

Perceived competence of physical examination skills among the registered nurses in a selected private hospital in Malaysia

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Abstract

Background: Physical examination in nursing practice is a systematic process of checking patients from head to toe using inspection, palpation, percussion, and auscultation techniques. This is part of a process to assist nurses in determining nursing diagnoses for patients' care needs. A trained nurse with competent assessment skills can monitor treatment outcome and rapidly detect early signs of deterioration in patients.

Objective: The purpose of this study was to determine the perceived personal competence, the frequency of use of physical examination techniques, the factors that influenced physical examination practices and to identify training needs on physical examination skills among the registered nurses (RNs) in a selected private hospital in Malaysia.

Methods: This is a cross-sectional descriptive study. A self-reporting questionnaire was adapted with permission and pilot tested to ensure its suitability for use in this local study. A total of 154 registered nurses (RNs) from various clinical areas responded to this survey.

Results: The regularly used physical examination techniques by the RNs were mostly inspection and vital signs assessment. The frequency of physical examination skills used was higher among RNs with 4-5 years of working experience. Lack of time, role boundaries/scope of practice and ward culture were some of the factors identified that influenced nurses' physical examination practices. Physical examinations of the cardiovascular, neurological and respiratory systems were the top three skills asserted as training needs by the RNs.

Conclusions: Inspection technique and vital signs checking are commonly practiced at ease by the RNs, but they perceived that they were least competent with palpation, percussion and auscultation techniques. Physical examination training is vital to ensure that the RNs keep their skills current in their nursing practice.

Keywords: Health assessment, perceived competency, influencing factors, training needs.

Introduction

Nursing is indeed a challenging vocation. With the increasing complexity of diseases, advancing population ageing, cost constraint in Malaysia's health care system, and the current situation of doctor-to-population ratio of 1:633 in Malaysia (Social Statistic Bulletin Malaysia, 2016), there is a need for nurses to expand their role to provide quality care to meet the needs of patients. One of the nursing role expansions is to be able to perform comprehensive health assessment because nurses are often the first line who meet the patients, comfort and educate them, thus nurses can contribute immensely in early detection of clinical deterioration of patients.

Physical examination was introduced into the nursing curricula in Canada and Australia in the 1900s. The purpose of this introduction is to support advanced practice in nursing. This introduction causes debates from the west to east, centring on the 'added value' into the RNs' repertoire. Some even argued that this introduction of physical examination skills was a major change in nurses' roles and had implication for the philosophy of nursing (Lesa & Dixon, 2007). Furthermore, the physical assessment skills were never included in the pre-registration nursing programme

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(West, 2006). Therefore, several studies were conducted and argued over the necessity of the nursing role expansion. Eventually, the findings of studies showed and emphasised the needs of the nursing role expansion in this aspect.

Health assessment is a fundamental aspect of the professional nursing role. It is a process to gather information about the health status of patients through complete health history taking and physical examination. It can be done annually on an outpatient basis, on new admission to a hospital or more frequently in intensive care (Jensen, 2015). Whereas, physical examination is a systematic checking from head to toe by using inspection, palpation, percussion, and auscultation techniques to collect objective data as part of a step in determining nursing diagnoses for patients' care needs (Zambas, 2010; Briks et al., 2013; Pejmankhah, 2014). Furthermore, Jensen (2015) emphasised that an accurate and comprehensive nursing assessment is the foundation for holistic and individualised nursing care.

In the nursing process, nursing assessment is the first step to obtain a baseline data for patients. The data collected through a thorough health assessment serves as the baseline in nursing process and provides the framework for the subsequent plan of care for the patient during hospitalisation (Dillon, 2007; Heeyoung et al., 2012; Fennessey, 2016). Douglas et al. (2014) and Massey et al. (2016) also emphasised that patient safety during hospitalisation rely on nurses' ability to detect the early signs of deterioration. As early as 2007, Lesa & Dixon highlighted numerous studies conducted to evaluate the outcome of utilisation of physical examination skills by nurses in their clinical areas across the world which have reflected positive results. They reported that the use of physical examination skills initiates early assessment

that helps to make sound judgements; increase the nurses' capacity to make a good decision about their patients and complications from the patient's illness were determined earlier.

