

Original Research Article

Occupational risk factors and associated stress level among coffee plantation workers of Kodagu District, Karnataka, India

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ABSTRACT

Background: Agricultural work is subject to the health risks inherent to a rural environment and at the same time to those deriving from the specific work process involved. This sector of activity being most unorganized, very little attention has been given to the occupational health problems. Coffee estate workers face many occupational risks

Methods: The sample size of the study was 340. The study was conducted from November 2021 to May 2022 in Kodagu district, Karnataka, India. A purposive sampling technique was used. Occupational health risks were measured using a self-constructed questionnaire. Perceived level of Stress level was assessed using Cohen's Perceived Stress Scale.

Results: Association of physical, chemical, mechanical and animal hazards with perceived stress level was found. Majority of the plantation workers experienced occupational risks, 15.58% workers experienced low stress, 27.35% workers experienced high stress and 57.05% workers experienced moderate stress. The results showed that there was no evidence to show the association between occupational risk factors and associated stress levels.

Conclusions: In the light of the results of the current study and answers to the research questions, it could be concluded that; more than half of the studied farmers were exposed to occupational injuries and hazards. Though more than three fourth of the coffee plantation workers experienced stress, there was no association between occupational risk factors and stress levels. Measures have to be taken to protect the workers from occupational hazards.

Keywords: Coffee plantation, Occupational hazards, Occupational safety, Stress level, Agriculture

INTRODUCTION

Agriculture is the pillar of the Indian economy. Agriculture is essential for the growth and development of the country. Agriculture can cause several risks affecting the agriculture workers. Occupational safety and health (OSH) is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment.¹ Since agricultural activities are

generally disorganised, agricultural workers' occupational health issues have received very little attention. Workers in agriculture may experience lung disorders and pulmonary diseases like farmer's lung and occupational asthma, hazardous dangers like chemical exposure and poisoning, injuries from machines and tools, insect and snake bites, and physical hazards like harsh weather and solar radiation.² The International Labour Organization (ILO) claims that the agriculture industry is the one that poses the greatest health risks worldwide. Exposure to the elements, close contact with living things, frequent use of chemicals and biological products, the use of pesticides, awkward working positions, and long hours are a few of

the health risks associated with agricultural employment.² Coffee is one of the largest traded products in the world after oil. India produces coffee at a seventh-place global ranking.⁵ The production of Robusta and Arabica coffees was 1,047 kg/ha & 478 kg/ha, respectively during the harvest season 2017-2018.³ These labourers of coffee plantations in Kodagu had come from the surrounding regions. As a result, even labourers who are not skilled have found work in the coffee plantations of Kodagu.⁴ Kodagu, which is also known by the name Coorg is the smallest district in Karnataka State. It is located in south-western Karnataka, on the Western Ghats of India. Kodagu has a land area of 4102 Sqkm. According to the 2001 census, the population of the district was 548561. Agriculture is the basic economic occupation in Kodagu. Most of the district's non-forest land is used for agriculture. Paddy fields along with Coffee and pepper agroforestry are found. Coffee is the most common plantation crop. Two varieties of coffees are grown; Robusta variety and Arabica variety.

Agriculture in Kodagu is affected by many issues like unskilled labourers and the lack of dependable labour, high transportation and high input costs. While occupational risk factors are one of the factors that may affect coffee production. The process involved in coffee farming is soil preparation, sowing and transplanting, irrigation, weeding, manuring, pruning, pesticide application, picking and field processing. Processing can be done in two methods: the dry method, and the wet method. The dry method involves more labour work. Coffee plantations usually require a large number of workers during the harvest season, between November and March. Therefore, seasonal labour is typically the norm.⁵ The medium plantation groups having 11-25 acres and small plantation groups having less than 10 acres were compared to understand the family labour supply for estate work and the results were insignificant. The total number of people working outside the plantation in a household was highest in the big groups, this was followed by small and medium-sized groups.

