Posture Adaptation of women engaged in MGNREGs: REBA Analysis

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Abstract
Indian rural women stretch their available human resources (time and energy) beyond its limit and in the process suffer with musculoskeletal pains / injuries. The women engaged with MGNREGs in rural sector have the advantage of availability of paid work within the vicinity of home for some time of the year along with agricultural activities, but are the victims of occupational hazards due to lack of awareness, knowledge and illiteracy, which results in fatigue and drudgery. In MGNREGs related activities, the women dig and carry about 10-20 kg weight in different postures to ensure that their work is finished faster. In the process, they unintentionally adopt awkward postures for longer durations due to use of unfit hand tools.

A study was conducted in rural areas of Anand district of Gujarat to understand the quality of work-life of the women engaged in MGNREGs by analysing their adopted work postures. A Sample consisting of thirty women were selected for deep analysis through Rapid Entire Body Assessment (REBA) technique, while handling manual material with tagara at the work site. The results of the REBA scores identified for the selected postures resulted in high to very high risk levels. Further statistical analysis of the 3 different postures along with intensity of body pain was tested through ANOVA and all the selected postures revealed significant body pains.

Key words: *Posture, Intensity of body pain, Women engaged in MGNREG scheme.*

INTRODUCTION

According to the India Labour Year Book (2011-12), the rural population in India were 83.3 crore and 34.8 crore were rural workers, out of which 12.2 crore were women. In order to provide guaranteed employment to the rural people, the Government of India came up with the National Rural Employment Guarantee Act in 2005. By 2006, it covered 200 remote backward districts and by 2008, it covered all the districts in India. It is mainly a labour-intensive program requiring relatively low investments from the worker and provides an earning source for survival.

MGNREGs provides legal guarantee of one hundred and fifty days of employment in every fiscal year to adult members of any rural household willing to undertake, unskilled manual work at the statutory minimum wage. They can work for the improvement of community assets like Water conservation and water harvesting, drought proofing, irrigation of canals, renovation of traditional water bodies, land development, flood control and protection and rural connectivity to provide all weather access etc

Creating durable community assets and strengthening the livelihood resource base of the rural poor are important objectives of the scheme. The scheme created local employment in the lean season of agriculture, thus ensuring livelihood for rural poor throughout the year. Almost 50% of the rural poor women took advantage of the scheme in different States of India. None the less the women suffer with musculoskeletal pains / injuries due to adopting awkward postures because of unfit hand tools (as the task funded under the MGNREG scheme shall be performed using manual labour and not with machines) The poor fit between the tools, the worker and the work place result in poor ergonomics which has a negative impact on workers in terms of accidents and injuries (Marras & Karwowski, 2006).

A number of studies that reviewed injury data in many countries found that the use of hand tool was responsible in 5-10% of all injuries (Singh, 2008) and they lack the awareness, skill or training in handling manual material. However, there is a growing recognition of the need to improve enterprising abilities and skills for better utilization and improved self-management (Hirway, 2011). The review of the implementation of the program over the last five years suggests that there is a need to continuously upgrade the capacities of the human resources needed for the sound implementation of the MGNREG Scheme (MGNREGs, Ministry of Rural Development, 2005 & 2008 Operational Guidelines).

The Objectives of the present study

- ✓ To study the existing work practices of the selected rural women working under MGNREGA in terms of postures adopted and the intensity of body pain endured by them in Anand District.
- ✓ To impart the training on identified gaps (in terms of postures) to the rural women engaged with MGNREGs.

Hypothesis

- There exists no significant difference between the intensity of body pain endured by the respondents with respect to their postures adopted during the work.

Materials and Methods

In MGNREGs related activities, the women carry about 10-20 kg weight on head, on shoulders, on back or in hands either standing erect, standing–cum-bending or in bending postures to ensure that their work finishes faster and all these load carrying activities result in drudgery. Hence the study was carried out with 30 women (age 18 to above 50 years) while working for rural connectivity in Anand District in Gujarat State. Multiple methods were used (at different stages) to collect the required data which included descriptive method (for obtaining personal data), self-report method (for intensity of pain), observational (for adopted postures), and direct methods (for anthropometric measurements) as they were considered to be most effective in (eliciting and) obtaining the data.

About Variables: Intensity of body pain and Postures adopted.