Therefore, health assessment is one of the most important components of contemporary nursing practice (Anderson et al., 2013). It is a crucial skill as the more comprehensive the assessment, the better the results will be obtained, and it increases the quality of patient care. In other words, the quality of patient care is related to the nurses' abilities in performing the physical examination (Adib-Hajbaghery & Safa, 2013).

Strong emphasis was placed on education preparation and assessment courses have become mandatory in nursing programme (Giddens & Eddy, 2009). Additionally, the physical examination was also considered as an essential competency for RNs, but the utilisation of physical examination skills is rarely visible in daily practice (Zambas, 2010). Several studies on the ability of the nurses to practice physical examination skills in their daily practice was conducted (Secrest et al., 2005; Giddens, 2007; Briks et al., 2012; Heeyoung et al., 2012; Akao et al., 2013; Adib-Hajbaghery et al., 2013; Pejmankhah, 2014; Massey et al., 2016). Researchers examined the utilisation of the physical examination skills among those nurses who was taught in undergraduate baccalaureate nursing programmes in America. The results reflected that only 29% of 120 skills which were taught by the educators were used daily or weekly, and 37% of the skills were never used by the nurses at all. Giddens (2007) also surveyed on the utilisation of 126 physical examination skills among the RNs and found that there were only 30 skills reported to be routinely performed. The remaining skills were performed occasionally or not performed at

all. Subsequently, a larger online survey conducted to explore the use of 121 physical examination skills by Australia nurses with 1518 completed questionnaire, found that only 34% of skills were routinely used in practice, 35.5% of skills were not used at all and 31% of skills were used rarely (Birks et al., 2013).

Adib-Hajbaghery and Safa (2013) investigated 200 nurses in one of the Iran's Hospital. Based on the findings, it was shown that nurses used their health assessment skills less than the desired level. Most of the participants of the study reported that they were not proficient in urogenital and nervous system assessments. Pejmankhah (2014) also studied some 104 Iranian nurses and found that nurses were only competent in taking history and interview. Despite broad agreement that physical examination is an essential competency for RNs which facilitates positive patient's care outcomes, there is limited study in Malaysia on this aspect. This study was timely to determine the competency of physical examination skills among these RNs in clinical practice.

Methodology

Google Scholar, PubMed and Web of Science databases were searched for publications of relevant studies between 2000 to 2017, using the following search terms: health assessment, perceived competency, influencing factors, training needs.

Sample and Setting

This was a cross sectional descriptive study with the objectives to determine the perceived personal competence, the frequency of use of physical examination techniques, the factors that influenced physical examination practices and to identify training needs

on physical examination skills among the registered nurses in a selected private hospital in Malaysia. The population of this study consisted a total of 361 RNs. Nursing administration team and those RNs with less than six months of working experience were excluded from this study.

A convenient sampling technique was applied to recruit the RNs from the Accident and Emergency Department (A&E), High Dependency Unit (HDU) and Intensive Care Unit (ICU), Maternity Ward, Medical and Surgical Wards. The sampling size was calculated with Raosoft software, basing on a margin error of 5% and confidence level of 95%. The calculated sample size required was 187, with an added attrition rate of 10%.

Instrument

The instrument of this study was adapted from existing survey tools developed by Heeyoung et.al (2012) and Birks et al. (2012) based on Giddens' (2007) 121 sets of physical examination tool. Permission to use Birks et al's tool for this study was granted, whereas the researchers duly acknowledged Heeyoung et al's tool, as both tools were adapted to ensure relevance to the local setting. The questionnaire was subjected to content validation by a panel of three nursing leaders, namely the Acting Director of Nursing and two nursing managers of the private hospital. A pilot study was also carried out among 30 RNs from another private hospital with almost similar settings as with this hospital under study. The internal consistency for the 38-item core skills was good, with a Cronbach alpha level of 0.91.

The questionnaire of this study comprised of five sections: 1) demographic characteristics; 2) Perceived

Personal Competence in Physical Examination which comprised of numeric rating scale (NRS) of 1 to 4 from not competent 'I do not know how to do this skill' to competent; 3) Frequency of use of Physical Examination Scale which also comprised of NRS of 1 to 5 from 'I know how to do this technique, but have never done this in my clinical practice' to 'I perform this technique frequently in my clinical practice' (every 2-5 times I work); 4) Training Needs, where the RNs were instructed to rank all 14 sectional systems based on the human anatomy in numerical order from 1 being the most important to 14 being the least important skills they needed training; and 5) Factors influencing the utilisation of physical examination in clinical areas where RNs were allowed to tick more than one of the nine factors listed. The RNs' confidentiality was ensured, with written consents obtained from each of them.

