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ORIGINAL ARTICLE

Physical assessment techniques performed by Italian registered nurses: a quantitative survey

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Aims and objectives. The aims of the study were to describe which of the core techniques of the physical assessment are regularly performed by a sample of Italian nurses, and to investigate the potential predictors of a more complete examination.

Background. Physical examination is among the essential tasks of nursing professionals, who are requested to perform a correct and complete physical assessment.

Design. Cross-sectional survey.

Methods. The study was performed between August 2013 and January 2014 in 17 Italian regions. A total of 1182 questionnaires were collected.

Results. Most participants were females (age range 41–50 years), and worked in Internal Medicine, Intensive Care and Surgical hospital units. Of the 30 core techniques that are currently taught and performed according to the Italian Baccalaureate degree requirements, 20 were routinely performed, 6 were seldom used and 4 were learnt but almost never performed (auscultation of lung, heart and bowel sounds and spine inspection). Graduate and postgraduate nurses, working in Intensive Care Units and Nursing Homes, were more prone than the others to carry out a more complete physical assessment.

Conclusions. The skills to perform a physical assessment are suboptimal among this sample of Italian nurses. Health and educational providers should pose more attention and efforts to provide nurses with an acceptable training in physical examination practice.

Relevance to clinical practice. This study describes the specific physical techniques performed by nurses in real practice and provides information on which skills require more attention in nursing educational programmes.

What does this study contribute to the wider global clinical community?

- Of the 30 core techniques that are currently taught and performed according to the Italian Baccalaureate degree requirements, only 20 were routinely performed, 6 were seldom adopted, and 4 were learnt but almost never performed.
- The skills to perform a physical assessment are suboptimal among this sample of Italian nurses, especially if employed in Internal care wards or with a lower educational level.
- Health and educational providers should pose more attention and efforts to provide nurses with an acceptable training in physical examination practice.

Key words: clinical competence, clinical judgment, nursing assessment, physical assessment skills, physical examination

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Introduction

The Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) states that each hospitalised patient should receive a daily physical assessment by a trained nurse, as part of routine care (ANA 2004). This assessment, which is one of the core competencies of nursing practice (ANA 2004, McElhinney 2010, Pellico *et al.* 2012), is fundamental both to gather information about patients' health status, and to evaluate the quality of nursing care (AACN 1998, Munro 2004, Wheeldon 2005).

The ability to perform a complete physical assessment has been included among the essential components of the professional nursing education (AACN 1998), and it has been taught in most baccalaureate degree programmes for at least the past decade (Solomon 1990).

Although many academic degree programmes aim to teach a correct method of physical assessment of patients to preregistration nursing students (Birks *et al.* 2013), growing concerns have been expressed about the adequacy of the educational preparation of the nursing graduates.

Background

Given the rapid changes in health care systems and the increasing demands placed on newly qualified nurses, there is a growing need for professional nurses to develop new and updated competencies for patients' assessment (Anderson *et al.* 2014). Indeed, current evidence suggest that graduates do not meet competency expectations from the employer point of view, and are not 'practice ready' (Burns & Poster 2008, Berkow *et al.* 2009). In addition, several studies described a mismatch between what is taught in preregistration programmes and the real ability of newly graduated nurses of putting into practice what they learnt (Lee 2002, Maben *et al.* 2006).

While universities strive to develop advanced competency-based curricula to prepare new nurses for practice, several studies evaluated the application of physical assessment skills in the real practice (Berkow *et al.* 2009). Some studies documented that nurses do not regularly use physical assessment skills (Barbarito *et al.* 1997, Secrest *et al.* 2005, Giddens 2006, 2007, Birks *et al.* 2013), or that they use only a small number of them (Giddens 2007, Birks *et al.* 2013), while baccalaureate nursing students usually perform less than half of the procedures taught in a physical assessment course (Barbarito *et al.* 1997). To our knowledge, however, no study evaluated the quality of physical assessment among a large sample of Italian nurses.

