

Assessment of Occupational Health of Workers in Floriculture Industry in Rural Maharashtra

Ashlesha Dandekar, Swati Raje, Prajakta Kadale

Department of Community Medicine, MIMER Medical College, Talegaon Dabhade, Pune, Maharashtra, India

ABSTRACT

Introduction: Unskilled agricultural workers are vulnerable to occupational induced health problems. Working in pesticide intensive environment of a polyhouse can lead to various health hazards. There are not many Indian studies regarding health risks and safety practices among floriculture workers and magnitude of the problem in India. **Aims and Objectives:** To assess occupational morbidities in polyhouse workers in floriculture industry in rural Maharashtra. **Material and Methods:** A cross sectional study was undertaken in 6 floriculture units of Floriculture Park. Sociodemographic, work and health related variables were recorded using a pretested structured questionnaire. Clinical examination and laboratory investigations were done by medical experts. **Results:** Overall morbidity was 89.83%, with respiratory problems prevalent in 66.94%, followed by musculoskeletal problems (62.5%). Itching was reported by 42(35.59%) of the study population. Three fourth female workers and 23% male workers had pallor. **Conclusion:** Alarming high prevalence (93%) of occupational morbidities found in our study underlines the need of health education to the workers as well as guidelines for safe occupational practices to the owners of the farms

Key words: Floriculture, respiratory problems, musculoskeletal problems

INTRODUCTION

India is an agriculture-oriented country with 60–70% of the Indian population depending on agriculture sector directly or indirectly. Agriculture contributes to 16–17% of gross domestic product. The agriculture-dependent population of India is 263 million (census 2011) and over half of them are agricultural laborers, i.e., unskilled workers, a trend observed for the 1st time in the past 40 years.^[1]

Agriculture in India is expanding its horizons with use of modern technology for betterment of the farmers income. Floriculture is one such industry of recent origin. It involves cultivation of flowers in plastic greenhouses (polyhouses). As floriculture industry has high export potential, flower growing area and cut flower production have been increasing rapidly for the past two decades.^[2] To promote the establishment of these export-oriented units, the government has also set up special floriculture zones in various parts of the country.^[3,4] Maharashtra is host to many floriculture units.^[3] One such zone is near Talegaon (Dabhade) spread over 200 hectares.

Enhanced production, good quality flowers, and higher profits are an area of concern for the owners. To improve cost-effectiveness, the labor force employed is mainly unskilled and from the unorganized sector and many a times migrants. These unskilled agricultural workers are vulnerable to occupational induced

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Address for correspondence:

Swati Raje, Department of Community Medicine, MIMER Medical College, Talegaon Dabhade, Pune, Maharashtra, India. E-mail: raje_swati@yahoo.co.in

health problems, more so due to ignorance and lack of education. On the other hand, cultivation practices in the floriculture industry are very pesticide intensive as compared to edible agricultural products. Since floriculture workers are exposed at numerous stages of plant growth, worker exposure is of particular concern in polyhouses where up to 127 different chemicals are used in enclosed spaces. This can lead to various health hazards such as allergic reactions, dermatitis, pneumonitis, cancers, neuropathies, endocrinal effects, and reduced cholinesterase levels leading to cholinergic symptom.^[5] The risk is even higher if there is no awareness or enforcement of the use of personal protective devices; proper labeling, handling and storing of pesticides, and following the re-entry period.

Occupational health remains neglected in developing countries because of competing social, economic, and political challenges. Occupational health of agricultural workers especially the pesticide applicators is a matter of public health concern. European countries developed flora business very early and have set norms for the workforce. India is comparatively naïve in this field. There are not many Indian studies regarding health risks and safety practices among floriculture workers. There is a need to identify the magnitude of the problem in India. It is also necessary to find out the knowledge, attitude, and beliefs of the workers about pesticide risks. This can help in formulating preventive and control measures and enforcing them.

To address this concern, the present study was undertaken to assess occupational morbidities in workers of floriculture industry in rural Maharashtra.

MATERIALS AND METHODS

Floriculture park at Talegaon Dabhade M.I.D.C, Pune, India, hosts about 100 units growing cut flowers. Considering the reported prevalence of morbidities in workers in floriculture industry as 63%,^[5,6] estimated sample size is 111. A cross-sectional study was undertaken in 6 floriculture units of Floriculture Park. Sampling type was purposive. All the workers who agreed to participate in the study were included in the study. The study was conducted after obtaining approval from the Institutional Ethics Committee and written permission from the farm owners. The purpose of the study and confidentiality was explained to all the study subjects and written informed consent taken.

Workers were interviewed using a pretested structured questionnaire for sociodemographic, work,

and health-related variables by trained personnel. Clinical examination was done by medical experts and spirometry with forced expiratory volume in 1 s was measured with Microlife 100 peak flow meter. Venous blood (5 ml) was collected from those who gave consent. Hemoglobin estimation was done by Sahli's, thyroid function tests by C.L.I.A., and serum cholinesterase levels by butyrylthiocholine method. Workers not involved in cultivation practices such as administrators were excluded from the study. Data collection was supervised for completeness, accuracy, and clarity. Consistency of data entry was checked by reentering 10% data. Data were analyzed using SPSS version 19.

