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Abstract

Due to the consequences of changes in fertility and mortality rates, there is an increase in population aging. In this context, the use of potentially inappropriate medications in this population makes nurses important agents in the identification of adverse reactions, requiring their knowledge about these drugs and their effects. The study aimed to verify nurses knowledge about the *2015 AGS BeersCriteria*, regarding the potentially inappropriate medications for the elderly, and their adverse effects. It is a cross-sectional, descriptive, and analytical study with a quantitative and qualitative approach performed in a teaching hospital in the Triângulo Mineiro, Minas Gerais. Of the 80 professionals, 74.1% reported attending the elderly frequently, and only 3.8% had a specialization course in elderly health. Only 13.8% reported knowing the Beers Criteria. And 69% believe that adverse drug reactions can be confused as a new symptom and because of this, new drugs can be inserted into the therapeutic plan. Three categories emerged: The importance of assertive knowledge about PIMs, The nurse as a fundamental character in ADR, and Knowledge as a reinforcer of care. There is evidence of the need to train nurses to better identify adverse drug reactions so that they can act on these events avoiding the worsening of the individual.

Keywords: Aged. Drug-Related Side Effects and Adverse Reactions. Nursing Team. Potentially Inappropriate Medication List.

1. Introduction

The American Geriatrics Society published in 2015, the last update of the Beers criteria. Beers' criteria, initiated in 1991, highlight medications considered inappropriate for the elderly population, due to the potential risk from the use, such as adverse drug reactions (ADRs), interactions, and iatrogenic cascades, that can bring harm to the patient (AGS 2012; AGS 2015).

Considering the population profile in Brazil, since the 60s, fertility rates have suffered a large reduction and changes in population growth have led to changes in age structure, with the consequence of the increase in the number of the elderly population (Simões 2016). In addition, the elderly use the health system very frequently and are consumers of large quantities of drugs due to the characteristic changes of aging. Thus, professionals working in the direct care of the elderly must know the drugs that are inadequate for them, since this is an age group that is gradually growing.

The Inappropriate Medications for the Elderly can lead to ADRs, defined as any unintentional, unintended, and unanticipated harmful consequence or response to a drug that occurs at doses that are usually used for prophylaxis, diagnosis, or therapy. ADRs are considered a type of Adverse Drug Event (ADEs), a concept that is very broad and expresses any unfavorable medical occurrence during a treatment using drugs but does not necessarily have a causal relationship with this treatment (ANVISA 2012)

The nurse is the health professional who spends more time with the patient, besides being accountable for his team, who in turn is responsible for the administration of the drugs. For this practice to be safe, it is necessary to know the drugs that will be administered, the unfavorable conditions to its use, besides the ADR involved (Botosso et al. 2011; Vestana et al. 2014) Regarding this aspect, the fact that practical tools and of easy access exist, such as the *BeersCriteria*, can facilitate care practice and minimize risks.

Therefore, it is necessary to measure if the professionals who administer these drugs have the knowledge and know-how to deal with the adverse effects. In addition, addressing this issue may raise the curiosity of these professionals to seek knowledge through scientific study, besides promoting more secure care assistance to the elderly patient, through a safe and adequate administration of drugs (Cuentro et al. 2014).

Considering the topics exposed above, this study aims to verify the knowledge of nurses about the 2015 AGS *BeersCriteria*, the existence of potentially inappropriate drugs for the elderly, and their adverse effects.

2. Material and Methods

It is a cross-sectional, descriptive, and analytical study, with a quantitative and qualitative approach. Considering the possibility of attending elderly patients, participated in the study nurses in the most varied clinics, working on direct patient care, at the General Hospital of the Federal University of the Triângulo Mineiro (HC-UFTM), in the city of Uberaba, Minas Gerais. The sample calculation considered a finite population of 118 professionals, considering a 95% confidence interval, margin of error of 5%, and a pilot proportion with a prevalence of 20%.

In the data collection, the professionals were approached during working hours, in the period from November 2017 to February 2018. The data were obtained through a structured instrument with objective and discursive questions, built by the authors and based on relevant scientific literature.

For qualitative questions, the Content Analysis proposed by Bardin (2011) was adopted. The method comprises three stages: Pre-Analysis, Material Exploration, and Treatment of Results and Interpretation. In this method, it is necessary to read in-depth, seeking exhaustiveness of the material, representativeness of the intended universe, homogeneity in the criteria for choosing the themes, and pertinence in adapting to the objectives (Bardin 2011). Thus, it is possible to identify the core of the text through categories organizing the speeches and information (Bardin 2011). Subsequently, the data were compared with the literature.

To guarantee confidentiality, the participants were identified by the acronym "E" and the numbers 1, 2, 3, successively represent the participating nurses. This project is part of a larger project approved by the UFTM Research Ethics Committee (CEP), through opinion 1.700.822 and all participants signed and received the Consent Term.

