

Nurses prescribing medications in geriatric centers: International mapping

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Abstract

Objective: the aim of this study was to identify the perceptions of nurses and physicians and describe the involvement of nurses in medical prescription in general and that of antibiotics in particular, in geriatric institutions. **Methods:** a cross-sectional multinational study was conducted among nurses and physicians in geriatric institutions between April and October 2017. Data was collected using three online questionnaires in both French and English. **Results:** in total, 78.7% of doctors discussed the relevance of the prescription with competent nurses. A map shows the relationship between the evidence level of nursing role in medical prescription, and prescriptive authorization nurses in the 51 participating countries. **Conclusions:** interpersonal physician-nurse relationships are essential in facilitating the nursing role of effective treatment management.

Keywords: Medical Prescription. Antibiotics. Geriatric Institution. Nursing.

Introduction

Geriatric institution or nursing homes are considered long-term care facilities (LTCF) in which elderly people spend extended periods of time, often until they reach their demise. This type of LTCF populace is not only fragile, susceptible to infection and vulnerable to different disease entities, but is also exposed to poly pharmacy¹ and constitutes the population with the highest drug consumption² including antibiotics (ATB).³

A multinational study conducted by Tolson and his team, revealed a consumption of 6 to 10 drugs per LTCF resident in 60% of countries and 11 to 15 drugs in 22% of countries.² Likewise, a systematic review conducted by Van Buul and his colleagues, reported that 47% to 79% of residents received at least one ATB treatment per year, some of which were not even medically indicated.³ A different prospective study endorsed the un-indicated use of antibiotics prescribed in geriatric hospices.⁴ This over the counter ATB prescription contributes to the development of drug resistance, which was found to be commonly spread among LTCF.⁵

In recent years, selected countries extended the prescribing law to include nurses, by handing them prescriptive authority in rural and remote areas, especially in primary care settings.⁶ However, the majority of countries kept the medical prescrip-

tion solely as the responsibility of the physician. Several factors might contribute to the increasing role of nurses in medical prescription and write-up: the lack of physicians, the multidisciplinary nature of decision making, whether diagnostic or therapeutic, and the role of nurses as the sole eye keepers on elderly population make them essential to offer nurses more control and appreciation in medical prescribing.^{7,8} A study in New Zealand emphasized the role of nurses as the only caregivers of the geriatric population. In fact, doctors rarely show up and base their verdicts on nurses' assessments only.⁹ Indeed, the nurses may be the only health professionals who conduct clinical assessment of the LTCF residents and therefore have a crucial role in their medical management. Understanding nurses' perceptions regarding their own role in prescribing can provide insight into their behavior in LTCF. This study aims to identify the perceptions of nurses and physicians in LTCF and describe the involvement of nurses in medical prescriptions in general and particularly in that of antibiotics prescriptions.

Methods

A multinational cross-sectional study was conducted among nurses and physicians in geriatrics institutions between April and October 2017. One hundred and thirty countries are

members of the International Council of Nurses (ICN). Each national association was contacted with the exception of 15 members who do not have e-mail addresses. Of the 115 ICN-membered countries invited via email, only 43 agreed to participate in our study. In addition, we used the snowball sampling technique and enrolled 8 more Arab countries. Thus, 51 of the 197 countries of the world participated including Australia, New Zealand (oceanic), 17 countries from Europe, 17 from Asia, 10 from Africa and 5 from America. With the cooperation of the association of nurses in each country, a nurse representative with a background or experience in geriatric patients was selected from each country. The nurse representative along with physicians specialized in LTCF population and nurses allowed to apply the medical prescription in LTCF, were asked to fill in an online survey.

Three original questionnaires were drafted by the first and second author, and other authors reviewed the questionnaires in terms of face validity, clarity of wording, and ease of completion. The final questionnaires were pilot tested in a sample of 8 nurses and 5 physicians to check the clarity and readability of all items. These questionnaires were composed of several parts, including closed and open questions, and were used to gather information, about the physicians-nurses relation and the perceptions of physicians, nurses and country representatives regarding nurse's right in medical prescription.