The number of full-time labourers was maximum in big coffee plantations, followed by the middle, and small plantation groups. The farm household reliance coefficient on the production of coffee as the primary occupation indicated that small and medium-sized coffee planters relied completely on coffee production, whereas only 71.5 per cent of big planters relied on the production of coffee as their main profession.² Coffee estate workers face many occupational risks. The most common injuries can be classified into; Physical hazards: Heat: Heat stroke, headache, dizziness, dehydration. Rain: Viral fever, infection, colds. Chemical hazards like irritation in the respiratory tract, eyes and skin. Mechanical hazards and Physical labour like Utility vehicle accidents, Cut and Laceration, Fracture, Carrying heavy loads, musculoskeletal disorders, falling from trees and drowning in water. Animal contact: Snake bites,

insect bites and leech, Tiger attack, Bison attacks, Elephant attacks and Leech bites. The workers often lack awareness of occupational dangers and labour for extended hours in risky work conditions without personal protection equipment. The use of machinery and tools has brought newer occupational wounds and injuries among the plantation workers.⁶ Plantation works are done manually using hand-operated tools and devices. Nonfatal accidents can be caused by using these tools like cuts, lacerations, fractures, utility vehicle accidents etc. Pesticide is another area of concern. Exposure to pesticides can cause eye irritation, skin irritation and respiratory tract irritation. The mental health of the workers is influenced by financial problems, exposure to pesticides, climate change/drought/heavy monsoon, past injuries and poor physical health.⁷ Animal human conflict is a major problem on the plantation. Workers come across elephants, bison, wild boar, snakes, leeches and insects. Stress is a feeling of tension. Stress can be caused by any event or thought that can make a person feel nervous, angry, or frustrated. Stress is the reaction by the body to an external stimulus like a challenge or demand. In the year 1936, the word "stress", was first used by Hans Selye. He defined stress as "the non-specific response of the body to any demand for change." Stress is like a coin that has two faces. A little stress can motivate a person and it is called eustress, whereas chronic stress can negatively impact health. Chronic stress can cause health problems such as Hypertension, Cardiovascular disease, Diabetes, Obesity, Headache, Memory problems, Depression, Anxiety, and Acne and worsen existing medical problems. Occupational stress is the response to work pressures. It is the combination of psychological and physical hazards that workers experience in the working area. Occupational stress is increasing globally, and it is affecting all categories of workers. It has a huge effect on mental and physical health problems, and also on the company or business. Understanding plantation culture and perceived stress unique to the plantation community is essential to addressing workers' emotional health and wellbeing.

The plantation is one of the most stressful occupations in the World It has reached a serious stage with pandemic impacts along with natural disasters, extreme weather events, financial pressures due to changing prices, worker shortages and other factors over the past many years. With these ongoing challenges, more plantation workers are experiencing stress and mental health concerns. A worker experiencing more stress outside the plantation can be more at risk to experience stress inside it. Stress outside the plantation can be due to family, social status, and interpersonal relationships. Because of changes in agricultural techniques and economic circumstances, farming is acknowledged as a high-stress vocation with a high percentage of psychologically unwell agricultural workers. Farmers who experience psychological discomfort are significantly correlated with socioeconomic circumstances.⁸ Occupational stress can have multiple effects on a worker. Stressors can be

internal as well as external stressors. Some of the stressors plantation workers come across are financial problems, loan load, unpredictable weather, competition, extreme work conditions, fatigue, no of personal time, paperwork, pain, muscular disorders or mobility problems related to years of physical work.

