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Assessment of occupational health hazards faced by farm workers in green gram cultivation

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Abstract

Green gram is the third main pulse crop of India grown in nearly 8 per cent of the total pulse cultivated area of the country. It's a seed contains 24.7%, protein due to its supply of cheaper protein source; it is designated as "poor man's meat". The present study was conducted in Muzffarpur district of Bihar (India) to assess the occupational health hazards around 70 farm workers engaged in different activities of green gram cultivation. The study concluded that (100%) of male workers engaged in land preparation and storage activities and female workers (100%) participated in harvesting, winnowing and cleaning activities. The men perform operations like storage (100%), Sowing (82.8%), and harvesting (77%) were performed manually. Besides threshing (65%) using wooden rods, winnowing (37%) is performed using woven bamboo frames. Only land preparation (68%) was performed by using agricultural equipments like tractor. While women shows (100%) involvement in harvesting, threshing and cleaning activities manually. Most of the general problems (95%) in soiling of hair, face, and feet come from land preparation, harvesting, threshing and winnowing activities and most of the workers (95%) were faced a specific problems of shoulders ache and (100%) of workers facing a stress from poor working environment. Hence, there is need to further studies could be conducted on development of improved tool and technologies for mitigating occupational health hazards in green gram cultivation.

Keywords: Occupational, Sustainable, Musculoskeletal, Mitigating

Introduction

The agriculture and allied area continues to be fundamental to the sustainable growth and development of the Indian economy. Not only it meets the food and nutritional necessities of 1.3 billion Indians, but also contributes considerably to production, employment and demand generation through different backward and forward linkages. In addition, the role of the agricultural area in alleviating poverty and in ensuring the sustainable development of the economy is well recognized. In agriculture sector India is the chief producer as well as consumer of pulses in the world. It plays a very important role in Indian Agriculture. In India, total production of pulses is 23.95 million tons (Anonymous, 2017-18) ^[1]. This is a main source of dietary proteins in the vegetarian diet of our nation. In addition being the source of proteins, they keep soil fertility also from beginning to end through biological nitrogen fixation and thus play a very important role in sustainable agriculture (Kannaiyan, 1999) ^[2]. Green gram is the third important pulse crop of India grown in nearly 8 per cent of the total cultivated pulse area of the country. Its seed contains 24.7% protein. Being cheaper source protein, it is designated as "poor man's meat" (Potter and Hotchkiss, 1997) ^[3]. It is a short duration crop grown mostly as a fallow crop rotation with rice. Most of the operations involved in cultivation of green gram performed manually by farm workers are very tedious, monotonous and time consuming. The workers who participated in green gram cultivation subjected to so many ergonomic problems like different types of musculoskeletal problems, drudgery and various types of occupational health hazards. Farm workers perform strenuous tasks and are exposed to a wide range of occupational risks and hazards. Low socioeconomic status and poor access to health care also contribute to existing health problems in these farm workers (Mobed *et al.* 1992) ^[4]. The present study was carried out to study the occupational health hazards among the farm workers in various activities of green gram cultivation.

Methodology

Locale and sample selection

The present study was conducted on Muraul block, Muzaffarpur district of Bihar. 35 male and 35 female workers were selected through snowball sampling. The workers were interviewed to elicit the information on occupational health hazards in different activities of green gram cultivation.

Tools used

Self structured questionnaire was used for electing information regarding demographics of respondents, type of activity performed, and occupational health problems encountered during work. Information was collected by personal interview and observation method.

Results and discussion

The results of the present study as well as relevant discussions have been presented below:

Background profile of the workers who participated in green gram cultivation activities

The background profile of the respondents is presented in Table 1. Both male (50%) and female (50%) were taken for the study among them the majority (44%) workers belong to the age group 25-35 years and majority (70%) of the respondents were married, (61%) were belong to the joint family system and the majority of the workers (64%) were illiterates.

Table 1: Distribution of male and female respondents according to their background profile

n=70			
Variables		Frequency	(%)
Gender	Male	35	(50)
	Female	35	(50)
Age	15-25 years	24	(34.2)
	25-35 years	31	(44.2)
	35-45 years	12	(17.1)
	45-55 years	3	(4.2)
Marital status	Married	49	(70.0)
	Single	21	(30.0)
Family types	Nuclear	17	(24.2)
	Joint	43	(61.4)
	Extended	12	(17.1)
Education	Illiterate	48	(64.2)
	Elementary school	14	(20.0)
	High school	6	(8.5)
	Intermediate	2	(2.8)

Monthly Income	Below 5000	13	(18.57)
	5000 – 10,000	31	(44.28)
	10,000 – 20,00	16	(22.85)
	Above 20,000	10	(14.28)
Occupation	Agriculture labour	53	(75.71)
	Cultivator	17	(24.28)
	Business	-	-
	Services	-	-

Further, it is observed from the table that maximum percent (44%) of respondents had their monthly income of Rs 5,000.00 to Rs 10,000.00, and major occupations of the workers (75%) were agriculture labour.

