

AN ERGONOMICS ASSESSMENT OF WORK STRESS OF DAIRY WORKERS IN TERMS OF MUSCULO-SKELETAL PROBLEMS DURING CLEANING OF CATTLE-SHED

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ABSTRACT

Objective of the study was to find out musculo-skeletal problems among the male and female dairy workers in cleaning of cattle-shed. It is greatest occupational health concern and seems to be a global problem. For the study, respondents of higher (40-50yrs) and Lower (30-40 yrs) age groups were randomly selected from three selected villages. The data for different parameters were collected through a questionnaire prepared for the purpose and analysed using statistical methods. It was found that cleaning of cattle-shed is a physically arduous activity and involves various risk factors which may be responsible for the development of various musculo-skeletal disorders among dairy workers. Further, it was noticed that females were more prone to musculo-skeletal disorders as compared to males. Both male and female dairy workers of higher age group were found most susceptible for WMSDs than dairy workers of lower age group. Hence, there is great need for the development of appropriate tools and techniques which may be safer for the health of dairy workers.

Key words : Dairy workers, Cattle-shed, Musculo-skeletal disorders, Risk factors

Work related musculo-skeletal disorders (WMSDs) are one of the greatest occupational health concern today. Similar to communicable diseases, occupational disorders can be regarded as traditional, emerging and re-emerging. Problems of work related to musculo-skeletal disorders are global in scope and widespread in many industries. Cleaning of cattle-shed involves manual material handling with heavy lifting, pushing, pulling and bent forward posture in standing position as well as repetitive motion. All these have been recognized as risk factors for occupational health by NIOSH. Pressure on the disk was considerably increased when trunk was bent forward as compared to standing posture in a upright position (Nechamson and Elistrom, 1970; Anderson and Ostengzen, 1974; Nechamos, 1974). Findings of the study conducted by Nechamson and Elistrom (1970) showed that posture such as stooping and lifting or carrying loads caused damage to the spinal discs and included health hazards on the supporting system of the spine, while sometime increased level of muscular tension in cervical region was noticed when the neck was kept bent. Moreover, dairy farming is highly gender sensitive because of most of the dairy activities are generally performed by female workers with less or no contribution from counterpart. Therefore, the objective of the present study

was to find out musculo-skeletal problems among male and female dairy workers involved in cleaning of cattle-shed.

METHODOLOGY

Kalyanpur block of Kanpur district was randomly selected as a study area for present study. Further, three villages namely- Hirdayapur, Ishwarigunj and Dharpur were selected randomly for data collection. Forty male and thirty female respondents of two age-group (30-40 yrs and 40-50 yrs) were selected purposively on the basis of physical fitness. Thirty male and twenty-two female respondents of 30-40 yrs and ten male and eight female respondents of 40-50 yrs were found physically fit from the selected samples of phase-I. Physical fitness was assessed through body mass index, body temperature, blood pressure and heart rate.

The subjects who met the following conditions were selected for the experiments :

Physical fitness : BMI index
Body temperature : not above 99°F
Blood Pressure : 120/80 ±10
Heart rate : 70-90 beats/min.

Musculo-skeletal problems among dairy workers were studied by assessing intensity of body pain in upper and lower extremity of dairy workers. To study the resultant and chronic effect of selected dairy farming

activities, a suitable body map along with 5 point scale developed by Varghese (1996) was followed. Scores of intensity of body pain adopted in the present study was as follows :

Very severe – 5, Severe – 4, moderate – 3, mild –2, very mild –1

RESULTS AND DISCUSSION

Table 1 implies that after cleaning of cattle-shed, females of lower age-group (A₁ B₁) perceived severe body pain in neck, shoulders, upper arm, low back, calf muscles and ankle/feet whereas females of higher age group (A₂ B₁) felt very severe body pain in neck, shoulders and upper arm and severe body pain in low back, calf muscles and ankle/feet.

severely affected than male body parts as well as workers of higher age group perceived more severe pain as compared to workers of lower age group.

Cleaning of cattle-shed involves sweeping²of the cattle-shed, collection of cow-dung and carrying and disposing-off cow-dung. Sweeping of cattle-shed requires bend posture along with forceful movements of both arm causing whole body vibration and high mechanical load on the musculo-skeletal system of the dairy workers. Bend or stooped posture was found to affect the ligaments and spinal muscles increasing the spine’s risk of injury (Solomonow *et al.*, 2003; Olson *et al.*, 2004). Collection of cow-dung and carrying and disposing-off cow-dung involves squatting posture on heavy lifting. Heavy load carried on head is transmitted through biomechanical

Table 1 : Mean ± S.D. of intensity of body pain in upper and lower extremity of female dairy workers during cleaning of cattle-shed.

