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Musculoskeletal disorders among the gardeners: A cross sectional study

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Abstract

Context: Gardeners are at increases risk of occupational hazards. Musculoskeletal disorders are common as they exposed to risk factors like unhealthy posture and lifting of heavy weight.

Aims: to assess the health status of the gardeners.

Methods and Material: this was a cross sectional study done on 60 gardeners. General information of the worker and work related history was enquired using Modified Nordic questionnaire. Anthropometric parameters were recorded. Examination of the gardeners was done. Analysis of Working Posture was done using OWAS method.

Results: Low back pain was the commonest musculoskeletal disorder in gardeners. It was followed thigh, ankle and neck pain.

Conclusions: Thus gardeners are at increased risk of development of MSD. It may be linked uncomfortable gardening posture during their work.

Keywords: Gardeners, posture, musculoskeletal disorder

Introduction

Gardening is the practice of growing useful plants. The occupational gardeners have a hectic physical work profile. They have to work till the afternoon of summer and early morning in winter. This fact is also important for the personnel engaged in gardening as they have to undergo physical strain in an environment polluted by pesticides, dust, severe cold and different allergic weeds affecting health of gardeners.

Spading means a tool with a broad, deep scoop or blade and a long handle, used in lifting and moving loose material as soil, snow, gravel etc. Spading in Indian working populations are widely varied depending their work situation such as digging of soil by gardeners and many others. Some authors had considered stooping, kneeling, squatting and twisting posture as the most uncomfortable and dangerous postures during gardening^[1-3]. These risk factors can be found in spading activity.

Musculoskeletal disorder is the leading cause of occupational ill health, an awkward and static posture has been recognized as a risk factor for work related problems. The high degree of flexion of the knees and the external pressure on the knees in kneeling work are known contributors to knee complaints^[4,5]. While squatting, a maximal bending knee joints and hip joints are required. These uncomfortable gardening postures can cause fatigue, physical pain and injuries to older gardeners. Moreover, digging with a conventional spade was determined to lead to lower back injury^[6]. Therefore the main aim of this investigation was to know the common complaints of the workers during various postures which was involved in this profession. Thus this study will enable us to know whether these workers are at risk of musculoskeletal disorder.

Subjects and Methods

This was a cross sectional study done on 60 gardeners.

Selection of Subjects

Sixty (60) male gardening workers engaged in nursery were selected randomly from unorganised sectors in Baidyabati, Hooghly. They were engaged in the spading like activities. General information of the worker and work related history was enquired using

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Modified Nordic questionnaire [7]. The questions were grouped to the following major selectors dealing with-

- a) General information of one worker i.e their age, years of experience, working status.
- b) Work organization and work behaviour.
- c) Stress at work and detailed questions on work related discomfort.
- d) Past history of workers.

Written informed consent was obtained from the workers. Height and weight were recorded. General and systemic examination of the workers was done. BMI and BSA along with PI (Ponderal Index) were calculated using equation. BP was also recorded. Permission was obtained from the institute ethics committee for smooth conducting of this study.

Analysis of Working Posture was done using OWAS method. OWAS is based on two parameters.

- Joint movement of back, upper and lower extremities.
- Force applied for which a posture is held.

The OWAS code constitutes a record for the posture itself considering three body parts viz the back, arms and legs which are applied involved with the force applied. Stick diagrams were drawn from the photographs [8].

Statistical analysis was done using statistical software. Numerical variable were expressed in mean and SD.

Results

From the questionnaire analysis, it was observed that the average duration of work was 9 hours per day starting from 9.00 am with two intervals of 20-25 minutes and 10-20 minutes, respectively. The subjects got one day off per week. The workers had an average of 8 yrs. of experience in the work they are performing. Physical characteristics and the physiological parameters are shown in table 1. Table 2 shows analysis of positive responses regarding work organization and work behaviour. Analysis of Responses regarding assessment of work stress and work related pain is shown in table 3. Low back pain was the commonest

musculoskeletal disorder in gardeners. (Table 4) It was followed thigh, ankle and neck pain. Analysis of posture by OWAS method is shown in table 5.

Table 1: The Physical Characteristics and the Physiological parameters of the workers

Variable	Mean± SD
Age (years)	49.1±11.27
Height(cm)	164.8±7.87
Weight(kg)	58.1±9.85
BMI(Kg/m ²)	21.4±3.10
BSA(m ²)	1.6±0.15
Ponderal Index	42.7±2.22
Heart Rate at rest (beats per min)	79.9±5.01
Systolic Blood Pressure at resting (mmhg)	122.2±11.85
Diastolic Blood Pressure at resting(mmhg)	81.9±9.57

Table 2: Analysis of Positive responses regarding work organization and work behaviour:

Questions	Number (%)
1.Job requires knowledge of skill full activity	38(63.3%)
2. Workers make frequent mistakes	48(80%)
3. Job demands frequent rotation for task and place	60(100%)
4. Job demands training for acquisition of skills	60(100%)
5. Rigidity in work methods and procedure	58(98.4%)
6. Supervisors pressure is high	36(60%)
7. Work demand target specific if any	50(83.3%)
8. Work wears if any	6(10%)
9. Job demands repetitive motions of body segments	60(100%)
10. like to work in a group	60(100%)
11. Motivation factor (money status)	56(93.3%)
12. Salary Satisfactory	10(6.7%)
13. Bonus/other allowances	60(100%)
14. Like to accept new jobs	10(6.7%)
15. Job description is clearly specified	60(100%)
16. Family dependance	60(100%)
17. Workers perform multiple tasks at a time	10(6.75%)
18. Job requires field working positioned	60(100%)

