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The need for educating healthcare professionals regarding good musculoskeletal health practice☆

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Abstract
Objective: The objective of this study was to assess the level of knowledge and practice of body mechanics towards preserving musculoskeletal health in daily routine activities of HCPs (medical officers, staff nurses, community health nurses, assistant medical officers, physiotherapists, and assistant nurses) from Hospital Tengku Ampuan Afzan, Pahang.
Method: A cross-sectional study was conducted with convenience sampling employed across five different departments. The departments were a department of medical, surgical, orthopedics, emergency and rehabilitation. The samples were selected according to a minimum of two years of clinical experience without any history of low back surgery. An instrument consists of socio-demographic background, knowledge on body mechanics and Owestry Low Back Pain Disability Index Questionnaire was used in this study.
Results: A total of 139 HCPs were recruited including medical officers, staff nurses, community health nurses, assistant medical officers, physiotherapists, and assistant nurses. A self-administered questionnaire pertaining to knowledge revealed that 73.4% of HCPs had inadequate knowledge of musculoskeletal body mechanics. Among all, 90.6% (minimal: 9.4%, moderate: 43.2%, severe: 42.4%, crippled: 5.0%) of HCPs showed moderate to crippled disability using Oswestry Disability Index classifications indicating the poor practice of body mechanics while working.
Conclusion: The findings of this study indicate that a lack of knowledge among healthcare professionals lead to the inadequate practice of preserving musculoskeletal health while carrying out duty in caring patients. It is suggested that enforcing and emphasizing health education for healthcare professionals is urgently needed towards reducing the risk of the musculoskeletal problem among healthcare professionals.

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Introduction

Musculoskeletal health always refers to the absence of disease to the muscles, bone and joint, tendon and ligaments and associated tissues that move the body.[1] The musculoskeletal system is used vigorously when an individual is performing activities for instance working, walking, etc. In the healthcare system, the healthcare professionals (HCPs) are the backbone involving direct and indirect care with the client. They are nurses, physicians, community nurses, assistant nurses, physiotherapists, assistant medical officers, occupational therapists, dietician and many more. When dealing with other people, all musculoskeletal system directly used to provide care. In this study, HCPs are defined as the nurses, medical officers, community nurses, assistant nurse, physiotherapist and assistant medical officer who are working in a tertiary hospital whose directly involved in care most of the time with the clients. As for the front liner in the health care system, they are responsible for delivering and translating healthcare policies towards care.

The action of moving, lifting, pushing and twisting are among day to day activities carried out by the HCPs during delivery care services towards the client. The concept of body mechanic was taught in their student training days in the college or universities so that injury prevention can be avoided. According to Waters, Nelson, Hughes and Menzel,[2] body mechanic defined as using 'proper' body positions or 'body movements' to facilitate safety from injury occurrence during lifting and moving. Christensen and Kockrow[3] stated the use of proper posture and body mechanic is needed to restrict tension and musculoskeletal system. However, most injury-related faced by the Malaysian are similar to other due to possible ignorance of translating the knowledge to practice.[4]

According to the 2010 Global Burden of Disease Study, low back pain is among the top 10 disease and injuries account for the highest number of Disability-Adjusted Life Year (DALYs) around the globe affecting the musculoskeletal system.[5] Low back pain is related to the musculoskeletal disorder affecting HCPs in their daily life. American Nurse Association (ANA) stated that 38% job related complain they were related to back pain, decreasing their musculoskeletal health which triggered the nurse to change the job.[6] Therefore, HCPs are exposed to the greater risk of back pain, jeopardising their musculoskeletal health if improper techniques are being practiced during care delivery. Lee et al.[7] stated that little study conducted on medical factors especially in developing countries in looking for the work-related low back pain which affected greatly daily routine activities. Thus, this study was conducted to determine the level of knowledge and practice of body mechanics in preserving musculoskeletal health among HCPs.

