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The Effects of Floriculture Industries on Health of Workers in Ethiopia: the Case of Holeta Town, Oromia Regional State

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Health problem,
Facilities,
Company

Abstract

In the world, more than 140 countries are involved in the production of floriculture industry. In Ethiopia it is also the newly emerged and the most booming industry. Even though its production increased over the world, floriculture industry is blamed for its impact on the health of workers. This paper is intended to assess the effects of floriculture industries on the health of workers based on the three selected companies of floriculture industries in the Holeta town. A total number of 270 sample respondents were participated in this study. This study used qualitative and quantitative data gathering techniques. The survey result showed that, accessing to clean drinking water, medical service, shower service and toilet services have been critical challenges for workers in the study area. The relationship between the independent variables such as quality of Personal protective equipment, clean drinking water and the frequencies of health problem were significant. To improve the workers' health problems, the respective companies of floriculture industries have to give attention in securing available provision of sanitation facilities and PPEs for their employees.

1.1. Introduction

Floriculture industry is defined as a cultivation, production and marketing of flowering and ornamental plants under controlled conditions [1]. After one decade, the production of floriculture is becoming an active and highly international industry. More than 140 countries are involved in cultivation of floriculture on the world [2**]**.Among these countries, Ethiopia is takes 5th in rank [3]. Until 2004, there was no more significant flower industry in Ethiopia [3]. However, after 2004, the number of floriculture industries was increased by foreign, by the Ethiopians, and by joint ventures between foreigners and Ethiopians [4].

From African continent, around one decade of experience in the production of floriculture industry, Ethiopia took second ranks in Africa and fifth exporters to the European Union (EU) market. In this country 64% of floriculture industries produced in a radius of 50 km from Addis Ababa city (capital city of Ethiopia) [4].

Floriculture industry is blamed in the society for the reasons of intensive use of agrochemicals, lack of labor unions, inappropriate use of cultivation methods and injure the workers for a long period of working hours [6]. Due to these problems, the floriculture industries are debatable industry on the world [7].

About 67% workers of floriculture industries had at least one sign of respiratory health and 81% workers of floriculture industries had symptom of skin problems after joining the work. Cough shortness of breath, wheezing, sneezing, chest tightness and asthma are the respiratory health problem that great proportion of workers of floriculture had faced [4].

1.2. Statement of the problem

Floriculture industries offer several advantages contributing to the world economic growth [8]. However, due to it using intensive chemical pesticides, herbicides, fertilizers and releasing waste, it have their own several environmental, social and health problems in several ways [9].

Flower farms have lack of different important facilities and these make harsh working conditions. Due these reasons, workers are exposed to several health risks associated with the poor and unsanitary conditions of the flower farms [9].

In Ethiopia around 95% of the total flower produced in Oromia [10]. When compared with other towns that are practicing in the production of floriculture, the expansion and concentration of floriculture industries are high (31%) in Holeta town [11].

Despite the expansion and concentration of floriculture industries in and around Holeta town has its positive impacts, there are also negative impacts that have to be mitigated. To do so, the research evidence is crucial. In this regard, there was no study conducted by the title on the effects of floriculture industries on workers in the study area. But the researcher observed some workers' health problems related to the floriculture industries in the study area. On this basis the researcher was motivated to do a research on the effects of floriculture industries on health of workers in Holeta town.

1.3 Objectives of the study

1.3.1 General objective

The main objective of study is to assess the effects of floriculture industries on the health of workers in Holeta town.

1.3.2 Specific objectives

The specific objectives of the study were:

- To assess the provision of personal protective equipment in the study area.
- To analyze the health service provision in the study area.

To identify the health effects of floriculture industries in the study area.

2. Research Methods

2.1 Description of the study area

Holeta town is one of the towns of Oromia Regional state. In north, south, and east the town is surrounded by Welmera woreda and in west by Ejere woreda. It is located between the latitude of 9^0 01′ 08″N - 9^0 06′ 15″N and longitude of 38^0 26′ 40″E -38^0 32′46″E. The altitude ranges between 2250-2500m above sea level. The town is 30 km away from Addis Ababa to the west [13]. The town has eight kebeles with the total area coverage of 5550 ha (55.5km^2) of which five kebeles are rural kebeles. The town was founded for the purpose of the military services in 1900s Holeta military academy [14].

2.1.2 Climate

The agro climatic zone of the town is Dega (high land) 41%, Woyna Dega (middle land) 59% with average highest temperature 21^{o}C and average lowest temperature 6^{o}C and annual rainfall of 1040- 1100 mm having a bimodal rainfall pattern. The major types land is agricultural land, forest, pastureland, settlement, water bodies and barren land [12].

2.1.3 Population

The population of the Holeta town is estimated at 57,828. Among this male is 28,336 and female is 29,492. From the total number of population, the number of workers who engaged in different in industries is 4554. Among this number of workers engaged in different industries, 2,902 workers are engaged in their work in the company of floriculture industries. The majority of workers are female workers. Like any other parts of Ethiopia, the population growth of this town is in alarming rates [12].