For quantitative data, descriptive and exploratory analyzes were performed based on the calculation of arithmetic means, standard deviations, absolute and relative frequencies, and maximum and minimum values, according to the normality of the data.

3. Results

80 nurses participated, of which 78.7% were female. The age ranged from 23 to 67 years, with a mean of 35 years (SD = 7.14), 21.3% refused to say their age. Most of the participants were single (47.5%) and had an income of four to six minimum wages (40%); as shown in table 1.

Regarding the educational level, 71.3% were specialists and 20% had a master's degree (Table 1). The most mentioned specialty was in the Treatment Unit or Intensive Care Unit (17.5%), followed by Urgency

and Emergency (16.3%), Oncology (7.5%), and Occupational health nursing (7.5%). Only 3.8% of the nurses possessed specialization in geriatrics/gerontology.

The majority of the participants had 6 to 15 years of professional formation (73.8%), with a mean of 11 years (SD = 6.15). The professionals working time in the institution ranged from one to 37 years, with an average of 10 years (SD = 6.61), with the majority of nurses (62.5%) working in the hospital from 6 to 15 years. The prevailing weekly workload was 36 hours (83.8%). The sociodemographic and professional data are described in table 1.

When asked about the care given to elderly patients, 74.1% of the nurses reported being very frequent, 21.3% being of moderate frequency, and 3.8%, not frequent care.

Table 1. Sociodemographic data and professional profile of the nurses participating in the study developed at the HC / UFTM, Uberaba-MG, 2018.

VARIABLES	N	%
Gender		
Female	63	78.7
Male	17	21.3
Age group		
up to 29 years	11	13.7
30 to 39 years	41	51.2
40 to 49 years	8	10.0
50 to 59 years	2	2.5
60 years or more	1	1.3
Did not reported	17	21.3
Marital status		
Married	29	36.2
Single	38	47.5
Divorced	7	8.8
Stable relationship	6	7.5
Income		
1 to 3 minimum wages	6	7.5
4 to 6 minimum wages	32	40.0
7 to 9 minimum wages	30	37.5
10 minimum wages or more	10	12.5
Did not reported	2	2.5
Professional formation		
College	7	8.7
Specialization	57	71.3
Master degree	16	20.0
Years of formation		
1 to 5 years	9	11.3
6 to 15 years	59	73.7
16 to 25 years	10	12.5
26 years or more	2	2.5
Time working in the institution		
1 to 5 years	17	21.3
6 to 15 years	50	62.4
16 to 25 years	10	12.5
26 years or more	2	2.5
Did not reported	1	1.3
Weekly workload		
24 hours	1	1.3
30 hours	1	1.3
36 hours	67	83.7
40 hours	4	4.9
48 hours or more	7	8.8
TOTAL	80	100.0

Table 2 presents the signs and symptoms listed by nurses regarding the possibility of adverse reactions caused by the use of PIMs by the elderly. All signs and symptoms listed on the instruments were considered adverse events related to the use of some PIMs by the 2012 and 2015 BeersCriteria.

Most professionals believe that these signs and symptoms can be developed with the use of some potentially inappropriate medication for the elderly (Table 2). According to 69% of professionals, these adverse reactions can be seen as a new symptom not related to the drug use, and thus, a new medication can be introduced to the treatment of the elderly patient. Regarding the knowledge about the 2015 AGS BeersCriteria, only 13.8% of the nurses affirmed knowing what it was.

Table 2. Signs and symptoms of ADR related to PIMs according to the BeersCriteria (2012 and 2015), according to the classification done by nurses participating in the study, Uberaba-MG, 2018.

Signs and symptoms	Yes		No		Did not reported		Total	
	N	%	N	%	N	%	N	%
Sleepiness	75	93.8	3	3.7	2	2.5	80	100.0
Decreased in renal function	74	92.6	3	3.7	3	3.7	80	100.0
Dizziness	74	92.6	1	1.1	5	6.3	80	100.0
Dry mouth	72	90.0	4	5.0	4	5.0	80	100.0
Tachycardia	72	90.0	3	3.7	5	6.3	80	100.0
Gastric ulcers	70	87.6	7	8.7	3	3.7	80	100.0
Blurred vision	69	86.2	5	6.3	6	7.5	80	100.0
Nausea	68	85.0	6	7.5	6	7.5	80	100.0
Shiver	68	85.0	5	6.3	7	8.7	80	100.0
Bradycardia	67	83.8	6	7.5	7	8.7	80	100.0
Insomnia	66	82.4	9	11.3	5	6.3	80	100.0
Agitation	65	81.3	11	13.7	4	5.0	80	100.0
Fatigue	62	77.4	9	11.3	9	11.3	80	100.0
Anxiety	57	71.2	14	17.5	9	11.3	80	100.0
Depression	55	68.8	14	17.5	11	13.7	80	100.0
Confusion	55	68.8	15	18.7	10	12.5	80	100.0
Edema	54	67.5	17	21.2	9	11.3	80	100.0
Memories difficulties	53	66.2	18	22.5	9	11.3	80	100.0

With the analysis of the discursive questions, following the proposed methodology, three categories emerged: "*Importance of assertive knowledge about PIMs*", "*The nurse as a fundamental character in ADR*" and "*Knowledge as a reinforcer of care*".