Aim

The aim of this study was to identify which physical examination skills are performed by Italian practicing nurses, to understand which competencies are mostly needed by the graduates of nursing programmes. Moreover, we evaluated whether physical examination skills significantly differ by nurses' age, educational level, clinical area of expertise and years of employment.

Methods

Design

A multi-centric cross-sectional survey was carried out between August 2013 and January 2014.

Participants inclusion–exclusion criteria

All Italian RNs employed in a public or private facility with a full time contract, providing direct patient care either in inpatient or in outpatient settings were eligible for inclusion. We excluded chief nurses, nurse directors, nurse educators and those employed part-time.

Procedures

A validated questionnaire (Giddens 2007, Birks *et al.* 2013) was administered through a web-based survey. To recruit an appropriate number of registered nurses (RNs), we asked the participation of the Italian Nursing Federation (IP.AS.VI.) of all Regions of Italy. We sent a prenotification e-mail to the presidents of the Nursing Federations of all Italian provinces, explaining the study purpose and the relevance for clinical practice, and asking formal participation. After the approval of a Federation president, an e-mail containing the study purpose and a link to access the questionnaire was sent to all the IP.AS.VI. members who were RNs. All RNs had to read and accept an online informed consent, approved by Ethic Committee of the coordinating centre, before compiling the questionnaire.

According to web-based criteria management (Dillman 2000), two weeks after the contact e-mail, a reminder was sent to nonresponders. Data collection ensured confidentiality and anonymity of participants and the web-survey was designed to avoid duplicate questionnaires.

Instrument description

After a formal authorisation of the author, we used a shortened version of the questionnaire developed by Giddens

(2007). The original tool had 126 items aimed at assessing which physical examination skills are most commonly performed by practicing nurses. To increase the response rate, we identified the 30 items routinely taught and performed, according to the Italian Bachelor degree requirements, and included them in the final questionnaire. The questionnaire also included selected socio-demographic data such as age, gender, educational level, years of experience as a RN, and setting of care.

The average frequency with which each skill was performed was measured using a six-point Likert scale, as follows: 0 = I do not know how to do this technique; 1 = I know how to do this technique, but it is not part of my clinical practice; 2 = I perform this technique rarely (a few times during my career); 3 = I perform this technique occasionally (a few times per year); 4 = I perform this technique frequently in my clinical practice (every 2–5 times I work); 5 = I perform this technique regularly in my clinical practice (every time I work).

The survey was pretested online on a selected sample of 20 RNs. In this phase, participants were asked to assess whether the items were easy to compile and consistent with the physical examination skills they routinely performed. No changes were deemed necessary and the survey was subsequently posted online for participants.

Statistical analysis

Questionnaire reliability was assessed using Cronbach's alpha on the 30-item scale. Alpha values were classified as follows: <0·50 unacceptable, 0·50–0·60 poor, 0·60–0·70 acceptable, 0·70–0·90 good and over 0·90 excellent (DeVellis, 2011). We tested item reliability deleting each item from the questionnaire and computing the specific alpha value: a deviation from the original value >0·10 suggested poor reliability of the deleted item (Ferketich 1991). Descriptive statistics were used to describe the general characteristics of the sample and the frequency of each physical examination item. ANOVA was performed to evaluate the potential differences across groups. In detail, we stratified the sample by several categories including: (1) type of education ('regional', 'academic', 'advanced'), (2) occupational sector ('private', 'public', 'autonomous'), (3) clinical setting ('medical', 'surgical', 'critical', 'residency', 'community health' and 'outpatient service'), (4) years of employment ('<5 yy', '5–10 yy', '11–20 yy', '21–30 yy', '30 + yy'), (5) age class ('20–30 yy', '31–40 yy', '41–50 yy' '50 + yy'). When the results of two categories were overlapping, we joined the categories and, if only two were remaining, we used *t*-test rather than one-way ANOVA. Data were analysed using SPSS (SPSS Inc., 2007).

Results

The Nursing Federations of 92 Italian provinces, located in 17 Italian regions accepted to participate, and a total of 1372 questionnaires were collected. After the exclusion of the questionnaires filled by chief nurse, nurse director/managers, nurse educators or by RNs employed part-time, 1182 questionnaires were included in the final sample.

