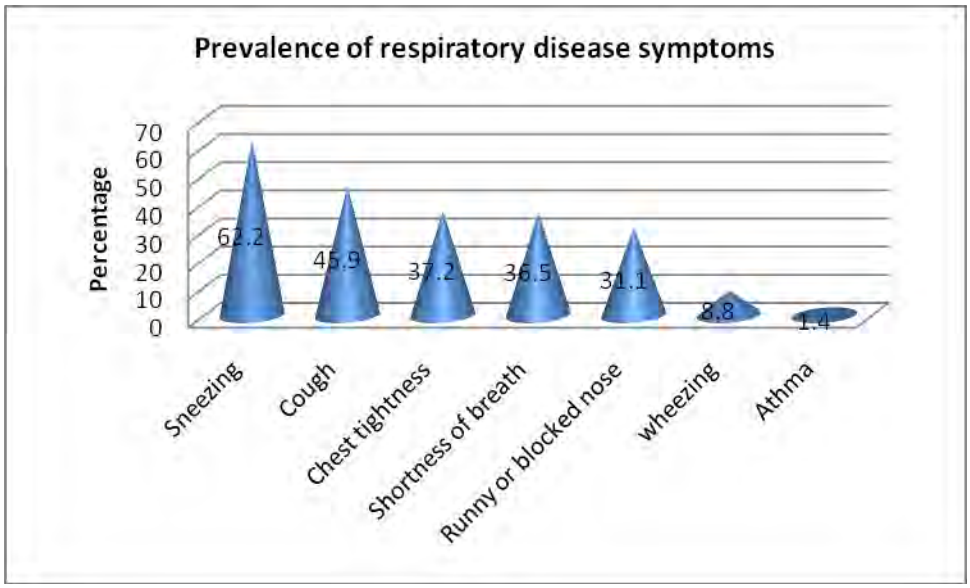
Two hundred nine 209(75.2%) workers reported at least one musculoskeletal health symptoms (Figure 4). Out of this back pain is the most prevalent 141(67.5%), followed by lower extremity problem 134(64.1%), arthritis 130(62.2%), upper extremity problem 116(56.0%) & neck strain 91(43.5%) (Figure 4).



Note : One respondent may have more than one disease symptom

Figure 4- Distribution of musculoskeletal disease symptoms among floriculture farm workers, East showa, Oromia, Ethiopia, Jul - Aug. 2013 (n=209).

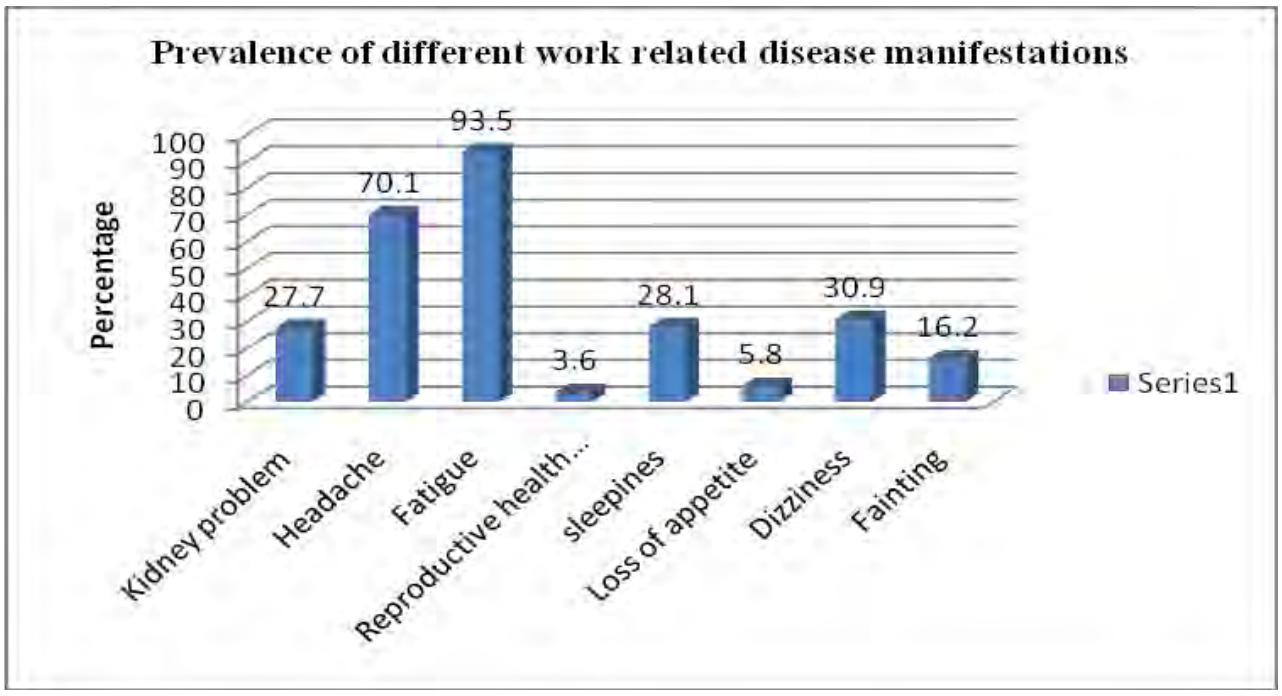
One hundred forty eight (53.2%) of the respondents had at least one respiratory health symptom prior to the study time (Table 4). The distribution of this symptoms were, Sneezing 92(62.2%), Cough 68(45.9%), Chest tightness 55(37.2%), Shortness of breath 54 (36.5%), Runny or blocked nose 46 (31.1%) Wheezing 13 (8.8%) & Asthma 2 (1.4%) (Figure 5).



Note : One respondent may have more than one disease symptom

Figure 5- Prevalence of respiratory disease manifestations, among floriculture farm workers, East showa, Oromia, Ethiopia, Jul - Aug. 2013 (n=148).

When we see the prevalence of different health symptoms among the study subjects 77 (27.7%) of respondents had kidney problem confirmed by a physician. In addition195 (70.1%) had headache, 260(93.5%) had fatigue & only 10(3.6%) had a physician confirmed reproductive health problem. The others such as Sleepiness 78 (28.1%), Loss of appetite 16(5.8%), Dizziness 86(30.9%) & Fainting 45(16.2%) (figure 6).

