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Original Research Article

Occurrence of occupational related diseases and risk factors among tea pickers and level of adoption of OHS programs in Kaboswo Tea Estate, Eldoret, Uasin-Gishu County, Kenya

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ABSTRACT

Background: Occupational hazards are threats to human health and well-being arising from workplace exposures that can lead to illness, injury, or death (Borgohain, 2013). Agriculture is considered one of the most dangerous sectors globally, regardless of age, due to the increased use of chemicals and motorized machinery, especially in developing countries. This has contributed to rising injury and poisoning rates among tea workers. Tea plucking, in particular, is physically demanding and often results in fatigue and musculoskeletal issues. Workers typically carry heavy baskets on their backs, concentrating weight on the neck and spine, often leading to severe back pain. This study aimed to identify occupational diseases associated with tea plucking in Kaboswo Tea Estate, Nandi Hills, Kenya.
Methods: A descriptive cross-sectional design was used with a population of 188 tea pickers. Seventeen questionnaires were distributed, ensuring equal representation. Data collection tools were tested for validity and reliability, then revised accordingly. Data were analyzed using SPSS for both descriptive (percentages, averages) and inferential statistics (regression, Pearson correlation).
Results: Respondents had an average age of 37 years. Commonly reported discomforts were in the shoulders (46.8%), ankles (47.3%), and fingers (38.5%). Musculoskeletal issues such as cold fingers (75.1%) and shoulder pain (54.4%) were prevalent. Few reported chronic symptoms.
Conclusions: Although musculoskeletal and respiratory issues exist, their prevalence is relatively low. Workers are aware of occupational health and safety (OHS) programs and actively implement them to reduce risk.

Keywords: Occurrence of occupational related diseases, Risk factors among tea pickers

INTRODUCTION

Occupational hazards are dangers to human health and wellbeing which are associated with specific occupations which may lead to illness, injury, or death. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards,[1] Agriculture is one of the most dangerous sectors in terms of occupational health and safety regardless of the age according to International Labor Organization's annual report. This was due to, among others, rise in the use of agricultural chemicals and motorized agricultural machinery recently in the developing countries, which has led to increased rates of injuries and poisoning among tea workers.[2] Tea plucking is a tedious and tough job, and can be very tiresome. There are a number of factors that makes it a tedious job and all of which can be better addressed by plantation management at tea estate. Since the workers carry heavy baskets, much weight is concentrated on their head and neck thus leading to severe back pain for many.[3]

Various organic allergens can be carriers of bacteria, molds, toxins and pesticides which transport them into the

respiratory tract thus causing serious lung difficulties. Gases used as pesticides and herbicides directly affect the workers by irritating the walls of respiratory tract thus provoking asthmatic reactions among people suffering from bronchial hyper-activity.[4] Work in the open expose's workers to rain, wind, cold, heat and ultraviolet radiation. These agents lead to a series of occupational health problems as well as causing absenteeism, low productivity, and a lowering of immunity leading to vulnerability to well-known disorders. Rain and cold may lead to respiratory infections and chilblains, which leave skin lesions liable to become infected. Exposure to the sun may cause burning that results from varying degrees of sunstroke.[5] The study sort to find out the incidence of musculoskeletal occupational related diseases among tea garden workers in Kaboswo tea estate in Nandi Hills, Nandi County, find out the incidence of respiratory occupational related diseases among tea garden workers in Kaboswo tea estate in Nandi Hills, Nandi County, find out the risk factors leading to occupational related diseases among tea garden workers in Kaboswo tea estate in Nandi Hills, Nandi County and to assess the level of adoption of occupational safety practices that can reduce occurrence of occupational related diseases among tea garden workers in Kaboswo tea estate in Nandi Hills, Nandi County.

METHODS

Study design and setting

The study adopted descriptive cross-sectional design methodology in Eldoret County, Kenya's to identify Occurrence of occupational related diseases and risk factors among tea pickers and level of adoption of OHS Programs in Kaboswo Tea Estate, Nandi Hills, Nandi County, Kenya. Study population was 188 tea pickers. The researcher distributed 17 questionnaires ensuring equal representation of all the tea garden workers. Then the researcher did validity and reliability test on the data collection tools. The study was conducted between the month of March and June 2021. The tool was revised accordingly, Yamane's formula was used to arrive at a sample size of 188 respondents. Then the researcher proceeded to collect data for the main study.