Importance of assertive knowledge about PIMs

Participants were able to elucidate, even without knowing the 2015 AGS BeersCriteria, one or more factors that make the drugs inappropriate, the potential health risks for the elderly, and the importance of knowing these drugs. Induction to adverse reactions and side effects; risks greater than benefits, interference in cognitive status, dependence, and autonomy; among other factors were cited. Here are some speeches: (E1) "Medications that may put in danger the lives of these elderly, as sedatives, opioids, some analgesics and antidepressants."; (E4) "They are drugs that, when administered in the elderly population, present greater health risks when compared to other age groups, this may be related to advanced age and the associated comorbidities."; (E36) "They are drugs that have a greater potential for adverse effects/adverse reactions that outweigh the benefits when used in the elderly."; (E67) "Identifying the medications used, being able to identify the signs and symptoms characteristic of adverse reactions, knowing about drug interaction and possible effects is essential."; (E72) "These are medications that should not be offered or administered to patients of advanced age because they affect their metabolism and/or their metabolism affect the action of the drug."

The nurse as a fundamental character in ADR

The discourses point out that the nurse is a direct agent in the care of the elderly patient and also the supervisor of the nurse team's work; They are also the people who can systematically assess the care given and identify early adverse effects of prescribed and administered drugs.

The participants also affirm that the nurse is the link between the patient and the medical team. In ADRs, their role is essential since they act in the suspension of administration, communication to the medical team responsible, and the patient surveillance, to minimize the consequences and avoid iatrogenic cascades, as can be observed in some speeches: (E5) "Knowing the patient, their diagnosis and having prior knowledge of adverse drug effects, I can intervene when adverse events occur."; (E8) "Communicate the medical team so the medication can be changed and to write down the adverse reactions in the patient's medical chart."; (E15) "Acting in the fight against adverse effects, improving communication among all team members"; (E75) "Identify quickly any changes, monitor the patient, evaluate vital signs, level of consciousness and leave patient at rest for a better evaluation."; (E54) "Always be aware of signs and symptoms that patients may present after administration of medications and act quickly and safely".

Knowledge as a reinforcer of care

This category refers to the speeches that relate the importance of knowledge for the care of excellence. To intervene, it is necessary to recognize adverse drug reactions and the consequences that their use can cause according to age and associated comorbidities. This knowledge, according to them, bases the orientation not only on the patient but also on the relatives, as in the following lines: (E71) "The nursing team should know the adverse effects of the medications administered to recognize reactions related to the effects or responses of the presented pathology."; (E17) "Be aware of potential adverse events to accelerate the notification (it is part of the nine "rights" of drug administration)."; (E48) "Be aware of the signs and symptoms regarding the use of PIM's to guide all nursing staff about the interaction of medications."; (E50) "To have the appropriate knowledge to discuss with the medical team the best drug therapy for the elderly patients considering the comorbidities and undesirable side effects. Prepare the nursing team for the recognition of the signs and symptoms presented by the patient and apply the appropriate protective measures."; (E42) "Acquiring greater knowledge for better performance."; (E54) "I think we should have a training course about these drugs so we can take the right actions."

4. Discussion

Considering the increase in the elderly population and all the peculiarities that permeate the health of this age group (Simões 2016), qualified care is essential, requiring from the courses of the professional specialization. However, the data presented contradict this necessity, since only 3.8% of the participants have academic specialization in geriatrics/gerontology, even with a high frequency of assistance given to this population. In this way, aspects inherent to these age groups are little approached and deepened in the formation of the professionals, with possible consequences in the clinical practice. In turn, the hospital services, facing this demand, can offer training and educational activities in the thematic.

The use of drugs that are potentially inappropriate by the elderly deserves attention because it exposes the organism to the appearance of adverse reactions, which can cause harm to the clinical picture, even rising health care costs (AGS 2012; Miller et al. 2017). Therefore, to guarantee greater safety to the population in this age group, it becomes a strategy to avoid the use of this type of medication and/or to be aware of the possibilities of adverse reactions caused by them (Lopes et al. 2016). A study performed with elderly people living in long-term care facilities in four municipalities in the State of São Paulo identified that among the participants who presented some type of ADR, the majority (95.4%) used at least one PIM (de Lima et al. 2017).