Medical advice and health education related to occupational morbidities were given immediately to the workers after data collection.

RESULTS

A total of 118 workers participated in the study of which 63 (53.38%) were males and 55 (46.61%) females. Age of the study population ranged between 18 years and 75 years, average being 32 years. Most of the study population was between 20 years and 40 years. The number of females in the reproductive age group was 48 constituting 87.27% of the female study population. Age and gender distribution of the study population are shown in Figure 1.

The majority of them, i.e., 95 (80.50%), belonged to joint families, while only 19 (16.10%) belonged to a nuclear family. Four of them were single while the rest were married. Most 112 (94.91%) were migrants while 6 (5.08%) were local people. The majority of the study population was uneducated (42 [35.59%]) or educated up to primary level only (45 [38.1%]). The majority, i.e., 104 (88.13%) of the study population, were unskilled agricultural workers.

Although the duration of employment ranged between 8 days and 20 years, mean duration of

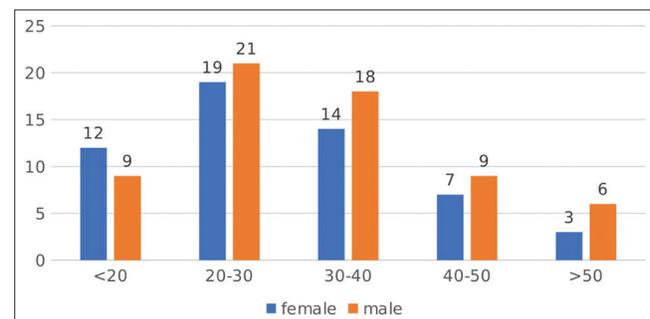


Figure 1: Age and gender distribution

employment was 4.5 years. All of them worked for 9 h/day for 6 days in a week. It was observed that the number of male and female workers did not differ with respect to duration of work [Figure 2]. This may be because most of the workers are families working together. The proportion of workers with more than 3 years experience was almost half (58 [49.15%]) of the study participants.

The work activities mainly involved working in polyhouse, packing, and spraying of pesticides. Other works being done by these workers included weeding and irrigation. As the floriculture units visited were on a smaller scale, some workers were doing all of the above-mentioned work as and when required. The observation of the occupational environment revealed that the workers were exposed to higher temperatures and humidity in the polyhouse, while those in the packhouse were exposed to very low temperatures and low humidity in the cold storage. Obnoxious smell of chemicals was omnipresent. The plants in the polyhouses were at ground level and up to a height of 2–3 feet and cultural practices such as harvesting, bending, weeding involved bending, sitting on haunches, and exposure to thorns of the rose plants. The path in between the flower beds was muddy and wet. The packhouse had work tables for dethorning,

grading, and packing of flowers but the floors were soiled, wet, and slippery at times due to spillage from buckets containing the day’s harvest. In spite of all these hazards, the prevalence of use of personal protective devices was low (65 [55.08%]) and suboptimal.

Common morbidities in past 1 year as reported by study population are depicted in Figure 3. Overall prevalence of morbidities in study population was 106 (89.83%). Respiratory morbidities such as breathing difficulty (22 [18.64%]) and respiratory tract infections (57 [48.30%]) together accounted for 66.94% of the morbidity burden. The other most commonly observed morbidity was musculoskeletal, i.e., backache and joint pain in 75 (62.5%) of the participants followed by neurologic symptoms such as headache and fatigue in 65 (55.08%). Skin problems in the form of itching were encountered in 42 (35.59%) of the study population. Cuts and wounds were fairly common with 41 (34.74%) of the participants agreeing to the presence of cuts and wounds while working. One participant was found to have history of hypertension. Other health problems reported by the participants were giddiness, fainting, loss of appetite, bloating of abdomen, gastritis, irritation of the eye and nose, eczema, etc.

Mean body mass index (BMI) of female workers was 20.2 + 3.13 as against 20.2 + 4.49 for males. The blood pressure was detected to be high for 1 female and 3 male workers. More than three-fourth (42 [77.6%]) female workers and 14 (23%) male workers had pallor on clinical examination. Hemoglobin estimation revealed that 38 female workers and 51 male workers had anemia. Serum cholinesterase levels were found to be low in 7 (of 109) workers, i.e., 2 females and 5 males. Thyroid function tests showed abnormal results in 6 (of 105) study participants – 3 female and 3 male workers. Derangement of respiratory capacity, i.e., reduced peak expiratory flow rate was found in 9 women and 8 men of 112 participants who did spirometry.