Table 3: Analysis of Responses regarding assessment of work stress and work related pain:

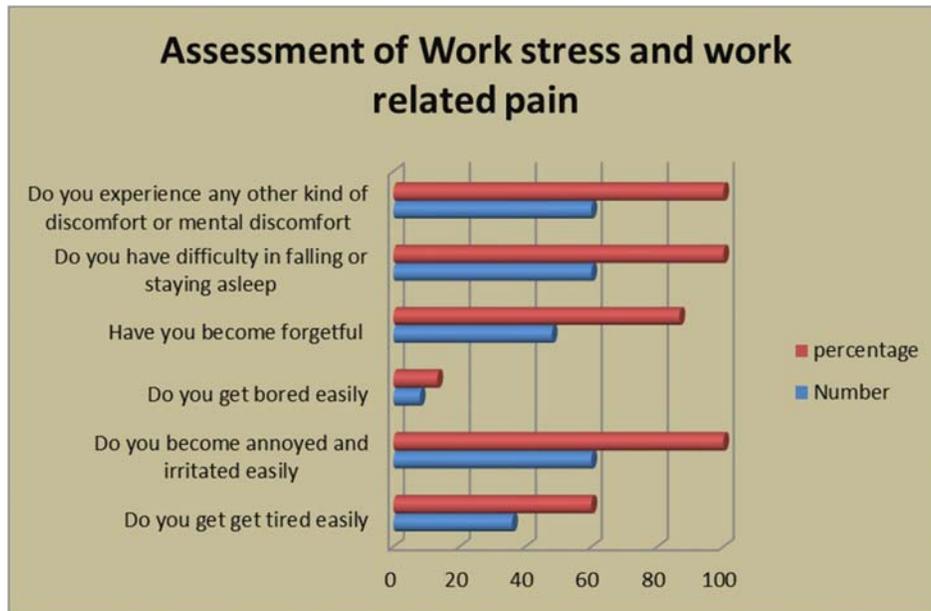


Table 4: Analysis of Responses regarding the development of musculoskeletal disorder in the different body parts:

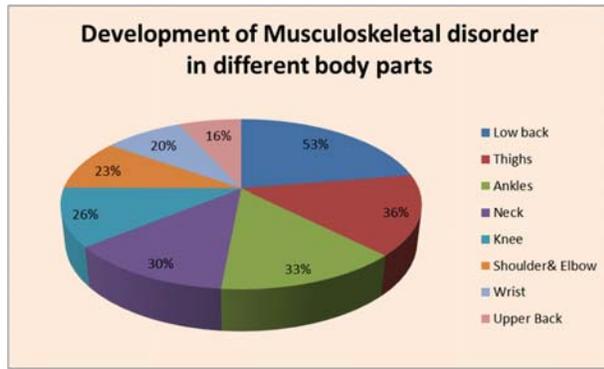


Table 5: Analysis of Posture by OWAS method:

Figure	Code	Action category	Remarks
	4131	3	Corrective measures as soon as possible

Above picture of the stick diagram shows that the worker has worked in this posture during long time, so the development of MSD can occur normally.

Discussion

In this study Developments of musculoskeletal disorders (MSD) at different parts of the body during spading activity in the nursery were analysed, it was found that most of the gardening workers involved mainly in spading activity have musculoskeletal disorders. Low back pain was mainly seen. The working postures in this study was analysed and it reveals that most of the postures required corrective measures as soon as possible as indicated by manually OWAS posture analysis system.

OWAS method to study the working postures of four construction sites [8]. In this study OWAS method was very effective for the analysis of postures in different nurseries. Gangopadhyay S *et al* had found that workers performing rigorous hand jobs were doing activities like grasping of the hands, repetitive bending of the wrist, vibration and localized mechanical pressure. They were considered to be the contributing factors towards the occurrence of this disorder [9]. In this study same repetition was performed with the spade by the workers for long time, so it can be stated that this will lead to occurrence of the work related musculoskeletal disorder.

Some reviews have affirmed that a strong work related component exists for many upper limb and low back pain cases [10]. A study reported that MSDs, likely attributed to physiologically strenuous occupational activities repeated on average of 30–40 times daily [11]. Occupational hazards, excessive stress in work station, fault of work station design, environmental stressors, more hour spend over recommended time, lack of proper nutritional supplements are the most important factors that affects their health. Woman has different ergonomically characteristics than man. So, design of women friendly tools and equipment is required for reducing these health hazards [12]. One Study reported that female agricultural workers suffered discomfort during work, after work and during sleep at night. By considering the results of the study it was revealed

that spading is the most strenuous task [13]. In the present study this activity was the main cause of low back pain. Moreover, as these workers belong to unorganised sectors, they do not get any such medical benefit or periodic health check-up facilities from the management and their low socio economic condition compels to remain in same profession.

Workers should take following precaution

- Workers should use gloves for fine gripping, work shoes, hat for safety purpose. Workers should be educated about the safety of these measures.
- They should reduce bending forward and should use instrument to carry heavy weight.
- They should maintain good decision making in relation to their work.
- Govt. should arrange a regular health check-up programme and also provide monitory support to them for their health.

Thus gardeners are at increased risk of development of MSD. It may be linked uncomfortable gardening posture during their work. Thus ergonomics in different aspects plays an important role in occupation health of the gardener. We recommend large multicentric trail with good sample size keeping all these factors in mind.

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