Data Collection

Ethical approval was obtained from the International Medical University Joint-Committee on Research and Ethics. Institutional permission was also obtained from the chief executive officer of the private hospital. The RNs consented to participate in this survey after the purpose, procedure, implications, maintenance of privacy and anonymity of this study were clearly explained to them. They were approached by the researchers after their shift duties from Monday to Friday. The survey generally took 20 to 25 minutes to complete.

Statistical Analysis

The data collected were analysed with Statistical software IBM SPSS statistics, version 25.0. Descriptive statistics of mean, standard deviation, percentages and frequencies were used to illustrate the data.

Results

The returned response rate was 73% (154 returned out of 210 sets of questionnaires distributed) with reasons that some of the nurses were away on leave and some were not keen to participate, especially those working in high workload units / wards such as surgical ward, A&E, HDU and ICU.

The RNs were predominantly female (n = 134, 87%). Majority of the RNs were in the age range of 20 to 30 years (n = 116, 75.5%), and 118 (76.6%) held a Diploma in Nursing. Most of the nurses worked in the general medical-surgical wards (n = 107, 69.5%), whereas 30 (19.48%) RNs were from specialty wards (ICU, HDU & A&E) and 17 (11.04%) were from the Maternity Ward.

Perceived personal competence of physical examination skills

The numeric rating scales were totalled into scores for the analysis of this section. The RNs perceived that assessing vital signs was their most competent skills (M = 3.92 to 3.86, SD = 0.28 to 0.36). Whilst inspecting jugular vein distension (M = 2.89, SD = 0.80), percussing abdomen for abdominal tones (M = 3.03, SD = 0.84), and inspecting the spine (M = 3.12, SD = 0.81) were rated as three least competent skills among the RNs. (Table 1)

Table 1: Perceived personal competency of physical examination skills among the RNs (N = 154)

PHYSICAL EXAMINATION SKILLS		PERCEIVED PERSONAL COMPETENCY	
		M	SD
1	Inspect general appearance	3.74	0.50
2	Assess mental status and level of consciousness	3.71	0.50
3	Inspect overall skin colour	3.71	0.50
4	Inspect gait and movement	3.75	0.48
5	Inspect external eyes	3.59	0.57
6	Assess speech	3.66	0.51
7	Assess gross hearing (base on conversation)	3.56	0.63
8	Inspect pupils if equal, round, reacting to light and accommodation	3.56	0.60
9	Inspect oral cavity	3.51	0.66
10	Palpate extremities for temperature	3.67	0.54
11	Palpate distal pulse for circulation	3.66	0.54
12	Palpate and inspect capillary refill	3.74	0.50
13	Inspect chest shape and movement	3.55	0.63
14	Assess breathing effort	3.62	0.59
15	Auscultate lung sound	3.29	0.71
16	Inspect jugular vein distension	*2.89	0.80
17	Auscultate heart sound	3.16	0.76
18	Inspect abdomen	3.49	0.62
19	Auscultate abdomen for bowel sound	3.49	0.65
20	Percuss abdomen for abdominal tones	*3.03	0.84
21	Palpate abdomen for mass, tenderness and distension	3.18	0.80
22	Inspect and palpate extremities for oedema	3.62	0.60
23	Inspect extremities for skin colour and hair growth	3.57	0.65
24	Palpate extremities for tenderness	3.54	0.64
25	Inspect wound and skin lesion	3.63	0.58
26	Inspect muscle and extremities for size and symmetry	3.38	0.70
27	Assess muscle strength	3.49	0.65

28	Observe range of motion of joints	3.48	0.63
29	Inspect the spine	*3.12	0.80
30	Inspect perianal region	3.30	0.74
31	Inspect urine and stool	3.53	0.64
32	Clinical breast examination	3.14	0.88
33	Assess vital signs:		
	Temperature	3.92	0.28
	Pulse	3.90	0.30
	Respiration	3.90	0.32
	Blood pressure	3.91	0.29
	Oxygen saturation	3.89	0.31
	Pain	3.86	0.36

M = Mean, **SD** = Standard Deviation

Frequency of Use of Physical Examination Skills by RNs

Researchers further clustered the frequency of physical examination skills according to median scores. There were 16 (42%) of the 38-item core skills which were rated in median 5, indicating skills were performed every time when the RNs were at work (Table 2). These skills were mostly applying inspection technique and vital signs assessment which measure body temperature, pulse, blood pressure, oxygen saturation and evaluate pain score (Table 2).