Statistical analysis

Descriptive statistics in SPSS, which was presented in percentages, averages, and frequencies, as well as interferential statistics like regression and Pearson correlation to analyze the quantitative data acquired by surveys.

Ethical consideration

Ethical Approval to carry out the research was sought from the Institutional Research and Ethics Committee (IREC) of the University of Eastern Africa, Baraton. Permission and authorization to carry out the research study were sought from both Chemundu Tea Estates and Kaboswo Tea Estates.

RESULTS

Most of the respondents averagely age 37years, and the middle age is 37years. The most appearing age is 37years. The minimum age is 20years while the maximum age is 51 years. Majority of the respondents were male (66%) and few females (34%). Most of the respondents had attained primary level (89.3%), high school (7.1%), college (0.6%) and those who never went to school were (3.0%). Most of the respondents had attained primary level (89.3%), high school (7.1%), college (0.6%) and those who never went to school were (3.0%). The average the respondents have worked in a day (8hrs), the middle time (8hrs), the most appearing mode (8hrs), minimum (8hrs) and maximum (8hrs) shows that most respondents pick the average weight of 44-46kgs of tea leaves per day. The minimum average that few people attain per day is average of 42-46kgs (1.2%). Most of the respondents do not do any other job apart from tea picking (89.3%).

Most of the respondents in this study do averagely pick tea of 44-46kgs per day as it is the estate rule for every worker to pick tea not less than 45kgs per day. With gradual increment in the load to be achieved, the strain level is found to be at high level and this will increase the chances of musculoskeletal disorders. However a study done at Assam, India had reported that the workers assume unnatural posture with a load of collecting basket as most of the workers had to fill 30kgs per day.[6]

In this study, most of the workers have ever done any other job before (54%). This might be those workers who never went to school so they have been moving from one job to another looking for better remunerations to sustain their families. It is also shown that many of the respondents are not engaging in any other work apart from tea picking (89.3%). This might be due to the strenuous work and tiresome work at the work place. However, a study done at Marangi tea estate had reported that all the surveyed female workers (88%) are leaf pickers while the rest (12%) are engaged in other activities. It also reported that all the surveyed male workers of Marangi tea estate, (70%) are leaf pickers and the rest (30%) are pesticide sprayers (Borgohain, 2013). From the table 4 above, shows that most of the respondents have experienced discomfort in the shoulder (46.8%), fingers (38.5%), ankle (47.3%), legs (32.0%), and wrist (17.8%). Some other respondents feel pain in the shoulder (1.2%), elbow (1.2%), wrist (1.2%), legs (1.8%), arm (0.6%), fingers (0.6%) and ankle (0.6%). Few respondents have experienced stiffness on the neck (0.6%), and movement limitation on the wrist and fingers, (0.6% and 1.2%) respectively. that most respondents have experienced musculoskeletal conditions like finger cold sensation (75.1%), pain in the arms (20.7%), pain in the wrist (22.5%), pain in the shoulder (54.4%) and lower back pain (8.3%) as it is shown in the Figure 1. Few respondents have experienced chilblains (0.6%).

Table 1: Demographic information.

	Mean	Median	Mode	Std. deviation	Variance	Range	Minimum	Maximum
Age in years	36.99	37.00	37.00	6.57	43.13	31.00	20.00	51.00

Table 2: Types of musculoskeletal symptoms experienced.

Type of musculoskeletal symptoms experienced	Discomfort, N (%)	Pain, N (%)	Stiffness, N (%)	Swelling	Movement limitation, N (%)
Neck	-	-	1 (0.6)	-	-
Shoulder	78 (46.2)	2 (1.2)	-	-	-
Arm	7 (4.1)	1 (0.6)	-	-	-
Elbow	23 (13.6)	2 (1.2)	-	-	-
Wrist	30 (17.8)	2 (1.2)	-	-	1 (0.6)
Fingers	65 (38.5)	1 (0.6)	-	-	2 (1.2)
Chest	4 (2.4)	-	-	-	-
Back	2 (1.2%)	-	-	-	-
Legs	54 (32.0)	3 (1.8)	-	-	-
Ankle	80 (47.3)	1 (0.6)	-	-	-
Sprain	6 (3.6)	-	-	-	-
Fractures	2 (1.2)	-	-	-	-

Table 3: Respondents' frequency of experiencing the musculoskeletal symptoms.

