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Work-related risk factors faced by female workers engaged in flower cultivation

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Abstract

The purpose of this research is to find out the various work-related risk factors faced by female workers engaged in flower cultivation and to recommend future directions as these factors have a direct impact on the health of female farm workers. It was found that female farm workers suffer from various occupational risk factors i.e. environmental, ergonomic, musculoskeletal and safety factors at workplace. Exhaustion due to extreme temperature was the main environmental risk factor reported by 80.8 percent respondents. Whereas, awkward posture and repetitive muscle activity were the main ergonomic risk factors reported by 65 percent respondents. Under musculoskeletal disorders, low back pain was the main problem reported by 70.8 percent of respondents. Considering safety factors perceived by respondents at workplace, lack of protective clothing was the main problem reported by 89.2 percent respondent. At the end, remedial measures were suggested so that the occupational risk factors faced by female farm workers can be reduced.

Keywords: Ergonomic, female workers, flower cultivation, remedial measures, work-related risk factors

Introduction

Floriculture has been practiced in India since long. References to flowers and gardens are found in the ancient Sanskrit classics like *Mahabharata*, *Shudraka*, *Ashvoghanda*, etc. Though the flower cultivation has been in practice in India since times immemorial but the floriculture has blossomed into a viable occupation only in recent years. In India, floriculture is viewed as highly developing industry and given fully export oriented status by the Government of India. According to census of India 2011, the farm women constitute 42.00 percent of agricultural work force. Women are considered as the backbone of rural panorama. Women connection to agriculture is an age old practice. Women perform various farm related activities both inside and outside the household. So far, as floriculture is concerned; women participate in almost all activities i.e. from transplanting to harvesting of the flowers.

Female farm workers perform strenuous tasks and are exposed to a wide variety of occupational risks and hazards. Exposure to occupational risk factors can adversely affect the human body. In this study, the term “occupational risk factor” includes various environmental, ergonomic, musculoskeletal and safety factors that may cause harm to an exposed person in the workplace and is potentially modifiable. Low socioeconomic status and poor access to health care also contribute to existing health problems in this population. Although agriculture is generally recognized as the nation's most hazardous industry and displays high rates of musculoskeletal disorders with evidence to suggest that ergonomic risk factors are involved, there is very little history of application of ergonomic approaches in agricultural workplaces. Therefore, the present study was undertaken with the following objectives.

- To find out the various work-related risk factors faced by female workers engaged in flower cultivation.
- To suggest remedial measures to reduce work-related risk factors faced by female workers engaged in flower cultivation.

Materials and Methods

The current study named “Work-related risk factors faced by female workers engaged in flower cultivation” was conducted by a field survey method with the aim to recognise the various work related risk factors faced by female workers engaged in flower cultivation and to recommend future directions.

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For gathering the appropriate data, a pre-structured interview schedule was used and the information regarding the flower cultivators was procured from department of Floriculture and Landscaping, Punjab Agricultural University, Ludhiana, Punjab. The study was carried out in marigold fields of Ludhiana district from month June - October. A total of 120 female labourers were selected as respondents randomly.

Results and Discussion

Female farm workers while performing various flower cultivation activities comes in contact with wide variety of work-related risk factors. Various occupational risk factors faced by female workers engaged in flower cultivation are discussed below

Environmental risk factors faced by respondents at workplace

The environmental parameters play a big role in the working efficiency of the workers. If in a workplace the environmental parameters go below or beyond the optimum level then it would cause discomfort for the workers. Perhaps more than any other occupational group, agricultural workers are exposed to a tremendous variety of environmental hazards that are potentially harmful to their health and well-being. Temperature, humidity, air, noise and exposure to pesticides were the environmental components considered for the study. Table 1 portrays the details pertaining to environmental factors faced by respondents while working in the field. Too high temperature to concentrate at work was reported by 64.2