The stress experienced by plantation workers can be directly linked to their work, and it is becoming worse in recent years. Ignoring stress can also lead to suicide, as stressors can make a person feel hopeless. Understanding occupational risk factors and occupational stress helps to raise awareness of the hazards and risks that are associated with the plantation, prevent occupational hazards, promote effective management and ensure workplace safety. Since there are only a few studies about the occupational hazards and occupational stress in the plantation sector and no previous study was done to know the occupational hazards in the coffee plantation of Kodagu district, Karnataka, this study was conducted in T. Shettigeri Village of Kodagu district in Karnataka to assess occupational health risks, to determine factors affecting occupational hazards and to assess the level of perceived stress among coffee plantation workers.

METHODS

The study was a community based cross-sectional study conducted from November 2021 to May 2022 among Coffee plantation workers in T. Shettigeri Village, Kodagu district, Karnataka, India. A purposive sampling technique was adopted to study participants. Considering the prevalence of occupational risk as high as 33% from a previous study done in Nepal with an absolute precision of 5% and confidence interval (CI) of 95%, a minimum sample of 340 was calculated. Prior to collection of data, clearance was obtained from the

Institutional Ethics Committee of JSS Medical College. Prior collection of data from the coffee plantations, necessary permission was taken from the competent authority. All research participants provided consent in the written format prior to the collection of data. Semi-structured questionnaire for gathering information regarding socio-demographic characteristics like age, gender, occupation, educational status, marital status, type of family, and socioeconomic status were used. Suitable data was collected from the coffee plantation workers through a self-constructed questionnaire on a variety of aspects of occupational risk factors, which included, physical hazards, chemical hazards, mechanical hazards, animal hazards. Perceived level of stress was measured using Cohen's Perceived Stress Scale.

The data that was collected was coded and typed into an Excel worksheet and was transferred and analysed using IBM SPSS statistics-25. Frequencies and percentages were computed. For categorical data, cross tables and graphs were created as needed, and inferential statistics such as the Chi-square test were applied to find the

association between occupational risk factors in coffee plantation workers and their stress levels. The statistical significance level was set at 5%.

RESULTS

The present study was conducted in coffee plantations of Kodagu district. Among 340 plantation workers majority were aged between 31-40 years (28.5%), (54.4%) participants were male. Majority of the participants (35.3%) received education up to primary school and (21.2%) were illiterate. About (68.2%) of the participants were married. 65.6% of the participants lived in the nuclear family. (38.2%) of the workers belonged to lower middle-class category (Table 1), (52.4%) of the workers worked for more than 10 years in the coffee plantation. (55%) of coffee plantation workers used no sun protection and (91.2%) of the workers worked in the sun for 3-5 hours. (51.17%) of the coffee plantation workers never used any PPE (Table 2).

Table 1: Socio-demographic characteristics of plantation workers.

Variables	Categories	N	%
Age (years)	18-30	72	21.2
	31-40	97	28.5
	41-50	75	22.1
	51-60	64	18.8
	61-70	30	8.8
	71-80	2	0.6
Gender	Female	155	45.6
	Male	185	54.4
Education	illiterate	72	21.2
	Primary school	120	35.3
	Middle school	49	14.4
	High school	46	13.5
	PUC/Diploma	14	4.1
	Graduate	28	8.2
	Postgraduate	11	3.2
Marital status	Married	232	68.2
	Widow	60	17.6
	Divorced	42	12.4
	Single	6	1.8
Type of family	Nuclear family	223	65.6
	Joint family	117	34.4
Socio-economic class	Upper class	50	14.7
	Upper middle class	25	7.4
	Middle class	102	30.0
	Lower middle class	130	38.2
	Lower class	33	9.7

Physical hazards

81.5% of workers experienced headaches, followed by (80.9%) cold, (60.9%) dizziness, (47.1%) dehydration, (46.8%) viral fever, (38.5%) infection and (20%)

heatstroke. The association between factors affecting physical hazards and stress level is given in (Table 3).

Chemical hazards

53.8% of workers experienced skin irritation, followed by (43.2 %) eye irritation and (25.9 %) respiratory tract irritation during the handling of pesticides. The association between factors affecting chemical hazards and stress level is given in (Table 4).

