

# POSTURAL STRESS AND MUSCULOSKELETAL DISORDERS OF FARM WOMEN IN UPROOTING OF PADDY SEEDLINGS FROM MAT NURSERY

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**Abstract**– Uprooting of paddy seedlings from wet bed is one of the most drudgery prone farm activities of Assam. Raising paddy seedlings in mat nursery is a solution for reduction of drudgery of farm women. A study was carried out to assess postural stress and incidence of musculoskeletal problems of farm women while uprooting in mat nursery. Angle of deviation in lower lumber region was measured with Flexi curve. Body Map was used to identify pains in different parts of the body. Angle of deviation at lumbar region was higher in wet bed and reported more 'severe' pain in shoulder joints, back, legs due to prolonged bending posture adopted in uprooting deep rooted seedlings. Mat nursery is a suitable alternative to wet bed for reducing drudgery, muscular stress, and labor cost. It is important to bring resilience in Indian agriculture to climate change.

## INTRODUCTION

Postural stress and musculoskeletal disorders (MSDs) are the most common work-related problems which lead to high costs and a reduction in labor productivity. In developing countries like India, human labour constitutes an important power for performing farm activities. Uprooting of seedlings is a female dominated agricultural operation and is one of the most drudgery prone activities in North Eastern regions of India. Uprooting of seedlings is an important agricultural activity in paddy cultivation and takes place before transplanting. In this method, germinated seeds are sown in raised seed bed are uprooted for transplanting when seedlings are 28-30 days old depending on the variety. This activity is carried out in an open field by farm women and is performed in the morning till afternoon approximately for 7-8 hours. It is highly labor intensive and strenuous due to long hours of bending and standing postures adopted in the field (Borah *et al.*, 2001). For reduction of drudgery of farm women in uprooting of paddy seedlings from wet bed a suitable alternative - mat nursery was adopted. An attempt

was undertaken to assess the postural stress and musculoskeletal disorders of farm women in uprooting of seedlings from mat nursery.

## MATERIALS AND METHODS

Twenty farm women who are normal, non-pregnant, non-lactating and without any major illness were selected in the age group of 25-45 years.



Seedlings grown in mat nursery



Uprooting from mat nursery

## Postural stress

Postural stress was assessed during performance of uprooting with the help of flexi curve (Varghese *et al.* 1994 and Varghese *et al.*, 1995). The angle of postural

bends was taken during uprooting and the angle of deviation of lumbar region was analyzed for the respondents against normal erect standing position.

**Identification on the incidence of musculoskeletal disorders**

Body map (Borg, 1982) is the technique used for identifying the sites and intensities of pain. To ascertain the musculoskeletal disorders in terms of severity of pain in different body parts among respondents, a 5 point scale, ranging from ‘very severe’, to ‘very mild’ was used.

**RESULTS AND DISCUSSION**

**Details of study**

Mat nursery is an alternative and improved method of uprooting for mechanical transplantation of seedlings. In this method, germinated seeds are evenly sown on a thick polythene sheet and covered with soil mixture. When seedlings are 20-21 days old, these are considered suitable for transplanting. This method does not require the process of mud removal and bundle making and could be directly transplanted by transplanter. However, in absence of mechanical transplanter, the seedlings could be manually uprooted by farm women, which may be a suitable alternative for reducing drudgery of farm women in uprooting in conventional method. Space required for raising seedlings in mat nursery is comparatively less than wet bed for the same amount of seeds.

Originally mat nursery was developed by CIAE, Bhopal for mechanical transplanting by transplanter. It is a dry method of sowing paddy seedlings. In Assam, dry method is not suitable because seedling grown in mat nursery could not be transplanted in wet land with the help of transplanter. Moreover, transplanter is very costly and hence unaffordable by the farmers. Keeping this in mind, for reducing drudgery of farm women while uprooting, the mat nursery (dry method) was refined to wet method for manual uprooting.