2.1.4 Socioeconomic activity

The major economic activities of the society are based on agriculture; trade and service are practiced in the kebeles of Holeta town. There are 9 companies of floriculture industries in the town considered as source of income. Among eight kebeles of Holeta town, in five kebeles of Holeta (Sadamo, Gelgel kuyu, Tulu Harbu, Mada gudina and Birbirsa siba kebeles) are producing floriculture [12].

2.2 Research Design

The research design undertaken in this study was cross-sectional survey research design. The researcher was decided to use this research design because; the data required for this study were collected in a single period of time. The data required for this study were collected between January 25/2017 to February 27/2017.

2.3 Source of data

In order to realize the objective of the study, the researcher was used both primary and secondary data sources. The primary data was collected from primary data sources using questionnaire, interview and personal observation. The Secondary source of data was published and unpublished documents, official reports, books, manuals and journal reports.

2.4 Sample size and sampling techniques

One of the towns of special zone of Oromia regional state surrounding Finfinne, Holeta town, is the focus of this study. The reason why towns of special zone of Oromia regional state surrounding Finfinne was selected due to numerous industries of floriculture are found. In the Holeta town, there are clustered productions of floriculture industries (9 companies of floriculture industries). From the total number of companies of floriculture industries (9), three (3) companies of the floriculture industries: Ethio-Agriceft, Hansa Flower and Agriflora company of floriculture industries were selected through simple random sampling. This method is preferable to give an equal chance for all companies of floriculture industries exist in the Holeta town.

According to Yamane's formula (1967) as cited by Teketel F. (2015), by using a calculation of sample size determination, for a 95% confidence level and e = 0.05, size of the sample should be $n=N/1+N\ (e^2)$, where N is the population size and "e" is the level of precision [14]. Accordingly, from the selected three floriculture industries with a total of 975 workers, the number of samples (n) = $975/1+975\ (0.05)^2$ =283 workers were selected as the sampled of respondents. Then, the stratified sampling method was used, to select workers from each department of the floriculture industries. There are four subdivisions of work branch in the company of floriculture such as; green house, pack house, spraying and irrigation. Accordingly, the total number of sample respondents was selected proportionally from each company floriculture industry in line with their total number of workers and with their subdivision of working type they have. Then, the simple random sampling method was used to select the sample respondents from each four subdivision of three companies of floriculture. In order to use this method, the research took the list of workers from each company of floriculture industries and finally sample was selected using the lottery method. Although the researcher plays efforts to collect the questionnaires from all respondents, 9 respondents don't return back the questionnaires and 4 workers were filled only partial (incomplete) of questionnaire. Hence, for only 270 workers who have filled and returned back the questionnaires, the analysis was done.

Table 2.1: The number respondents those selected from each company of floriculture industries

No	Floriculture companies	Total No. Workers in the company	No. sampled respondents selected
1	Ethio-Agriceft	352	95
2	Hansa	309	90
3	Agriflora	314	85
4	Total	975	270

Additionally, for key informant interview, three managers from sampled floriculture industries, one manager from of environmental and forest protection office of Holeta town and two managers from health center of Holeta town (one from government clinic and one from private clinic). For the purpose of case study, six workers (two workers from each sampled company of floriculture industries) of sampled workers of floriculture industries were selected purposefully based on their experience and position in the production process.

Generally, 282 respondents were selected for this study.

2.5 Methods and Instrument of Data Collection

For this study, the following data collection methods were undertaken.

2.5.1 Survey questionnaires

To gather data for this study, questionnaire was applied for the sampled workers of floriculture industries. Accordingly, the questionnaire was conducted for 270 workers (employees) of floriculture industries by using both close and open ended questionnaires**.** The questionnaires were prepared in English first and then translated into the local language. In order to this, three enumerators were employed.

2.5.2 Key informant Interview

Interviewees were selected purposively from outside of the sampled respondents with individuals who expected to have information about the area of the study. Accordingly, the researcher conducted semi-structured interview checklist for three managers of sampled floriculture industries (either head manager or vice manager) and with a manager of Holeta's environmental protection office and two managers from the health center of Holeta town were selected for interview. The tools employed in the interview were camera and notebook to record their sound and to take a note.

2.5.3 Case Study

The case studies of individual workers were purposively selected from the selected company of floriculture industries. They were selected based on their experience in the company, to get available information in detail. Hence, six respondents (which were two of the respondents from each selected company of floriculture industries) were selected. The information was gathered through interviews.

2.6 Data analysis and Presentation

Data obtained from the sample respondents using different methods were analyzed by employing both quantitative and qualitative techniques. Therefore, data collected from the sample respondents using questionnaire were analyzed quantitatively by using Statistical Packages for Social Science (SPSS) version 20. Data gathered using questionnaires was sets by using percentage and frequency. Pearson chi-square test was used to show the significance of the independent variables with the dependent variable. The primary sources of data like interviews, case studies were analyzed by narrative form. Finally, the analyzed data were presented in the form of tables, figures and texts.