The median scores of 4 recorded a total of 18 (47%) of the 38-item core skills where RNs performed between two to five times while at work. There were four (11%) of the 38-item core skills where RNs rarely perform at all, with only a few times in a year. These skills were inspecting jugular vein distension, percussing abdomen for abdominal tones, inspecting the spine and clinically examining the breasts, which yielded similar result as the three least competent skills among the RNs.

Table 2. Frequency of physical examination skills used

MEDIAN = 5 <i>I perform this technique regularly in my clinical practice (every time I work)</i>	MEDIAN = 4 <i>I perform this technique frequently in my clinical practice (every 2-5 times I work)</i>	MEDIAN = 3 <i>I perform this technique occasionally in my clinical practice (a few times a year)</i>	MEDIAN = 2 <i>I perform this technique rarely in my clinical practice (a few times in my career)</i>	MEDIAN = 1 <i>I know how to do this technique, but have never done this in my clinical practice</i>
(42%)	(47%)	(11%)	(0%)	(0%)
1. Inspect general appearance	1. Inspect pupils	1. Inspect jugular vein distension	None	None
2. Assess mental status and level of consciousness	2. Inspect oral cavity	2. Percuss abdomen for abdominal tones		
3. Inspect overall skin colour	3. Palpate distal pulse	3. Inspect the spine		
4. Inspect gait and movement	4. Palpate and inspect capillary refill	4. Clinical breast examination		
5. Inspect external eye	5. Inspect chest shape and movement			
6. Assess speech	6. Auscultate lung sound			
7. Assess gross hearing	7. Auscultate heart sound			
8. Palpate extremities	8. Inspect abdomen			
9. Assess breathing effort	9. Auscultate abdomen for bowel sound			
10. Inspect wound and skin lesion	10. Palpate abdomen for mass, tenderness and distension			
11. Assess temperature	11. Inspect extremities for skin colour and hair growth			
12. Assess pulse	12. Inspect and palpate extremities oedema			
13. Assess respiration	13. Palpate extremities for tenderness			

14. Assess blood pressure	14. Inspect muscle and extremities for size symmetry			
15. Assess oxygen saturation	15. Assess muscle strength			
16. Assess pain	16. Observe range of motion-joints			
	17. Inspect perianal region			
	18. Inspect urine and stool			

Training needs of physical examination skills

Based on the data in Figure 1, the training needs were high for cardiovascular system examination skills (n=67, 43.5%), followed by neurological system (n= 50, 32.5%) and thorax/respiratory system (n= 15, 9.7%).

Whereas 26.6% (n = 41) listed integumentary system as the least important training needs required by the RNs. Genitalia/ anus/ rectum/ prostate system for male patients was rated at second in the list at 25.3% (n = 39) and genitalia and reproductive system for female was listed third least important, 8.4% (n = 13).