Activities performed by male and female workers in green gram cultivation

Green gram cultivation done by various activities like a seed selection, land preparation, sowing, harvesting, threshing, winnowing, cleaning and storage. The male and female participated almost all the activities.

Table 2: Types of activities performed by male and female workers in green gram cultivation

Sl. no.	Activities performed	Male n=35		Female n=35	
		Frequency	(%)	Frequency	(%)
1.	Selection of seeds	7	20.0	32	91.4
2.	Land preparation	35	100	9	25.7
3.	Sowing	29	82.8	6	17.1
4.	Harvesting	27	77.1	35	100
5.	Pod drying	16	45.7	31	88.5
6.	Threshing	23	65.7	34	97.1
7.	Winnowing	13	37.1	35	100
8.	Cleaning	-	-	35	100
9.	Storage	35	100	12	34.2

It was observed from the table-2 that greater percent of male workers engaged in green gram cultivation performed farm activities like land preparation, storage (100% each), sowing (85%), and harvesting (77%) as shown in fig. 1. Whereas the activities performed by female workers are harvesting, winnowing, cleaning (100% each), threshing (97%) and (91%) seed selection as shown in fig. 2.

Fig 1: Activities performed (Male)

Fig 2: Activities performed (Female)

Manual and mechanical techniques used for green gram cultivation

Green gram cultivation activities are mostly done manually, such as seed selection, sowing, harvesting, threshing,

winnowing and cleaning and only one activity land preparation is done either by mechanical tractor or with kudaal, khurpi and bullock.

Table 3: Techniques used by male and female workers for performing in green gram cultivation activities

Sl. no.	Activities performed	Male n=35				Female n=35			
		Manual		Machine		Manual		Machine	
		f	%	f	%	f	%	f	%
1.	Selection of seeds	7	20.0	-	-	32	91.4	-	-
2.	Land preparation	11	31.4	24	68.5	9	25.7	-	-
3.	Sowing	29	82.8	-	-	6	17.1	-	-
4.	Harvesting	27	77.1	-	-	35	100.0	-	-
5.	Pod drying	16	45.7	-	-	31	88.5	-	-
6.	Threshing	23	65.7	-	-	34	97.1	-	-
7.	Winnowing	13	37.1	-	-	35	100	-	-
8.	Cleaning	-	-	-	-	35	100	-	-
9.	Storage	35	100.0	-	-	12	34.2	-	-

The techniques used for performing green gram cultivation activities are represented in table 3. The farm activities like storage (100%), Sowing (82.8%) and harvesting (77%) were performed manually. Besides threshing (65%) using wooden rods, winnowing (37%) is performed using woven bamboo frames. Only land preparation (68%) was performed by using agricultural equipments like tractor and machine in green gram field. Women shows (100%) involvement in harvesting, threshing and cleaning manually. None of the activities performed using advanced agricultural equipments and

appliances. The lack of mechanization and over drudgery in green gram cultivation lead to many health problems.

General problems faced by farm workers while performing the activities in green gram cultivation

During green gram cultivation farmers faces so many general health problems like skin allergy, headache, hearing problems, rashes insect biting and excessive sweating because they working continuously in contact with sunrays, noisy work environment and long duration of work.

Table 4: General problems encounter while performing the activities in green gram cultivation

Slno	Problems encountered	Activities								
		Selection of seeds	Land preparation	Sowing	Harvesting	Pod drying	Threshing	Winnowing	Cleaning	Storage
		F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)
1.	Soiling (hair, face & feet)	62(88.5)	63(90.0)	70(100)	67(95.7)	-	70(100)	70(100)	61(87.1)	25(37.7)
2.	Skin Allergy (face, hand & feet)	23(32.8)	56(80.0)	-	63(90.0)	55(78.5)	66(94.2)	61(87.1)	45(64.2)	-
3.	Headache	8(11.4)	31(44.2)	-	67(95.7)	-	45(64.2)	41(58.7)	22(31.4)	10(14.2)
4.	Heat (faint, rashes, sweating)	46(65.7)	68(97.1)	18(25.7)	70(100)	61(87.1)	70(100)	61(87.1)	55(78.5)	23(32.8)
5.	Insects biting	-	27(38.7)	-	32(45.7)	5(7.1)	-	-	-	-
6.	Excessive sound during work	5(7.1)	50(71.4)	-	-	-	65(92.0)	12(17.1)	48(68.5)	-

n=70

The general problems encountered while performing the activities in green gram cultivation are depicted in Table 4. Soiling of face, feet and hair were the problems faced by green gram workers above (95%) during each activity sowing, threshing, winnowing and harvesting respectively. Field operation like harvesting, threshing and land preparation above (95%) causing fainting, Rashes, sweating due to heat from sun during long hours of outdoor activity. While performing farm activity like harvesting, threshing and winnowing above (85%) causing skin allergies on hands, face and feet due to fine organic dust in the surrounding while performing these activities. Similar results were found in Sudha *et al.* (2014) ^[6] found that skin allergy was the major problem faced by the dal mill workers during dehusking, cleaning, sieving, drying, packaging, loading and unloading. Burning sensation of skin, eye irritation and itching were also faced by the dal mill workers attributed to strong sunlight and heat produced by machines.