| Groups | Intensity of body pain (mean ± S.D.) | | | | | | | | | | | |
|-------------------------------|--------------------------------------|----------|-------|-----------|-----------|------------|----------|-------|-------|-------------|------------|-----------------|
| | Body parts | | | | | | | | | | | |
| | Neck | Shoulder | Chest | Upper arm | Lower aim | Upper back | Low back | Thigh | Knee | Calf muscle | Ankle/feet | Sole of the leg |
| A ₁ B ₁ | 4.8± | 4.6± | - | 4.9± | 1.0± | 2.36± | 4.36± | 1.0± | 2.72± | 4.63± | 4.04± | 3.50± |
| | 2.0 | 1.0 | - | 3.0 | 3.0 | 2.0 | 1.0 | 0.0 | 0.67 | 3.08 | 3.0 | 1.78 |
| A ₂ B ₁ | 5.0± | 5.0± | - | 5.0± | 2.0± | 2.75± | 4.75± | 2.0± | 3.5± | 4.9± | 4.50± | 3.8± |
| | 0.0 | 0.0 | - | 4.0 | 2.0 | 3.0 | 2.0 | 0.0 | 2.57 | 4.6 | 2.0 | 2.0 |

Where: A₁B₁ = Females of lower age group (30-40 yrs), A₂B₁ = Females of higher age group (40-50 yrs)

Table 2 explain that after performing cleaning of cattle-shed, males of the lower age group- 30-40 yrs (A₁B₂) perceived severe body pain in upper arm and moderate pain in shoulders, calf muscles and in sole of leg. On the other hand males of the higher age group (A₂B₂) perceived very severe body pain in upper arm and severe body pain in neck and shoulders, arm and severe body pain in neck and shoulders.

Thus, it is clear that female body parts are more

forces of the body, specially the limbs and trunk, to create internal load on tissues and anatomical body structure. Tissue damage may occur when the imposing load exceeds the internal tolerance of tissue and results in an outcome of discomfort, pain, impairment or disability.

Hence, all these factors may be responsible for severe to very severe body pain in concerned body parts after cleaning of cattle-shed.

Table 2 : Mean ± S.D. of intensity of body pain in upper and lower extremity of male dairy workers during cleaning of cattle-shed.

| Groups | Intensity of body pain (mean ± S.D.) | | | | | | | | | | | |
|-------------------------------|--------------------------------------|----------|-------|-----------|-----------|------------|----------|-------|-------|-------------|------------|-----------------|
| | Body parts | | | | | | | | | | | |
| | Neck | Shoulder | Chest | Upper arm | Lower aim | Upper back | Low back | Thigh | Knee | Calf muscle | Ankle/feet | Sole of the leg |
| A ₁ B ₂ | 2.4± | 3.0± | - | 4.7± | 0.8± | 1.2± | 2.96± | 2.5± | 1.36± | 3.0± | 2.6± | 3.5± |
| | 2.0 | 3.0 | - | 3.0 | 2.0 | 2.0 | 1.0 | 2.0 | 3.0 | 0.0 | 2.27 | 1.78 |
| A ₂ B ₂ | 4.0± | 4.0± | - | 5.0± | 1.5± | 1.3± | 3.30± | 1.4± | 1.5± | 3.6± | 2.8± | 1.10± |
| | 0.0 | 2.0 | - | 1.0 | 2.0 | 3.0 | 3.0 | 2.0 | 1.28 | 2.3 | 2.73 | 2.8 |

Where: A₁B₂ = Males of lower age group (30-40 yrs), A₂B₂ = Males of higher age group (40-50 yrs)

CONCLUSION

Cleaning of cattle-shed is a physically arduous activity and involves various risk-factors which may be responsible for the development of various musculo-skeletal disorders among dairy workers. Further, females are more prone for these work related to musculo-skeletal disorders as compared to males. Along with it, dairy workers of higher age group (both males and females) were found most susceptible for WMSDs than dairy workers of lower age group. Hence, there is great need for the development of appropriate tools and techniques for making the operation of cleaning cattle-shed easier, less physically demanding and safer for the health of dairy workers. Moreover, these tools and techniques should match the capability of both male and female dairy workers of different age group for increasing their working efficiency.

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REFERENCES

Anderson, B.J.G. and Ostengzen, R. (1974). Lumber disc pressure and muscle activity during sitting. *Studies on office chair. Seed J. Rehabilitation Med.* **6** : 104-114. **3**

Nechamos, A. (1974). Lumber intradiscal pressure. In: Grandjean, E. and Hunting, W. *Ergonomics of sitting posture; review of various problems of standing and sitting posture. App. Ergonomics* **8**: 135-140.

Nechamson, A. and Elistrom (1970). Orthopaedic research on the effect of posture spine. *App. Ergonomics* **4**: 87-88.

Olson, M.W., Li, L. and Solomonow, M.(2004). Flexion-relaxation response to cyclic lumbar flexion. *Clin. Biomech. Bristol.*, **19** : 769-776.

Solomonow, M., Baratta, R.V., Bank, A., Freudenberger, C. and Zohou, B.H. (2003). Flexion, relaxation response to static lumbar flexion in males and females. *Clin. Biomech.*, **18** : 273-279.

Varghese, M.A., Atreya, N. and Bhatnagar, A. (1996). Ergonomics studies in India. *Tech. Bull.* Postgraduate, Deptt. Of Family Resource Management, SNDT Women's University, Mumbai.