3. Results and Discussion

3.1 Introduction

This chapter is devoted to the results of this empirical study on assessing the effects of floriculture industries on the health of workers in Holeta town. In order to answer the objectives of the study, analyses were followed. Accordingly, at the first part of this section, the description of the respondents who took part in the study and associated factors related to the study were examined. Cross-tabulations and inferential statistical analyses were done to gain a better idea of the relationships between dependent and independent variables. Finally, the results were presented and reported by means of tables, graphs and verbal narrations.

3.2 Socio- demographic description of the respondents

In the table 3.1 the socio-demographic cross tabulation analysis result of the three targeted companies of floriculture industries were done.

According to below table 3.1, the number of female workers in the overall three floriculture companies were 230 (85.19%) and only 40 (14.8%) of workers were male respondents. According to study done by several researchers, the majority of workers of floriculture were female workers. Because, female workers are preferable in the production of floriculture

industries for caring for flowers, packing, picking rather than male workers [6]. For instance, in the studies that were done by Tigist (2007), Dagnachew (2014) and Workineh (2007), the majority of total workers were female workers in the floriculture industries [15, and 16]. However, according to study done by Watts (2012), children and women are more vulnerable to the effects of pesticides of floriculture industries [17].

Table 3.1: Socio-demographic Characteristics of the Respondents with their Respective Floriculture Companies

Socio-demographic Variables		Name of company			
		Agriflora flower company N= 83	Hansa flower company N= 91	Ethio- Agriceft flower company N= 96	Total N=270
		Percent	Percent	Percent	Percent
Sex	Male	4.1	5.5	5.2	14.8
	Female	26.7	28.1	30.4	85.2
Educational level	Cannot read and write	18.2	10.4	12.6	41.1
	Grade 1-4	4.1	4.8	8.2	17
	Grade 5-8	4.1	9.6	8.9	22.6
	Grade 9-12	4.1	7.4	5.2	16.7
	Diploma	0.4	1.5	0.7	2.6
	Degree	0	0	0	0
Marital status	Married	18.9	9.6	13	41.5
	Unmarried	7.4	18.9	17	43.3
	Divorced	2.6	3.7	4.1	10.4
	Widowed	1.9	1.5	1.5	4.8
Number of Children	None	11.5	20.4	27.8	59.6
	1-4	15.2	11.1	5.9	32.2
	5-8	3.3	2.2	1.8	7.4
	>9	0.7	0	0	0.7
Monthly Salary of the Respondents	500-700	11.1	8.2	3	22.2
	701-900	18.2	24.8	11.5	54.4
	901-1100	1.5	0.7	19.3	21.5
	>1101	0	0	1.8	1.8

Source; Field survey, 2017

According to above table 3.1, majority (43.3%) of the workers of these companies were unmarried and followed by married workers or 112 (41.5%) and many of them have a children. For the workers who either divorced or widowed with their children, the income earned from the company of floriculture industries was not enough to fulfill their basic needs.

Besides to this, more than half (62.8%) of the respondents were below grade 4 and who cannot read and write. There are a very small number of workers of diploma holders and almost none worker of degree holders and above according to indicate in table3:1. For this reason, their awareness on the effects of chemicals and defending for their right is expected to be lower. Similarly, according to Dagynatu's study in 2012 confirmed that, the majority of workers were unskilled labor. Also, according to the study done by Workineh (2014), the majority (70%) of the workers of floriculture industries were uneducated (cannot read and write) [18].

On the salary of workers in table 3.1 revealed that, 147of the workers (above 50%) of sampled respondents' salary was in the range of between 701 to 900 Ethiopian Birr (ETB) and 22% of sampled respondents' salary was between 501 to 700 ETB and a few numbers of respondents paid above 1100 ETB. The salary received by a small number of the sampled respondents was above 1100 ETB while the large number of sampled respondents was earn between 701-900 ETB monthly. According to this study, the workers of floriculture industries were earn between 26 to 35 ETB per day. Majority of respondents were not satisfied with their paid salary because; this payment does not enough to buy PPEs and milk in order to mitigate the effect of chemicals. Similarly, according to study done in Uganda (NAPE, 2012), the payment for the workers of floriculture industries was too little in comparison with the safety of work and the economic situation in Uganda [20]. Other study done in Ethiopia (Tigist, 2007) also confirmed that, the amount of salaries' received by the workers of floriculture industry is very low when it compared with their efforts (e.g. Picking and packing flowers require workers to stand the whole day) [6].

3.3 Description of the Participants in relation to their Specific jobs

Under this subtitle, the workers' role in the specific work division, the time of working in their company and the workers' year of service in the company of floriculture industry were discussed as follows.