Methods

The cross-sectional study design was conducted with a number of HCPs in Hospital Tengku Ampuan Afzan (HTAA), Kuantan, Pahang state hospital, to determine knowledge and practice of body mechanics in daily routine activities for the benefit of preserving their musculoskeletal health. The data collection started after ethical approval obtained from Kulliyyah (Faculty) of Nursing Research Committee (KNRC), International Islamic University Malaysia Research Ethics Committee (IREC) and Clinical Research Center (CRC), HTAA. Data were collected from April until May 2015 across six settings namely orthopedics department (2 wards), medical department (4 wards), surgical department (2 wards), trauma and emergency department, physiotherapy unit, and rehabilitation center unit. These settings were chosen since it is catered for adult care patients and the ratio of staff and patient is 1 to more than 1 in their daily activities. All HCPs in the selected areas were invited to participate in this study based on the following inclusion criteria; permanent staff, able to understand Malay or English and had a minimum of two years of clinical experience. The HCPs were excluded if they are under training or study leave during the data collection period and has a history of low back surgery. The history of low back surgery was assessed through the demographic section of the questionnaire. All respondent were invited based on convenience sampling.

A self-administered questionnaire was employed during the data collection period. The questionnaire consisted of two different sections; Section I for sociodemographic data and Section II for knowledge and practice of body mechanic in preserving musculoskeletal health among HCPs. In the sociodemographic section, the following information was obtained; age, gender, level of education, profession, department, years of experience and medical history of the respondent. While in Section II consists of Part A (knowledge assessment of body mechanics) and Part B (reflecting the practice of body mechanics in preserving musculoskeletal health). In Part A, there were 15 questions asking regarding general information about body mechanics, causes, promotion, prevention, and complication domain. The questionnaire is adopted from Salome.[8] The questions are multiple choice questions with four different choices to respond with one correct answer. Each correct answer rewarded with one point meanwhile zero points awarded for the wrong answer. The total maximum score for Part A is 15 points. The score is converted into percentage via calculation of total score of respondent divided by 15 times 100 for the categorizing into inadequate knowledge for the score of less or equal than 50%, moderately adequate knowledge for the score of 51–75% and adequate knowledge for the score more than 75%.

To assess the practice of body mechanics in preserving musculoskeletal health, Oswestry Low Back Pain Disability Index Questionnaire (ODI) was adopted from Fairbank and Pynsent.[9] There are 10 items in the questionnaire with a 6-point Likert scale rated 0–5 for each response. The total score is converted into a percentage and classified into minimal disability (0–20%), moderate disability (21–40%), severely disability (41–60%), crippled (61–80%) and bedridden (81–100%). The higher score of respondent indicates poor body function, while a lower score indicates good body function. In Section II, both mean and standard deviation (SD) are tabulated as for the measurement of the score. Prior to the assessment, both questionnaires in Part A and B underwent forward and backward translation process.[10] The questionnaire was translated by two bilingual native expert HCPs and compared with the original question in the later part process for the comprehensible of the questionnaire. A pilot study was conducted among

20 nurses for the reliability test with good internal consistency Cronbach alpha value of 0.795 (knowledge) and 0.859 (practice).

The sample size was determined using a sample size calculator online application[11] with a set margin of error at 5%, confidence interval of 95% and a response rate 50%. Therefore 199 respondents are required for the study.

Participation in this study was on a voluntary basis. Initially, the researcher approached potential respondents, provided self-introduction and screened them for eligibility enrolment in the study according to inclusion criteria. Then, the purpose of the study was elaborated by the researcher to respondent. Later, the respondent was provided with details information regarding this study. Prior to the data collection process, consent and agreement form were obtained from the respondent. A self-administered questionnaire was distributed with 10–15 min taken by the HCPs to complete the questionnaire. The researcher stayed while waiting for the HCPs to complete the questionnaire in case of any clarifications needed. Later, respondent returned the completed questionnaire and checked by the researcher in ensuring the questionnaire is completed without any missing answer. All information provided was kept confidential and anonymous. Statistical Package for the Social Sciences (SPSS) version 19.0 was used to analyze the data. Results are tabulated descriptively in the table with mean, SD, frequency and percentage. The association between knowledge and practice of body mechanic were interpreted based on the significant value set at $\alpha = 0.05$ (p-value) and a power of 80%.

