

Title page

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Musculoskeletal risk assessment among nurses in patient manual handling in hospital wards – a cross sectional study

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Musculoskeletal risk assesment among nurses in pateint manual handling in hospital wards – a cross sectional study

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Abstract

Objectives: To find out the percentage work related musculoskeletal disorders among nurses and to perform risk assessment of low back pain using the MAPO index in a tertiary care hospital.

Methods and Material: A cross-sectional descriptive study was conducted on 25 full time nurses, working in a tertiary care hospital. Self reported musculoskeletal discomfort was identified using a 25 item questionnaire which included the Nordik Questionnaire. The investigators administered the MAPO index in order to perform risk assessment of low back pain.

Results: Data was summarized using SPSS version 14. Sixty eight percentage of the nurses reported WRMSDs. Percentages of WRMSDs were more among nurses who work with non cooperative patients (71.42%) and semi cooperative patients (75%). The major area of discomfort reported during activities of manual handling was the low back (44%). Years of experience among nurses also showed a strong positive correlation with WRMSDs. Risk stratification using MAPO index showed moderate to high risk for WRMSDs in all the hospital wards.

Conclusions: Percentage of self reported WRMSDs among nurses were 68%, which is a not ignorable and has to be addressed. Self reported pain and discomfort were more prevalent in low back and was related to

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various factors like age of nurse, years of experience, type of patients handled, patient's assistance during the activity and the type of ward. Evaluation using MAPO index showed that the nurses were exposed to moderate to high risk for WRMSDs.

Background

Nursing is a profession involves 24 hour patient care. This includes activities ranging from dressing, bathing, lifting, lifting and shifting activities. Direct nursing care around the world has reported high number of work related musculoskeletal disorders (WRMSD).[1] Most of the WRMSD involve injuries at the back, the other sites are neck, arm, shoulder, wrist and knee disorders.[2]

For nursing personal, risk factors for WRMSD involve activities like turning, bathing, dressing and transfers. These tasks are enough to cause WRMSD, other risk factors include- weight of the patient being moved, Frequency of handling, level of postural awkwardness, required duration of the job.[1] Adoptions of incorrect postures, associated with forward flexion of trunk, lateral rotation of trunk are also high risk postures.

The different manoeuvres in patient manual handling have consistently been related to low back pain and injuries which are perceived to be most stressful.[3] Several authors have stated that the prevalence rate of LBP in nurses to be 45%-58%. [4],[5],[6] Studies have shown that a one in six nurses (about 17%) will suffer from LBP each year. [7] Back pain among nurses are more than half ie 56% of the permanent nature. [8]

There are several observational methods to assess the risk of WRMSD for example REBA(Rapid entire body assessment [9] ,as proposed by Royal college of nursing 1996 and Owako Working Posture Assessment System (OWAS).The Movement and assistance of Hospital patients (MAPO) index has been used in many Italian hospitals for both acute and long term stay patients for a number of reasons. It allows the detailed analysis of the main risk determinants for low back pain in nurses, comparison of different wards and comparison of both pre and post interventional plans. Also can be used to simulating different kinds of intervention and finally it is a simple and rapid technique. [10] The first analysis of association between exposure level and low back pain permitted the definition of some classes according to the well know traffic model, for this index-absent or negligible risk ranges from 0.5-1.5, Moderate risk ranges from 1.5-5, high risk values exceeding 5.

The MAPO index has various components. They are Disabled patient/operators ratio(NC/Op, PC/Op), Lifting factor(LF), Minor Aid factor(AF), Wheelchair Factor(WF), Environment Factor(EF) and

Training Factor(TF). MAPO index is calculated using the formula: **MAPO= (NC/OP x LF + PC/OP x AF) x WF x EF x TF.**

As proven in many studies, nurses are exposed to WRMSD and no doubt that these disorders are multifactorial. There exists dearth regarding the prevalence and risk factor evaluation studies of work related low back pain among nurses in India. So the need for the study is to identify nurses who are at risk using MAPO index, thereby helping in developing prevention strategies in the form of education, exercises, engineering controls or administrative controls. An analysis of the situation by risk stratification can give a further in sight and help develop an intervention program at the earliest. The objectives of this study were to find out the percentage work related musculoskeletal disorders among nurses and to perform risk assessment of low back pain using the MAPO index in a tertiary care hospital in India.

Methods

A cross-sectional study was conducted on 25 nurses, working in a tertiary care hospital in Udupi district, Karnataka, India. The only inclusion criterion was they should be full time nurses with work experience more than 6 months. The exclusion criterias were presence of any musculoskeletal disorders before becoming full time nurse, nurses working in outpatient departments, operation theatres etc, nursing supervisors, students, interns and post graduates. Ethical clearance for the study was obtained from university ethical committee, Manipal University.

The study was carried out after obtaining the clearance from the medical superintendent and the nursing superintendent. An informed consent was taken from all the participants. The 25 item questionnaire which includes the Nordik Questionnaire was given to the nurses to fill. The MAPO index was filled ward wise by the investigator taking into consideration all the components in the index mentioned earlier. SPSS version 14 and descriptive statistics were used to summarize the data.

Results

Seventeen out of twenty five nurses reported WRMSDs ie 68%. Correlation of age and WRMSD showed a moderate correlation of 0.449.

Table 1 shows the relation between the type of ward and the self reported WRMSD by the nurses.

Table 2 shows the relation between the type of patients in the wards grouped into three major categories and the total number of nurses who reported WRMSD during manual handling of the patients. A lower percentage of self reported WRMSD was seen with the co-operative patients.

Table 3 depicts that out of 25 nurses, 72.27% reported WRMSD while performing manual handling of patients who contributed to less than 50% in the transfers, bed making etc.