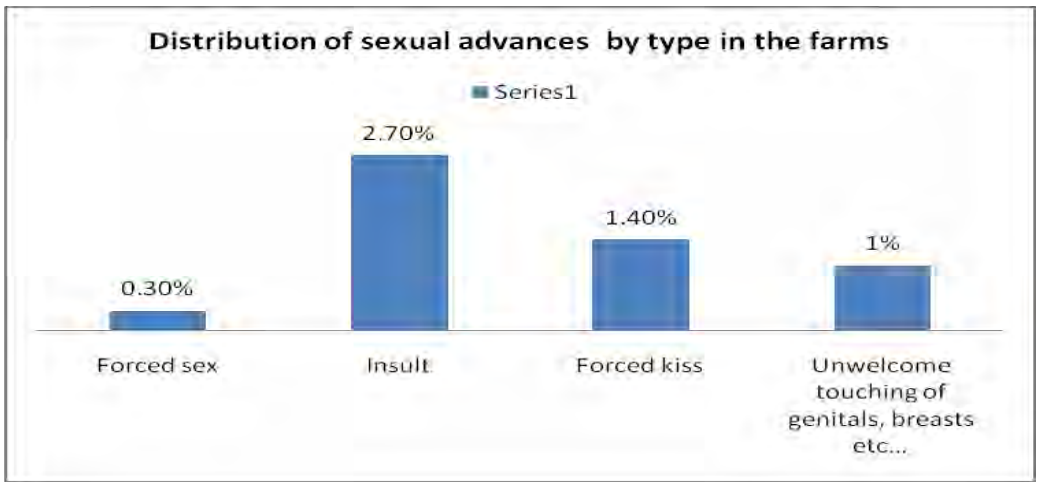


Note : One respondent may have more than one disease symptom

Figure 6- Prevalence of different disease manifestations, among floriculture farm workers, East showa, Oromia, Ethiopia, Jul - Aug. 2013 (n=330).

Sexual harassment

Women reported to be sexually harassed. The Figure below illustrates the distribution of different sexual harassment faced by female workers while they are working or walking to work or back home, which includes forced sex 1 (0.3%), insult 8 (2.7%), forced kiss 4 (1.4%) & unwelcome touching of genitals, breast etc… were 3 (1%) (Figure 7).



Note : One respondent may have more than one disease symptom

Figure 7- Distribution of different female sexual advances, among floriculture farm workers, East showa, Oromia, Ethiopia, Jul - Aug. 2013 (n=330).

Alcohol and substance use

Among all the respondents almost all 304(92.1%), 327(99.1%) & 320(97.0%) not used alcohol, cigarette and chat respectively (Table 5).

Table 5- Reported behavioral characteristics of respondents, East showa, Oromia, Ethiopia, Jul - Aug. 2013. (n=330)

Variables	Frequency	Percent
Alcohol drinking		
Never	304	92.1
Regularly	1	.3
Sometimes	25	7.6
Smoking cigarette		
Never	327	99.1
Regularly	3	.9
Chewing chat		
Never	320	97.0
Sometimes	10	3.0

Most 313(95.7%) of the respondents used personal protective equipments. Two hundred forty (73.6%) of the respondents were satisfied by their jobs, the rest 86(26.4%) were not.

One hundred fifty nine (48.2%) of study participants had safety trainings. One hundred eighty two (55.2%) of the respondents were aware of the risk involved while working in floriculture farms.

Four job categories were described by the respondents and the majority 213 (64.5%) were working in Green houses followed by 58(17.6%) Pack house, 38 (11.5) Open field/irrigation and 21(6.4) were sprayers. Most 213(64.5%) of the respondents had working experience of 1 - 3 years followed by 3.1 – 5 which is 67(20.3%) & 50(15.2%) were above 5 years

Table 6 - Work environment characteristics of respondents, East showa, Oromia, Ethiopia, Jul - Aug. 2013. (n=330)

Variables	Frequency	Percent
Job satisfaction		
Yes	240	72.7
No	90	27.3
Use of PPE		
Yes	313	94.8
No	17	5.2
Knowledge of hazards in the farm		
Yes	182	55.2
No	148	44.8
Occupational Health & Safety training		
Yes	159	48.2
No	171	51.8
Job category		
Green house	213	64.5
Pack house	58	17.6
Sprayer	21	6.4
Open field/ irrigation	38	11.5
Total service year in the company		
1-3	213	64.5
3.1-5	67	20.3
>5	50	15.2

4.13.2 Socio demographic, behavioral & work environment determinants

The table below presents selected socio economic, behavioral & work environment characteristics of workers in relation to work related health problems. Among this factors: age group, education level , OHS training , use of PPE & knowledge of hazards in the farm did not show any statistically significant association with work related health problems of individual worker. Whereas sex, job satisfaction, job category & total service year were statistically significant, however after adjusting for other factors only job category and job satisfaction were statistically significant association on the occurrence of work related disease symptoms (Table 7).

Job satisfaction was also another variable that showed positive association with prevalence of work-related health symptom. The odds of symptom of disease were higher among Workers who were satisfied by their job than their counterparts after adjusting the effect of confounders with [AOR: 0.11, 95% CI (0.03 – 0.43)*] (Table 7).

Job category was significantly associated with work-related occupational health symptoms. Working as sprayer meant having 6.61, with 95% CI (1.11 – 39.19) times more odds of diseases symptoms than irrigation section workers after adjusting other variables effect (Table 6).

In this study there were significant differences on work-related health effects between workers who had different service year on their present job. Workers who worked for 1 – 3 years had more work related health effects [3.734(1.11 - 12.6)*] than workers who had a service year of 5 years and above before adjusting for other confounders (Table 7).

Table 7- Distribution of selected factors of work related health problems among respondents in floriculture farms, East Showa, Oromia, Ethiopia, Jul - Aug. 2013. (n=330)

Variables	Health problem			
	Yes	No	W4COR (95%CI)	AOR (95%CI)
Sex				
Male	28(8.5%)	16(4.9%)	1	1
Female	250(76.2%)	36(10.4%)	0.25(0.12 – 0.49) ***	0.34(0.1 – 1.09)
Age group				
15-24	137(41.5%)	29(8.8%)	0.430(0.08 – 2.46)	0.34(0.05 - 2.24)
25-34	96(29.3%)	11(3.4%)	0.229(0.04 – 1.4)	0.15(0.2 - 1.13)
35-44	38(11.6%)	6(1.8%)	0.316(0.05 – 2.12)	0.29(0.03- 2.5)