per cent respondents. Whereas, other problems caused due to extreme temperature included exhaustion (80.8%), heat rash (65.0%) and fainting spells (40.0%) followed by muscle spasm (31.7%) and cramps (25.8%). As far as humidity is concerned, large majority of respondents (84.2%) reported humidity was just tolerable, whereas 70.8 percent reported humidity level as comfortable and 54.2 percent said it was too humid. Talking about the air, 56.7 percent reported windy air, 37.5 percent said that air was full of smells and 35.0 percent reported that air was full of dust and suffocating. Therefore, it can be concluded that performance of the workers can also be improved by making their working conditions comfortable by providing them short breaks under shades. While considering noise another environmental factor, 10.0 percent respondents said that the noise was very annoying and disturbing their work as these farms were close to urban area, or factories. While studying the problems caused due to exposure to pesticides 45-62 per cent of respondents reported that exposure to pesticides causes headache, eye allergy and nausea. Regarding toxicity symptoms associated with pesticides, Yassin *et al* (2002) ^[4] also gave the similar results that common self-reported toxicity symptoms among farm workers were burning sensation in the eyes/face, dizziness, cold/breathlessness, itching/skin irritation, and headache. Whereas, 37.5 per cent reported skin allergies, 24.2 per cent reported difficult breathing and fainting and 15.8 per cent reported asthma problem caused by exposure to pesticides. Protective clothing like mask can be provided to reduce chances of respiratory allergy problems.

Table 1: Environmental risk factors faced by respondents at workplace n=120

Environmental factors	Percentage (%)	Z Score
Temperature		
Too high to concentrate at work	64.2	3.104*
Extreme temperature causing		
Exhaustion	80.8	6.755*
Heat rash	65.0	3.286*
Fainting spells	40.0	2.191*
Muscle spasm	31.7	4.017*
Cramps	25.8	5.295*
Humidity		
Just tolerable	84.2	7.486*
Comfortable	70.8	4.564*
Too humid	54.2	0.913**
Air		
Windy	56.7	1.460**
Full of smells	37.5	2.739*
Full of dust	35.0	3.286*
Suffocating	35.0	3.286*
Noise		
Very annoying/ Disturbing work	10.0	8.764*
Exposure to pesticides causing		
Headache	61.7	2.556*
Eye allergy(redness, watery eyes, itching)	53.3	0.730**
Nausea	45.8	0.913**
Skin allergies	37.5	2.739*
Difficulty breathing	24.2	5.660*
Fainting	24.2	5.660*
Asthma	15.8	7.486*

Multiple responses

*Significant ** Non-Significant

Ergonomic risk factors faced by respondents at workplace

Ergonomics is the study of work in relation to the setting in which it is to be accomplished (the workplace) and those who do it (workers). Various ergonomic factors faced by

respondents are displayed in Table 2. It was found that awkward posture (73.3%) was the main ergonomic factors felt by respondents as they generally adopt awkward posture i.e. squatting and bending posture while transplanting, hoeing,

weeding and harvesting for long hours, which cause musculoskeletal problem. Data reveals that 60-65 per cent of respondents reported awkward posture, repetitive muscle activity, requiring strain on muscles and monotonous/too repetitive work as the main ergonomic factors faced by them. It was found that by doing same work for long time make them bored. Cox and Griffiths (1996) ^[1] also reported that doing repetitive and monotonous work results in boredom which further results in nervousness, depression, anger and poor mental health. Other ergonomic factors faced by respondents are prolonged working hours (48.3%), improper designed tools/equipment (40.0%) followed by prolonged sitting (31.7%), uneven ground (30.8%), ground too muddy/slippery (22.5%) and improper flower plantation (15.0%), whereas, too high speed of work was reported by only 13.3 per cent of respondents.