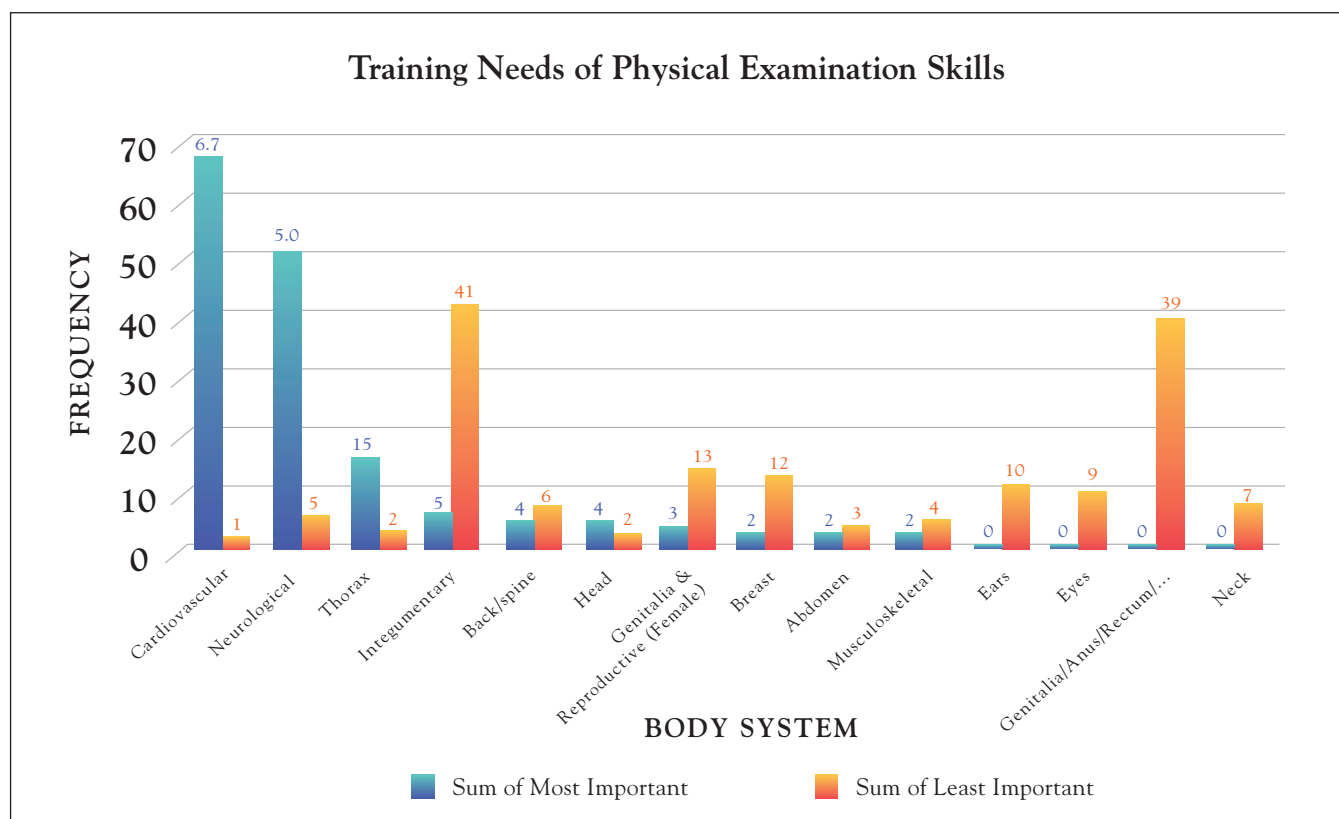


Figure 1. Training needs of physical examination skills

Influencing factors to physical examination practice

Figure 2 presents the seven factors that influence the RNs' physical examination practice in clinical areas. 'Lack of time' (n = 123, 80%) was identified as the major factor hindering the practice of physical examination. 'Role boundaries/scope of practice' (n = 45, 29%) came in second and 'Ward culture' (n = 43, 28%) listed third.

About 6% (n = 4) of the RNs selected 'others' and the compiled answers given were burdened by paperwork, high patient-nurse ratio, high workload, incompetent skills, carrying out billing procedures on patients' consumables usage and procedures.