Musculo-skeletal symptom	Never	Everyday, N (%)	Once a week, N (%)	Monthly, N (%)	Once in 3 months, N (%)	Once in 6 months N (%)	Once a year, N (%)	More than a year, N (%)	Long before I came to pick, N (%)	Once in a while, N (%)
Neck	-	-	-	-	-	-	-	-	-	1 (0.6)
Shoulder	-	1 (0.6)	3 (1.8)	1 (0.6)	-	-	-	-	-	74 (48.3)
Arm	-	1 (0.6)	2 (1.2)	-	-	-	-	-	-	5 (3.0)
Elbow	-	1 (0.6)	2 (1.2)	1 (0.6%)	1 (0.6)	-	-	-	-	20 (11.8)
Wrist	-	2 (1.2)	4 (2.4)	-	-	-	-	-	-	27 (16.0)
Fingers	-	3 (1.8)	4 (2.4)	-	1 (0.6)	-	-	-	-	59 (34.9)
Chest	-	-	-	-	-	-	-	-	1 (0.6)	3 (1.8)
Back	-	-	1 (0.6)	-	-	-	-	-	-	1 (0.6)
Legs	-	3 (1.8)	3 (1.8)	1 (0.6)	-	-	-	-	-	50 (29.6)
Ankle	-	1 (0.6)	4 (2.4)	1 (0.6)	1 (0.6)	-	-	-	1 (0.6)	72 (42.6)
Sprain	-	-	-	-	-	-	-	-	4 (2.4)	2 (1.2)
Fractures	-	-	-	-	-	-	-	-	2 (1.2)	-

Table 4: Respondent's times of experiencing the musculoskeletal conditions.

Musculoskeletal conditions	While picking tea, N (%)	At the end of the day after picking tea, N (%)	When I rest between tea picking periods, N (%)	During weekends
Lower back pain	2 (1.2)	12 (7.1)	-	-
Pain in the shoulder	25 (14.8)	67 (39.6)	-	-
Pain in the neck	1 (0.6)	1 (0.6)	-	-
Pain in wrist	24 (14.2)	13 (7.7)	1 (0.6)	-
Pain in arms	18 (10.7)	16 (9.5)	1 (0.6)	-
Finger cold sensation	119 (70.4)	8 (4.7)	-	-
Chilblains	1 (0.6)	-	-	-
Chest pain	-	3 (1.8)	1 (0.6)	-

Table 5: Respondent's frequency of experiencing the musculoskeletal conditions.

Musculo-skeletal conditions	Never	Everyday, N (%)	Once a week, N (%)	Monthly, N (%)	Once in 3 months, N (%)	Once in 6 months, N (%)	Once a year, N (%)	More than a year, N (%)	Long before I came to pick tea, N (%)	Once a while, N (%)
Lower back pain	-	1 (0.6)	1 (0.6)	1 (0.6)	-	-	-	-	-	11 (6.5)
Pain in the shoulder	-	1 (0.6)	5 (3.0)	-	-	-	-	-	-	87 (51.5)
Pain in the neck	-	-	-	-	-	-	-	-	-	2 (1.2)
Pain in wrist	-	1 (0.6)	5 (3.0)	-	-	-	-	-	-	32 (18.9)
Pain in arms	-	1 (0.6)	2 (1.2)	-	-	-	-	-	-	32 (18.9)
Finger cold sensation	-	1 (0.6)	1 (0.6)	1 (0.6)	-	-	-	-	-	124 (73.4)
Chilblains	-	-	-	-	-	-	-	-	-	1 (0.6)
Chest pain	-	-	-	-	-	-	-	-	2 (1.2)	2 (1.2)

Table 6: Respondent's times of experiencing respiratory conditions.

Respiratory condition	While picking tea, N (%)	At the end of the day after picking tea, N (%)	When I rest between tea picking periods, N (%)	During weekends, N (%)
Nasal allergy	15 (8.9)	-	-	-
Allergic conjunctivitis	1 (0.6)	-	-	-
Asthmatic conditions	-	1 (0.6)	-	-
Chronic obstructive diseases	-	1 (0.6)	-	-
Tiredness	85 (50.3)	82 (48.5)	-	-
Allergic reactions	2 (1.2)	-	-	-
Dehydrating	46 (27.2)	-	-	-
Heat exhaustion	73 (43.2)	1 (0.6)	-	1 (0.6)
Dizziness	49 (29.0)	1 (0.6)	-	-