Demographics

Most participants were females (77·2%) and lived in Northern Italy (73·8%). About 35·8% of the sample had an age comprised between 41–50 years, 32·8% had a Bachelor degree, 48·7% had an equivalent nursing qualification. About half of the RNs had at least 11 years of experience in clinical practice, 31·2% of them worked in Internal Medicine Units, 21·2% in Intensive Care Units and 16·6% in Surgical Units (Table 1).

Scale reliability

The scale had a Cronbach's alpha value of 0·94, which may be considered excellent. This value was stable after one-by-one item deletion, and the total alpha value of the scale never dropped below 0·93. Total items correlations ranged between 0·38–0·72.

Physical assessment – overall

Of the 30 selected core techniques, 20 were 'frequently' or 'regularly' performed by the majority of the participants (mean score >3; <20% of 0–1 answers; Table 2). In particular, the following eight skills were performed very frequently by almost all participants (all mean scores >4; <10% of 0–1 answers): 'Inspection of overall skin colour', 'Evaluation of breathing effort', 'Assessment of mental status and level of consciousness', 'Inspection of wounds', 'Inspection of skin lesions', 'Inspection of extremities for skin colour and hair growth', 'Evaluation of speech', 'Evaluation of the face for movement and sensation'.

Six techniques were applied 'rarely' or 'occasionally' by a high percentage of the sample (mean score 2–3; 25%–35% of 0–1 answers): 'Palpation and inspection of capillary refill', 'Palpation of extremities for tenderness', 'Assessment of muscle strength', 'Inspection of muscles and extremities for size and symmetry', 'Assessment for PERRLA (Pupils Equal, Round, Reactive to Light and Accommodation)', 'Assessment of Glasgow Coma Scale'.

Table 1 Characteristics of the study sample (n = 1182)

Variables	n (%)
Gender	
Male	269 (22·8)
Female	913 (77·2)
Age in years	
20–30	294 (24·9)
31–40	303 (25·6)
41–50	423 (35·8)
50+	162 (13·7)
Geographical area	
Northern	873 (73·8)
Centre	189 (16·1)
Southern-Islands	120 (10·1)
Education	
Regional	576 (48·7)
Bachelor	388 (32·8)
Advanced	218 (18·4)
Setting	
Internal Medicine	369 (31·2)
ICU	251 (21·2)
Surgical Unit	196 (16·5)
Community	177 (15·0)
Nursing Home	58 (4·9)
Other	131 (11·1)
Years of experience	
<5	291 (24·6)
5–10	165 (14·0)
11–20	303 (25·6)
21–30	315 (26·6)
>30	108 (9·1)

Finally, four techniques were learnt but almost never performed by more than 60% of the participants (mean score <2; 43%–58% of 0–1 answers): 'Auscultation of lung sounds', 'Auscultation of heart sounds', 'Auscultation of the abdomen for bowel sounds' and 'Inspection of the spine'.

Predictors of the quality of the physical assessment

As shown in Table 2, for almost all items, the nurses operating in intensive care units or nursing homes were significantly more likely than all others to perform the recommended physical assessment technique. A higher educational level (advanced or bachelor vs. regional) was also frequently associated with a higher score in 15 skills. Finally, as compared to older colleagues, the nurses aged 20–40 years were more likely to perform a few core procedures, including two of those that were infrequently made: palpation and inspection of capillary refill, and auscultation of abdomen for bowel sounds. A few differences were also found by years of experience, but when the analyses were adjusted for age class no item remained significant.

Discussion

In this survey, the Italian nurses frequently or regularly performed 20 of 30 core techniques of the physical assessment, but only eight of them were performed at every visit. Six skills were performed rarely or occasionally, and four were either not known or never applied in daily nursing activities.

