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Study of the characteristics of the oral administration of medicines in internal medicine and its implications for nursing care

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Abstract
Objective: This study sought the relevance and features of oral drug administration, and its implications in nursing care, pursuing to improve its safety and effectiveness. *Methods*: In a descriptive research from an internal medicine department, 194 episodes of patient in charge in the year 2014 were studied. Hereafter, most commonly orally given active principles and pharmaceutical forms were reviewed with the scientist evidence to assess whether they required special advices during its administration to ensure security and effectiveness. *Results*: Most of the active principles have special suggestions, therefore, if they are not applied mistakes and interactions may happen as a result. *Conclusions*: Orally given drugs need a series of features, in which nursing care, allows to the professional to ensure an interdisciplinary process, for instance the pharmacological treatment, that leads to personalized, safe and effective administration.
Key-words: Oral route. Specific recommendations. Nursing care. Access to information.

Características de la administración oral de medicamentos en medicina interna y sus implicaciones para el cuidado enfermero

Resumen
Objetivo principal: El objetivo perseguido en esta investigación es estudiar la relevancia y características de la administración oral de fármacos, y sus implicaciones para los cuidados de enfermería, buscando aumentar la seguridad y efectividad de la misma. *Metodología*: Realizamos un estudio descriptivo en un servicio de medicina interna, concretamente de 194 episodios de ingreso correspondientes al año 2014. A continuación, se analizaron los principios activos y formas farmacéuticas más empleados por vía oral, revisando en la evidencia científica cuáles de ellos requerían recomendaciones especiales para garantizar la seguridad y eficacia en su administración. *Resultados principales*: La mayoría de los principios activos empleados poseen recomendaciones especiales, y se cometen errores e interacciones significativas como consecuencia de no aplicarlas. *Conclusión principal*: La administración de medicamentos oral entraña una serie de características, en la que los cuidados de enfermería, permiten al profesional garantizar que un proceso interdisciplinario como el tratamiento farmacológico, conduzca a una administración personalizada, segura y eficaz.
Palabras clave: Administración oral. Recomendaciones específicas. Cuidados de enfermería. Acceso a la información.

Introduction

Drugs have become a resource of great transcendence to promote, prevent, keep and recover a satisfactory health level. Even today, that we find many degenerative and terminal pathological processes, drugs have an important key role to ameliorate the symptoms.[1] In fact, to our society, drugs exert a peculiar impact. Many of the expectations that are created along the interaction between health care professionals-patients, it is solved or transferred to the drugs, which appear mythified. This confidence towards drugs it is excessive and unjustified and it explains such high consumption of drugs.[2,3]

However, pharmacotherapy isn't free of risks for the patients, because it may cause a series of harmful effects, either of iatrogenic nature inherent to the drug (side effect) or as a result of an error during the complex system of drug use (medication mistakes). All of it forces to a more rational use, with the collaboration and coordination of the whole multidisciplinary team and with the active participation of the patients.[1,4-6]

Oral route, because of its accessibility and comfort, is very often the first choice in the drug administration whenever patient's features allows it. Even, a nasogastric tube is sometimes placed to give drugs in those who have an altered swallowing capacity.[7,8]

Other advantages of oral route is that it allows the autoadministration of drugs, which it is very often well accepted by the patient, since it rarely causes anxiety during administration, it is a safe route because it does not compromise the

cutaneous barrier, it can achieve a local effect on the gastrointestinal tract or a systemic in respect of the needs, and it allows too in case of overdose to withdraw the drug if not that much time has elapsed. Thereby, oral route is the simplest, safest and cheapest, and it will be always the choice whenever posible.[9]

There are authors who sustain and have contended, that the degree of oral route use in primary care should be a quality index,[4] being the main route. On the other hand, there is too little scientist literature that weightens the oral vs other routes and its consideration in specialized care, specifically in hospitalization.[10]

Likewise, oral administration of some active principles might bring with it a series of specific recommendations, relative to time of the day that they must be given, handling of the pharmaceutical form, interaction with some sort of foods or other drugs, whose application is required to guarantee the safety, efficacy and quality of the oral therapy.

In this context, with the realization of this work, we set out to achieve the following objectives: To study the features of oral drug administration and its implications in nursing care in improving safety and effectiveness. To know the importance of the oral route in an internal medicine department, as well as knowing the most commonly used orally given pharmaceutical forms. To identify scientist evidence and specific suggestion regarding four basic aspects: interactions with other drugs, interactions with food, dosage interval and manipulation of the pharmaceutical form. To assess the degree of the potential mistake as a result of not fulfilling such specific recommendations.

Methods

We have developed a descriptive-longitudinal-retrospective study, in which electronic clinical histories (pharmaceutical registry) were analyzed corresponding to 194 random admissions of the internal medicine department, during the time gap between January-December of 2014. The sample was calculated in respect of a confidence interval of 95%, an expected maximized proportion of 50%, a design effect 1 (simple random design) and an accuracy of 10%.