Intensity of body pain:

One of the common problems faced by the work force is musculoskeletal pains / injuries. Actual treatment or prevention for these injuries is not possible until we understand the possible causes of the pains. In the present study, an attempt was made to understand the intensity of body pain sustained by the MGNREGS women in the work-site. The intensity of

body pain in 32 different parts of the MGNREGS women was measured using Body mapping technique, with the help of the pictorial diagram. All the body parts were divided in to four groups as upper extremity, the back, lower extremity and the joints. The respondents were made to observe the picture and detailed inquiry was conducted about their pain perceptions in different parts using five point rating scale (Verghese, 1995), with no pain (1), mild pain (2), moderate pain (3), severe pain (4) and extreme pain (5) was documented for the analysis.

Posture:

The working postures of women (engaged with MGNREGs) while handling manual material were observed to evaluate the intensity of body pain endured due to the type of activity and the tools used. As most of the women were working with *tagara*, three postures of lifting and unloading were selected for studying the impact of postures on musculoskeletal pains endured by the respondents and were analysed through Rapid Entire Body Assessment (REBA) by Hignett and Mc Atamney (2000) as it is simple and easy tool with wider applications. This method critically analyses all the segments of the posture through an ergonomic lens in dynamic working situations with an aim to understand the musculoskeletal problems endured by the respondents. The analysis is done using REBA sheet which provides scores for each posture and the risk is calculated from no risk to very high risk, along with further suggestions.

REBA analysis

By keeping the neutral posture as base line, all the other deviations of postures (from the base line) were given different scores, based on the angle of deviation. The body parts were grouped into 'A' and 'B'. While 'A' consists of different angles of neck, trunk and legs, 'B' group consists different angles of upper arms, lower arms and wrists. The postures selected for the study were: Posture 1 is the position of stooping down to ground level and lifting the load, Posture 2 is the position of lifting the load up to chest level, Posture 3 is the position of unloading, while lifting the *tagara* from above the head.

The postures recorded through photographs were allotted scores according to the proposed REBA sheet and were matched with the given tables, along with added scores for load/force and coupling. The score obtained was added with the score given for static / repeated / unstable postures. The final score was then interpreted with the given action levels to analyse the levels of risk sustained by the respondents.

Results

Intensity of body pain: The intensity of body pains of the women engaged with MGNREGs were identified through Body Mapping Technique and the mean score item indicated that the most affected body parts were the joints and the back, followed by lower extremity and then the upper extremity (Fig.1).

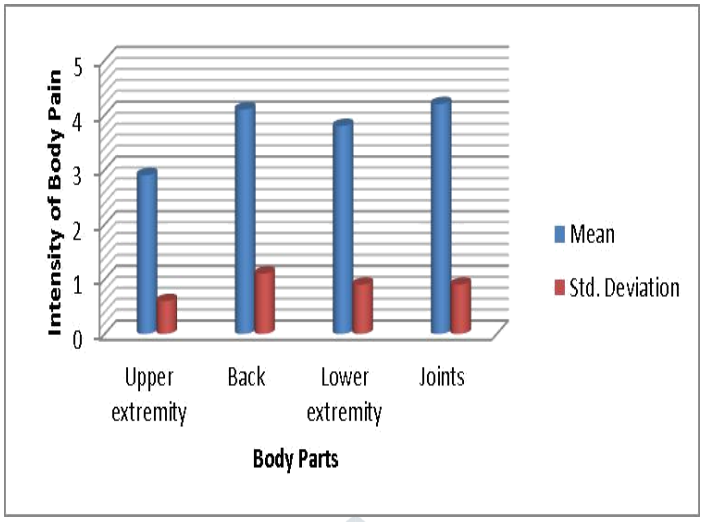

Fig. 1: Intensity of Body pain of the Respondents.

The probable reasons spotted for all kinds of pains at work place could be awkward postures, lifting and carrying the load, the repetitive nature of work and misfit tools about which the women seldom complain. This reveals the tremendous adaptive capacity of women along with strong motivation to uplift the family from financial constraints.

Posture: Most of the women engaged in MGNREGs covered in the sample complained of pain in different regions of the body, mostly due to manual material handling and the cumulative risks were observed in the REBA posture analysis.