Table 3.2: Frequency distribution of employees in terms of job related across companies

Source		Ethio Agriceft flower company	Hansa flower company	Agriflora Company	Total
		Percent	Percent	Percent	Percent
Specific Job position	Sprayers	1.8	1.8	2.2	5.9
	Green house workers	24.1	25.9	22.6	72.6
	Irrigation workers	3.3	1.8	3	8.2
	Pack house workers	5.9	3.7	3.7	13.3
Service Year	<2years	18.5	31.9	22.2	72.6
	2-4years	5.9	1.1	6.7	13.7
	>4years-6years	3.7	0.4	3.3	7.4
	>6years-8years	0.7	0	1.5	2.2
	>8years	1.8	0.4	1.8	4.1
Working hour length	12 or more hours	8.5	8.9	9.3	26.7
	9-12 hours	2.2	1.1	1.8	5.2
	8 hours	18.9	23.7	24.1	66.7
	4-7 hours	1.1	0	0.4	1.5
	Less than 4 hours	0	0	0	0

Source; Field survey, 2017

In company of floriculture industries, workers are categorized as their work position such like, workers of greenhouse, workers of pack house, workers of irrigation and sprayers (from managers of floriculture companies). According to Dagnachew's study in 2014, the work position is the major factor which determines the health of floriculture industries' workers [15]. According to show in table 3.2, 212 (78.5%) of the respondents were working in the two highly chemical exposing positions and high temperature area that has a synergistic effect on the health of workers, namely-workers of greenhouse 196 (72.6%) and spraying chemical 16 (5.9%). Similarly, according to a study done by Tigist (2007), even though all the working conditions in floriculture industries affect the health of workers, the majority of workers engaged their work in the greenhouse and spraying [6].

In terms of the year of service in the company of floriculture industries, 196 (72.6%) of the respondents have stayed in the working for less than 2 years. On the other hand, only 11 (4.1%) of the respondents were served for more than 8 years. However, staying long period of time in the company of floriculture industries is expected to be a high in health problems. Sixty six percent of the workers in all the three companies has worked for 8 hours daily based on their daily working hours, but a significant number of respondents 86 (26.66%) work for more than 8 hours daily especially during the time of holly day such as valentine and Christmas day. Similarly, according to a study done by Tigist (2007), the unfairness of the payment and underpaying for their workers are there in the company of floriculture industries [6].

3.4 Provision of personal protective equipments in floriculture companies

Under this, availability of personal protective equipments (PPEs), quality of PPEs and types of PPEs provided for workers of floriculture industries were discussed.

As the type and number of the PPEs available in their respective companies, the overall response of the participants ranges from "*almost none*" to "*moderate*" levels. There were 86 (32%) of workers floriculture industries who were working without any personal protective equipment (PPEs) and 111 (41%) of employees were got some amount of PPEs and there was no employee who got enough PPEs from the overall three companies of floriculture industries.

However, overall responses on the quality aspects of the already available PPEs in their respective companies ranges from *"very poor"* to *"higher"* levels, though the number of respondents who said "*high"* are only 14 (5%), because they are using masks that used for a long period of time, tore and very old PPEs. Similarly, according to study done by Anteneh (2013) in the Rift Valley of Ethiopia was same to this finding regarding to PPEs. He stated that, employees of floriculture industries either not wearing or wearing defective PPEs, which absorb chemicals or retain heat and are very uncomfortable [20]. The study done by Alli (2008) also confirmed that, regarding to the quality of PPEs, the equipments provided for workers sometimes heavy, cumbersome and uncomfortable and restrict workers movement [21].

Case study 1: Opinion of worker on provision of PPEs

This case study was gathered from 46 years old female worker of Agriflora floriculture industry. She told me that, her assignment was working in the greenhouse. She said to me that, "I have been working for 8 years in the company of Agriflora. However, until now, I have never seen PPEs even by my eye". Occasionally, the provision of partial PPE was annually on Valentine day. She noted that, they are forced to enter to greenhouse as soon as the chemicals sprayed. Then, the chemicals absorbed by their skin and inhaled through their mouth and nose. After a time the chemicals starting injuring her skin, body and now both her leg and hand are painful. She told me that, "When I have told the problem to the management body of the company, they were replying my questions as I am joking by saying that the cause of your pain is not in our company and this company does not have negative effect". However, the reality is not as they said. My skin has been already changed. The thorn injects our skin and tearing our clothes daily. The informant added her view that "I am worrying about my tomorrow's life; the effects of chemicals will have long lasting effect on my body".

3.4.1 The types of personal protective equipments being used

As indicated in table 3.2, there were several employees were employed without any personal protective equipment. On the other hand, there are also some provisions of personal protective equipments provided for workers of floriculture industries.