Table 2: Ergonomic risk factors faced by respondents at workplace n=120

Ergonomic factors	Percentage (%)	Z Score
Awkward posture	65.0	3.286*
Repetitive muscle activity	65.0	3.286*
Requiring strain on muscles	64.2	3.104*
Monotonous/too repetitive work	63.3	2.921*
Prolonged working hours	48.3	0.365**
Improper designed tools/equipment	40.0	2.191*
Prolonged sitting	31.7	4.017*
Uneven ground	30.8	4.199*
Ground too muddy/slippery	22.5	6.025*
Improper flower plantation	15.0	7.668*
Too high speed of work	13.3	8.033*

Multiple responses

*Significant ** Non-Significant

Musculoskeletal disorders faced by respondents

Musculoskeletal disorders are chronic diseases and inflammatory conditions that cause pain and deteriorate everyday activities. They can affect many different parts of body including upper and lower back, neck, shoulders and extremities (arms, legs, feet, and hands). Various musculoskeletal disorders faced by respondents are presented in Table 3 which shows that low back pain (70.8%), general muscular cramps (61.7%) and cervical (50.0%) are the most commonly felt musculoskeletal disorders by the respondents. Similar results were given by Sekimpi (2007) ^[2] that musculoskeletal discomfort, mainly back ache is most common among agricultural employees. He believed that newly designed agricultural hand equipment and machinery will help in reducing the work load and MSDs among agricultural labours. Whereas, sprain and stretching/compression of tendons and nerves are felt by 44.2

per cent of respondents. Carpel tunnel syndrome is experienced by 35.8 per cent of respondents. On the other hand 14-23 per cent of respondents felt other musculoskeletal disorders i.e. Repetitive strain injuries, Ligament injury, Slip disk, hair line fractures and fractures due to undue stress.

Table 3: Musculoskeletal disorders faced by respondents n=120

Musculoskeletal disorders	Percentage (%)	Z Score
Low back pain	70.8	4.564*
General muscular cramps	61.7	2.556*
Cervical	50.0	0.000**
Sprains	44.2	1.278**
Stretching/ compression of tendons and nerves	44.2	1.278 **
Carpel tunnel syndrome	35.8	3.104 *
Repetitive strain injuries	22.5	6.025*
Ligament injury	17.5	7.120*
Slip disk	15.8	7.486 *
Hair line fractures	14.2	7.851*
Fractures due to undue stress	14.2	7.851*

Multiple responses

*Significant ** Non-Significant

Safety factors perceived by respondents at workplace

Safety is a basic ergonomic feature which helps in reducing the accidents and allows the workers to work safely in a secure environment. It broadly includes the unsafe work conditions and work practices, lack of basic facilities and tools and equipment's. Different safety factors perceived by respondents at their workplace are presented in Table 4. It shows that 40.8 per cent respondents reported that the working conditions were unsafe. Whereas, 23.3 per cent respondents reported that work practices were unsafe. It was observed that there was lack of basic facilities like separate toilet for women, facility to warm meal and sanitary napkin disposal system which should otherwise be provided to them. Majority of respondents (89.2%) reported that they were not provided with protective clothing. Whereas, 35-39 per cent respondents reported that there is a lack of place to keep personal belongings and first aid kit during injury. But it was also observed that those who were provided with protective clothing like gloves were not using them. Similar finding was reported by Singh (2016) ^[3] that 78 per cent of workers were not wearing the personal protective equipment's while working. The main reason behind not wearing the PPEs was that they feel uncomfortable after wearing the available PPEs. As far as tools and equipment's are considered, 40.8 per cent respondents reported trowel has blunt edges and too much effort is required to operate it, whereas 35.00 per cent respondents reported improper handle of trowel.

Table 4: Safety factors perceived by respondents at workplace n=120

Safety factors	Percentage (%)	Z Score
Unsafe work conditions	40.8	2.008*
Unsafe work practices	23.3	5.842*
Lack of basic facilities		
Lack of protective clothing	89.2	8.581*
Lack of place to keep personal belongings	38.3	2.556*
Lack of first aid kit during injury	35.0	3.286*
Tools and equipments		
Trowel has blunt edges and too much effort is required to operate it	40.8	2.008*
Improper handle of trowel	35.0	3.286*

Multiple responses

*Significant ** Non-Significant

Remedial Measures

Some remedial measures were suggested so that occupational risk factors can be reduced. These tools allow workers to do their jobs with improved postures, better hand grips, and less metabolic energy than their jobs currently require.