Data was collected using three online questionnaires, in both French and English. Participants' anonymity and confidentiality were respected. Each country was informed through a letter, explaining the objective of the study and the voluntary nature of its participation. Lastly, all the participants signed an informed consent before enrolling in our study.

Data entry and analyses were performed using IBM SPSS software version 21. Frequencies and percentages were used to describe categorical variables. To determine whether the nurses' tools or the doctor-nurse relationship affected the nursing role in medical prescription in LTCF, these two variables (presence of tools for the nurses and doctor-nurse relationship type) have been associated with some dependent variables concerning the role of the nurse, participants were classified into two groups looking at their responses on the presence of tools (yes/no) and the type of doctor-nurse relationship (absent, directive / interactive). Statistical bivariate analysis was performed. The Pearson chi-square (χ^2) Fisher's Exact test were used as appropriate for categorical variables. A p-value < 0.05 was considered statistically significant.

In addition, a composite variable was created to assess the right of nurses in medical prescribing. Three themes were selected: nursing rights in medical prescription, discussion of the appropriate drug and doctor-nurse relationship. This composite variable is equal to the sum of the positive answers (yes), among doctors and nurses for 10 variables. Some of the variables are as follows: physician's perception of nurses' role in medical prescription, nurses' own perception in drug prescribing, appropriate prescription discussion and communication between nurses and physician. The obtained score ranged between 0 and 10. In a second step, the ranking of the scores was calculated based on the Sturges' rule "STURGE"¹⁰: the number of classes = $1 + (3.3 \log n) = 1 + (3.3 \log 5) = 3$ and resulted in 4.3. Given the relatively small number of variables, we opted for 3 classes of variables: From 0 to 3 = weak role, from 4 to 7 = moderate

role, over 7 = important role. Concerning the open-ended questions included in the three questionnaires, the coding was created and then the analysis was performed using the ATLAS.ti software.

Results

A final total of 151 responses were received from 51 countries. It includes 42 representatives, 62 nurses and 47 doctors. Results are expressed as a percentage of the 51 countries. Where more than one nurse or doctor participated from the same country, the responses were combined, allowing for recognition that in some countries, such as Canada, Australia, their average working experience in LTCF was 9.6 ± 6.913 years.

Concerning the physician's perception of the nurse's role in medical prescription, 63.8% of doctors approved drug-prescribing role of nurses and almost half (48.9%) entrusted the nurses in prescribing antibiotics. In addition, 78.8% of physicians indicated that they discussed the appropriate prescription with competent nurses, and 51.1% mention that the nurse is competent enough to give advice on a prescription. Nurse competence is the ability to combine mobilizing knowledge, its know-how, its skills and behavior on one hand, and the environment resources on the other hand, to accomplish a mission defined by the company. In addition to these operational skills, relational skills can be fundamental in the commitment of nurses in interdisciplinary teamwork with doctors and participation in decision-making processes. Indeed a good inter-professional communication improves the overall management of patients. Regarding the diagnostic assessment of infectious diseases, 80.8% of physicians stated that nurses are allowed to order primary tests such as urinalysis and strips, or sometimes ask for chest x-rays and blood tests, in case of emergency situations (Table 1).