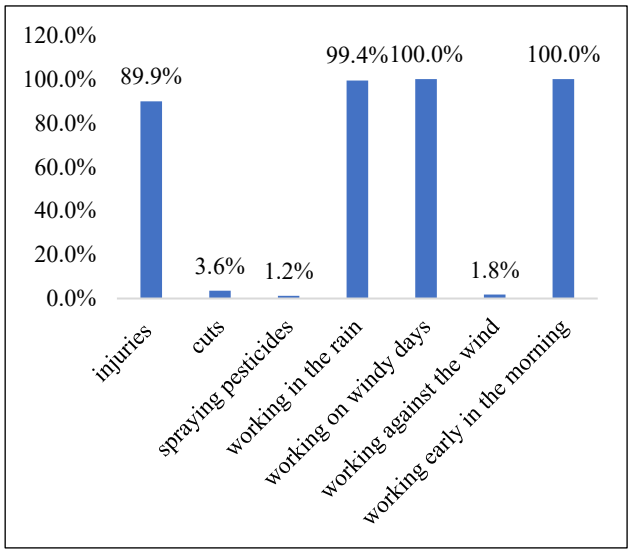

Figure 1: Respondents level of experience on other occupational conditions.

Most of the respondents have shown that it depends with the estate rules to stop picking tea when it rains (99.4%). All the respondents have shown that they don't change direction of the picking as per the wind direction, they neither work less hours on cold days nor on hot days and they neither have regular break periods nor have rest stations. All the respondents have also agreed that they are always allowed to take a sick off when they are sick, the estate pays when they get hurt while picking tea, the supervisor changes their activities, they are taking the tea to the shed after some picking time, they take breaks in between the tea picking, the use baskets provided by the estate and have health insurance. All the respondents have shown that they are not given seats in the tea sheds, they don't use any basket and they wear boots that they bought. They have also agreed that they wear mask, rain jackets, heavy protective clothing and they also shelter when it starts raining. Most of the respondents have also agreed that they position themselves against the wind and they also disagree that once through with one basket the owner takes to the shed and rest. Many of the respondents

have experienced injuries when rained on while picking tea (53.8%), working in the rain while picking tea (98.8%), working on windy days (89.3%) early in the morning and working early in the morning (100%). Few respondents have experienced conditions like cuts, spraying pesticides and working against the wind. Many of the respondents have experienced injuries when rained on while picking tea (53.8%), working in the rain while picking tea (98.8%), working on windy days (89.3%) early in the morning and working early in the morning (100%). Few respondents have experienced conditions like cuts, spraying pesticides and working against the wind.

Table 7: Respondent's frequency of experiencing respiratory conditions.

Respiratory condition	Never, N (%)	Everyday, N (%)	Once a week, N (%)	Monthly, N (%)	Once in 3 months, N (%)	Once in 6 months, N (%)	Once a year, N (%)	More than a year, N (%)	Long before I came to pick tea, N (%)	Once in a while, N (%)
Nasal allergy	-	-	-	-	-	-	-	-	2 (1.2)	13 (7.7)
Allergic conjunctivitis	-	-	-	-	-	-	-	-	1 (0.6)	-
Asthmatic conditions	-	-	-	-	-	-	-	-	1 (0.6)	-
Chronic obstructive diseases	-	-	-	-	-	-	-	-	1 (0.6)	-
Tiredness	-	97 (57.4)	3 (1.8)	-	-	-	-	-	-	67 (39.6)
Allergic reactions	-	-	-	-	1 (0.6)	-	-	-	-	1 (0.6)
Dehydrating	-	7 (4.1)	-	-	-	-	-	-	-	39 (23.1)
Heat exhaustion	-	43 (25.4)	-	-	-	-	-	-	-	32 (18.9)
Dizziness	-	41 (24.3)	-	-	-	-	-	-	-	9 (5.3)

Table 8: Respondent's circumstances for experiencing respiratory conditions.

Respiratory conditions	When rained on while picking tea during the day, N (%)	During spraying of tea farms, N (%)	After spraying of tea farms, N (%)	Early in the morning, N (%)	Late in the evening, N (%)	Late in the night, N (%)	When picking tea during sunny days, N (%)
Nasal allergy	13 (7.7)	-	-	2 (1.2)	-	-	-
Allergic conjunctivitis	-	-	-	1 (0.6)	-	-	-
Asthmatic conditions	1 (0.6)	-	-	-	-	-	-
Chronic obstructive diseases	1 (0.6)	-	-	-	-	-	-
Tiredness	19 (11.2)	1 (0.6)	–	1 (0.6)	142 (84.0)	2 (1.2)	2 (1.2)
Allergic reactions	1 (0.6)	-	-	1 (0.6)	-	-	-
Dehydrating	47 (27.8)	-	-	-	-	-	-
Heat exhaustion	74 (43.8)	-	-	-	-	-	-
Dizziness	49 (29.0)	-	-	-	-	-	-

Table 9: Respondent's experience on the risk factors existing in the workplace.