Table 2: Factors affecting occupational hazards among coffee plantation workers.

Variables	Categories	N	%
No of working years	1-5	53	15.6
	5-10	109	32.1
	More than 10	178	52.4
Sun protection	Sunscreen	9	2.647
	Baseball cap	68	20
	Hat with brim	31	9.117
	Full sleeved shirt	115	33.823
Working hours	Up to 1 hour	1	0.3
	1-2 hours	6	1.8
	3-5 hours	310	91.2
	6-8 hours	22	6.5
PPE during pesticide use	Never use protective equipment	174	51.17
	Gas mask	14	4.11
	Dust mask	41	12.05
	Full face shield	20	5.88
	Hat	24	7.05
	Goggles	40	11.76
	Boots	34	10
	Gloves	56	16.47

Mechanical hazards

91.8% of the workers experienced cut and laceration, followed by (81.8%) fracture, (80%) carrying heavy loads, (69.7%) musculoskeletal disorders, 27.9% utility vehicle accidents, (25.6%) fall from the tree, (18.2%) fracture and (6.2%) drowning in the water.

The association between factors affecting mechanical hazards and stress level is given in (Table 5).

Animal hazards

80.9% workers came in contact with insects, followed by (79.7 %) with Tiger, (79.4%) with snakes, (48.5 %) with Elephant, (39.7%) with leech, (25.6 %) with wild boar

and (25%) with bison. The association between factors affecting animal hazards and stress level is given in (Table 6).

Stress level

15.58% of the workers experienced low stress, followed by (27.35%) of the workers experienced high stress and (57.05%) of the workers experienced moderate stress (Figure 1). To examine the association between occupational risk factors and associated stress levels among coffee plantation workers of Kodagu district Karnataka, the Chi-square test was used. Association of socio-demographic factors, factors affecting occupational hazards, physical hazards, chemical hazards, mechanical hazards and animal hazards with perceived stress level was found. The results yielded insignificant results $p > 0.05$. Thus, there was no evidence to show the association between occupational risk factors and associated stress levels.

DISCUSSION

The current study sought to examine if there was a relationship between occupational risk factors and associated stress levels. While this study was unable to produce significant results, other studies have demonstrated a link between occupational risk factors and associated stress levels. The study comprised of 340 coffee plantation workers, working in plantations of T. Shettigeri village, Kodagu district, Karnataka. Among 340 plantation workers, more number of workers (28.5%) were in the age group of 31-40, followed by the age groups 41-50, 18-30, 51-60 and >60. This result is much as same the result of a study performed by Singh et al. The study aimed to know how agricultural labourers in a rural section of India's Ahmednagar district utilise personal protective equipment and precautions when applying pesticides. The majority of the study participants were in the age group 31-40.¹⁸

According to the study done by Kundu A et al (2006) on the Wage-employment relationship in the agricultural labour market of West Bengal, it is seen that majority of the study participants had studied up to only primary school 51.35%.¹⁹. In the current study majority of the plantation workers had completed primary schooling (35.3%), followed by workers who were illiterate (21.2%) and who had studied more. This could be due to the socio-economic status of the plantation workers. The majority (38.2%) of the plantation workers in this study were in the lower-middle-class category.

In the study done by Backes et al it was seen that modifiable determinants of sunburn and suboptimal leisure and occupational sun protection practices were observed in agricultural workers. Occupational sunburn increased with not wearing a hat.²⁰ Kearney et al in their review tell that the agricultural workers have varying levels of sun protection awareness. Numerous studies

have shown that although agricultural workers were conscious of the hazards and dangers resulting from excessive solar radiation, they frequently failed to take necessary precautions when working outside.²¹ Similarly in the current study we can see that 187 (55%) of coffee plantation workers used no sun protection, 115 (33.82%) of the workers used full sleeve shirts, 68 (20%) of the

people used baseball caps, 34 (9.11%) of the workers used hat with a brim and only 9 (2.64%) of the people used sunscreen for sun protection. According to the study done by Chethana et al the whole coffee crop is grown in shade solely in India.² In the current study, among 340 coffee plantation workers, 310 (91.2%) of the workers worked in the sun for only 3-5 hours.