Regarding nurses' perception of their role in medical prescription from the participated countries, 70.6% and 58.8% of nurses indicated that they have a significant role in drug prescription and in antibiotic prescription respectively. Thus, 58.8% feel that they have the competences to issue an opinion on a prescription, 56.9% of nurses suggested antibiotics therapy to the doctor as well as 76.4% of nurses mentioned that they discussed the appropriate medical prescription. Furthermore, 76.2% of nurses representing the countries of this study

Table 1. Physician's perception of nurse's role in medical prescription

Variables	Yes N (%)	No N (%)
Physician's perception of significant nurse's role in medical prescription	30 (63.8%)	17 (36.1%)
Physician's perception of significant nurse's role in antibiotic prescription	23 (48.9%)	24 (51.1%)
Discussion the relevance of a prescription with nurses	34 (72.3%)	13 (27.7 %)
If yes, the setting of discussion:		
- Competent nurse	37 (78.7%)	10 (21.2%)
- Nurse recognizes the resident well	42 (89.3%)	5 (10.6%)
Nurses' competency to give advice on a prescription	24 (51.1%)	23 (48.9%)
Using rapid diagnostic tests by Nurses	38 (80.8%)	9 (19.1%)
If yes, setting of use:		
- Urgent situation	25 (53.1%)	
- Suspected Infection	11 (23.4%)	
- Others	2 (4.2%)	

N= 47 doctors

expressed that the doctors' visits to the geriatric hospices are insufficient with difficulties to reach them.

The results of the bivariate analysis of the competences of nurses and their role in medical prescription shows that being competent reflected his significant role in antibiotic prescription regarding the pertinent therapy (p value 0.01).

Also, the results of this research demonstrated a significant association between the competences of nurses and the discussion of the appropriate medical prescription with the physician (p value 0.01) (Table 2).

The majority of participants from 51 countries responded that the doctor prescribed based on the assessment of nurses. The bivariate analysis for this study also showed that having a good interpersonal physician-nurse relation was significantly associated with the role of nurses in medical and antibiotic prescription (p value 0.031, 0.012) respectively. Furthermore, this analysis showed that good communication between physicians and nurses gave the nurse the right to suggest the appropriate medical prescription (p value 0.001) (Table 2).

According to the composite variable, one-third of the countries (31.3%) reflected an important nurse's role in medical prescription, particularly in Anglo-Saxon countries (Australia, Canada, New Zealand, United States, South Africa), followed by a moderate role in 50.98% and a weak role 17.6% (Figure1). A high significant association was found between the important role of the nurse and the given authorization in drug prescription. In fact, in these countries, the nurses with important role were more permitted (78.5%) to prescribe a medication compared to the nurses with moderate (7.14%) and weak role (14.2%) (P value <0.000) (Figure1). Moreover, this Figure shows that 14 out of 51 countries' participants allowed nurses' drug prescription. This consent was more prevalent among American and some African countries, yet limited amongst their European counterparts. Moreover, it was scarce among the Asian countries, and especially rare among the Arab countries.

In textual analysis of the answer of open-ended questions, nurses from 20 countries (39.2%) indicated that they sometimes provide drug names or antibiotics to doctors; it was their initiative. On the other hand, nurses from 17 countries (33.3%) announced that they suggested the name treatment. The nurses expressed that they discussed the prescription with the

Table 2. Association between nurses' role, their competences and relation to physicians in medical prescription

Bivariate Analyze Variables		The competences of nurses			Physician-Nurse relation		
		Yes N (%)	No N (%)	Chix2 « P »	Absent/directive N (%)	Interactive N (%)	P- value
Significant nurse's role in medical prescription	Si	53(48.6%)	28 (25.6%)	0.076	33 (30.2%)	48 (44%)	0.031*
	No	13 (11.9%)	15 (13.7%)		18 (16.5%)	10 (9.1%)	
Significant nurse's role in medical prescription	Si	47 (43.1%)	20 (18.3%)	0.010*	25 (22.9%)	42 (38.5%)	0.012*
	No	19 (17.4%)	23 (21.1%)		26 (23.8%)	16 (14.6%)	
Discussion the relevance of prescriptions between the nursing staff and doctors	Si	60 (55%)	31 (28.4%)	0.010*	36 (33%)	55 (50.4%)	0.001*
	No	6 (5.5%)	12 (11%)		15 (13.7%)	3 (2.7%)	
Effect of nurses' assessment on doctors' decisions	Si	46 (42.2%)	25 (22.9%)	0.216	26 (23.8%)	45 (41.2%)	0.004*
	No	20 (18.3%)	18 (16.5%)		25 (22.9%)	13 (11.9%)	