Working conditions	Always, N (%)	Never, N (%)	It depends on the estate rules, N (%)	It depends with the day, N (%)	It depends on the supervisor's decision, N (%)	It depends with the owner of the farm, N (%)
They stop us from picking tea when it rains	-	1 (0.6)	168 (99.4)	-	-	-
They change direction of tea picking as per the wind direction	169 (100)	-	-	-	-	-
We work less hours on cold days	-	169 (100)	-	-	-	-
We work less hours on hot days	-	169 (100)	-	-	-	-
We have regular break periods	-	169 (100)	-	-	-	-
We have rest stations	-	169 (100)	-	-	-	-
When sick you are allowed to take a sick off	169 (100)	-	-	-	-	-
The estate pays when you get hurt while picking tea	169 (100)	-	-	-	-	-
Seats have been provided in the tea sheds for workers to sit	-	169 (100)	-	-	-	-
The supervisor changes our activities	169 (100)	-	-	-	-	-
We can be taking the tea to the shed after some picking time	169 (100)	-	-	-	-	-
I take breaks in between the tea picking	169 (100)	-	-	-	-	-
We use baskets provided by the estates	169 (100)	-	-	-	-	-
We buy our own baskets according to my size and strength	-	169 (100)	-	-	-	-
We have health insurance for any accident or injury	169 (100)	–	-	-	-	-
We use any basket as long as it can carry more kilograms of leaves	-	169 (100)	-	-	-	-
I wear boots that are provided by the company	-	169 (100)	-	-	-	-
I buy my own boots	169 (100)	-	-	-	-	-
I wear a mask while picking tea	169 (100)	-	-	-	-	-
I wear heavy protective clothing against cold	169 (100)	-	-	-	-	-
I wear rain jackets	169 (100)	-	-	-	-	-
We shelter when it starts to rain	168 (99.4)	1 (0.6)	-	-	-	-
We continue picking tea while it rains	3 (1.8)	166 (98.2)	-	-	-	-
We position ourselves against the wind while picking tea	167 (98.8)	2 (1.2)	-	-	-	-
We just pick tea no matter the direction of the wind	169 (100)	-	-	-	-	-
There are persons who pick tea that is full and takes it to the shed	168 (99.4)	1 (0.6)	-	-	-	-
Once through with one basket the owner takes it to the shed and rests	-	169 (100)	-	-	-	-

DISCUSSION

Demographic information

The age of the workers in the tea estate seems to decrease drastically as from age 50 onwards. This could be attributed to the nature of the work they are doing and poor working conditions and so many young people from 20-37 years had a high turnover than the old. This study population is almost similar with study done in Esperanza Estate in Mulanje, Malawi among tea garden workers shows that age of the participants were in the range of 16-35 with a minor representation from the age ranges of 36 above (Phiri et al, 2011).

Most of the workers in tea estate were males (66%) and few females (34%). This could be attributed to the nature of work they are doing as it involves repetitive hand movement, standing for longer hours and environmental conditions in tea farms. Similarly, a study done in Esperanza Estate in Mulanje, Malawi among tea garden workers reported the highest population were male workers (71%) and female workers were 29%.[7]

Majority of the respondents were married (91.7%). This is because married people have many responsibilities of providing for their families thus tend to seek for employment, which gave rise to the high proportion of married people in this study population.

However, there were also single people in this study population (4.7%), who could be the ones who had either completed primary or secondary education and were after employment and thus had not settled down due to ensuring their financial stability before getting married or proceeding with their education. This finding concurs with a study among tea garden workers in India which had 82% married and 11% single workers.[8]

Musculoskeletal symptoms

Most of the respondents in this study have experienced the musculoskeletal symptoms once in a while. Few have experienced them in everyday basis, once a week, monthly, once in 3 months and long time before coming to pick tea. This indicates that many of the workers are still young and energetic and so they don't get tired easily and also the terrain of the land is not too steep for them. Also, their supervisors are not pressurizing them so the take their time and they do go for break when they feel tired. This is different from the study done at Tamil Nadu, which shows that the symptoms were reported during the plucking of leaves for long hours. It also shows that the duration of pain and stiffness varies and is mainly intermittent.[9]