Consistent with previous studies (Giddens 2007, Birks *et al.* 2013), our results suggest that one-third of the selected procedures are not routinely applied in clinical practice. The potential explanations include: heterogeneity of nursing core curricula in the national setting (Sala & Manara 1999, Palese *et al.* 2006), role boundaries and time shortage (Birks *et al.* 2013). It is also possible that nurses do not fully recognise the importance of performing a complete physical examination. While breaking down some barriers is a difficult task, improving preregistration programmes for nursing students and planning more tailored training courses is certainly required.

Interestingly, the majority of the skills routinely performed involved skin examination and general observation and inspection. Indeed, in our sample, three basic inspection activities (inspection of overall skin colour, of skin lesions and of extremities) were performed by almost all participants during every examination. Conversely, spine inspection, and some auscultation procedures (of the heart, abdomen and lung sounds) were not considered as part of the typical nursing practice, probably because these skills are usually regarded as advanced competencies, more often performed by physicians. These findings may suggest an educational paradox: on one side, there are growing concerns on the inadequate preparation of graduate nurses, thus it seems logical to underline the importance of a high-quality nursing education. On the other side, our results suggest that nurses perform a fairly small set of examination techniques, raising questions regarding the actual need of teaching advanced assessment skills to nursing students (Giddens 2007).

As already shown in other studies (Giddens 2007, Birks *et al.* 2013), in our sample the nurses employed in critical care units and in nursing homes reported the highest scores in almost all physical assessment techniques, and were in general more prone to perform a complete physical assessment, as compared to nurses working in other settings. Indeed, critical care units and nursing homes are highly challenging areas, in which nurses often works alone, are an active part of the decision-making process, and they have to manage high-risk patients. Therefore, in these settings, the physical examination is a fundamental part of patients' management, and nurses are in general well

Table 2 Mean scores of each item of the Giddens questionnaire (Giddens 2007); frequency of 0–1 answers for each physical assessment skill (overall sample); and *p*-values of the differences in the mean scores of each item by selected variables

Code	Items (skills)	Overall sample		Educational level	Age class	Setting of care
		Mean score (SD)	% of 0–1 answers			
EO1	Inspect overall skin colour	4·51 (1·04)	3·7			***
EO2	Evaluate breathing effort	4·47 (0·98)	3·1			***
EO3	Assessment mental status and level of consciousness	4·67 (0·79)	2·0			***
EO4	Inspect and palpate extremities for oedema	3·84 (1·28)	7·1			***
EO5	Palpate extremities for temperature	3·84 (1·36)	8·7			***
EO6	Palpate and inspect capillary refill	2·40 (1·71)	34·0	*	**	***
EO7	Palpate distal pulses for circulation	3·43 (1·51)	14·6	*		***
EO8	Inspect wounds	4·29 (1·25)	7·0	*		***
EO9	Auscultate lung sounds	1·42 (1·54)	58·3	*		***
EO10	Auscultate abdomen for bowel sounds	1·66 (1·53)	52·0	*	**	***
EO11	Inspect abdomen	3·56 (1·53)	13·3			***
EO12	Auscultate heart sounds	1·58 (1·59)	54·5	*		***
EO13	Inspect skin lesions	4·58 (0·87)	2·0			***
EO14	Inspect extremities for skin colour and hair growth	4·46 (0·96)	2·6			***
EO15	Inspect external eyes	3·77 (1·46)	10·7			***
EO16	Evaluate speech	4·47 (1·02)	3·2			***
EO17	Palpate abdomen for tenderness and distension	3·18 (1·64)	19·0	*	**	***
EO18	Observe range of motion of joints	3·48 (1·56)	14·9			***
EO19	Inspect chest shape	3·96 (1·29)	6·7	*		***
EO20	Evaluate face for movement and sensation	4·15 (1·23)	5·4			***
EO21	Palpate extremities for tenderness	2·46 (1·65)	31·4	*		***
EO22	Assess muscle strength	2·73 (1·56)	25·0			***
EO23	Inspect muscles and extremities for size and symmetry	2·74 (1·69)	27·5			***
EO24	Assess hearing on the basis of conversation	3·90 (1·37)	7·9			***
EO25	Inspect and examine stool	3·99 (1·41)	10·2			
EO26	Assess gait	3·96 (1·35)	8·5	*	**	
EO27	Assess for PERRLA	2·62 (1·64)	29·4	*		***
EO28	Assess using Glasgow Coma Scale	2·70 (1·79)	33·0	*		
EO29	Inspect the oral cavity	3·43 (1·51)	14·9	*		***
EO30	Inspect the spine	1·98 (1·58)	43·3	*		***

PERRLA, Pupils equal, round, reactive to light and accommodation.