45-54	5(1.5%)	2(.6%)	0.800(0.08 – 8.47)	1.24(0.09 -17.81)
>54	4(1.2%)	2(0.6%)	1	1
Educational level				
Can read & write	15(4.6%)	2(0.6%)	0.533(0.06 - 4.5)	0.45(0.04 - 4.7)
Can't read & write	73(22.3%)	10(3.0%)	0.548(0.1 – 2.95)	0.39(0.06 – 2.6)
Primary school (1 - 8)	124(37.8%)	25(7.6%)	0.806(0.16 – 4.03)	0.47(0.08 – 2.84)
Secondary school (9 - 12)	58(17.7%)	11(3.4%)	0.759(0.14 – 4.06)	0.25(0.04 – 1.74)
Higher education	8(2.4%)	2(0.6%)	1	1
Job category				
Green house	184(56.1%)	298.80%	1.04(0.38 - 2.88)	1.3(0.43 – 4.6)
Pack house	52(15.9%)	6(1.8%)	0.76(0.22 – 2.7)	0.74(0.19 – 3.11)
Sprayer	9(2.7%)	10(3.0%)	7.33(1.99 - 26.97)**	**6.61(1.11 – 39.19)***
Open field/ irrigation	33(10.1%)	5(1.5%)	1	1
Total service year in the company				
1 – 3	172(52.4%)	41(12.5%)	3.734(1.11 - 12.6)*	3.31(0.74 – 14.73)
3.1 – 5	59(18.0%)	6(1.8%)	1.593(0.378 - 6.710)	3.01(0.6 – 15.1)
>5	47(14.3%)	3(0.9%)	1	1
Job satisfaction				
Yes	193(59.6%)	45(13.9%)	1	1
No	83(25.6%)	3(.9%)	6.451(1.95 - 21.35)*	**0.11(0.03 – 0.43)***
OHS training				

Yes	127(38.7%)	30(9.1%)	1	1
No	151(46.0%)	20(6.1%)	0.56(0.3 – 1.04)	0.63(0.29 – 1.37)
Knowledge of hazards in the farm				
Yes	153(46.6%)	27(8.2%)	1	1
No	125(38.1%)	23(7.0%)	1.04(0.57 – 1.91)	1.54(0.69 – 3.42)
Use of PPE				
Yes	264(81.2%)	47(14.5%)	1	1
No	11(3.4%)	3(.9%)	1.53(0.41 – 5.7)	3.5(0.71 – 17.37)

Note : *significantly associated at p<0.05, **significant at p<0.01, ***significant at p<0.001, PPE: Personal Protective Equipment, OHS: occupational health & safety.

4.13.3 Key informant interview

Four key informant interviews were done in order to supplement the findings of quantitative result. The interviewees were selected purposively based on their position & experience in the farm. Overall key informant interview is summarized in the following thematic areas.

OHS officer

In all the four farms there is no full time hired OHS officer but there were OHS focal persons, who take trainings on occupational health & safety.

Commonly observed cases

Commonly observed health problems were Back pain, soft tissue problem (cutting by flower), eye irritation, headache, skin problems & kidney problems are most commonly observed. This strengthens the quantitative result of the study.

Maternity leave

Based on the rule one month before & two months after birth is given for pregnant in all farms. In addition as one of the respondent said “in addition to the legal maternity leave after five months of pregnancy they transferred to less heavy job”

Health & safety training

There is no training given for newly hired employees but on job training is given for selected employees & supervisors by Ethiopian horticulture producers & exporters association twice a year on most of the farms then the training is cascaded by those trainees to all floriculture farm workers

to all employees as the informants said, but the result of the questionnaire collected from the employees did not show that, almost half of the employees said we didn‟t take any trainings on health & safety issues.

Work area supervision

As they said quarterly risk assessment is done on occupational health & safety, but there is no regular work area supervision, moreover there is environmental risk assessment twice a year.

Medical checkup

There is no pre-employment medical checkup for all employees but as they said there is cholinesterase & other tests is done quarterly for all pesticide sprayers, but for other employees only two of the farms said there is medical checkup yearly for all of them.

Work hours

On times like Valentine‟s Day and Christmas workers engaged in overtime work to meet excessive demand (more than 48 hours per week), cover long shift at one task without a break”.

4.13.4 Work environment observation

According to the work environment observation checklist the farms were observed. It revealed that there is no enough safety signs & rules as needed in all the farms. In addition except some of the pesticide sprayers most of the workers didn‟t use personal protective equipments properly, because of their reasons and lack of complete and sufficient supply of the equipments by the farms. All of them did not have written safety and health plan of action but they all do have a copy of some important safety & health regulations. Most of the farms are in the outskirts of Bishoftu city so that all of them did not have health service facility near to them, but some of them have a nurse responsible for first aid & simple emergency care of the employees even if the first aid kit not filled as prescribed. Regarding shower facilities most of them have it for only pesticide sprayers but there is no for other employees, but they all have dining room. And all farms have rest room which is separated for each sex.

Table 8- Available health risks in Bishoftu area flower farm workers, East showa, Oromia, Ethiopia, Jul - Aug. 2013.

Types of occupational health risks	Examples of associated agents	Olij flowers	Joytech flowers	Minaye flowers	Dugda flowers
Chemical	Pesticides(Organophosphates , carbamates etc…)	√	√	√	√
	Fertilizers	√	√	√	√
	Metals (lead, mercury, arsenic.)	_	_	_	_
	Organic solvents (benzene, toluene, chloroform, carbon disulfide…)	√	√	√	√
Biological	Infectious agents	_	_	_	_
	Malaria	_	_	_	_
Physical	UV / solar radiation	√	√	√	√
	Handling of pesticides, herbicides & fertilizer	√	√	√	√
	Dust	√	√	√	√
	Extreme cold	√	√	√	√
	Extreme heat	√	√	√	√
Ergonomical	Bending / lifting of chemical containers	√	√	√	√
	Standing for long time	√	√	√	√
	Bending for long time	√	√	√	√

Table 9- Some of the pesticides used in Bishoftu area floriculture farms, indicating WHO classification, East showa, Oromia, Ethiopia, Jul - Aug. 2013.

Pesticides	WHO classification stages of pesticides
Clofentazine	I
Iprodione	I
Dimethoate	I
Paraquat dichloride	I
Prochloraz	I
Lambda Chyalothrin	II
Lufenuron	II
Imidacloprid	II
Carbendazim	II
Fenhexamid	III
Iprodione	III
Difenoconazole	III
Organosilicon	IV
Mancozeb	IV
Sulphur	IV

Note: I= extremely hazardous, II=Hazardous, III= moderately Hazardous, IV=slightly hazardous

5 Discussion

In this study occupational health risks, associated factors & outcomes of floriculture farm workers were assessed among 330 workers. We found a high prevalence of occupational health symptoms among workers who were satisfied by their job and workers who work as pesticide sprayers. The study also revealed that there were inadequate health and safety provisions.

In this study, women workers were the majority 284(86.1%) of the employees of flower industries. Similarly, in the study done in Uganda 54% and Colombia 65% were females [5, 16]. As per the key informants in this study, females were selected in this areas because flower care, cutting & packing needs a great care, dexterity & patience and they think woman have this behaviors. This is also similar with study done in Tanzania where women workers were preferred because they are „obedient", „careful", „industrious", „have little complaints" and are „not aggressive. All traits indicate that women are seen as more tolerant and therefore more likely to put up with a poor quality working life [30].

The majority of the workers on the farms had lower level of education or illiterates which was similar with the study done in Tanzania where 30% of them were illiterates [30]. This could be explained by the fact that the sector is more of labor intensive which does not require higher education.