Many of the respondents have experienced finger cold sensation while picking tea (70.4%), due to picking tea early in the morning when mist and dew is still there. Some respondents have experienced pain in the shoulder (39.6%) at the end of the day after picking tea, this is due to repetitive motion and continuous bending. However, according to the study for garden workers at Tamil Nadu, 83.6% of workers experience back pain every day. It also reported that the overall prevalence of work-related musculoskeletal symptoms was high in the past 12 months and 7 days prevalence highest in the shoulder and lower back pain respectively (Vasanth et al, 2015). Another study has shown that awkward wrist/ hand posture is a risk factor for the development of wrist disorders among tea leaf pickers especially when it combines with other factors such as long duration under force and repetitive movement.[10]

Occurrence respiratory diseases

The study shows that most of the workers get tired (98.8%) every day while picking tea and some get tired once in a while and late in the evening after picking tea. Its then followed by heat exhaustion (44.4%), dizziness (29.6%) and nasal allergy (8.9%). However, the surveyed tea garden workers of Hajua tea estate, India had reported facing some symptoms like; respiratory diseases (48.14%), headache (20.18%) and chest pain (6%).[11] Also, another study had reported that the prevalence of nasal allergy among the workers was about 11% and that of bronchial asthma was 8.3%. "Ebihara, described two patients working in a tea garden who had allergic symptom that was caused by airborne cilia from tea leaves".[12]

Risk factors leading to occupational related diseases

Workers at tea estate have experienced injuries (89.9%) while picking tea (90.5%). Many have experienced the condition once in a while when rained on while picking tea (53.8%) and some late in the evening (36.1%). This study concurs with a study done in Tamil Nadu among tea garden workers in India, in which it reported that 95% of the workers had experienced injuries in the workplace. It also states that the main source of injury was tea leaves (41%), followed by walking on uneven gardens (13%) and pesticides (11%).[13]

Moreover, another study done at Hajua and Marangi estate had reported that injury is the common among tea pickers, whereby plucking (48%) being the main activity related to cause more percentage of injury, followed by pruning (20%), walking on uneven surfaces leading to slips, sprains and falls (15%), pesticides spraying and cleaning of fields or weeding (7%).[14]

The supervisor changes their activities and thus reducing the musculoskeletal diseases arising from continuous repetitive movements. The workers take the tea to the tea shed when it is full. This helps in relieving them from the load they are carrying. The estate provides baskets of the same size to all the workers. On account of PPEs, the workers in this estate have shown that they wear mask to prevent the spread of covid-19, wear rain jackets or

shelter when it is raining and wear heavy protective clothing when the weather is bad.

Implementation of OHS programs

Workers in this study do take a break whenever they feel like. The breaks take 15 mins and it is only once during a tea picking session. The company doesn't allow the workers to take longer time in break and so most of them take the break during lunch time so that they can eat whatever they had packed for their lunch. Contrary, a study done in Tamil Nadu reports that out of 116 workers, 115 reported taking breaks during work. The duration of the break ranges from 10 minutes (one worker) and 30 minutes (20 workers), to 60 minutes (92 workers) and 90 minutes (2 workers).[15]

All the workers dress warmly when the weather is bad, have rain jackets, wear gumboots and aprons. This is the requirement as per the estate rule that each and every worker should adhere to the rule of putting their safety first. A study done at concurs with this study that continuous training of employees on OHS policy is important in the programs implementation and this help in reduction of occupational related diseases as well as injuries in the workplace.[16]

Moreover, all the workers in the estate have reported that gloves, gumboots, googles and heavy jackets are provided individually while apron is provided by the estate. The estate should provide gumboots and heavy jackets to the workers despite the fact that they are many. Similarly, the study done at Hajua and Marangi estate also advocates that the estate should provide clothing like masks, aprons, gumboots, gloves etc. it also advocates that the precautions should be taken while spraying tea farms so that the workers are not exposed to hazardous chemicals. Protection equipment such as goggles, chemical-resistant gloves, aprons, boots and respirators should be provided to sprayers.[17]

CONCLUSION

The incidence of musculoskeletal and respiratory diseases among Kaboswo tea estate workers appears to be low. Although numerous risk factors exist that could contribute to occupational illnesses, the workers are knowledgeable about occupational health and safety programs and actively implement them.

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