Results

A total of 139 respondents were eligible for the data analysis which contributes to 69.8% of response rate from the required sample size. The mean age of respondent was 28.99 ($\pm$3.04) years with a range of 24–37 years old. Duration of working experience among respondent is 4.84 ($\pm$2.68) years with a range of 2–12 years' experience. Approximately three quarter (74.1%) of the respondent is female, and the remaining is male (25.9%). Among all respondents, 40.3% were nurses, 12.9% were community nurses, 15.1% were assistant nurses, 18.7% were physicians and 6.5% each for both assistant medical officers and physiotherapists. The highest participation was from the medical department (32.4%) followed by surgical department (20.9%), emergency department (30%) and orthopedics department (19.4%). Other participations were from rehabilitation center unit, and physiotherapy unit were 2.2% and 3.6% respectively. All of the respondents in this study reported as having no medical history of low back pain, except for seven. The socio-demographic characteristic of the respondents was being tabulated details in Table 1.

A total of 15 questions were used in assessing the level of knowledge regarding body mechanic among respondents. The questions represented the general causes, promotion, and prevention & complication regarding body mechanics. Almost all (99.3%) of respondent have inadequate to moderate knowledge on body mechanic. Out of 139 respondents, the majority have inadequate knowledge level (73.4%), the remaining were having a moderate level of knowledge (25.9%), and only 1 respondent (0.7%) has adequate knowledge on body mechanics. Details were presented in Table 2.

Table 1 Socio-demographic data of respondents ($n = 139$).

Variable	Mean	*SD*
Age	28.99	$\pm$3.041
Year of experience	4.84	$\pm$2.682
Variable	**Frequency (*n*)**	**Percentage (%)**
Gender		
Male	36	25.9
Female	103	74.1
Level of education		
Certificate	19	13.7
Diploma	91	65.5
Bachelor Degree	29	20.9
Professions		
Physician	26	18.7
Nurse	56	40.3
Community nurse	18	12.9
Assistant nurse	21	15.1
Physiotherapist	9	6.5
Assistant medical officer	9	6.5
Departments/Units		
Medical department	45	32.4
Surgical department	29	20.9
Emergency department	30	21.6
Orthopedic department	27	19.4
Rehabilitation center unit	3	2.2
Physiotherapy unit	5	3.6
Medical history		
Yes	7	5
No	132	95

Table 2 Level of knowledge and practice of body mechanic ($n = 139$).

Variable	Frequency (*n*)	Percentage (%)
Knowledge		
Inadequate	102	73.4
Moderate	36	25.9
Adequate	1	0.7
Practice		
Minimal disability	13	9.4
Moderate disability	60	43.2
Severe disability	59	42.4
Crippled	7	5

The comparison of knowledge level on body mechanics was carried out inferentially among respondent. There is no significant difference of knowledge regarding body mechanic between male (41.9 ± 14.22) and females respondents (43.0 ± 12.52), with p-value = 0.636. Level of education among respondent did not influence the level of knowledge on body mechanic ($p = 0.097$). Similarly, the position of HCPs ($p = 0.283$), different department ($p = 0.257$) and history of having musculoskeletal disorder also did not

Table 3 Comparison mean score practice of body mechanic according the socio demographic characteristic ($n = 139$).