Two hundred seventy eight study subjects 278(84.24%) had at least one sign of occupational health symptoms. This was a bit lower compared to study done in Ecuador which documented 91.9% of workers had at least two health symptoms [2]. Moreover, the study done in Holleta area farms also documented that 95.85% of study respondents had at least one symptom of disease [12]. This may be because in the recent years some preventive rules are put in place by different respective bodies.

In this study, the most prevalent occupational health symptoms were fatigue 260(79.3%) & musculoskeletal health problems 209(75.2). Whereas according to a study done in Kenyan flower farm workers the commonest health symptoms were respiratory tract infections (42.5%) &

gastrointestinal problems (16.7%) [18]. This difference may be due to the old age of flower industries in Kenya were stayed a bit longer than Ethiopia & the symptoms observed were symptoms which could happen after long term exposure to the agents as compared to the symptoms observed in this study.

Observations made revealed that workers in most working areas were exposed to excessive heat specially those working in green houses, hazardous pesticides including WHO classification class I, which is extremely hazardous to human health, specially workers working in spray, standing for long time for workers working almost in all sections, poor ventilation specially workers working in green houses, incomplete personal protective equipments on almost all workers. This is in agreement with studies done in Holleta & Gondar [12, 28].

Most of 252(90.6%) this work related health problems were developed after they join the work, Similarly on the study done on West Showa, Oromia which shows 93.25% of them developed the health symptoms after they join the work [12].

Sexual harassment reported among female workers were very few in these farms as compared to similar studies done on Uganda which shows over half of female workers had heard a woman complaining of sexual harassment. The same is true for Tanzania which documented around 48% of sexual harassment[30]. This may be due to the fact that the numbers of men were low and also due to cultural differences.

Only 10(3.4%) had a physician confirmed reproductive health problem in this study. This was also showed in other studies done among largely female workforce in Colombia where moderate increases in miscarriages after either parent started working in floriculture [24]. In addition on other study from Colombian flower workers also concluded that female floriculture workers had reduced ability to become pregnant [8]. The reasons of this low prevalence in our study may be because of the effects of pesticides used in the farms is long term and the farms are comparatively lower age compared to the countries in this studies [31].

In this study, possible influence of cigarette smoking, alcohol drinking & chewing chat is avoided since all most all individuals did not report these behavioral factors. Similar results has been reported in a study done in Holleta [12]. The reason for this may be because the large number of workers was female in the industry & females are not engaged in such an act as the norm of the community did not encourage it [32].

The survey also revealed that there were inadequate health and safety provisions such as health and safety education programs, personal protective equipment, health and safety instructions and First aid facilities in the sampled floriculture farms. Because of lack of health and safety training 159(48.2%) & knowledge towards the health risks of the pesticides & their environment 182(55.2%) even some sprayers were spraying the pesticides without wearing personal protective equipments. Other studies in Jimma & Tanzania also showed that most workers operating with no knowledge of hazards associated with particular activities [33, 34].

Unlike this study most occupational health and safety studies conducted in developing countries revealed that education is likely to enhance workers health and safety practice that prevent them from work-related health problems [35, 36]. However, in our study occupational disease symptoms didn‟t change significantly as educational levels of the workers decreased or increased. This could be explained by in part education only can‟t eliminate injury when the level of hazards is high and when the use of reliable techniques and safe work organization were limited. Similarly there is no statistically significant relationship between occupational health & safety training and occupationally induced health symptoms. This was in contradiction with other studies done here in Ethiopia [12, 28, 36]. As we observed the possible explanations for this may be the appropriateness of the training, the educational background & level of knowledge of the trainer.

Although there was no significant association between age and occupational health symptoms in this study, literature reviews showed that older ages are associated with relatively less occupational health complications [28]. The reasons for this was higher work-related health problems amongst young people include lack of information, lack of training, lack of supervision ,lack of experience on the job , lack of knowledge and skill. Many workers begin work at an early age and often without safety training.

The study revealed that job satisfaction is statically significant with occupational health symptom of the workers. Those who were not satisfied by their job were less likely to had occupational health symptoms [AOR: 0.11, 95% CI (0.03 – 0.43)*] than who were satisfied by their job. This was in contradiction with studies done in Gondar & Addis Ababa [28, 34]. And the reason for this could be workers who were not satisfied by their job may under report or carelessly report their disease symptom because they think nothing will be changed by repeated interviews by different researchers and this was one of the challenges faced the research.

In this study there were significant differences on work-related health effects between workers who had different service year on their present job before adjusting the effect of other variables. Workers who worked for 1 – 3 years had more work related health effects [3.734(1.11 - 12.6)*] than workers who had a service year of 5 years and above. This was supported by other studies which showed occupational health problems decreases as service year or working experience increases [28, 37]. Again this could be explained by the age of most of flower farms here in our country were not more than 10 years & the health effects occurred during these time were the acute ones , this time of exposure is not enough to produce the chronic or cumulative health effects of pesticides & other available hazards in the industries. In addition the workers adapt the environment & their knowledge of hazards & protective mechanisms also increases as their service year increases. In other words during this age of the farms the acute health effects dominated the chronic effects but this may be change as the time goes & long enough to produce the late effects of those hazards.

Our study revealed that job category was significantly associated with occupational disease symptoms [AOR: 6.61, 95% CI (1.11 – 39.19)]. Sprayers experienced more work related health effects than irrigation section workers. This was in agreement with studies done in Gondar, Addiss Ababa & Tendaho [28, 35, 37]. The reason for this was sprayers exposed more directly to pesticides than other section workers.

The qualitative assessment of this study shows that most occurring disease symptoms were skin related problems, headache, fainting, kidney related symptoms & back pain. This is more or less similar with study done in Holleta which revealed, 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 commonly occurred disease symptom [12].

6 Strengths and limitations of the study

Strength

- This study used a mixed method research to triangulate the information and to explore ideas that are not addressed by quantitative survey.
- The study tries to address neglected health problem among vulnerable population (women).

Limitation

- There could be seasonal variations in occurrence of health problems. The seasons may result in low market demand and workers are given their annual leave or evacuated from their work. This may lead to low frequency of health problems due to less activity and less crowding of workers.
- Some workers were not cooperative for interview because of repeated interviews by different interviewers & they think nothing is changed by repeated interviews.
- Health worker, social desirability and recall biases could also be other limitations of the study.
- Presence of very limited similar studies in the country for comparison purpose.

7 Conclusion

The health concerns related to the floriculture industry are complex. In this study spray section workers & workers who had job satisfaction were at risk of occupational health symptoms. There were inadequate health and safety provisions such as health and safety education programs, personal protective equipment, health and safety instructions and first aid facilities in the sampled floriculture farms. So information on occupational health risks associated factors & health outcomes related to these industry workers is very important in making the problem more visible to policy makers and other responsible body.