*t-Test $p < 0{\cdot}05$ for the comparison between advanced/Bachelor vs. regional education.

**t-Test $p < 0{\cdot}05$ for the comparison between 20–40 vs. >40 years of age.

***t-Test $p < 0{\cdot}05$ for the comparison between intensive care units or nursing homes vs. all other settings.

trained to practice a wide variety of procedures. It is to note, however, that our results also showed an overlap in the type of skills performed across clinical settings: although some differences in the type of procedures performed by nurses employed in different settings were apparent (and expected), many core skills were applied in all settings.

When the results were stratified by length of employment, no significant differences were found in the quality and quantity of items routinely performed by newly qualified nurses and nurses with a longer experience. Also, a few techniques were more likely to be performed by younger nurses. This may be due, at least in part, to the changes in nurses core curricula introduced in the Italian Universities in recent years: indeed, a heavy emphasis has been given to the selection of those practices that are really needed to professional nurses (Sala & Manara 1999, Palese *et al.* 2006). Therefore, we may speculate that those nurses who recently followed preregistration nursing programmes received a more complete training, as compared to less recently graduated nurses. Clearly, more data are required to confirm such hypothesis.

Overall, the findings of this study could be useful for health care managers and decision makers to plan educational interventions, that may primarily be directed towards undergraduate nurses, aged more than 40 years, and working in hospital surgical or internal medicine units. Besides nurse education, health care operators

should fully realise the importance for patient safety of all assessment skills. As nursing practice becomes more and more difficult along with the increasing heterogeneity of clinical settings and the complexity of care, nurses are called to improve their skills in performing a complete physical assessment, which represents the first step of a safe and effective care.

Study limitations

This study has some limitations that deserve discussion. First, although we were able to enrol a large number of RNs from several Italian Regions, the sample may not to be representative of all Italian nurses, given the large differences in the response rate among regions of North, Centre and South of Italy. Second, the cross-sectional design of the study does not permit to determine causal relationships, and we were only able to show the associations between selected variables and the frequency of core techniques. Third, an information bias might have occurred, as it is possible that the nurses who agreed to participate were more motivated or more interested in the topic, thus more prone to perform a complete physical assessment than non-responders. Thus, the frequency of the assessment of the core techniques in real practice may be even lower than those reported in our survey.

Conclusions

In conclusion, although the majority of this sample of Italian RNs regularly performed several physical assessment skills, almost one-third of the skills were infrequently or never applied. Among the techniques that were less frequently performed, we found the auscultation of lung, heart and bowel sounds, spine inspection, the assessment and inspection of muscle strength, the assessment of PERRLA and Glasgow Coma Scale, and the palpation of capillary refill and extremities for tenderness.

Overall, graduate and postgraduate nurses, working in Intensive Care Units and Nursing Homes, were more prone than the others to carry out a more complete physical assessment.

Relevance to clinical practice

The findings of this study clarify the specific physical techniques performed by RNs in different clinical settings and may provide insight into the physical examination content and skills to target nursing programmes. These results could sensitise policy, health care decision makers and academic centres to support the development of advanced nursing practice, allowing nurses to acquire more clinical competencies and complex decision-making skills.

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Contributions

All authors participated in all phases of the study (design, data collection and interpretation of the results). Study design: GC; manuscript preparation: GC, MT, VS; statistical analysis: MT and LM; data collection: DC, MC and critical revision the paper: MEF and LM. All authors had full access to data and are responsible for the integrity and the accuracy of the data.

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Conflict of interest

No conflict of interest has been declared by the author(s).

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