Variable	Mean score	Statistic value	p-Value
Gender		−0.873[a]	0.384
Male	39.1		
Female	41.4		
Medical history		−1.197[a]	0.234
Yes	34.9		
No	41.1		
Level of education		3.430[b]	0.035[*,d]
Certificate	40.9		
Diploma	42.6		
Bachelor	35.2		
Profession		12.326[c]	0.031[*,e]
Physician	47.19		
Physiotherapist	91.94		
Nurse	73.05		
Community nurse	75.92		
Assistant nurse	71.74		
Assistant medical officer	79.06		
Department		1.673[c]	0.866
Medical	73.76		
Surgical	65.95		
Trauma and Emergency	74.10		
Orthopedics	66.69		
Rehabilitation center unit	65.67		
Physiotherapy unit	55.60		

[a] t-Statistic from independent t test.
[b] F-statistic from one-way ANOVA test.
[c] Z-statistic from Kruskal–Wallis test.
[d] Mean practice score among ''diploma and bachelor'' was significantly different after post hoc test done.
[e] Mean practice score was significantly different between ''physician and physiotherapist group'' and ''physiotherapist and nurse group'' after post hoc test performed.
[*] Significant finding, p value < 0.05.

influence the level of knowledge on body mechanic among respondents. Table 3 summarized the inferential statistical analysis of the relationship between sociodemographic data of respondents with the level of knowledge on body mechanic.

In assessing the practice of proper body mechanic among respondents, 10 questions with Likert scale of 0–5 being asked descriptively, nearly half of the respondent had both severe disability (42.4%) and moderate disability (43.2%) followed by minimal disability (9.4%) and crippled (5%). The details were presented in Table 2.

The relationship between the practice of right body mechanic and the socio-demographic background was carried out. There is no significant difference of body mechanic practice between male (39.1 ± 12.62) and female (41.3 ± 13.83) respondents ($p = 0.384$). One-way ANOVA test showed that there was a significant difference in practice on right body mechanics among the different level of education ($p = 0.035$). Those with diploma showed the highest mean score of practice on right body mechanic (42.6) followed by a certificate holder (40.9) and bachelor holder (35.2). Post hoc Bonferroni showed that only diploma holder has a significantly higher mean score than bachelor holder.

Kruskal–Wallis test showed that there was a significant difference of practice on correct body mechanics across 6 different positions of healthcare worker (p-value = 0.031). Post hoc Bonferroni test has shown that physiotherapist (91.94) has a significantly higher mean score as compared to the physician (47.17) and nurses (73.05).

Independent t-test was carried out in comparing the mean score of practice among respondent with and without medical history of the musculoskeletal disorder. The result showed that there was no significance ($p = 0.234$) difference among the respondent who was presenting or not presenting with a medical history of the musculoskeletal disorder.

Association of age and year of experience with body mechanic practice among respondent were investigated. Pearson, correlation coefficient test, showed that there was a weak positive correlation between age ($r = 0.364$, $p < 0.001$) and year of experience ($r = 0.418$, $p < 0.001$) with correct. Details were presented in Table 4.

Table 4 Correlation mean score practice of body mechanic according the age and year of working experience among respondent ($n = 139$).

Variable	Practice score	
	Correlation coefficient	p value*
Age	0.364	0.001
Years of experience	0.418	0.001

* Pearson correlation coefficient, significant finding, p value <0.05.

Discussion

Majority of HCPs at HTAA is female gender especially in the nursing profession such as a nurse, community nurse and assistant nurse which is still dominantly by the female gender. In Malaysia, the community nurse and assistant nurse were all females who contribute towards the high female turnout population in this study with 74.1% out of 139 respondents.[12] Moreover, due to the high proportion of respondent coming from nurse profession (40.3%), which are highly contributing to the diploma holder background of the respondent (65.5%). Even though the nursing profession in Malaysia is growing, yet most of the nurses were trained with a minimum of a diploma. Respondents from the medical department contribute the highest number with 32.4% out of 139 respondents.

The objective of this study was to determine the level of knowledge and practice on right body mechanics among HCPs. Results showed that most of the HCPs had inadequate (73.4%, $n = 102$) to moderate (25.9%, $n = 36$) knowledge of body mechanics. The finding in this survey aligns with Salome[8] and Pradap[12] studies. Salome in her findings showed that 93.33% of nurses have poor knowledge prior teaching program implemented.[8] A similar finding is shown in Pradap[12] study that majority of the respondent (86.7%) has poor knowledge of body mechanics before enrolled in the teaching program. However, the findings in Pradap's study most probably due to the participants are a new student who has no idea and exposure of body mechanics yet.