Table 3: Association between factors affecting physical hazards and perceived level of stress.

Variables	Category	Stress			Chi-square	Df	P value
		Low	Medium	High			
Heatstroke N (%)	Yes	14 26.4	31 16.0	23 24.7	4.624	2	0.099
	No	39 73.6	163 84.0	70 75.3			
Dizziness N (%)	Yes	33 62.3	110 56.7	64 68.8	3.925	2	0.140
	No	20 37.7	84 43.3	29 31.2			
Headache N (%)	Yes	39 73.6	165 85.1	73 78.5	4.37	2	0.112
	No	14 26.4	29 14.9	20 21.5			
Dehydration N (%)	Yes	22 41.5	93 47.9	45 48.4	.781	2	0.677
	No	31 58.5	101 52.1	48 51.6			
Viral fever N (%)	Yes	23 43.4	93 47.9	43 46.2	.359	2	0.836
	No	30 56.6	101 52.1	50 53.8			
Infection N (%)	Yes	20 37.7	76 39.2	35 37.6	.080	2	0.961
	No	33 62.3	118 60.8	58 62.4			
Cold N (%)	Yes	45 84.9	160 82.5	70 75.3	2.768	2	0.251
		8	34	23			
	No	15.1	17.5	24.7			
		3.8	5.7	10.8			
	No	51 96.2	183 94.3	83 89.2			

This could be due to the shade present in the plantation area. This can also be the reason for the absence of heatstroke in the majority (80%) of the participants. To determine how agricultural labourers in a rural part of India's Ahmednagar district employ personal protective equipment and safety precautions when applying pesticides, Singh B et al (2009) conducted research. The majority of employees either didn't wear PPE or only partially did. The majority of the workers (77%) were unconcerned about the health concerns associated with pesticide exposure.¹⁸ The results are similar to the current study where 51.17% of the plantation workers did not use any protective equipment. In the current study, 60.9% of the participants experienced dizziness. This trend is the same as the research done by Kiatkitroj et al. 60% of the

Thai Sugar cane farmers experienced dizziness.²² In the study by Sadiq et al that was conducted on maize farmers, the results of respondents' self-reported heat stress-related symptoms show that 71.20% of the workers experienced headaches.²³ In the current study, we can see that 81.5% of the plantation workers experienced headaches due to heat. In the current study, the experience during the rainy season was categorised into infections, viral fever and cold. About 80.9% of the plantation workers experienced cold. In the study done by Vashishtha et al it is seen that in India, there is often only little influenza activity during the year. But there is a clear spike during the monsoon season.²⁴ In the study by Hutter et al titled "cytotoxic and genotoxic effects of pesticide exposure in male coffee farmworkers of the

Jarabacoa Region, Dominican Republic," it was discovered that the use of pesticides has an impact on more than just short-term health and wellbeing; it can also have long-term risks for health and established the

importance of occupational safety measures including training and protective covering.²⁵ In the current study we can see that 43.2% of the plantation workers experienced eye irritation.

Table 4: Association between factors affecting chemical hazards and perceived level of stress.