Specific problems faced by farm workers while performing the activities in green gram cultivation

Farm workers while performing in green gram cultivation faced so many musculoskeletal and other occupational health hazards (Cuts, breathing problems and running nose, etc.). Because they working with poor postures like a forward bending in harvesting activities, seed selection, threshing, and cleaning activities done with stooping postures and winnowing done with continuously standing postures.

Table 5: Specific problems encounter while performing the activities in green gram cultivation

Sl.no.	Problems encountered (Specific activity)	n=70	
		Frequency	%
1.	Seed selection		
	Backache due to bending	55	78.5
	Shoulder ache due to holding	54	77.1
2.	Land preparation		
	Backache due to bending	23	32.8
	Shoulder ache due to holding	24	34.2
3.	Harvesting		
	Backache due to bending	62	88.7
	Shoulder ache due to holding basket	66	94.2
	Neck pain	56	80.0
	Itching in hands feet	67	95.7
4.	Threshing		
	Cuts in hand and feet	35	50.0
	Itching /Irritation in hands and other body parts	64	91.4
5.	Winnowing		
	Breathing problems due to dust	21	30.0
	Watering in nose	67	95.7

The specific problems encountered in activities of green gram cultivation are depicted in table 5. The workers faced specific problem during harvesting were itching in hands and feet (95%), shoulder ache due to holding basket while picking green gram (94%), Backache due to prolonged bending (88%) and neck pain (80%). The problems may be due to faulty posture. During threshing activity (91%) respondents faced the problem of irritation in hands and other body parts due to the process of cleaning, dehusking and sieving produces fine organic dust in the environment, which may be the reasons for Itching /Irritation. During cleaning, dehusking and sieving activities coughing, sneezing and watering nose are common problems during winnowing activity.

Occupational stress in green gram cultivation activities

Occupational stress is the negative effect on the individual from the sum of the different factors in a workplace, which may act as stress. It has been further defined as perceived imbalance between occupational demands and the individual's ability to perform when the consequences of failure are tough to be important. During green cultivation, workers face so many work related stress like stress from financial worries, health anxieties, poor working environment, wages discrimination and incorrect postures.

Table 6: Occupational stress faced by workers in green gram cultivation

Sl.no.	Stress triggers	n=70	
		Frequency	%
1.	Incorrect postures	32	91.4
2.	Monotonous & repetitive task	33	94.2
3.	Poor working environment	35	100
4.	Wages discrimination	34	100
5.	Financial worries	32	91.4
6.	Family problems	25	71.4
7.	Multiple roles	31	88.5
8.	Health anxieties	21	60.0
9.	Lack of equipments (tools & equipment and protective clothing)	33	94.2
10.	Time boundation	3	85.7

It is noticed from Table 6 that farm worker of green gram cultivation show the various reasons behind disliking the job. Major reasons as stated by workers were poor working environment (100%), wages discrimination in women (97%), monotonous and repetitive work (94%), adopting incorrect postures, lack of equipments (91%) and multiple roles (88%). The above findings get decisive support from the study done by Roscow and Wilson (2005) ^[5], who reported that the high risk factors for workplace stress were over workload, poor relations with supervisors, a low level of participation in decision and insufficient communication of information etc as shown in fig. 3.

Fig 3: Work related stressed faced by farm workers

Conclusion

The study concluded that most of the farmers were age group of 25-35 years, 70% were married, 61% belong to joint family, 64% workers were illiterate and 44% of the respondents have 5000-10,000 rupees monthly income and 75% of the workers belongs to agriculture labour category. During green gram cultivation (100%) of male workers engaged in land preparation and storage activities and female workers (100%) participated in harvesting, winnowing and cleaning activities. In farm activities, male perform operations like storage (100%), Sowing (82.8%) and harvesting (77%) manually. Besides threshing (65%) using wooden rods, winnowing (37%) is performed using woven bamboo frames. Only land preparation (68%) was performed by using agricultural equipments like tractor and machine respectively. While women shows (100%) involvement in harvesting, threshing, winnowing and cleaning activities manually. Most of the general problems (95%) like soiling of hair, face, and feet come from land preparation, harvesting, threshing and winnowing activities and most of the workers (95%) were faced a specific problems shoulders ache and 100% of workers facing a stress from poor working environment.

Recommendations

In green gram cultivation occupational health hazards necessarily impose long term effects on health that could be curbed up to some extent through the use of personal protective equipment. And further studies can be conducted on development of improved tool and technologies for mitigating occupational health hazards in green gram cultivation.

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