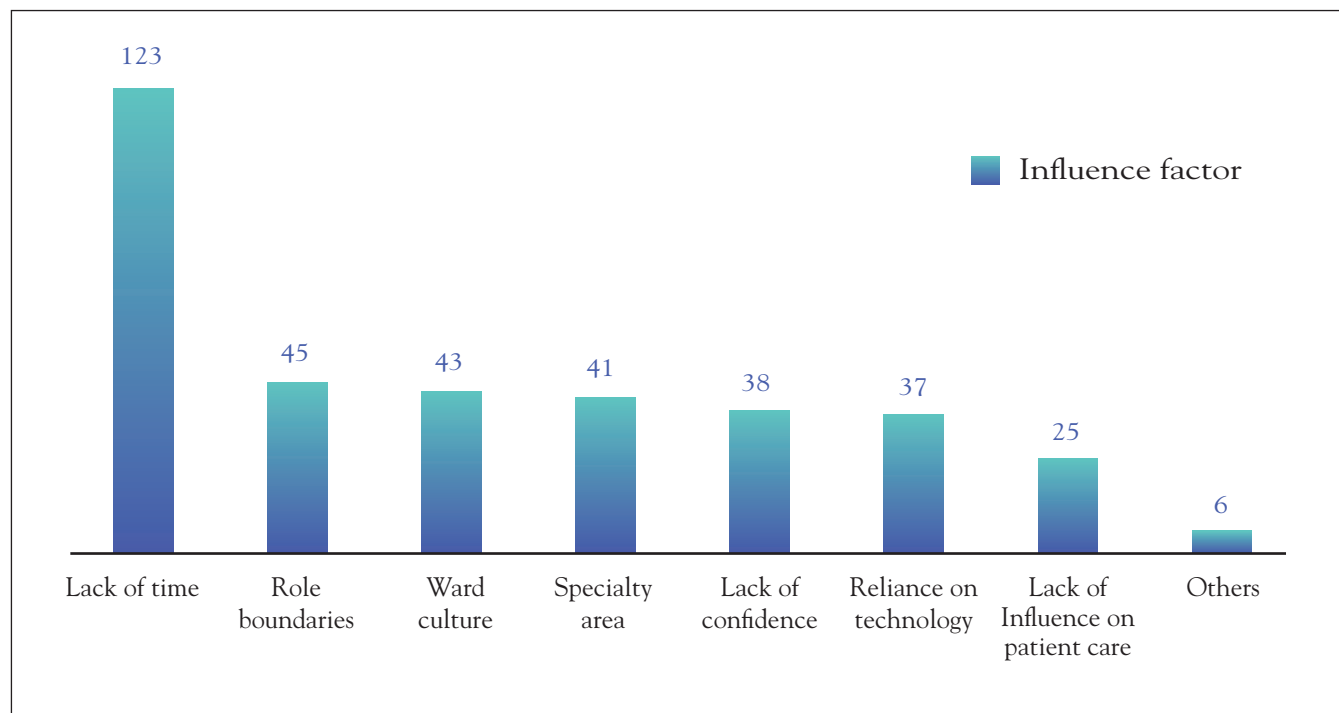


Figure 2. Factors influencing physical examination

Discussion

The findings of this study showed that the RNs perceived personal competence of physical examination skills fell within the scale of 'somewhat competent'. This result corresponded with Heeyoung et al. (2012) study where the Korean nurses responded the similar competency scale. An accurate and complete health assessment is the foundation for appropriate holistic and individualised nursing care (Jensen, 2015). In Adib-Hajbaghery and Safa's (2013) study, the level of nurses' proficiency in health assessment skill was not satisfactory too. In addition, the two studies in the Asian region by Heeyoung et al. (2012) and Akao et al. (2013) also argued that majority of nurses were incompetent in

their physical examination skills, especially skills that were rarely performed and specific.

The RNs in this study routinely used physical examination skills only at 42%. This closely resembles the result of previous studies describing a relatively small set of physical examination skills that were used (Giddens, 2007), 34% of skills routinely used (Birks et al., 2012), and used of health assessment skills less than desired level (Adib-Hajbaghery & Safa, 2013). Majority of the physical examination skills performed routinely in this study (16 out of 38-item core skills) were mainly inspection, general observations and checking of vital signs of patients. These results were consistent with the findings of Osborne et al. (2015) and Massey et

al. (2016), where vital signs and observations were identified as important components in early detection of deterioration signs. This was perhaps what the RNs in this study relied on, as the complex responsibilities of physical examination should fall under the doctors' role.

Moreover, nurses are always rushing through assessments and unable to carry out in-depth physical examination due to the common factors of lack of time, high workload and patient-nurse ratio in the wards (Birks, 2012) which, in this study presented similar findings. This study also showed that the frequency of use of physical examination techniques was higher among the RNs with 4-5 years of working experience. This finding can be attributed to level of professional experience as stated in Benner's from novice to expert theory. Lack of time and role boundaries or scopes of practice were identified as the main factors influencing physical examination practice among the RNs in clinical areas. Similar responses have been observed in other studies. Birks et al. (2012) found that time is the key factor that determines the quality of physical examination by nurses. For example, in a high turnover ward, nurses may not have the time to perform comprehensive physical examination upon admission or transfer in and may only complete inspection of general appearance and obtain vital signs from their patients. Time is the most significant factor influencing nursing practice and the depth of physical examination (Giddens, 2007; Birks et al., 2012).