Table 3.3: Types of available PPEs provided for workers of floriculture

Types of personal protective equipments	No of respondents	Percent
Gloves	30	11.1
Boot	8	2.96
Gown	28	10.4
Glove and gown	82	30.4
Glove, gown and boot	30	11.1
Glove and boot	7	2.6
Not have PPEs	86	32.0
Total	270	100.00

Source; Field survey, 2017

Among some distribution of PPEs, 32% of workers of floriculture industries were working without any personal protective equipment, 30.4% of workers have glove and gown, 11% of workers have only gown, 11% of sampled workers have only glove, gown and boot, 3% of workers have only boots and 2.6 % of sampled workers have glove and boot. Regarding to the provision of PPEs in the company, the researcher was obtained interview with sampled company's (farm) managers of Floriculture Companies. Accordingly, the data generated from the manager of Agriflora floriculture industry stated that, in their company they are using chemicals which have no more effects on the health of workers. According to him, "*even though they were working without PPE, the effects of chemicals do not have more power to injure the body of workers except the thorn injects their hand sometime"*. The manager assured me as the owner of the company promised to provide PPEs and to fulfill the most essential facilities (drinking water, shower and toilet). According to the manager of Hansa floriculture industry, PPEs were provided in their company, but the workers do not want to wear the PPEs provided. However, the workers were blamed them by saying "*PPEs were uncomfortable to work and it is worn out*" (see case study 2).

Case study 2: Opinion of workers on quality of PPEs

This is about a 24 years old man who was working in the Hansa flower Company. His task was spraying chemicals. He said that, "I provided old and torn PPEs; especially my mask has no filtration materials, the spray suit is not designed for sprayer; it cannot protect liquid materials or chemicals leaking from the sprayer to his body, due to the low quality of PPEs the chemicals are absorbed into his body easily. This exposed him for sneezing, vomiting and headache disease frequently".

3.5 Provision of necessary facilities in the companies of floriculture industry

3.5.1 Provision of Sanitation Services

In table 3.4 shown that, the accesses of clean drinking water, shower service and toilet services were discussed with respective company of floriculture industries in Holeta town.

Table 3.4: Accesses to sanitation services in the respective companies of floriculture

		Access to clean drinking water		Access to shower service		Access to toilet service	
		Count	Percent	Count	Percent	Count	Percent
Responses of workers	None	30	11	189	70	0	0
	Poor	95	35.2	58	21.5	136	50.4
	Fair	122	45.2	16	5.9	99	36.7
	Good	21	7.80	6	2.2	23	8.5
	Very good	2	0.7	1	0.4	12	4.4
	Total	270	100	270	100	270	100

Source; Field survey, 2017

As indicated in above table 3.4, regarding to the provision of clean drinking water, the responses of workers was rated from none to very good. However, the majority (45%) of the workers said that the provision of clean drinking water in their company rated as fair, 35% of workers stated that the provision was poor, 11% of workers blamed the company by the lack of provision of drinking water and a small number of workers said that, the provision of clean drinking water was good. Similarly, according to studies done by Mulugeta (2009) and Tewodros (2010) confirmed that, the provision of necessary facilities for workers in the Ethiopian floriculture industry were inadequate [23and 24].

According to indicated in above table 3.4, majority (70%) of workers cannot take opportunity of using shower service, whereas 22% of them were can use the shower service, but they were rated as the service was poor. Regarding to the provision of toilet service, in overall the three companies have provided the service of toilet, but 50% of workers rated the service as poor, 36% of the workers rated the service as fair, 8.5% and 4% of workers rated the service of toilet in their company as good and very good respectively. This study revealed that, the provision of toilet facility was available in respective company of floriculture industries except it's blamed by its quality. There was no available quality of drinking water in their company. In order to this, the workers are mandate to drink contaminated water due to unavailable provision of clean drinking water (see case study 3). According to the key informant interview with Holeta town environment and forest protection authority's head, their office wrote warning letters to the floriculture companies as they providing and fulfilling PPEs, necessary facilities. However, some of the floriculture companies did not fulfill PPEs and provide necessary equipments and services to their employees until now. Similarly, the study done by Tigist (2007) showed that, there was under supplied with basic facilities like shower, washing facilities and free medical services. Access of shower service was very difficult for the workers who particularly work for 8 or more hours with the temperature in the greenhouse ranging up to 37 or even more degree Celsius [11].

Case study 3: Opinion of worker on sanitation services in floriculture industries

This is about a 29 years old woman who was working in the greenhouse of the Hansa Floriculture Company. She said that, "Always when I return back to my home the smell of chemicals remained with me due to absence of PPE that would ashamed of me to greet people due to the pungent smell until I had to have shower and change my working clothes. Most of the time, we are forced to enter the green house as soon as the chemicals are spraying or immediately after the spraying completed. Unavailability of toilet in the farm was a serious problem. Workers are forced to urinate everywhere in the company's compound. One of the problems in our company is an absence of clean water supply that we are forced to drink unsafe water". According to the woman's point of view, she had faced many risky circumstances of the impacts of pesticides and other floriculture chemicals because of this; they were repeatedly exposed to typhoid and other forms of water born diseases. She adds her views that "Our Company is working only on increasing profit by compromising employees' health. We are poor and marginalized even to exercise our legal rights. No one government body enforced the company to implement a common code of conduct".

3.5.1.1 Quality of sanitation facilities

Regarding to the quality of the provided facilities in the company of floriculture industries in figure 3.3 revealed that, 53% of the workers stated, the quality of the sanitation service was low, 27% was stated as good, 15% was stated as very low quality and only 4% was stated as very good quality. According to study by Tigist (2007), the absence of toilet facilities, clean drinking water and shower with the presence of high temperature in the greenhouses create harmful effects on workers' health [6].