Rest Breaks

- To reduce strain take short rests or if necessary close the eyes and cover them with the hands without pressing and breathe deeply eight to ten times.
- Micro-breaks – between burst of activity rest the hands, neck and shoulders in a relaxed straight posture.
- Rest-breaks – every 30-60 minutes take a brief 5-minute break and engage in another activity.
- Exercise break- every 1-2 hours do gentle stretching exercise.

Field Problems and Solutions

Problem: Due to dust in the fields, they suffer from breathing problems and respiratory diseases as they do not cover their mouth while working in the field or sometimes temporarily cover it with dupatta which is not appropriate (fig 1).



Fig 1.

Solution: In order to cope up with this problem they should wear mouth mask (fig 2). The main benefit of wearing a mask is that it helps prevent you from getting ill and therefore helps keep you working. Wearing a mask can stop you from developing the symptoms of respiratory illness caused by inhalation of hazardous substances at work (for example, coughing, wheezing, shortness of breath, chest tightness or difficulty in breathing).



Fig 2: Face Mask

Problem: While flower cultivation women suffer from scratches and cuts in the hands and also they feel pain in distal

phalanx as they pluck the flowers with hand (fig 3).



Fig 3.

Solution: In order to protect your skin from scratches and cuts; and prevent pain in distal phalanx gloves were developed. The material used for making gloves is water proof so that the moisture in the flowers do not make them wet and the fabric is durable too so that it cannot tear off easily. It avoids your hands from getting dirty; help to prevent infection as scratch or cut can quickly lead to an infection and protect your hands from field insects. In order to prevent pain in distal phalanx, the gloves were designed in such a way that the fingers and the thumb were cushioned with foam so as to give you the feeling of softness and reduce the pressure on fingers and thumb while plucking flowers. These gloves are suitable for both marigold and rose flowers as they are field tested (fig 4, 5 and 6).



Fig 4: (Gloves)



Fig 5: (Use of gloves in marigold fields)



Fig 6: (Use of gloves in rose fields)

Problem: Trowel used for hoeing and removing weeds is not ergonomically designed as women generally adopt squatting posture during these activities and maintain it for long hours, which cause musculoskeletal problems (fig 7).



Fig 7.

Solution: Instead of traditional hand trowel it was suggested to use ergonomically designed trowel. It is a long handled tool, available in two length medium length (16”) and long length (48”). Out of two, long length trowel is best as it is ergonomically designed maintaining the body in a good posture minimizing the burden on muscles and joints. It helps in reducing musculoskeletal problems. It has non-slip handle that make it easier to hold. This makes you feel less strain, stress and pain. Whereas, while using medium length trowel, one has to work in a bent posture putting some strain on back but still better option than using traditional trowel (fig 8 and 9). Therefore, Perceived exertion experienced by the women while using improved tools was less as compared to traditional methods.

Trowel	Picture	Height	Posture adopted
Medium length		16 inches	Bending  Fig 8: (medium length trowel)
Long length		48 inches	Standing  Fig 9: (long length trowel)

Problem: After plucking flowers, women usually put them in a basket, bucket or polythene and keep flowers in hand until their hands are full with flowers and then put them in bucket

or basket, which decreases their work speed as their hands are not free (fig 10 and 11).



Fig 10.



Fig 11.

Solution: Instead of using basket, bucket or polythene prefer using harvest and clean up apron. The large harvesting bag (developed by AICRP, Department of Family Resource Management, Punjab Agricultural University) leaves your hands free and features a bottom flap that unhooks to easily deposit your load into waiting receptacles. With adjustable waist straps, it will fit practically anyone (Fig 12).



Fig 12.

Conclusion

From research findings it can be concluded that female farm workers while performing various flower cultivation activities were exposed to a wide variety of occupational risks factors. Some remedial measures were suggested so that occupational risk factors faced by female workers engaged in flower cultivation can be reduced. But there is a need for ergonomic improvement of agricultural work settings.

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