Variables	Category	Stress			Chi-square	Df	P value
		Low	Moderate	High			
Eye irritation N (%)	Yes	21 39.6	89 45.9	37 39.8	1.284	2	0.526
	No	32 60.4	105 54.1	56 60.2			
Skin irritation N (%)	Yes	26 49.1	102 52.6	55 59.1	1.663	2	0.435
	No	27 50.9	92 47.4	38 40.9			
Respirator tract infection N (%)	Yes	12 22.6	54 27.8	22 23.7	0.916	2	0.633
	No	41 77.4	140 72.2	71 76.3			
No experience due to chemicals N (%)	Yes	20 37.7	47 24.2	25 26.9	3.851	2	0.146
	No	33 62.3	147 75.8	68 73.1			

Table 5: Association between factors affecting mechanical hazards and perceived level of stress

Variables	Category	Stress			Chi-square	df	P value
		Low	Medium	High			
Utility vehicle accidents N (%)	Yes	16 30.2	50 25.8	29 31.2	1.071	2	0.585
	No	37 69.8	144 74.2	64 68.8			
Carrying heavy loads N (%)	Yes	45 84.9	154 79.4	73 78.5	0.975	2	0.614
	No	8 15.1	40 20.6	20 21.5			
MSK disorders N (%)	Yes	32 60.4	137 70.6	68 73.1	2.773	2	0.250
	No	21 39.6	57 29.4	25 26.9			
Fall from tree N (%)	Yes	14 26.4	48 24.7	25 26.9	0.174	2	0.917
	No	39 73.6	146 75.3	68 73.1			
Drowning in water N (%)	Yes	2 3.8	13 6.7	6 6.5	0.632	2	0.729
	No	51 96.2	181 93.3	87 93.5			
Cut and laceration N (%)	Yes	49 92.5	178 91.8	85 91.4	0.050	2	0.975
	No	4 7.5	16 8.2	8 8.6			
Fracture	Yes	6 11.3	39 20.1	17 18.3	2.154	2	0.341
	No	47 88.7	155 79.9	76 81.7			

Table 6: Association between factors affecting animal hazards and perceived level of stress

Variables	Category	Stress			Chi-square	df	P value
		Low	Medium	High			
Snake N (%)	Yes	41 77.4	151 77.8	78 83.9	1.563	2	0.458
	No	12 22.6	43 22.2	15 16.1			
Insect N (%)	Yes	46 86.8	153 78.9	76 81.7	1.750	2	0.417
	No	7 13.2	41 21.1	17 18.3			
Leech N (%)	Yes	23 43.4	75 38.7	37 39.8	0.390	2	0.823
	No	30 56.6	119 61.3	56 60.2			
Tiger N (%)	Yes	9 17.0	44 22.7	16 17.2	1.591	2	0.451
	No	44 83.0	150 77.3	77 82.8			
Bison N (%)	Yes	14 26.4	47 24.2	24 25.8	0.151	2	0.927
	No	39 73.6	147 75.8	69 74.2			
Elephant N (%)	Yes	24 45.3	94 48.5	47 50.5	0.374	2	0.829
	No	29 54.7	100 51.5	46 49.5			
Wild boar N (%)	Yes	21 39.6	90 46.4	44 47.3	0.922	2	0.631
	No	32 60.4	104 53.6	49 52.7			
Other animals N (%)	Yes	0 0.0	2 1.0	3 3.2	3.027	2	0.220
	No	53 100.0	192 99.0	90 96.8			

53.8% of the plantation workers experienced skin irritation and 25.9% of the plantation workers experienced respiratory tract irritation. In the study by Hutter et al it was seen that agricultural workers exposed to chemicals reported significantly greater systemic and local symptoms, such as tiredness, nausea, and dizziness, as well as strong exhaustion, stomach discomfort, skin problems and watery eyes.²⁶ According to the study by Moreschi et al it shows that accidents involving tractors are one of the most common causes of mortality in agriculture.²⁷ In the current study, 27.9% of the plantation workers experienced utility vehicle accidents. This could be due to the majority of the plantation owners drive the utility vehicles and only experienced and licensed plantation workers and given allowed to handle utility vehicles. We can observe from the systematic study performed by Mucci et al that the most common type of injuries among agricultural workers were wounds, ranging from bruises, lacerations, and cutting lesions. Additional causes, including fractures, twists, sprain, and overuse injuries, have been identified by the authors in

other research.²⁸ In the current study we can see that 91.8% of the plantation workers experienced cut and laceration, 18.2% of the plantation workers experienced fractures, 80% of the plantation workers carried heavy loads, 69.7% experienced musculoskeletal disorders, 25.6% of the plantation workers fell from tree and 6.2% of the workers had an experience of drowning in the water.