N= (47 doctors & 62 nurses) = 109 participants; *P-value<0.05significant

doctor if they felt that the prescription was inappropriate 18 (29%), or that there was an error of choice or dosage 19 (30.6%). However, the majority of nurses reported that they lacked pharmacological knowledge 24 (38.7%) and legal authorization 8 (12.9%) to be able to discuss an ATB prescription. In other words, the nurses reported that they need theoretical knowledge and legal permission to have a role in cal prescriptions and discuss prescriptions with doctors in order to help make medical decisions.

Discussion

The participation of physicians and nurses with experience and knowledge of the workflow in LTCF in different countries has been essential and can enrich this study. Regarding the perception of doctors and nurses about the nurse's role in medical prescription and particularly antibiotic therapy, the countries participating in this study disputed two contrary attitudes: the first consider that the nurses have a rather weak role towards prescription; while the second carried a much more supportive opinion.

At the level of the health professionals, approval for the active role of nursing staff in prescribing drugs was found to be more dominant among nurses themselves rather than by the physicians. Similarly, we observed the same trend of agreement regarding antibiotic prescriptions. This can be justified by doctors' doubts regarding nurses' skills and their competencies. Nevertheless, there is a higher desire among nurses

Figure 1: Distribution of countries according to the importance of the nurse's role in the medical prescription



and a greater willingness to collaborate in the context of prescription, an attitude found to be more constructive when compared to the physicians.¹¹

The nursing role in medical prescriptions in our study is similar to the results of the study done by Olans and colleagues, who described nurses as being the first responders and central communicators in drug therapy.⁷ Indeed, the central role of a nurse in routine resident care and her communication with the doctor clearly shows that she can perform an effective role in managing diseases and medical prescription in geriatric institutions. Furthermore, our study participants perceived that physicians rely on nurses' assessment for the prescription, a finding consistent with the results of an Australian study that stressed the executive and important organizational role of nurses in management of infectious disease among geriatric institutions due to the lack of medical staff.¹² The difficulty to reach doctors in geriatric hospices, expressed by nurses representing the countries of this study, is concordant to literature data. In addition, it's indicates that reduced doctor visits may be attributed to the physicians' busy practice and low reimbursement from patient care in LTCF.¹³ In these conditions, the nurse's integration in residents continuing assessment and diagnostic process can provide an additional positive perspective and improve her role in the management of drugs and antimicrobials. As the historic example of Florence Nightingale, where nursing involvement has led to innovations in infection control, shows that nursing experience with the patient can not only help to improve clinical outcomes, but also identify new improvements in patient care among different disciplines.¹⁴

Widespread disparities regarding the active role of nurses in prescription was found among the participating countries. Important roles were noticed among Anglo-Saxon countries compared to the traditional European states. Suggested factors for this difference included the nature of nurse training and education, resistance from the medical professionals to give up such authority in ordering drugs, and national regulatory and decree restrictions.¹⁵

Moreover, the prescription authorization to nurses, in some countries of this study, confirm the results of Maier and Aiken who reported a recent adoption, between 2010 and 2015, of prescription drugs by nurses in 35.9% of countries.⁶ These results are concordant to the international search of Delamaire and Lafortune where 12 countries, including Canada, USA, UK & France reported the beneficial role of prescription authorization as an answer to doctors' shortage and the increased need to fill this gap.¹⁵ Although this authorization serves an important health care functions, it should not be as the primary focus of the nursing role. Polymedication care planning should primarily consider the need to continue, discontinue or modify drug treatments based on the resident health status.