Table 4 shows that the major area of discomfort reported during activities of manual handling was clearly the low back (44%) followed by shoulders 12%.

Table 5 shows that all the nurses with more than 5 years of experience reported WRMSDs.

Table 6 depicts ward wise risk stratification of nurses, all the wards except cardiac wards reported high risk for WRMSDs.

Table 7 shows the association between MAPO index and WRMSDs in different wards.

Discussion

The aim of the study was to find out the musculoskeletal risk among nurses while performing manual handling of patients. A questionnaire was filled by 25 nurses working in various wards of a tertiary care hospital in India. The percentage of discomfort was 68% obtained from the study.

Age showed a moderate correlation with WRMSD. The age variation of the study group was between 21 to 48 years with maximum participants in the age group of 21 to 25 years. The major area of discomfort reported was the low back ie 44%, this is in line with the studies done by Knibbe JJ, Friele RD 1996, Garg et al 1991, Daltroy et al 1997 where they reported the prevalence rate of low back pain in nurses to be 45%-58%. From the previous studies there have been various risk factors which have supported that the lower back is the region that sustains maximum stress. The activities performed by the nurses are bed making and transfers where the level of postural awkwardness is in the form of improper biomechanics (hip and spinal flexion without knee flexion). Increased complaints can also be attributed to long standing hours, majority of nursing population being female and anthropometric factors coupled with unsuitable environment. [11]

A clear relation exists between the following; WRMSD and designation, WRMSD and years of experience. A higher percentage of WRMSD was seen in incharge nurses who have work experience of more than 10 years. A Risk assessment done according the MAPO index concluded that all wards except the cardiac wards were HIGH risk. The MAPO index states the risk of the ward. The major component that influenced the score was the nurses to patient ratio. In the cardiac wards the ratio was low where as compared to the ICU and neurosciences. Here the ratio was higher majorly due to the patient status.

An association was found out between the WRMSD and the MAPO index among the nurses of the respective wards. An association exists in neurosciences and medicine wards, showing a VAS of 7.5 and MAPO index risk of 25.98 in neurosciences ward and a VAS of 6 and MAPO index risk of 9 in medicine wards.

A further discussion was made regarding the relationship between the patient type and back pain. Nurses grouped the patients in the ward they are working into the following group non co-operative, semi co-

operative and co-operative. Nurses who grouped their patients into the non co-operative group complained of 71.42% and the area of discomfort as low back. Also a higher percentage of discomfort- 75% was also seen in nurses who grouped their patients into the semi co-operative group. This could be attributed to the following reasons- inappropriateness and sustenance of a posture while performing activity like back and hip flexion, improper lifting technique, absence of lifting devices and space constraints.

The major limitations to attaining substantial evidence were a small sample size, non compliance by the nurses and lack of time given by the nurses.

A conclusion can be drawn from the study that nurses are subjected to various WRMSDs especially back pain. It is also related to various factors like age of nurse, years of experience, type of patients handled, patient's assistance during the activity and the type of ward.

Competing Interests: No

Authors' Contributions:

SK carried out administering the questionnaires and MAPO index

GN participated in design of the study, performed statistical analysis and helped to draft the manuscript

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Table 1

Ward	Total number of nurses	WRMSD +ve	WRMSD -ve	Percentage of nurses with positive WRMSDs
ICU	7	3	4	42.87%
Cardiac	2	1	1	50%
Surgery	6	6	0	100%
Medicine	2	1	1	50%
Neurosciences	2	2	0	100%
Orthopedics	6	4	2	66.66%

Table 1 shows the relation between the type of ward and the self reported WRMSD by the nurses.

Table 2

Patient type	TOTAL number of nurses	WRMSD +ve	WRMSD -ve	Percentage of nurses with positive WRMSDs
Non co-operative	7	5	2	71.42%
Semi co-operative	4	3	1	75%
Co-operative	14	9	5	64.28%

Table 2 shows the relation between the type of patients in the wards grouped into three major categories and the total number of nurses who reported WRMSD during manual handling of the patients. A lower percentage of self reported WRMSD was seen with the co-operative patients.

Table 3

Assistance from patients	Total number of nurses	WRMSD +ve	WRMSD -ve	Percentage of nurses with positive WRMSDs
<50%	11	8	3	72.27%
>51%	14	9	5	64.28%

Out of 25 nurses, 72.27% reported WRMSD while performing manual handling of patients who contributed to less than 50% in the transfers, bed making etc.

Table 4

Area of discomfort	Number of nurses	Percentage of nurses
Low back	11	44%
Both the shoulders	3	12%
Neck	1	4%
Knee	1	4%
Right shoulder	1	4%

The major area of discomfort reported during activities of manual handling was clearly the low back. (44%)

Table 5

Years of experience	Total number of nurses	WRMSD +ve	WRMSD -ve	Percentage of nurses with positive WRMSDs
<5	15	8	7	53.33%
6-10	1	1	0	100%
11-15	3	3	0	100%
>15	5	5	0	100%

Table 6

Ward	MAPO index	Risk stratification
ICU	7.875	HIGH
Cardiac Wards	3.87	MODERATE
Surgery	9.625	HIGH
Neurology	25.98	HIGH
Medicine	9	HIGH
Orthopedics	5.53	HIGH

All the wards except the cardiac wards reported a high risk for WRMSD mainly back pain.

Table 7

Ward	MAPO index	WRMSD
ICU	7.875	4
Cardiac Wards	3.87	4
Surgery	9.625	4.5
Neurology	25.98	7.5
Medicine	9	6
Orthopedics	5.53	3.33

Association between MAPO index and WRMSDs in different wards.