According to the study done by Bal et al the forests of Kodagu district harbour a large population of the Asian elephant.¹¹ In the current study we can see that 48.5% of the plantation workers came in contact with the elephant in the plantation area. The study conducted by Narayana et al demonstrates that Kodagu is the crucial area for elephant crossings in the Western Ghats. The population of elephants in Kodagu is estimated to be approximately 1022, or roughly 16 per cent of the entire elephant population in the state of Karnataka. Elephant sightings and reports are made throughout the estates throughout the year, but during the busiest months of the coffee harvest season, there is a noticeable increase.²⁹

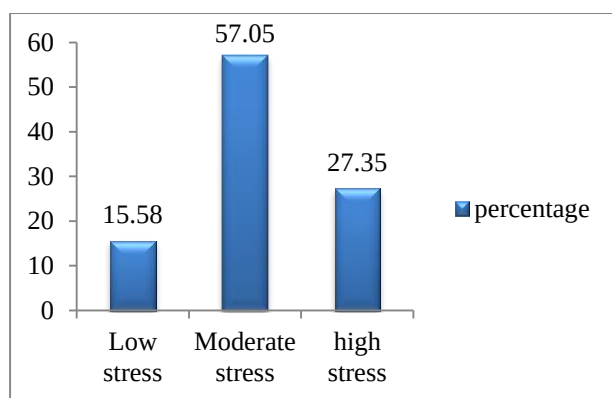


Figure 1: Perceived stress level.

In the current study 80.9% of the coffee plantation workers came in contact with insects, 39.7% with leech, 20.3% with tiger, 25% with bison, 45.6% with wild boar and 1.5% with other animals like sambar deer, wild dogs and leopards. Tigers, elephants, leopards, wild boars, gaurs deer, wild dogs, Hanuman langurs, Malabar giant squirrels, and sloth bears are the most prevalent species found in Kodagu, according to a research conducted by Narayana et al. Brown palm civets, Asian clawless otters, Nilgiri langurs, lion-tailed macaques and Nilgiri martens are also found. Other animals seen on occasion include jackals, civets, small cats and mongooses.²⁹ In the current study among 340 coffee plantation workers, 53 (15.58%) of the workers experienced low stress, followed by 93 (27.35%) of the workers who experienced high stress and 194 (57.05%) of the workers experienced moderate stress. According to the study done by Chengane et al high-stress levels, sleep deprivation, and exhaustion were reported more frequently.³⁰ In the study conducted by Daghigh et al it was found that agricultural workers were more likely to experience psychological problems. Understanding the risk factors for agricultural workers' psychological problems and how they affect them is crucial for lowering the problem of mental illness.⁷

Limitations

The size of this sample was not large enough to detect the hypothesized effect. The study was conducted in only one village in the district. The whole district varies in terms of biodiversity and working patterns. The data was collected during their work time. The workers might have given answers without interest to cope with their working time.

CONCLUSION

Though more than three fourth of the coffee plantation workers experienced stress, there was no association between occupational risk factors and stress levels. Plantation workers are more prone to occupational risk factors and yet their safety is ignored despite the risks. Measures have to be taken to protect the workers from physical, chemical, mechanical and biological hazards. In

the past, many studies have shown poor mental condition and risks of suicide in agricultural workers. So it is important to identify what is causing stress among the agricultural workers.

Recommendations

Create awareness about Personal Protective equipments. Maintenance of the utility vehicles to prevent occupational accidents. Give training to use machinery and tools. Conduct further research on occupational safety and occupational stress among plantation workers.

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