3.5.2 Access to health services

3.5.2.1 Access to first aid

According to figure 3.4 revealed that, above sixty percent of workers said that, there was no any first aid service in their company. Whereas, 37% of the workers stated that, the service of first aid is there in their company but they give service occasionally and a few numbers of workers agreed that the service of fist aid has been usually there in their company. One respondent stated that *"In the company of floriculture industries there was no more care for workers. Even if you are failed in the company, there is no person who considers you. To defend our right, the workers association is essential however, in the company of floriculture workers union is forbidden" (see case study 4).* Similarly, according to study by

Mlynska et al.(2015), association of workers in the company of flower industries is violated both directly and indirectly [25].

Case study 4: Workers' Perception on service of first aid

This case study is about 32 years' old female workers of Ethio-Agriceft floriculture industries in Holeta town. Her task is in the green house. According to she told me that, there is no first aid service in their company when the workers faced with health problem. She stated that, "if you have get permission from our supervisor, my co-workers or my relatives can help you by ceasing the work, but if it is not, you try to either sleep at the work place until the workers are released from the work or try to move to your home if you can. Once time when I was pained for the reasons of smell of chemicals in green house, I have slept near to the green house until the workers were released from the work. There was no service of first aids. No one was reminding me in that place from management body of company. There was no work association in our company to improve this difficult situation and to raise such like problems related with work. By the effects of floriculture I am no confidence of free from other health problems. There is no service chemical check up, for the seek knowing my health condition. Not only am I, but also all of the workers fear to raise their problems related with work".

3.5.2.2 Access to medical service

According to figure 3.5 revealed that, the majority or sixty percent of workers were stated that the provision of medical service was very little, 31% of workers were rated as moderate and the number of workers who said the service of medical provision was none and good were very low. Even though, the health problems of floriculture industries are occurred obviously on the workers as stated in table 3.7, the companies isn't give available medical service unless its thereby name only to show their existence of fulfill facilities. However, in fact, there is unavailable medical service provision in their company (see case study 6). Although the provision of medical service was available in the three selected companies of the floriculture industry, there was no medical service they obtained. Even they didn't have permission to go to the clinic at the time when they are sick within working hours (see case study 4).

3.5.3 Provision of Training and Instructions for the Employees

Among different factors, training is a major factor to reduce or increase the effect of any work related problems. However, according to data revealed in table 3.5, almost a majority (81%) of workers respondent of floriculture industries didn't take any work related training, whereas, only 2% of workers were got training. The workers who get the training and not get training have not equal chance to face with health problems related with their work (see case study 5).

In contrast, other research done by Tizita (2014) in Sebeta and Rift valley stated that, the companies of floriculture industries provide job related training for employees as they start working in the company. According that study to the training was given to the employees for one week up to a month [7].

Table 3.5: Provision of training for employees

Provision of training before workers starting work	No of respondents	Percent
a. Very Rarely	45	16.7
b. Rarely	219	81.1
c. Sometimes	5	1.9
d. Most of the time	1	.4
Total	270	100.0

Source; Field survey, 2017

Case study 5: Opinion of workers on job related training and instructions

This case study is by 21years old male worker who was working in the irrigation department of the Ethio Agriceft Company. According to his view, he was hired before 2 months in the company. When he started working in the company, he did not get any job related training. Due to this, he didn't know how to the danger of pesticides and other dangerous of floriculture chemicals even he contacts chemicals daily. The informant said that, "even I don't know what PPEs are and how using PPEs if there. Due to the precautionary measure are not given for us, one day the chemical dropped on my hand. Thereafter, I am unhealthy occasionally. Our company wants to increase only its profit rather thinks about the health of its workers in comparison with the profit. No one gives attention to our problem, including the government sectors. The informant also said that, "in addition to the harsh work condition, our wage is very poor. I am worried about my future condition due to the impact of chemicals on my health situation, because floriculture chemicals are said have persisted and have collective effect".

3.6 The Effects of Chemicals on the Health of Workers

On the effects of chemicals on employees of floriculture industries, there are different data sets were collected for the study.

3.6.1 The Safeness of floriculture industries' work environment

According to figure 3.6 revealed that, the majority or above fifty percent of workers observed that the work environment of floriculture Company was risky, twenty five percent of workers were observed as normal, fourteen percent of workers were observed as highly risky and only ten percent workers were observed as the work environment of floriculture industries was safe. Similarly, according to Mulugeta (2009), in the environment of floriculture activities are producing different types of waste ranging from hazardous to non-hazardous. The empty chemical containers (fertilizers and pesticides) and outdated chemicals are the major concerned wastes disposals released from floriculture industries [22].

3.6.2 The types of health problems that faced workers of floriculture industries

In the next table 3.6, the workers faced with health problems related to the floriculture industries and the health problem which the workers of floriculture faced were presented.