In summary, comprehensive health & safety interventions were lacking on those flower industries which resulted in different occupational health related disease symptoms.

8 Recommendations

Based on the findings of this study and experience of other countries producing floriculture products, the following recommendations are stated to sustain the floriculture industries with its minimum health impacts and optimum economic benefits in the country.

- Provide appropriate pre employment & on job health and safety training for workers.
- Establish & strength regular & periodic supervision of the workplace.
- The flower farms should recruit workers with moderate level of education especially sprayers to be able to read safety instructions and understand their importance.
- Pre-employment & periodic medical checkup should be in place or strengthened.
- Farms management should ensure provision of adequate PPEs and strictly observe re-entry time rules in green houses after pesticide spray.
- There should be provision of safety instructions in pictorial form for the illiterates & workers who do not know the language while ensuring that most of workers recruited have some education.
- The farms should employ occupational health and safety professionals to mentor their staff's health and to minimize the farms environmental impact.
- Further detailed comparative studies should be done between the floriculture farm workers & the surrounding communities to see those health problems in the farms were also the cases in the community or not & to come up with better conclusion.

Taking these points into consideration it is possible to run sustainable floriculture production keeping the balance of its economic advantages without or with minimal negative health impact from the floriculture production practices in the country.

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ANNEXES

9.1 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

Principal investigator Phone -0913 37 71 65 E-mails- **davewbf@gmail.com**

Advisor- MItike molla(Phd), Address- Addissababa, Phone number- 0911 13 18 05

School of public health- Phone – 011 515 77 01

Section one: Socio demographic information.

No	Question	Possible response	Skipping	code
1	Sex	1.Female 2.Male		
2	Age (If he or she does not know ask before and after event significant)	_____ Years		
3	Religion	1.Orthodox 2.Catholic 3. Protestant 4.Muslim 5. Others specify.		
4	Ethnicity	1.Oromo 2.Amhara 4.Tigrai 3.SNNPR 5.other specify____		
5	Education level	1. Can read and write 2. Can‟t read and write 3.Primary school (1-8) 4. Secondary school (9-12) 5.Higher education		
6	Marital status	1.Married 2. Never married 3.Divorced 4.Widowed 5. Living with partner 6. Separated		
7	Employment pattern	1.Permanent 2.Temporary 3.Daily labor		
8	Job category	Green house 1. Pack house 2. Sprayer 3. Irrigation 4. Other specify_____		
9	Total service year in the farm Months/years	_____ Year		

		_____ Mth		
10	How many hours are you working a in a day?	_____ Hrs		
11	Daily or monthly salary in birr			
12	A r e a of Residence	1.Urban 2.Rural		

Section two: Health outcome information

Skin disorders related questions				
13	Have you ever had eczema which attacked you on & off after being hired here?	1.Yes 2.No		
14	Have you had itchy rash at any time after being hired here?	1.Yes 2.No		
15	Have you had this burning at any time after being hired here?	1.Yes 2.No		
16	Majorly attacked body part by the above skin disorders?	1. Hand 2. Face 3. Leg 4. Neck 5.other _____		
17	Did you ever had one or more of the above skin problems before starting this job?	1.Yes 2.No		
18	If yes for question 17 is it aggravated now?	1.Yes 2.No		
Musculoskeletal Problem related questions				
19	Have you ever had back pain after being hired here?	1.Yes 2.No		

20	Have You had Neck strain(pain) after being hired here?	1.Yes 2.No		
21	Have You had lower extremity problem after being hired here?	1.Yes 2.No		
22	Have You had upper extremity problem after being hired here?	1.Yes 2.No		
23	Have You had arthritis after being hired here?	1.Yes 2.No		
24	Did you ever had one or more of the above Muskuloskeletal skin problems before starting this job?	1.Yes 2.No		
25	If yes for question 24 is it aggravated now?	1.Yes 2.No		
Respiratory problem related questions				
26	Do you usually had cough during working time(excluding clearing throat or single cough) after being hired here	1.Yes 2.No		
27	Have you ever troubled by shortness of breath after being hired here ?	1.Yes 2.No		
28	Does your Chest ever feel tight or Your breathing becomes difficult after being hired here?	1.yes 2.No		
29	Have you ever had **wheezing** or whistling after being hired here ? If "No" please skip to next Question	1.yes 2.No		
30	Have you ever had asthma which is confirmed by a physician after being hired here?	1.yes 2.No		
31	Have you ever had a problem with **sneezing**, or runny or blocked nose when you DID NOT have a cold or flu after being hired here?	1.yes 2.No		
32	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 after being hired here?	1.yes 2.No		
33	Did you ever had one or more of the above respiratory problems before starting this job?	1.Yes 2.No		
34	If yes for question Q 33 is it aggravated now?	1.Yes 2.No		
Other health problems				

35	Have you had reproductive health problem which is confirmed by a physician after being hired here.(only for female)	1.Yes 2.No		
36	Have u ever face the following sexual advances on your workplace or when walking to/from job?	A. Forced sex 1.Yes 2. No B. Insult 1.Yes 2. No C. Forced kiss 1.Yes 2. No D. Face unwelcome touching on your genital or breast etc. 1. Yes 2. No		
37	Have you had a problem with **headache** when you came into the work place?	1.Yes 2.No		
38	Have you had a problem with **fatigue** when you were at rest after being hired here?	1.Yes 2.No		
39	Have you had a problem with **sleepiness** during working time after being hired here?	1.Yes 2.No		
40	Have you had frequent problem with **loss of appetite** after being hired here**?**	1.Yes 2.No		
41	Have you had **Kidney problem** after being hired here?	1.Yes 2.No		
42	Have you had a problem with **Dizziness** when you were at work after being hired here?	1.Yes 2.No		
43	Have you ever **Faint** in the farm during working hours?	1.Yes 2.No		
44	When did the above disease symptoms manifested?	1. Before join the work 2. After join the work		

45	Did you visit health facility following disease symptoms?	1.Yes 2.No		
46	If "yes" for Question number 45 Who would cover medical cost?	1.The farm 2. Yourself		
47	Have you ever had sick leave for medical process?	1.Yes 2.No		
48	If "yes" for question number 47 for how long?	1.Till recovery 2. Work while on medication. 3.Other option		
49	If "no" for Question number 45 what was the reason?	1. The farm has no health facility 2. Lack of break 3. Lack of money 4. Other		

Section three: Workers knowledge & behavior information (associated factor information)

50	Do you drink alcohol?	1. Never 2. Regularly 3.Sometimes		
51	Do you smoke cigareet?	1. Never 2. Regularly 3.Sometimes		
52	Do you chew chat?	1. Never 2. Regularly 3.Sometimes		
53	Are you satisfied with the job or task required to do	1.Yes 2.No		
54	Do you use any personal protective equipment?	1.Yes 2.No	If no skip to Q 409	
55	If yes to Q54, what type?	1.Gloves 1.Yes 2.No		

		2.Ear plug 1.Yes 2.No 3.Respirators 1.Yes 2.No 4.Helmet 1.Yes 2.No 5.Overalls 1.Yes 2.No 6.Goggles 1.Yes 2.No 7. Face shield 1.Yes 2.No 8. Boots 1.Yes 2.No 9.Others, specify____		
56	If No to Q54,what are your reasons?	1.the company not provide 2. Not comfortable to use 3. Lack of knowledge on how to use it? 4.Decrease work performance 5. shortage of supply 6.Other, specify_____		
57	Do u know which material is hazardous to your health while performing your job.	1.yes 2. No		
58	Do u take training on OHS before or after starting your job?	1.yes 2. No		

That is the end of our questionnaire. Thank you very much for taking time to answer these questions. We appreciate your help.