Information sources that we used to identify and analyze the recommendations from some active principles and orally given pharmaceutical forms were: technical data sheet of drugs.[11] Potential drugs interactions were classify by using the online base data know as Drug Interaction Checker ® (2015).

Estimated values in the source population were presented with a confidence interval of 95%. To do this, we used the statistical package of SPSS 17. statistics ® for Windows, with which we support to organize, tabulate and do statistical analysis regarding each patient and the whole. Kolmogorov-Smirnov test was used to contrast that the study population followed a normal distribution.

In order to organized, present and summarized all the gathered data descriptive statistic was used: mean, standard deviation, absolute and relative frequency for each category. This results were complemented with graphical analyses (bar or sector graphs). Finally, the possible significative associations among quantitative variables were determined with coefficient of Linear Correlation of Pearson.

The following study was developed after acceptance and approval by the ethical committee of clinical research of the corresponding investigation protocol.

Results

Administration of a total number of 2206 drugs were analyzed, by using different methods (table1), corresponding to 97 distinct active principles.

Table 2, shows pharmaceutical forms' percentage distribution that were used for administration of medicine through oral and nasogastric tube route.

Table 1. *Percentage of use of different routes of administration*

Routes	Percentages
Intravenous	46,27%
Oral	37,65%
Subcutaneous	8,87%
Inhalation	5,47%
Topical	1,49%

Table 2. *Distribution of dosage forms of oral administration*

Pharmaceutical form	Percentages
Tablet	70%
Solution for injection/infusion	1%
Gastroresistant capsule	7%
Powder for oral suspension	8%
Coated tablet	3%
Capsule	6%
Prolonged release tablet	1%
Others	4%

After identifying the most commonly used active principles through oral route (use at least in 5% of all patients), we analyzed which of them had specific recommendations for the administration in regard to the following aspects:

- Interaction with drugs.
- -Interaction with foods.
- Time of administration.
- Pharmaceutical form handling.

It was observed that 100% of active principles had at least one recommendation and 13.8% presented recommendations for all aspects that were analyzed. Warnings about potential interactions were the most important aspect, highlighting that 96.6% of these active principles had recommendations in this regard.

If we focus on the time of administration, for the 51.7% of drugs it was established a regular patter in a specific time of the day. Such drugs belonged to the following pharmacological groups: anticoagulants, antiarrhythmics, beta-blockers, antibiotics, hypolipidemic, benzodiazepines, corticoids, antihypertensive, diuretic, thyroid hormone, proton pump inhibitors, H2 antagonist and alpha antagonist.

In 44.8% of active principles, a special precaution had to be kept in regard of drug administration along with foods. Finally, pharmaceutical specialities corresponding to 29,6% of studied active principles, they had accurate indications in respect of pharmaceutical form handling.

When we analyzed if special recommendations of some active principles that are used were fulfilled, we realized that in approximately 48.1% of active principles one mistake was

committed at least in regard to the studied aspects, 177 potential mistakes were identified (figure 1).

It must be said, that an error was considered whenever medicine administration did not fulfill all the recommendations with the high scientific evidence.

At the same time, 46 potential medicine interactions were identified, among them, 35 were significative, thus, it was advice to closely follow-up the patient; 7 were serious, an alternative was needed; 4 were minor or none significative, so no action was required (figure 2).