**Postural stress**

Analysis of postures showed that the subjects assumed ‘standing’ and ‘bending’ postures in uprooting from wed bed (UWB), on the other hand ‘sitting’ and bending postures were mostly assumed in uprooting in mat nursery (UMN) with occasional standing. This is due to the small seedlings height in mat nursery. The analysis further showed that the

angle of normal curve of the subjects was 203° while the angle of bend (AOB) was 220° in UWB and 210° in UMN respectively. Angle of deviation (AOD) was the deviation from normal curve in erect position. Angle of deviation was 17° in UWB and 7° in UMN which indicated that the respondents had to assume bending postures for longer time in wet bed leading to more drudgery (Fig. 1).

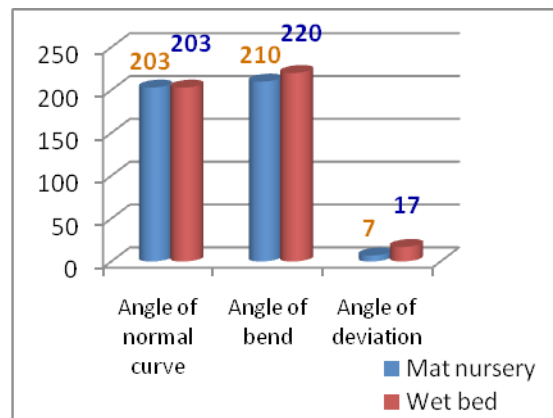


Fig. 1. Angle of deviation

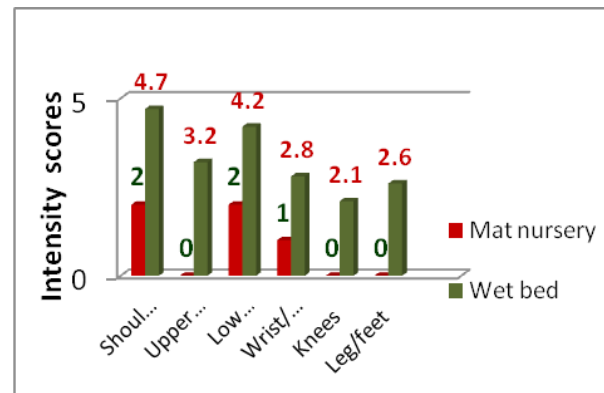


Fig. 2. Incidence of musculoskeletal disorders

**Incidence of musculoskeletal problems**

The present experiment shows that uprooting was carried out by changing postures frequently which may cause musculoskeletal problems amongst farm women. Data on incidence of musculoskeletal problems reveals that the intensity of pain in UWB was ‘severe’ in different body parts. The subjects experienced ‘severe’ pain in shoulder joint and ‘low back’ scores being 4.7 and 4.2 respectively while ‘moderate’ pain felt by most of the respondents in ‘leg’ and ‘hands’ due to prolonged bending postures adopted in uprooting of deep rooted seedlings, from wet bed. It was encouraging to note that the intensity of pain was less in UMN. ‘Mild’ pain was

experienced in shoulder (2.0), low back (2.0) and wrists (1) by the respondents (Fig. 2). The reason expressed by the respondents was that since the roots are not deep rooted in mat nursery as in wet bed and mat nursery was smaller in size, uprooting needed less effort. However, the respondents were of the opinion that they need to be skillful in separating the small roots of seedlings in mat bed which remain entangled to each other.

### CONCLUSION

The foregoing analysis reveals that raising of seedlings in mat nursery had reduced drudgery of farm women. Hence, mat nursery may be a suitable alternative to wet bed for drudgery reduction of the women involved in uprooting of seedlings. For increasing yields of paddy and future food security for growing population mat nursery is an improved technology to bring resilience to Indian agriculture. To overcome the problems of drought and flood, mat type nursery is one of the important coping mechanisms since there are no significant

differences between yield attributes of mat nursery and wet bed.

### Conflict of Interest:

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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