9.2 Annex-II Amharic Version Questionnaire

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

መለያ _____

የድርጅቱ ስም _____

መጠይቁ መሞላት ከመጀመሩ በፊት የተሳታፊውን ፈቃደኝነት መጠየቅያ ቅጽ

ሰሊም እንደምን አለ? እኔ ---------- እባላለሁ። እዚህ የመጣሁት ይህን ጥናት ከሚያካሂደው የአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና የትምህርት ክፍሌ ነው። ከስራ ጋር በተያያዘ በዚህ ድርጅት ውስጥ ምን አይነት የጤና ችግር እንዳለ መጠኑስ ምን ያህሌ እንደሆነ እና በምን ምክንያት ሉከሰት እንደሚችሌ ሇመረዳት እንፈሌጋሇን። በመሆኑም ይህን መረጃ ለማግኘት በዚህ ድርጅት ውስጥ ይህን መጠይቅ በማካሄድ ሊይ እገኛለው፡ በመሆኑም የዚህ ጥናት ውጤት በሀገራችንና በዚህ ድርጅት ውስጥ የሚደረገውን የሙያ ደህንነትና ጤንነት አገሌግልት ለማሻሻል ከፍተኛ እገዛ ይኖረዋል፤ ስለሆነም ከስራዎ ጋር በተያያዘ ላለፉት አመታት እዚህ ከመጡ ጀምሮ የተከሰተ የጤና ችግሮችን በተመለከተ የተወሰኑ ጥያቄዎችን ለማንሳት እወዳለሁ። በአጠቃሊይ መጠይቁ 15 ደቂቃ ያህል ይፈጃል የሚሰጡት መረጃ ለማንም ተሳልፎ አይሰጥም በተጨማሪም በተቃራኒ መልኩ ፊጽሞ አይተረጎምም ስምዎን መመዝገብ አያስፈልገኝም ። ተሳትፎዎ ሙለ በሙለ በፈቃደኝነት ሊይ የተመሰረተ እንደመሆኑ መጠን ጥያቄዎቹን እንዲመልሱ በምንም አይነት መልኩ አንገፋፋዎትም በመሆኑም በማይፈልጉበት ሰዓት መጠይቁን የማቋረጥ መብት አለዎት።

ስለዚህ ለመቀጠል ፍቃደኛ ነዎት 1. አዎ ☐ 2. አይደለሁም ☐

የጠያቂው ስም_____ ፊርማ_____

መጠይቁ የተሞሊበት ቀን_____ የተጀመረበት ሰዓት_____ የተጠናቀቀበት ሰዓት_____

የመጠይቁ ግምገማ 1. ተሟሌቷል 3. ተጠያቂው አሌተገኙም

2. ተቋውሞ 4. በከፊሌ ተሟሌቷል

የአረጋገጠው ሱፐርቫይዘር ስም_____ ፊርማ_____

ቀን_____

ለማንኛውም ችግር እና ግልጽ ላልሆነ ነገር ከታች ባለው አድራሻ ማነጋገር ይችላሉ።

ዋና የጥናቱ ተሳታፊ- ዳኛቸው ሙሀመድ አድራሻ- አዲስ አበባ ስልክ - 0913 37 71 65

አማካሪ- ምትኬ ሞላ(ዶ/ር) አድራሻ- አዲስ አበባ ስልክ- 0911 13 18 05

የህብረተሰብ ጤና ትምህርት ክፍል ስልክ- 011 515 77 01

ክፍል አንድ፡ ማህበራዊና ስነ- ሕዝባዊ ገጽታዎችን በተመለከተ (Socio Demography information related)

ተ.	ጥያቄ	መልስ	(ይለፍ)	(ኮድ)
1	ጸታ	1. ወንድ 2. ሴት		
2	እድሜ	ዓመት		
3	ሐይማኖት	1. ኦርቶዶክስ 2. ካቶሊክ 3. ፕሮቴስታንት 4. ሙስሊም 5. ሌላ		
4	ብሔር	1. ኦሮሞ 2. አማራ 3. ትግራይ 4. ደቡብ 5. ሌላ ይጥቀሱ.....		
5	የትምህርት ደረጃ	1. ማንበብና መፃፍ የሚችል 2. ማንበብና መፃፍ የማይችል 3. የመጀመሪያ ደረጃ/1-8 / 4. ሁለተኛ ደረጃ /9-12/ 5. ከፍተኛ ትምህርት		
6	የጋብቻ ሁኔታ	1. ያገባ/ች 2. ፊፅሞ ያላገባ/ች 3. የፈታ/ች 4. የሞተባት/የሞተበት 5. ያለህጋዊ ጋብቻ አብሮ የሚኖር 6. ተለያይቶ የሚኖር		
7	የቅጥር ሁኔታ	1. ቋሚ 2. ኮንትራት 3. የቀን ሰራተኛ		
8	የስራ ድርሻ/ክፍል	1. ግሪን ሀውስ 2. ማሸጊያ ቤት 3. ፀረ-ተባይ ረጪ 4. መስኖ 5. ሌላ ካለ _____		
9	በዚህ ስራ የቆይታ ጊዜ?(በወር/በአመት)	_____ አመት _____ ወር		

10	በቀን ለስንት ሰዓት ይሰራሉ?	_____ ሰዓት		
11	የቀን/የወር ደመወዝ በብር?			
12	የመኖሪያ ቦታ?	1.ከተማ 2. ገጠር		

