

ERGONOMIC SURVEY ON HEALTH STATUS OF THE NURSES WORKING IN SHIFT IN HOSPITALS

Subhashis Sahu^{1*}, Smaranika Goswami¹ and Ramjyoti Ganguly²

¹ Ergonomics and Occupational Physiology Laboratory, Department of Physiology, University of Kalyani, Kalyani-741235, Nadia, India
Email: skcsahu@yahoo.co.in sahuphysiolku@gmail.com Phone: 0091-33-2582-8750 (Extn.353) Fax: + 91 (033) 2582 8282.

² Department of Physiology, K. N. College, Berhampur, India.

*Corresponding author:

ABSTRACT

The nurses working in hospitals have to work in shift to deliver proper health care. These rotating shift works in turn causes different health problems. The nature of job poses high cognitive and emotional load. Present study aimed at evaluating the health problems and stressors of nurses working in rotating shifts. Result indicate that nurses suffers from sleep deprivation, gastro-intestinal problems, gynecological problems and other health problems due to shift work and it increased with age. The nature of work is psychologically demanding. Some ergonomic solutions are formulated to ameliorate the problems.

INTRODUCTION

The hospital should remain open 24 hours a day, all days in the year. So, the nurses working in hospitals have to work in shift and have to work in weekends and holidays. Nurses have to be prepared for responding properly even for the unforeseen and unpredictable incidents. The jobs of nurses are not only psychologically demanding (in both cognitive and emotional sense) but also have heavy physical component (Pheasant *et al*, 1991). The health problems in nurses working in shifts include both subjective and to a lesser extent objective health measure. The lack of sleep is a general complain of the nurses working in rotating shifts. Other major complaints are gastro-intestinal disturbances, gynecological disturbance and musculoskeletal disorders (Sahu, 1999). The present study aimed at evaluating the health status of nurses and possible stressors on them on different age group of nurses.

MATERIALS AND METHODS:

a) *Questionnaire study*: An elaborative ergonomic questionnaire based on the standard shift work index (Barton *et al*, 1995) was developed and applied on

182 nurses working in shifts in four hospitals with very high intake of patients, of West Bengal, India. The nurses were divided into three groups based on age- a) Young age below 30 years, b) Middle aged-30 to 45 years and c) Old more than 45 years.

b) *Direct observation*: Direct observation was carried out.

c) *Subjective assessment of stressors*: Impact of different stressors were assessed in five point scale where 0 means no impact and 5 means extreme impact.

RESULTS AND DISCUSSION

The duty of the nurses demand hard work, long term mental stress, little leisure and work in shift. These factors lead to development of many diseases. Complaints about different health problems are given in Table 1. In many studies ageing has been shown to increase the adverse health effects (Harma, 1993; Sahu, 1999). In the present study, it was observed that although on-job sleep facilities were available in the night shift in the wards with chronic patients in health care units, the duration of sleep was least when the nurses work in night shifts in all age groups (Table 1).

Table 1. Duration of sleep in different shifts of different age group

Shift	Age group		
	Young	Middle Aged	Old
Morning Shift	6.01 + 1.12	6.1 + 1.02	5.9 + 0.98
Afternoon shift	6.4 + 0.97	6.3 + 1.02	6.2 + 1.01
Night Shift	5.1 + 0.91	5.4 + 1.12	5.3 + 0.89
Off day	7.2 + 1.20	7.1 + 1.21	7.1 + 0.97

Table 2. Complaints about different health problems in nurses.

Type of complaints	Young (N=60)	Middle aged (N=80)	Old (N = 42)
Sleep disturbance	40.0%	43.6%	52.4%
Gastro-intestinal	35.0%	43.8%	64.3%
Cardiovascular	20.0%	25.0%	33.3%
Pain in different body part	23.3%	40.0%	50.0%
Respiratory problem	20.0%	25.0%	38.1%
Tiredness / Fatigue	23.3%	43.8%	64.3%
Nervousness / Anxiety	15.0%	18.6%	35.7%
Gynecological problem	35.0%	50.0%	28.6%

NB: Percentage do not add to 100 on account of multiple response

Although the duration of sleep is not significantly different in three age groups but the complaints is much more about quality of sleep in older age. Older group of nurses complained more about delay in the onset of sleep, frequent awakening and bad quality of sleep. The deficit in the pre-eminently anabolic deep sleep accentuates the insufficiency of restoration of the tissues which promotes a transition of chronic mental fatigue.

Oginiski *et al* (1993) showed no significant age difference in subjective health complaints except musculo-skeletal problems. But the present study revealed that older people complained almost about all health problems more than the other two age groups.

Complaints about gastrointestinal problems are common in all age groups. Among the gastro-intestinal complaints— heartburn, flatulence and indigestion are more common. Verner *et al* (1989) suggested that susceptibility to shift work related to gastro-intestinal complaints may be due to the

disruption of the individual's time structure. Central nervous system and endocrine mechanisms may also contribute to the pathogenesis of digestive diseases (Carpentier and Cazamian, 1977). There is evidence that there are circadian rhythms in the digestive enzyme secretion rates as well as gastro-intestinal motility (Verner *et al.*, 1989). It is likely that there are circadian or ultradian rhythms in the secretion of different digestive juices of the human body and which may be disrupted or modified by the variation of meal timing and composition of meals. Sahu and Dey (2011) observed that the nurses when work in night shift then the number of full meals per 24 hours, appetite and eating satisfaction were significantly lower.

Knutsson (1989) observed that shift workers are more susceptible to coronary heart diseases. In the present study it was observed that complaints about different cardiovascular problems like high or low blood pressure, irregular heart beats, ischemic heart, etc are increased with age. It may be the cause of the dual effect of ageing and shift work.