Second key factor influencing nurses' physical examination practices was role boundaries in this study. Nurses perceived some physical examination skills are to be carried out by doctors, and often their nursing assessment findings were not considered in prescribing treatment for patients' care. Osborne et al., (2014) are

of the opinion that RNs' perception of their role in physical examination is largely shaped by professional boundaries. It appears that a better understanding of the purpose of nursing and medical assessment is essential to enhance professional role and patient's outcome.

A total of 28% (n = 18) of the RNs indicated 'ward culture' as the third influencing factors that affect nurses' physical examination practice. According to Bandura's (1997) Social Learning Theory, Bandura suggests that people learn from one another, via observing, imitating, and modeling. Therefore, it explains nurses' behaviour in learning, behavioral, and environmental influences in the practice of physical examination. If nurses are discouraged to perform their skills to full scope of practice, the lesser use of the skill will lead to a faster decline in competency. The remaining factors which include specialty area, lack of confidence, reliance on technology equipment, and lack of influence on patient care were interpreted and supported by previous research (Giddens, 2007; MsElhinney, 2010; Birks et al., 2012; Osborne et al., 2014; Zambas, 2016).

The ability of nurses to overcome numerous factors that may hinder the practice of physical examination should be viewed as a major concern in nursing profession. Physical examination is one of the essential nursing activities to ensure patient safety and outcome of treatment. Nurses are required to maintain their competence in performing regular physical examination on each patient in order to detect positive or negative clinical changes during the period of hospitalisation. The findings of this study gave a general idea of the utilisation of the RNs' physical examination skills and the factors influencing their practices.

Among the training needs agreed upon by the RNs on body systems' physical examination, the ones that were in the top three list were cardiovascular system (n = 67, 43.5%), followed by neurological system (n = 50, 32.5%) and thorax/respiratory system (n = 15, 9.7%). This result was consistent with the study by Heeyoung et al. (2012) where training needs on these three systems were rated high by the Korean nurses. The results again highlighted that nurses in non-western country lack the confidence in performing the examination on these body systems as compared to nurses in western countries. Another possible factor that could attribute to this might also be because a majority of the RNs were from medical and surgical wards, thus, RNs may perceive these as infrequent use of examination skills which warrant further training.

The training needs for male and female urogenital system was not favoured by the RNs, which may probably be due to the social-cultural factors in Malaysia. Interviews and examination on patient's urogenital areas and sexual behaviour are challenging and embarrassing for both patients and nurses. Nurses maybe of the opinion that this skill is best left for the doctors to perform.

Overall, the findings reflected that the training needs of the RNs were somehow related to their level of proficiency in physical examination skills and the clinical areas where they worked.

Implication of the study

Findings from this study showed that physical examination training is vital for the RNs in order to ensure that they keep their skills in tune. Reevaluating the current physical examination content syllabus in the

nursing programme curriculum needs to be considered. Regular in-service training or refresher course on physical examination with simulation training catered for experienced and inexperienced RNs may help to bridge this practice gap.

The greatest barrier influencing the practice of these skills was time factor. Nursing administrators ought to implement measurements to eliminate tasks that occupy RNs time away from patients' care, such as reasonable patient-nurse ratio, and assigning patients according to acuity and competency of the RNs as well as to review system processes in order to reduce unnecessary or redundant paper work.

Refined competency in physical examination enhances RNs clinical reasoning and judgement in their nursing practice. With this, coupled with good work system processes would be of great benefit to patients care.

Limitations

A few limitations were observed. The sample size of the study was relatively small (n = 154) and the data was collected from one private hospital, therefore the generalisability is restricted. A larger randomised sample of RNs across the city or country from both public and private healthcare is recommended for future studies.