The practice of body mechanic among HCPs in this study revealed that approximately 90.6% respondent has a problem in applying body mechanic in their daily activities routine which is categorized as a moderate disability to crippled in applying the correct body mechanics as per indicated in the ODI. Only 9.4% have a minimal disability of applying correct body mechanics. The finding of this study is contradicted with Toraman, Ardahan and Balyaci Ozum[13] findings where there were only 24.8% of the respondents in Turki has a moderate disability of applying the correct body mechanics.

Proper education training should be carried out so that the prevention of back pain injury among HCPs can be prevented. The rank of HCPs in at-risk occupation for strains and sprain in 2000 at the United States showed that nursing aids, orderlies & attendants and a registered nurse were ranked no. 2 and 6 respectively according to Bureau of Labor Statistic, United States, the year 2002 report in de Castro.[14] In addition, the work-related musculoskeletal disorder prevalence is associated with the types of occupation. Yasobant and Rajkumar[15] study found that work-related musculoskeletal disorder is associated with occupation and 26.4% of prevalence work-related musculoskeletal disorder among healthcare professionals at tertiary care hospital in Chennai, India.

The mean score practice rank is highest among physiotherapist as compared to another profession. The nature of physiotherapist profession uses the mainly physical ability as their core work most probably contributes towards the highest practice of body mechanics. If they are not properly using body mechanics, they will tend to develop a musculoskeletal injury. So, awareness among physiotherapist might be higher as compared to other HCPs. Mean score of practice is higher among diploma holder as compared to certificate and bachelor holder. This is due to the majority of respondent were diploma holder since most of the HCPs trained in Malaysia still at diploma level as the lowest trained as compared to another country.

Age and year of experience showed there is a weak positive correlation between these two variables and practice of body mechanics. This is supported by Gropelli and Corle[16] findings that additional of age will have greater risk for musculoskeletal injuries. However, in Darragh, Huddleston, and King[17] study showed there is no significant finding between duration of working experience with the musculoskeletal injury. The contradict result in this study may be influenced by the improper respond towards the questionnaire provided by the respondent.

Limitations have been faced during the study period. Firstly, the finding of the study cannot be represented Malaysia as a whole as it is only bounded at one hospital. Furthermore, the sampling method employed was nonprobability sampling. Secondly, the low response rate turns out in the study. It could be due to the massive workload among HCPs. They were not keen to involve in the study. Even after some flexibility exercised to the respondent such as giving them some space and time to answer at their home, yet they did not return the questionnaire. The reason for not returning is either lost or forgotten. Some of the respondents have answered the questionnaire yet incomplete due to their workload required their immediate attention. Therefore, the incomplete questionnaires were not counted in this study. Besides, this study is conducted in one setting. Therefore, it is recommended for the study to duplicate at other setting. Perhaps multi-staging randomization of sample should be implemented in the future study.

Future research is needed in exploring more details regarding the issue of body mechanic or musculoskeletal disorder involving more health care institution in Malaysia. Intervention research from multi-discipline and stakeholders is recommended to enlighten the issues in work-related disorder.

Conclusion

The findings in this study suggested that further intervention study should be carried out for better awareness of musculoskeletal issues. The proper health education emphasizing the practice of body mechanics application is required in health prevention and promotion among HCPs. The promotion and refresher course of body mechanics can be

implemented through continuous education (CNE) program available in the hospital. Observation by higher ranked staff should be carried out from time to time in the initial period so that the awareness on the importance of having good body mechanics can be instilled in HCPs. The observation team can be appointed among their ward supervisor or unit chief. Therefore HCPs will probably perform better due to their action was being monitored by an observant team.

Conflict of interests

The authors declare no conflict of interest.

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