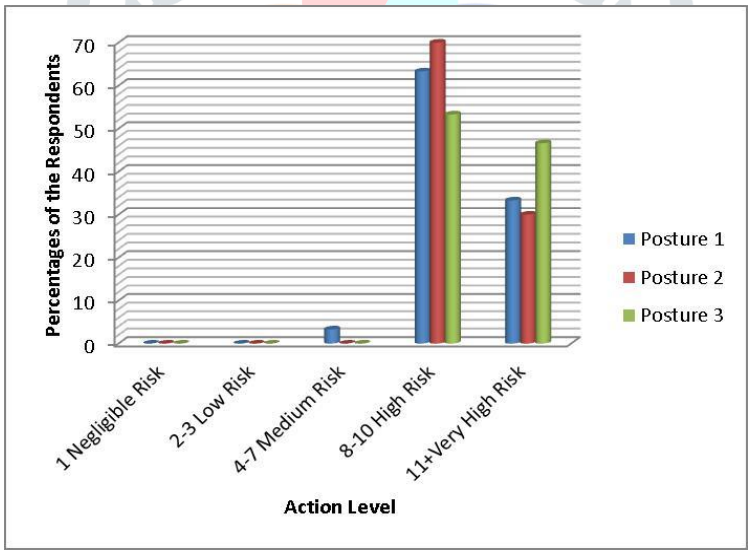

Fig. 2: Posture Analysis: REBA Action Level score of the tagara Users (N=30)

The REBA scores identified all the three postures being in high to very high risk levels when subjected to further analysis through ANOVA tests.

Posture 1 where the women stoop down to ground level to pick up the loaded tagara:

The analysis through ANOVA of posture 1 displayed significant difference of pain in the lower palm at 5% significance.

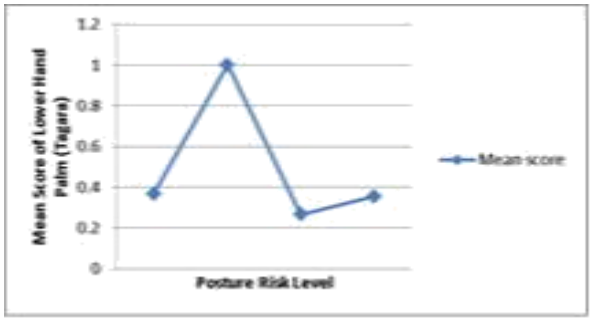

Fig. 3: Mean score of lower palm vs Risk level of posture 1.

The mean score of hand pain is the effect of cumulative disorders due to gradual deterioration of the musculoskeletal system through continuous lifting and handling activities. The women in the MGNREGs work site are observed lifting and unloading continuously, adopting stooping postures, up to 200 times in a day and endured severe low back pain. The micro analysis of ANOVA disclosed the effect of posture 1 on lower back, right leg, left thigh, right knee, right foot, and the joints at 5% sig. difference and both the arms showed 10% significance. This might be due to the lifting of the load of 10 to 20 kg., from the ground level against the gravitational force, while maintaining stooping posture.

Posture 2 is the position of lifting the load up to chest level.

In case of posture 2, the funnel analysis of ANOVA identified the head and left palm pain at 5% level of significance. The head is one of the most affected parts, with weights being carried up to 10-20 kg's several times a day, other than rest of the work performed by the women. This might be the reason that the women exhibited different scores for degrees of intensity of pain in the head with extreme pain being the highest.

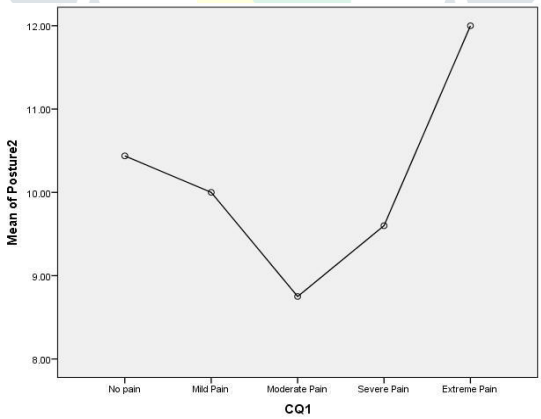

Fig. 4: Mean score of intensity of body pain v/s risk level of posture2.

From the means score of the posture 2, we can say that there was high score of respondents in extreme pain category and medium score of respondents in severe pain category. The observed factors in the worksite affecting the pain could be the load being too heavy and large, the task being too strenuous and involving awkward movements along with working environment like uneven slippery floor, insufficient space, extreme temperatures and poor lifting techniques. Other than the head the left palm also exposed to pain at 5% level of significance.