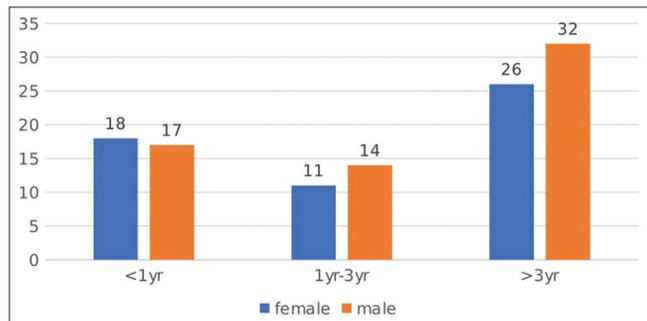


Figure 2: Distribution of number of work years

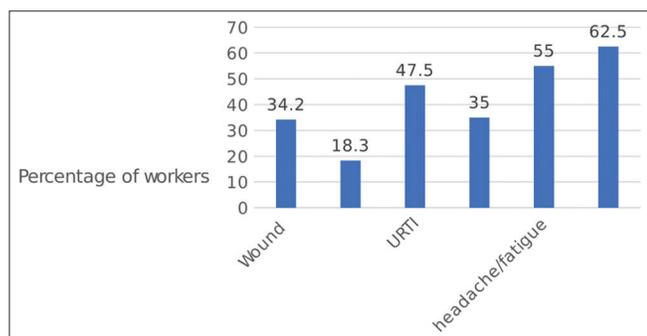


Figure 3: Morbidity pattern

DISCUSSION

Our study population was evenly distributed in terms of the number of male and female workers as compared to studies in other parts of the world where women workers made up the majority of the employees in floriculture industry (Ethiopia^[5] [79.9%] and Tanzania^[7] [65–70%]). Our findings were similar to a study in Bengaluru (2016)^[8] which reported 53.5% of the workforce as males. The reason could be that in most of the farms migrant families were employed with all adult members working in the farm. Migrants

constituted 94.91% of the study population similar to a Kenyan study that reported 84.1% migrant workers,^[9] 87.27% of the women studied were in the reproductive age group in whom effects of pesticide exposure can have long term consequences. Low levels of education of workers in this study are similar to those in other studies.

Overall occupational morbidities were seen in 106 (89.83%) workers of floriculture industry in our study area. A similar study in Ethiopia (2013)^[5] reported 95.85% morbidities. Chitra *et al.* (2006)^[10] reported that 86.1% of farmers spraying predominantly insecticides in Southern India had experienced signs or symptoms related to pesticide exposure. Other studies have reported 79% in Bengaluru (2016),^[8] 32% in Phillipines,^[5,11] and 50–60% in Latin America.^[5,11] The higher prevalence found in our study could be due to sociodemographic determinants such as poverty, illiteracy, migrant population, poor housing, and working conditions. The fact that the workers were staying in the floriculture farms itself away from health care facilities might have contributed to the higher prevalence. There was no pre-placement medical examination. Suboptimal use of personal protective devices and lack of knowledge about the re-entry period was also observed. The farms being small-scale units, the workers were doing all categories of work. All these factors may place them at increased risk of exposure to agrochemicals.

The most commonly identified health symptoms were respiratory (66.94%) and musculoskeletal (62.5%) followed by neurologic (55.08%) and skin problems in 35.59% in the present study. Similar studies have found the prevalence of respiratory and skin problems to be 81.1% and 67.8% in Ethiopia^[5] and 42.5% and 6.5%, respectively, in Kenya.^[12] A study in floriculture units near Bengaluru^[11] reported musculoskeletal problems as the predominant morbidity (64%), followed by headache (38%), allergic conjunctivitis (10.1%), skin symptoms (3.1%), and allergic rhinitis (2.3%). Musculoskeletal symptoms are also found in cultivation of other crops as agricultural practices involve physiologically incorrect postures for long hours. High prevalence of respiratory and neurologic symptoms is related to exposure to organic and inorganic dusts and pesticides while working in the polyhouse. The presence of higher humidity enhances formation and absorption of complex aerosols, causing respiratory effects.^[13] Low serum cholinesterase levels in 7 (6.42%) and altered thyroid profile in 6 (5.71%)

study participants further point toward toxicity of pesticides. Our findings are in coordination with those by Rastogi *et al.*^[12] The prevalence of inhibition of the cholinesterase enzyme in workers who handle organophosphorus pesticides fluctuates between 3 and 18%.^[13] Lower nutritional status, as reflected by low average BMI, is also a factor for enhanced morbidity due to pesticide exposure.

CONCLUSION

Alarming high prevalence (89.83%) of occupational morbidities found in our study underlines the need to establish a Health and Wellness Center in Floriculture Park. Detailed multicentric studies are needed to look into determinants of occupational health in polyhouse workers. Health education of workers should be periodically carried out as it forms the cornerstone of occupational health and safety.

The limitation of our study is that it was carried out in a limited geographical area.

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