Costa (1996) observed that rotating shift worker has more specific adverse effect on women's health in relation to their particular hormonal and reproduction functions. Malformations in an equal number of mothers of normal babies, working in rotating shift work was associated with a slight excess of babies for gestational age (Nurmimens, 1989). It was evident that menstrual problems are more frequent in shift workers (Uehata and Sasakawa, 1982). In the present study it was observed that a large number of nurses complained about different gynecological complaints. The complaints are less in older group, which may be due to the fact that they have reached the phase of menopause and the disruption to cyclic alteration ceased.

Fatigue in night work is two folded – on one hand, work is performed during a period of nocturnal deactivation and is, more fatiguing, on the other hand, her sleep takes place during a period of diurnal activation and is therefore, less restorative. So, a large number of nurses working in rotating shift complain about tiredness and fatigue. Pain indifferent body parts are common complains of these nurses.

The effect of self-selection of individuals with specific sleep behavior (Knutsson and Akerstedt, 1992) or better health status (Angersbatch et al., 1980) may lead to different conclusions in cross sectional study in developed countries. But in India, or other developing countries, the job opportunity being so scarce, the possibility of selection of job is minimum. So, the dropout from the shift work due to intolerance to shift or due to health problems are less, which intern increases the health complaints with ageing.

The nurses rated different type of stressors in their job. Details are given in table 3.

Table 3: Different type of stressor faced by nurses

Stressor	Rating in 5 point scale
Physical load in duty	2.9 + 0.65
Mental Load	3.9 + 0.45
Time pressure	3.1 + 0.39
Emotional stress	4.0 + 0.69
Conflict with domestic duty	3.2 + 0.58
Social duty	2.8 + 0.62

From the table it was observed that the time pressure and emotional load is very high because they have to handle critical patients as well as there relatives in unforeseen situations. Another important factor, those due to Indian tradition female members have to look after all aspect of the house-hold duties and responsibility. They have to look after their children, other family members including older members and guests. So, when a man coming from the occupational work can take rest, but women have to rejoin in the house hold works. So, these double burdens make them more vulnerable to fatigue and stress. The rotating shift duty diminishes the number of hours spent together at home with members of the family as well as attending social gatherings

CONCLUSION

Shift work, double burden of work in workplace and at home, insufficient infrastructure, mental and physical stress are the causative factors which make nurses more venerable to health problems with ageing. So, detail ergonomic study should be carried out to evaluate work load and work environment of nurses. Some ergonomic solution may be formulated to ameliorate the problems.

RECOMMENDATIONS

1. Provision of resting room in each ward, improvement of transport facilities to and from residence and in-campus residential accommodation would reduce the problem.
2. Shift schedule should be designed in such a way that consecutive night work to any nurse should be made minimum.
3. Female nurses with young children should preferably be engaged in morning and afternoon shifts.

References

- Angersbach, D., Knauth, P., Loskant, H., Karvonen, M. J., Undeutsch, K. and Rutenfranz, J 1980, 'A retrospective cohort study comparing complaints and disease in day and shift workers', *International Archives of Occupational and Environmental health*, vol. 45, pp. 127 – 140.
- Barton, J., Spelter, E., Totterdell, P., Smith, L. Folkard, S. and Costa, G 1995, 'The standard shift work index: a battery of questionnaires for assessing shift work related problems', *Work and Stress*, vol.9, no. 1, pp. 4-30.
- Carpenter, J. and Cazamian, P 1977, 'Night work', *International Labour Office*, Geneva, pp. 82.
- Costa, G. 1996, 'The impact of shift and night work on health', *Applied Ergonomics*, vol. 27, pp. 9 -16.
- Harma, M. 1993, 'Individual difference in tolerance to shift work: a review', *Ergonomics*, vol. 36, pp.101 – 109.
- Knutsson, A. 1989, 'Shift work and coronary heart disease', *Scandinavian Journal of Work Environment and Health*, vol. 14, pp.317 – 321.
- Knutsson, A. and Akerstedt. T. 1992, 'The healthy – worker effect: self-selection among Swedish shift workers', *Work and Stress*, vol.6, pp.163 -167.
- Nurminens, T. 1989, 'Shift work, fetal development and course of pregnancy', *Scandinavian Journal of Work Environmental Health*, vol. 15, pp.395 – 403.
- Oginska, H., Pokorski, J. and Oginski, A 1993, 'Gender, ageing and shift work intolerance', *Ergonomics*, vol. 36, pp.161 -178.
- Pheasant, S., Holmes, D. and Stubbs, D 1991, 'Back pain in nurses: some ergonomic studies', In: Lovesey, E.J. (ed.) *Contemporary Ergonomics*, Taylor and Francis, London, pp. 323 – 327.
- Sahu, S. 1999, 'Ergonomics studies on personnel working in shifts in different health care units for Improvement of Efficiency, Occupational Health and Safety', PhD Thesis, University of Calcutta pp. 207
- Sahu, S. and Dey, M. 2011, 'Changes in food intake pattern of nurses working in rapidly rotating shift', *Al Ameen Journal of Medical Sciences*, vol.4, pp.14 -22.
- Uehata, T. and Sasakawa, N. 1982, 'The fatigue and maternity disturbance of night working women', *Journal of Human Ergology*, vol. 11, pp. 465 -474.
- Verner, K.J., Szabo, S. and Moore, J.G.1989, 'The effect of shift work on gastro-intestinal (GI) function: a review', *Chronobiologia*, vol.16, pp.421 -439.