ክፍል ሁለት ፡- የጤና ችግር መረጃ

የቆዳ ላይ ችግሮች				
13	እዚህ ስራ ከጀመሩ በኋላ ሄድ መጣ እያለ የሚየስቸግር ሽፍታ ነበረብህ/ሽ?	1. አዎ 2. የለም		
14	እዚህ ስራ ከጀመሩ በኋላ በማንኛውም ጊዚ ቆዳህ ሊይ ማሳከክ ኖሮብህ ያውቃል?	1. አዎ 2. የለም		
15	እዚህ ስራ ከጀመሩ በኋላ በማንኛውም ጊዚ በቆዳህ ሊይ የማቃጠል/የመቅላት ስሜት ኖሮብህ ያውቃል?	1. አዎ 2. የለም		
16	የቆዳ ላይ ችግር በዋናነት የሚጠቃው የሰውነት አካልህ/ሽ	1. እጅ 2. ፊት 3. እግር 4. አንገት 5. ተጨማሪ ካለ		
17	ከላይ ከተጠቀሱት አንዱም ሆነ ከአንድ በላይ የቆዳ ችግር ስራ ከመጀመርዎ በፊት ነበረብዎት?	1. አዎ 2. የለም		
18	ለጥያቄ ቁጥር 17 መልስዎ አዎ ከሆነ አሁን ተባብሷል?	1. አዎ 2. አልተባባሰም		
ከአጥንትና ከጡንቻ ጋር የተያያዙ ችግሮች				
19	እዚህ ስራ ከጀመሩ በኋላ በማንኛውም ጊዚ የጀርባ ላይ ህመም አጋጥሞዎት ያውቃል?	1. አዎ 2. የለም		
20	እዚህ ስራ ከጀመሩ በኋላ በማንኛውም ጊዚ የአንገት ላይ ህመም አጋጥሞዎት ያውቃል?	1. አዎ 2. የለም		
21	እዚህ ስራ ከጀመሩ በኋላ በማንኛውም ጊዚ የእግር ህመም(መቆርጠም፣መደንዘዝ) ተሰምቶዎት ያውቃል?	1. አዎ 2. የለም		
22	እዚህ ስራ ከጀመሩ በኋላ በማንኛውም ጊዚ የእጅ ህመም(መቆርጠም፣መደንዘዝ) ተሰምቶዎት ያውቃል?	1. አዎ 2. የለም		

23	እዚህ ስራ ከጀመሩ በኋላ በማንኛውም ጊዜ የመገጣጠሚያ ህመም (መቆርጠም፣መደንዘዝ) ተሰምቶዎት ያውቃል?	1. አዎ 2. የለም		
24	ከላይ ከተጠቀሱት አንዱም ሆነ ከአንድ በላይ ጡንቻ ህመም ስራ ከመጀመርዎ በፊት ነበረብዎት?	1. አዎ 2. የለም		
25	ለጥያቄ ቁጥር 24 መልስዎ አዎ ከሆነ አሁን ተባብሷል?	1. አዎ 2. አልተባባሰም		
የመተንፈሻ አካላት ጋር የተያያዙ ችግሮች				
26	እዚህ ስራ ከጀመሩ በኋላ በስራ ወቅት በተደጋጋሚ የማሳል ስሜት አአጋጥሞሃል/ሻል ጉሮሮን ለማስተካከል የሚደረገውን ሳይጨምር?	1. አዎ 2. የለም		
27	እዚህ ስራ ከጀመሩ በኋላ በትንፋሽ ማጠር ተቸግረህ ታውቃለህ/ሽ?	1. አዎ 2. የለም		
28	እዚህ ስራ ከጀመሩ በኋላ ደረት ክብድ ክብድ ወይም የአተነፋፍስ ችግር ገጥሞህ ያውቃሌ?	1. አዎ 2. የሞም		
29	እዚህ ስራ ከጀመሩ በኋላ ደረት ሊይ ሲጥ ሲጥ የማለት ችግር ገጥሞህ/ሽ ያውቃል የለም ከሆነ የሚቀጥለውን ጥያቄ ይለፉት?	1. አዎ 2. የለም		
30	በሀኪም የተረጋገጠ አስም አለብህ/ሽ?	1. አዎ 2. የለም		
31	እዚህ ስራ ከጀመሩ በኋላ በተደጋጋሚ ማስነጠስ (Sneezing) አጋጥሞዎት ያውቃል። ጉንፋን ይዞዎት እያለ ከሚያጋጥሞዎት ውጭ?	1. አዎ 2. የለም		
32	እዚህ ስራ ከጀመሩ በኋላ የአፍንጫ ፈሳሽ ችግር ወይንም የአፍንጫ ፍሳሽ መብዛት ወይንም መደፍን ገጥሞዎት ያውቃል?	1. አዎ 2. የለም		
33	ከላይ ከተጠቀሱት አንዱም ሆነ ከአንድ በላይ የመተንፈሻ አካል ህመም ስራ ከመጀመርዎ በፊት ነበረብዎት?	1. አዎ 2. የለም		
34	ለጥያቄ ቁጥር 33 መልስዎ አዎ ከሆነ አሁን ተባብሷል?	1. አዎ 2. አልተባባሰም		
ሌሎች ችግሮች				

35	እዚህ ስራ ከጀመሩ በኋላ በሀኪም የተረጋገጠ ከወሊድና ከወሊድ አካላት ጋር የተያያዘ የጤና ችግር አጋጥሞዎት ያውቃል።	1. አዎ 2. የለም		
36	ከዚህ በታች የተጠቀሱት ወሲባዊ ትንኮሳዎች በስራ ቦታሽ ወይም ከስራ ወደቤት ወይም ከቤት ወደ ስራ ስትጓዢ ደርሰውብሽ ያውቃሉ? ተገዶ መደፈር በተቃራኒ ፆታ መሰደብ ተገዶ/ያለፈቃድ መሳም ያለፈቃድ/ተገዶ ጡት ወይም ብልት መነካት	1. አዎ 2. የለም 1. አዎ 2. የለም 1. አዎ 2. የለም 1. አዎ 2. የለም		
37	እዚህ ስራ ከጀመሩ በኋላ ወራት የራስ ህመም (Headache) ችግር ነበርበህ/ሽ?	1.አዎ 2.የለም		
38	እዚህ ስራ ከጀመሩ በኋላ የድካም ስሜት (Fatigue) ይሰማህ ነበር/ሽ?	1.አዎ 2.የለም		
39	እዚህ ስራ ከጀመሩ በኋላ የእንቅልፍ እንቅልፍ የማለት ስሜት (Sleepiness) ነበረብህ/ሽ?	1. አዎ 2. የለም		
40	እዚህ ስራ ከጀመሩ በኋላ የምግብ ፍላጎት ማጣት(loss appetite) ወይንም መቀነስ **በተደጋጋሚ** ገጥሞህል/ሻል?	1. አዎ 2. የለም		
41	እዚህ ስራ ከጀመሩ በኋላ በሀኪም የተረጋገጠ የኩላሊት ችግር (Kidney problem) ገጥሞሃል/ሻል?	1. አዎ 2. የለም		
42	እዚህ ስራ ከጀመሩ በኋላ በተደጋጋሚ የድብርት ስሜት(Dizziness) በስራ ወቅት ገጥሞህል/ሽል?	1. አዎ 2. የለም		
43	ባልታሰበ ሁኔታ ስራ ቦታ መውደቅ (Fainting) ገጥሞህ/ሽ ያውቃል?	1. አዎ 2. የለም		
44	ከላይ የጠቀስናቸው የጤና ምልክቶች የጀመረህ/ሽ?	1. እዚህ ከመግባትህ በፊት 2. እዚህ ከገባህ በኋላ		
45	ከሊይ የጠቀስናቸውን የጤና እክልች ባጋጠመህ/ሽ ጊዜ ወደ ህክምና ቦታ ሄደሃል/ሻል?	1. አዎ 2. አልሄድኩም		
46	በተራ ቁጥር 45 መልሱ አዎ ከሆነ የህክምናውን ወጪ የሚሸፈነው በማን ነው?	1. በሰራተኛው 2. በድርጅቱ 3. ራስዎ		
47	ህክምናውን በምታደርግበት ጊዜ እረፍት ይሰጥህል/ሻል?	1. አዎ 2. አይሰጠኝም		
48	በተራ ቁጥር 47 መልሱ አዎ ከሆነ በምን ያህሌ ጊዜ?	1. ህክምናውን ተከታትለህ እስክምትጨርስ		