According to this study, authorizing nurses to write medical prescriptions reflects the importance of their nursing role among LTCF in different countries. This can be justified by the training of nurses and thus their theoretical skills that allow them to access a role in the prescription of drugs. In the United States, nursing education is classified in seven interconnected levels, ranging from beginner to advanced, where students can opt to acquire continuous medical education.¹⁶ The curriculums of nursing education are based on the nursing professional higher education standards where courses focus

on community care and disease prevention, and emphasize independent thought. Moreover, advanced nurses were granted authority to prescribe drugs of all categories.¹⁵ In the United Kingdom and Ireland, this permit was allowed to all trained nurses who completed the appropriate courses.¹⁵ In Spain, a law about nurses' prescription was adopted in 2015, but is pending to be implemented anytime soon [14028 Royal Decree 954/2015 of 23 October]. In Canada, nursing education is divided into: assistant nurse (2 years) and registered nurse (3 years) and both are eligible to participate in community medical care services after completion of a 4 years bachelor's education program.¹⁷ In China, nursing education has developed rapidly in the past 30 years, but continuing nursing education is still limited.¹⁷

Our manuscript highlights two essential factors for the imperative nursing role in medical prescription which can be linked to the theoretical nursing skills and interpersonal communication with the physicians. Regarding skills, the nurses in this study announced that they have the necessary tools to discuss or issue an opinion on a prescription. Lim and colleagues have revealed that the lack of training of nurses in the use of antibiotics is one of the many obstacles that impede the optimal prescription of antibiotics.¹² Moreover, the physicians have stated that they discuss the relevance of prescription rather with the nurses they deem competent. These results are similar to Muhrer's study, which showed that the nurses' level of knowledge is necessary to have a role in medical prescription.¹⁸ The training on the appropriate use of drugs and especially antimicrobials is important for all health disciplines, and particularly for health care providers. Nurses should be included in training in order to improve the residents' quality of life. Thus, the therapeutic management, including antimicrobials, is a multidisciplinary approach, and it's the nurse who's at the center of the communication. Indeed, the communication, including discussion between nurse and prescriber, requires sufficient knowledge from the former counterpart of the pharmacological characteristics of drugs.

Since the improvement of medical prescriptions is a process integrating the efforts of doctors, pharmacists and nurses, organizing meetings between them is an important step to reducing the consequences of poly pharmacy.¹⁹ Therefore, it is important to update the nurses' knowledge in drug pharmacokinetics, pharmacodynamics and dosing on regular basis, to provide their role in appropriate drug prescriptions, to facilitate their attendance to general medical meeting and to improve multidisciplinary collaboration focused on advanced care planning. After all, they are often the sole care provider and link between the doctor and geriatric patients.

Limitations: The choice of the mode of diffusion of questionnaire conditioned the general presentation of the results, so the main limit of this study resides in the participation of the countries. Despite repeated contacts and individual contacts, the number of participating countries (51) has been below the expected number (131), which may have influenced our findings. Furthermore, the absence of geriatric facilities in some countries is also an important limitation. This context has been addressed by the inclusion of caregivers working in geriatric services in hospitals.

Conclusion

The nurses' role cannot be only defined as orders carrier; it reaches beyond these limits. They are an important part in the medical management, caregiving and decision-making. Most of the time nurses are the first and only watch towers, keeping eyes on fragile section of population, susceptible to different types of diseases, if unnoticed early on, can lead to the demise of the elderly. However, physicians' lack of interest and the shortfall in physician-nurse interactive communication still hinder the active role of nursing in medical management and prescription write-up.

Consequently, a revised role of geriatric home care nurses should be kept in mind. New protocols should be implemented to elucidate the role of nurses in health management. Nurses

in the geriatric settings should have continuous educational goals and updated knowledge about the pertinent problems related to the elderly population. Doctors should push further for this direction, for the purpose of better care provision, better diagnostic inquiries, and prevention of geriatric related complications. Moreover, they should let down the protective, controlling, old-fashioned way of issuing one-way directions, since after all; caregiving is a multidisciplinary team profession.

Declaration of interest

Neither potential conflict of interest, nor monetary gain was reported by the authors.

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