BIOMECHANICAL ANALYSIS OF WORK POSTURES OF OPERATING ROOM NURSES

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INTRODUCTION

Work in health care units is associated with considerable physical strain and many musculoskeletal complaints. Most investigations have concentrated on the work of general hospital nurses, work-load stress in this particular group is connected with poor work postures, patient-lifting activities and carrying too much weight [1,2]. I carried out an biomechanical study amongst operating room nurses in order to determine posture stress load on this group of health care workers and the effect of static work posture on this stress. The work posture stress load in these p u p s is mainly due to the high prevalence of static work during activities of instrumentation nurses.

This survey in operating theatres relates work postures to basic activities and can be used as a starting point from which to improve work conditions in order to reduce or eliminate physical complaints among operating room nurses. In considering the prevalence of musculo-skeletal disorders, the respective roles of working conditions and anthropometric factors have to be understood precisely to allow the institution of effective preventive measures. Different professional groups with different tasks can be distinguished within operating rooms. The ergonomic stress on these groups may depend upon their tasks. Accordingly, the sample included two proffessional p u p s: anaesthetic nurses and instrumentation nurses.

SUBJECTS

The study was carried out in the operating rooms of the municipal hospital in Lodz and included 4 female workers in the surgery department of this hospital.

METHODS

The analysis of working techniques was based on random workpostures recordings of 4 workers. Video recordings (in sagittal plane) of the work postures were made during normal work (during the course of 8 daily surgical programmes in the speciality general surgery). The mean duration of surgical programmes was 1.45 h (range 0.75 - 2.35 h). Observations were taken at 1 minute intervals. Postures (including lifted weights and forces used for pulling and pushing) related work activities and working techniques were analysed using WATBAK version 3.1 - a computer software package for the assessment of low back injury risk during manual handling tasks (University of Waterloo, Canada) (WATBAK License Agreement of 03.09.1991).

The output of the program included: L4/L5 compression for 5 cm extensor tissue moment arm length and joint moments of force (elbow, shoulder, ankle, knee, hip and torso).

RESULTS

Table 1. Average and maximal joint moments [Nm]

Joint	Anaesthetic nurses		Instrumentation nurses	
	avg	max	avg	max
Elbow	0.8	0.9	1.9	27.5
Shoulder	1.4	1.6	5.8	17.7
Ankle	18.0	15.8	21.0	73.6
Knee	1.5	1.7	6.7	53.5
Hip	3.8	6.0	6.8	60.0
Torso	18.2	18.3	20.7	96.3

Table 2. Lumbar spine (L4/L5) parametrs

	Anaesthetic nurses	Instrumentation nurses
Compression force [N]		
mean value	630	745
max value	677	1925
Shear force [N]		
mean value	7	69
max value	61	484

Table 3. The average time spent in the static workposture [min/1h]

	Anaesthetic nurses	Instrumentation nurses
Arms	8	8
Legs	12	13
Back	7	14

For anaesthetic nurses postures of parts of the body are not harmful to the musculo-skeletal system. Only among instrumentation nurses there were observed slightly or distinctly harmful workpostures. It was connected with the necessity of lifting large weights - boxes with operating tools and cloths (mass up to 20 kg).

My investigation indicates that the physical and ergonomic stress reported in some groups of health care workers is caused not by "bad" (from biomechanical point of view) workpostures, but mainly aggravated by high incidence of purely static workpostures.

CONCLUSIONS

Observations revealed that the work-load for instrumentation nurses may were harmful and depended mainly on lifting weights.

The results would appear to justify giving priority to ergonomic improvement of work posts, adapting them to the general population in a standing posture.

Some work postures seen among operating room staff need improvement and several ergonomic improvements can be suggested.

REFERENCES

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