		2. ህክምና እየተከታተልክ ትሰራለህ 3. ሌላ ካለ ይጥቀሱ----------		
49	በተራ ቁጥር 45 መሌሱ አልሄድኩም ከሆነ ምክንያቱ?	1. በድርጅቱ የህክምና ተቋም ስለሌለ 2. ፍቃድ ስለማላገኝ 3. መታከሚያ ገንዘብ ስለሚያንሰኝ 4. ሌላ ካለ ይግለፁ----------		

ክፍል ሶስት :- በሰራተኛው ዕውቀትና ስነ-ባሃሪ (ተያያዥ ጉዳዮች) ላይ የሚያተኩሩ ጥያቄዎች፡፡

50	መጠጥ ትጠጣለህ?	1. በጭራሽ አልጠጣም 2. ሁልጊዜ እጠጣለሁ 3. አንዳንድ ጊዜ እጠጣለሁ		
51	ሲጋራ ታጨሳለህ?	1. በጭራሽ አልጠጣም 2. ሁልጊዜ እጠጣለሁ 3. አንዳንድ ጊዜ እጠጣለሁ		
52	ጫት ትቅማለህ?	1. በጭራሽ አልጠጣም 2. ሁልጊዜ እጠጣለሁ 3. አንዳንድ ጊዜ እጠጣለሁ		
53	በስራህ ደስተኛ ነህ/ሽ	1. አዎ 2. አይደለሁም		

54	የግል ጉዳት መከላከያ	1. አዎ 2. አልጠቀምም		
55	በተራ ቁጥር 54 መልሱ አዎ ከሆነ የትኛው አይነት(ያሉትን ያክብቡ)?	1. ጓንት 2 .የጆሮ/የድምጽ መከላከያ 3 .የአፍና የአፍንጫ መከላከያ 4. የጭንቅላት መከላከያ/ሄልሜት 5. የሥራ ልብስ 6 .የብየዳ መነፀር/ጎግል 7. የፊት መከላከያ 8. ቦቲ ጫማ		
56	በተራ ቁጥር 54 መልሱ የለም ከሆነ ምክንያቱ?	1. ድርጅቱ አያቀርብም 2. ለሥራ አይመችም 3. አጠቃቀሙን አላውቅበትም 4. የሥራ ፍጥነትን ስለሚቀንስ 5. የአቅርቦት እጥረት 6. ሌላ ካለ---------		
57	ስራዎን ሲያከናውኑ የቱ ማቴርያል በጤናዎ ላይ ጉዳት ሊያስከትል እንደሚችል ያውቃሉ?	1.አውቃለሁ 2. አላውቅም		
58	ስለ ስራ አካባቢ ደህንነትና ጤንነት ከመቀጠርሽ/ህ በፊት ወይም በኋላ ስልጠና ወስደሻል/ሀል?	1. ወስጃለሁ 2. አልወሰድኩም		

ይሄ የጥያቄው መጨረሻ ነው፡፡ ግዜዎን ሰውተው ስለሞሉልን እናመሰግናለን፡::

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

Addis Ababa University

School of Public Health

Checklist for observation of available occupational health risks & working Environment in floriculture farms in the surrounding areas of Bishoftu town.

Checklist identification number: _____

Name of the farm_____

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. Is there any regular work area supervision?
9. Is there Medical checkup (pre employment or periodical) of the workers after being hired?
10. Is there any regular work area supervision?

Thank you!

9.4 Annex- IV Working Environment Observation Checklist

Addis Ababa University

School of Public Health

Checklist for observation of available occupational health risks & working Environment in floriculture farms in the surrounding areas of Bishoftu town.

Checklist identification number: _____

Name of the farm_____

1. Is there warning signs or safety rules? 1. Yes 2. No. Yes requires no lack of such arrangement at inspection around.
2. Do the employees use the necessary personal protective equipment? 1. Yes 2. No. Yes requires no lack in use of safety devices seen at inspection around.
3. Does the farm has copy of the most important safety and health regulations?

1. Yes 2.No. Yes requires a copy of the regulation.

4. Does the farm follow written health and safety plan for action in the workplace?

1. Yes 2.No. Yes requires completion of at least one of the measures in the plan.

Is there any health service near to the farm? 1. Yes 2 .No

5. Does the farm has first aid equipment? 1. Yes 2.No Yes requires that first aid equipment content be as prescribed.
6. Does the farm has shower facilities which is separated for each sex? 1. Yes 2.No
7. Does the farm has rest room which is separated for each sex? 1. Yes 2.No
8. Does the farm has dining room? 1. Yes 2.No

That is the end of our observation. Thank you very much for taking time to answer these questions. We appreciate your help.

Name of inspector _____

Signature_____Date_____

9.5 Annex- V Available health risk Observation Checklist

Checklist identification number: _____

Name of the farm_____

Table 1

Types of occupational health risks	Examples of associated agents	State the name of associated agents(including WHO classification stages of pesticides for pesticides)
Chemical	Pesticides(Organophosphates, carbamates etc…) Fertilizers Metals(lead, mercury, arsenic.) Organic solvents (benzene ,toluene, chloroform, carbon disulfide…)	
Biological	Infectious agents Malaria	
Physical	UV / solar radiation Handling of pesticides, herbicides & fertilizer Dust Extreme cold Extreme heat	
Ergonomical	Bending / lifting of chemical containers Standing for long time Bending for long time	

That is the end of our observation. Thank you very much for taking time to answer these questions. We appreciate your help.

Name of inspector _____

Signature_____Date_____