Table 3.6: Frequency of health problem and types of health problem

Have you faced a health problem since you started working in floriculture industries?	Frequency	Percent
Yes	186	69
No	84	31
Total	270	100.0
Types of health problems with the workers faced		
Skin disease	42	15.6
Headache	62	23
Intestinal disease	13	4.8
Neurologic	1	0.4
Skin disease and headache	54	20
Headache, Skin and intestinal diseases	10	3.7
Skin diseases and neurologic	2	0.7
Skin disease and birth defect	2	0.7
Not being sick	84	31.1
Total	270	100.0

Source; Field survey, 2017

As indicated in table 3.6, 69% of the workers were faced health problems since they were starting to work in floriculture industries and only 31 %of workers were free from any job related health problems. Among the sampled respondents who faced work related health problem, 23% of the workers had headache, 20% faced with both skin diseases and headache, 15.6% of the workers faced skin diseases, 4.8% intestinal disease, 3.7% of workers faced intestinal diseases, headache and intestinal disease, 1% of workers faced with skin disease and birth defect and 1% of sampled workers faced skin diseases and neurologic diseases. Similarly, according to a study done by Dagnachew (2014) in East Shewa of Ethiopia, 90.6% of the workers of floriculture industries had at least one sign and symptom of work related health problems developed after they joined their current work. According to him, among the workers who, faced with health problem after they join the work, the majority of workers had faced at least one symptom of musculoskeletal health and skin problem respectively [15].

3.6.3 The View of Physicians on Health of Workers

In order to identify the common diseases, their causes and symptoms of diseases the workers in floriculture industries faced, the key informant interview from Holeta health center and one private clinic were surveyed. Because the employees of the three selected companies are commonly diagnosed at these two health centers. According to the manager of Holeta health center, per day about 90% of patients were getting services from floriculture industries (from Hansa and Ethio-Agriceft). Additionally, the Doctor of the private clinic center (who serves the workers of Agriflora floriculture industry) added his views that, even though the numbers of workers' patients was not more in number as other patients from different places, a number of workers of Agriflora Company were coming daily. According to both the government and private clinic center's managers interview, the workers in floriculture industries were exposed to different kinds of diseases with the symptoms of headache, skin disease, constipation, vomiting, diarrhea, intestinal disease, backbone disease, blood pressure, amoeba, kidney disease, body scrambling, fatigue and stomach diseases were some of the diseases which the workers of floriculture industries faced. As per their diagnosis: headache, kidney disease, skin allergies, backbone disease, blood pressure, amoeba and typhoid were the common diseases which the workers of floriculture industries regularly faced.

According to one respondent stated in case two that, the causes of the health problems inferred were due to the effects of chemicals, the absence of clean drinking water (they are drinking contaminated water) and the unavailability of shower services in their company of floriculture industries.

Case study 6: Opinion of employee on chemical effects of floriculture industry

This is about a 38 year-old man sprayer who was working in the Agriflora Company. He has 6 years working experience in that floriculture industry. According to him, he cannot read and write and he is the father of 4 children. The informant told me that, "there are no available PPEs in their company and working (spraying) without PPEs. The issue amazes me more, when we raise our problem to the supervisor or the manger, they promised us to fulfill essential facilities and PPEs. After a time nobody was reminding us. Even when controller or government body come, the owner (manager) of the company shifts us (hide us, as we don't raise our problem. We cannot raise our problems freely (we don't have right to raise our problems). To those people who have direct contact with chemicals daily: soap, shower, milk and other provisions are essential, but no one of them was available in our company. Once a time when I had sprayed with worn out PPEs (glove and spray suits), the chemical was dropped on my leg and touched my hands. Now, I am exposed to skin pain. I have tried so much to find a solution for this problem, but still I haven't had. I am in tensions due to this disease. I am working in this risk full job because; I don't have the option to fulfill my basic family needs including education opportunity of my children. It is a must pass through the danger of floriculture chemicals until any other opportunity is available".

3.7 Significant Levels of Independent variables on Dependent variable

Under this the Chi-Square statistical analysis carried out to see which of the variables in the sets of variables significantly influence the health status or health problem of the respondents. Accordingly, on the next table the frequency of health problem and the quality of personal equipments and its significance were presented as follows.

Table 3.7: Frequency of health problem and quality of personal protective equipments being used

Frequency of health problem	Quality Personal protective equipment being used									
	Very low		Low		Moderate		High		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Always	7	2.6	8	3	1	0.4	0	-	16	6
Many times	14	5.2	23	8.5	7	2.6	2	0.7	46	17
Sometimes	30	11	56	20.7	24	8.9	5	1.8	115	42.6
Very few times	9	3.3	22	8	29	10.7	2	0.7	62	23
Not being sick	11	4	11	4	4	1.5	5	1.8	31	11.5
Total	71	26.3	120	44	65	24	14	5.2	270	

Significance level of quality of personal protective equipment on frequency of health problems

Pearson Chi-Square (X^2)	Value	Df	Asymp. Sig. (2-sided)
	36.646[a]	12	.000

Source; Field survey, 2017

As above table 3.7, in relation to the provision of PPEs, as one of the independent variable on the health of workers having exposure to chemicals, both the quantity and quality parameters of the PPEs in the companies were analyzed. They were analyzed to check their significance level against the reported response of the participants on their health status. However, only the response on *quality* parameter was found to have a significant difference in the responses of the participants on one of the health status indicators i.e., *"frequency of health problem"* of the respondents as indicated in table 3. 7.