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REFERENCES

- Adib-Hajbaghery, M., & Safa, A. (2013). Nurses' Evaluation of Their Use and Mastery in Health Assessment Skills: Selected Iran's Hospitals. *Articles of Nursing and Midwifery Studies*, 2 (3), 39-43.
- Akao, S., Tanabe, K., Dorjsuren, B., & Higuhi, M. (2013). Physical assessment ability of nurses and midwives on maternal care in Mongolia. *Journal of Mongolian Nurse Association* 5(3), 475-480.
- Anderson, B., Nix, E., Norman, B., & McPike, H. D. (2013). An evidence based approach to undergraduate physical assessment practicum course development. *Journal of Nurse Education in Practice*, vol. 14, 242-246.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W H Freeman/Times Books/ Henry Holt & Co. Retrieved from https://books.google.com/books?id=ZL7qN4jullUC&dq=editions%3AitTbpOYuAYgC&source=gbs_book_other_versions
- Briks, M., Cant, R., James, A., Chung, C., & Davis, J. (2012). The Use of Physical Assessment skills by RNs in Australia: Issues for nursing education. *Journal of Collegian*, 20(1), 27-33.
- Dillon, P. (2007). *Health assessment: a critical thinking case studies approach*. (2nd ed.). Philadelphia: F.A. Davis
- Douglas, C., Osborne, S., Reid, C., Batch, M., Hollingdrake, O., Gardner, G., et al. (2014). What factors influence nurses' assessment practice? Development of the barrier to nurses' use of Physical assessment scale. *Journal of Advanced Nursing*, 70 (11), 2683-2694. <https://doi.org/10.1111/jan.12408>
- Fennessey, A.G. (2016). The Relationship of Burnout, Work Environment, and Knowledge to Self-Reported Performance of Physical Assessment by RNs. *Journal of MedSurg Nursing*, 25(5), 346-350.
- Giddens, J.F., & Eddy, L. (2009). A survey of physical assessment skills taught in undergraduate in nursing programs: are we teaching too much? *Journal of Nursing Education* 48 (1), 24-29.
- Giddens, J.F. (2007). A survey of physical assessment skills performed by RNs: lessons for nursing education. *Journal of Nursing Education* 46 (2), 83-87.
- Heeyoung, O., Jiyeon, L., & Eun Kyung, K. (2012). Perceived Competency, Frequency, Training Needs in Physical Assessment among RNs. *Journal of Korean Society of Adult Nursing*, 24(6), 627-634.
- Jensen, S. (2015). *Nursing health assessment: A best practice approach* (2nd ed.). Philadelphia: Lippincott Wolters Kluwer.
- Lesz, R., & Dixon, A. (2007). Physical assessment: implications for nurse educators and nursing practice. *Journal of International Nursing Review* 54(2), 166 – 172.
- Massey, D., Chaboyer, W. & Anderson, V. (2016). What factors influence ward nurses' recognition of and response to patient deterioration? An integrative review of the literature. *Nursing open*. <https://doi.org/10.1002/nop2.53>
- McElhinney, E. (2010). Factors which influence nurse practitioners ability to carry out physical examination skills in the clinical area after degree level module – an electronic Delphi study. *Journal of Clinical Nursing*, 19(21-22), 3177-3187. <https://doi.org/10.1111/j.1365-2702.2010.03304.x>
- Osborne, S., Douglas, C., Reid, C., Jones, L. & Garner, G. (2015). The primacy of vital sign – acute care nurses' and midwives' use of physical assessment skills: a cross sectional study. *International Journal of Nursing Studies*, 52 (5), 951-962.
- Pejmankhah, S. (2014). Evaluate nurses' self-assessment and educational needs in term of physical examination of patients in hospitals of Birjand University of Medical Sciences. *Procedia-Social and Behavioral Sciences*, 141, 597-601.
- Petersen, E., (2013). Retrieved from <http://smallbusiness.chron.com/selfefficacy-theory-workplace-10330.html>
- Secrest, J.A., Norwood, B.R., & DuMont, P.M. (2005). Physical Assessment Skills: a descriptive study of what is taught and what is practiced. *Journal of Professional Nursing*, 21(2), 114-118.
- Social Statistic Bulletin Malaysia (2016). Retrieved from <https://www.dosm.gov.my>
- West, S. (2006). Physical Assessment: Whose role is it anyway? *Nursing in Critical care*, 11(4), 161-167.
- Zambas, S.I. (2010). Purpose of the systematic physical assessment in everyday practice: critique of a "sacred cow". *Journal of Nursing Education*, 49(6). 305-310.
- Zambas, S. I. (2013). *The consequences of using advanced assessment skills in medical and surgical nursing: keeping patients safe* (Doctoral dissertation, Auckland University of Technology).
- Zambas, S. I., Smythe, E. A., & Koziol-Mclain, J. (2016). The consequences of using advanced physical assessment skills in medical and surgical nursing: A hermeneutic pragmatic study. *International journal of qualitative studies on health and well-being*, 11(1), 32090. <https://doi.org/10.3402/qhw.v11.32090>