Figure 1. *Distribution of the identified potential error type*

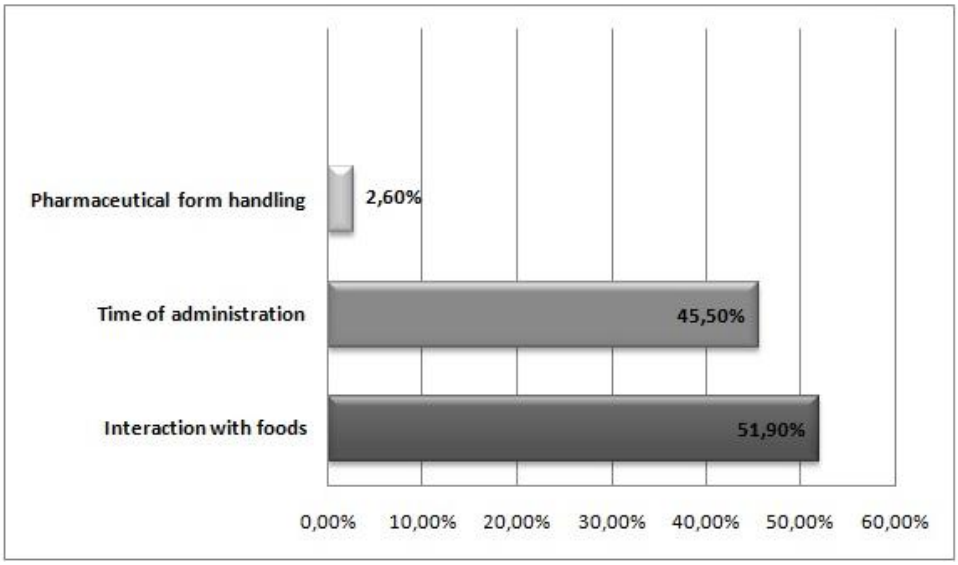
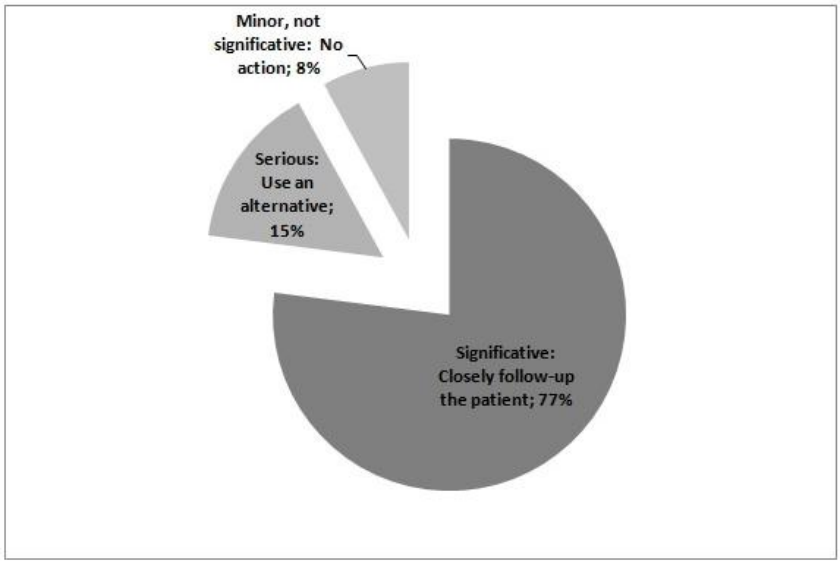


Figure 2. *Classification of drug interactions identified*



Finally, by using Pearson's bivariate correlation, we found out interesting associations. On the one hand, there was a significantive relation between the number of drugs that wereorally given and the age (p=0.047)/days of stay (p=0.007). At the same time, there is acorrelation among the number of interactions of medicines with the number of drugs that aregiven orally (p=0.0001). On the other hand, patient's age does not intervene with the number ofintravenously given medicines, there is only a positive association with days of stay (p=0,0001).

Discussion

In our work we have shown that oral route in drug administration has a none insignificant impact on the specialized hospital care.[5]

This data allows us to establish that the oral route is considered by Barrueco et al.[9] as a simple, safe and economic route, and it might be underestimated because most of the treatments posses a series of specific and special recommendations, that if not applied, may affect the biodisponibility of the drug, changing their effect or it could even favor the appearance of drug related side effects.[1,12]

Furthermore, we need to take into account that oral route allows autoadministration of the drugs by the patient, therefore, nurse professional must appraise if the prescribed treatment has any special recommendation or if patients have enough knowledge, otherwise, o teach they should teach them so they can take properly and safely their treatments. At the same time, the correct or incorrect therapeutic regimen and the achieved response must be supervised all the time.

We must not forget the special risk that drug interactions imply to the patient' safety, according to different studies, some diverse variables may influence its numbers. For instance, old age is involved indirectly, because as we become older a high number of diseases appear, some of them are chronic, that require multiple treatments, or as it is known, the polypharmacy, a key variable in the development of the interactions.[13] In fact, a huge number of consumed drugs are associated in a linear way with the exposition to drug interactions.[14,15]

Thus, oral administration of drugs has some particular features that require from the nurse professional a care application that ensure a correct, safe and effective administration of it. Thereby, it is required first of all, that the nurse has enough knowledge regarding oral pharmacotherapy and its specific recommendations[16]. An easy access to guidelines or fast and dynamic reference sources, in respect of the changes that are produced, it will make much easier such activity for the professional. In fact, it has been proved that the presence in the workplace of guidelines and protocols of drug use and administration contributes to significantly diminish the number and severity of the mistakes and its consequences, respectively.[17]

A useful tool could be some computer applications, in which all of the recommendations are gathered together, or even new alarms of some potential interactions regarding the clinical weight and management of them.[18,19] At the same time, such tools can aid in the creation of some evidence based care plans focus on the important aspects of pharmacotherapy.

Conclusions

- Oral route is the second most commonly use in the internal medicine department, right after the intravenously.
- Because oral administration implies a series of specific characteristics, nursing care is essential to guarantee and promote a correct, safe and effective administration of medicines.
- As a result of the increasing complexity of pharmacological therapy, it is necessary to rely on available technology to provide evidence-based recommendations in a dynamic and expeditious manner, to assist the nursing professional in ensuring oral drug administration of quality.

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