Hence, as the Pearson Chi-Square value (P-value) is 0.000, it can be interpreted that the relationship between quality of personal protective equipment respondents' use and the frequency of health problems they face was highly significant that could be true and probable to the overall study population.

Table 3.8: Frequency of Health Problem and Access to clean water

Frequency of health problem	Access to clean water											
	None		Poor		Good		Very good		Excellent		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Always	3	1	8	3	5	1.8	0	-	0	-	16	6
Many times	9	3.3	22	8	13	4.8	2	0.7	0	-	46	17
Sometimes	12	4.4	51	19	50	18	2	0.7	0	-	115	42.6
Very few times	5	1.8	11	4	41	15	5	1.8	0	-	62	23
Not being sick	1	0.4	3	1	13	4.8	12	4.4	2	0.7	31	11.5
Total	30	11	95	35	122	45	21	7.8	2	0.7	270	

Significance level of access to clean water and frequency of health problems

X^2	Value	Df	Asymp. Sig. (2-sided)
	93.686[a]	16	.000

Source; Field survey, 2017

As indicated in table 3.8, the access to clean water in targeted companies rated from none to excellent. However, the majority (45%) of employees' response was rated as good, 35% of the workers stated that the access of clean drinking water was rated as poor, whereas a small number (0.7%) of workers rated as excellent. In other hand, the frequency of the health problems of the employees is rated from always sick to rarely sick. The majority (42%) of workers were exposed to health problems sometimes, whereas, a few (11%) of workers were not being sick after they join the company of floriculture industries.

Among the sanitation service category of health predictors considered, the variable "access to clean water" showed a significant difference on the health status indicator variables. Accordingly the value of chi-square shown that, the access to clean water is significant difference on the "frequency of health problems on the different body parts" with $P<0.05$ which is 0.000 as displayed on table 3.8. Therefore, this result of chi-square value can be interpreted that, the relationship between the independent variable (access to clean water) and the frequency of health problems they face was highly significant.

4. Conclusion and Recommendations

Under this chapter conclusion of major findings and set recommendations are presented. It is believed that, this research added original and valuable information to the effects of floriculture industries on the health of workers.

4.1 Conclusion

Based on the analysis made, the 78.5% of the workers are engaged in the highly chemical exposing positions (spraying chemical and working in the greenhouse). Regarding to the provision of PPEs in the floriculture companies, there is a significant level of difference among the companies. On the other hand, access to clean water for sanitation and drinking, access to medical, shower and toilet services have been critical challenges for employees. However, unquestionably these facilities are very essential services those have to be fulfilled to reduce the risks of chemicals. Among these health predictors considered only the variable access to clean water shows significant difference on the health status indicator variable. The effects of chemicals were visibly observed on employees working in the floriculture companies. There were significant numbers of employees reported to have frequent health problems and who have experienced diverse health problems on their different body parts. The major causes of health problems in the company of floriculture industries were lack of PPEs, lack of clean water for sanitation and drinking, job position, unavailability of medical service, and toilet services. Due to these factors, the majority (69%) of workers of floriculture industries faced with at least one different health problem related to the work after they hired in the company. The workers of floriculture industries were exposed to different kinds of diseases such as headache, skin disease, constipation, vomiting, diarrhea, intestinal disease, backbone disease, blood pressure, ameba, kidney disease, fatigue, stomach diseases and etc. were some of the diseases which the workers of floriculture industries faced. As per their diagnosis, the physicians of Holeta health center were also confirmed the diseases stated above were the common diseases which the workers of floriculture industries regularly faced.

4.2 Recommendations

Based on the results of the study, the following recommendations were forwarded:-

Recommendations on the practical implications of the study

- ✓ The respective companies of floriculture industries have to give attention in securing available provision and quality of PPEs for their employees, especially for those working in such chemical exposing job positions as sprayer and greenhouse worker.
- ✓ The owners of floriculture companies have to provide the necessary services like shower, free medical service and first aid.
- ✓ Government authorities have to carry out frequent and sustainable monitoring of work environment.
- ✓ To fulfill the three pillars of sustainable development the government of Ethiopia has to take attention to the workers' health of floriculture industries.
- ✓ Employees have to formulate work associations that may give chance to raise their problems and they have to ask to be fulfilled the necessary services and facilities.

Recommendations for further research

✓ Similar empirical studies have to be carried out by other researchers in diverse geographical and socio-demographic contexts in Ethiopia to get more information on the impacts of floriculture industries.

As this study is restricted to the effects of floriculture industries on employees working in them, the environmental effect (soil, air and neighboring effects) of floriculture industries is the other research gap to be studied and solved.

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