The nursing team, as the front line of care, occupies an important role in the identification of ADRs. In many cases, the ADR's may be seen as a new symptom, due to the difficulty of their identification, favoring the addition of more medications for the treatment of this patient. Thus, there is a great responsibility of the nursing team when assessing the appearance of an adverse reaction (Arboit and Silva 2012; Paranaguá,

et al. 2013; Mendes et al. 2013; Pezato and Cesaretti 2015; Shade et al. 2017) making it necessary for them to have in-depth knowledge about medications.

Even if the professionals identify the ADRs, there may still be difficulty in pointing out which are the professional conducts that must be taken in this situation. The occurrence of AME's is related to the lack of training and professional qualification, which highlights the importance of training professionals about PIM's and what adverse reactions are related to them, to promote care with quality to the elderly. (Arboit and Silva 2012; Shade et al. 2017; Medeiros et al. 2017).

Factors such as work overload, lack of professional knowledge, and poor and inefficient communication collaborate for adverse events to occur. It is necessary to introduce into the health institution, as a way to manage and provide adequate and quality customer care, the culture of patient safety (Medeiros et al. 2017; Lemos et al. 2018). Communication failures can lead to error, but when it is effective, it becomes an important bridge in the interpersonal relationships between the team, enabling dialogue about possible errors, and preventing them from occurring (Gonçalves et al. 2018).

Pharmacovigilance, proper notification (Ezeuko et al. 2015; Zerhouni and Benkirane 2017), and communication with the medical team are fundamental attitudes in the context of ADR and were pointed out in the speeches of the nurses participating in this study. It is important to raise the awareness of the professionals about the benefits of using communication to avoid negative effects, providing patient safety by sharing knowledge among the team, promoting the multiprofessional work, and providing good care practices (Tartaglia et al. 2018; Gonçalves et al. 2018).

Permanent education (PE) is an important tool to optimize and improve the quality of the service, to implement preventive measures, and to empower and sensitize the professionals regarding patient safety against the appearance of these side effects (Arboit and Silva 2012; Paranguá et al. 2013; Mendes et al. 2013; Pezato and Cesaretti 2015; Shade et al. 2017). In addition, the importance of a PE action that addresses pharmacology to a sufficient extent is emphasized, so that it can strengthen nurses' knowledge about medications (Oguz et al. 2015).

In a study carried out with health professionals working in the medical clinic and in the pharmacy service of a teaching hospital, it was possible to identify factors such as greater experience with the client and with the medications they use during hospitalization, as facilitators of early identification and decision making about adverse events (Modesto et al. 2014). However, the use of one or more drugs concomitantly makes it difficult to identify ADRs, sometimes confusing the professional (Henriques 2017).

Considering all this context and difficulties involved in the prescription and administration of drugs to the elderly, the BeersCriteria were developed and are constantly being updated to be used as a tool to assist in the multiprofessional approach, in the evaluation of the quality of care and the monitoring of adverse effects.

Therefore, the use of this protocol can reduce costs and provide improvements in elderly care (AGS 2015). In addition, it aims to improve the selection of medications aimed at the education of prescribers, administrators, and patients regarding PIM's. However, even though it was available for consultation and was created decades ago, only 13.8% of the respondents in the present study knew of the Beers list.

It is also worth mentioning that the drugs used by the elderly are mostly provided by the Brazilian Unified Health System (SUS), is considered one of the factors related to the high prevalence of PIM prescriptions (Oliveira et al. 2012; Garske 2018). Therefore, it is important to adapt the Beers Criteria list according to the Brazilian reality, since some medications are not compatible with what is available in the country (Cassoni et al. 2014). Consequently, it is necessary to invest in safer drugs to constitute the national list of drugs available through SUS (Oliveira et al. 2012).

5. Conclusions

With the increase of the elderly population in the country, it becomes inevitable to deepen in the thematic of the drugs potentially inappropriate for the elderly to improve care and consequently patient safety.

It could be observed that most of the study participants were unaware of the Beers Criteria, a useful tool to help identify inappropriate drugs for the elderly population and of the ADRs they may cause. Therefore, it is necessary to train the professionals regarding the appearance of ADRs so that it facilitates

the detection and identification of them, enabling fast and adequate conduct. Permanent education activities inside hospitals could facilitate the deepening of the theme.

Most of the professionals in this study provide care to the elderly population, which reinforces why it is so necessary to address this issue. When the symptom is not seen as an adverse reaction, new drugs may be inserted into the patients' therapy, increasing the hospitalization duration, and making the patient more susceptible to worsening their clinical condition.

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