The posture 3, where the women empty the tagara from (over) the head level

The intensity of pain scores due to adoption of the posture 3, i.e., action of emptying the loaded *tagara* with a slight forward bend in the angle of neck, which aids to throw the load from top of the head, while lifting the loaded *tagara* with hands. This position suddenly disturbs the center of gravity of the load and the body, which they were maintaining while carrying the load and has an effect on the musculoskeletal conditions of the neck which is detected in the micro analysis with 5% level of significance

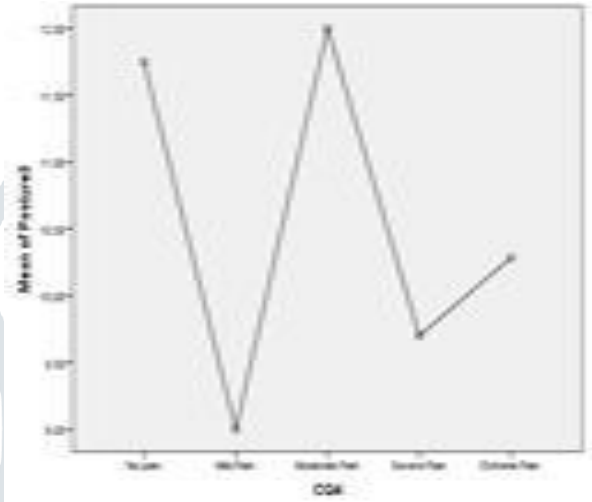

Fig. 5: Mean score for intensity of body pain v/s risk level of posture 3.

The women exhibit different scores for different degrees of intensities of pain in the neck while adopting the third posture, which is the end part of action cycle of manual material handling. The means plot shows, posture three affected moderately in terms of pain in the neck, when it comes to severe pain the scores are lower, but rose again for extreme pain.

The back was the most affected part in terms of respondent's perceived pain, recorded and analyzed using body mapping technique**.** The pain experienced by women in the upper back in different postures was analyzed through ANOVA, which indicated that there is a significant difference in the pain in the upper back in total score of all postures, with 10% confidence interval.

Action Plan

An intervention programme was planned as it is gathered from the review of literature that early intervention works better for good result and intervention can connect prevention and management of musculoskeletal problems (Marras & Karwowski, 2006). To conduct the intervention programme, modules were developed based on the gaps identified after analysing the results, through the observation of the MGNREGs women's adopted postures in the work-site through REBA and ANOVA analysis.

Table 1: Training Module on Posture: A paired t-test

The paired t-test analysis of pre and post- test was administered at the beginning and end of

the intervention programme on the knowledge gained by the respondents and the scores revealed a significant difference (1%).

No	Statement (n=42)	Pre-Test		Post-Test	
		Correct		Correct	
		F	%	F	%
1	Three Major Body Parts	12	29	36	85.7
2	Do you know that earth has a force called gravity	00	00	00	00
3	We don't maintain alignment of the body parts, it may lead to injuries	01	2.3	35	83.3
4	We don't maintain body alignment, we spend more energy to work	24	57.1	37	88
5	Definition of good posture	24	57.1	42	100
6	Definition of bad posture	26	62	32	76.1
7	Good & bad postures from the following pictures.	19	45.2	32	76.1
8	Benefit by maintaining good posture of our body.	30	71.4	42	100
9	Pain when you keep the body in bad posture	27	64.2	42	100
10	Easy to maintain good posture while working	26	62	32	76.1

All of the respondents could connect the relationship between the bad posture and the body pain and learnt about the benefit of maintaining good posture, on the whole the posture module made a considerable difference among the women and was found quite effective in enhancing the awareness of the respondents related to posture. This indicates that the training program has had an effect on the women's knowledge on available ergonomical choices for improving their quality of life.

Conclusion

The present study was conducted to analyze the (three selected) postures adopted by the women engaged with MGNREGs through REBA analysis, Intensity of body pain and ANOVA revealed that all the three postures were rated as high to very high risk levels, which suggests that the postures had severe impact in terms of musculoskeletal pains endured by the women. The respondents of the study were informed about the result and were advised to implement the change.

An intervention programme was conducted on the identified problems and the paired t-test of pre and post-test analysis of the intervention indicated significant difference (1%). A simple tool '*field lift'* was designed (involving the participants) to reduce the repetitive stooped postures (while lifting tagara about 200 times in a day) while working in MGNREGs activities.

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