

Importance of the Pharmaceutical Council in the Dispensation of Laxants and Probiotics

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Abstract: The goal of pharmaceutical care is to improve the patient's quality of life, and it must do so by maximising its effectiveness and reducing the risks of the treatment. Therapeutic protocols are an important tool for encouraging the correct use of drugs. The aims of this work are: to analyse the type of patients who visit the pharmacies in the study; to determine the importance of pharmaceutical advice in dispensing; and to identify the most commonly used strains of probiotics and laxatives. A transversal descriptive and observational study was conducted with 500 patients in five pharmacies. The population taking part in the study is predominantly female, aged over 61, of Spanish nationality, actively employed and with middle or higher educational studies. Over 90% of the patients followed the advice of the pharmacist over the advice of their doctors. The most widely used probiotics were *Lactobacillus acidophilus* and *Saccharomyces boulardii* for gastrointestinal protection and treatment of diarrhoea. The most commonly used laxatives are bulk-forming and contact laxatives. The pharmacist's opinion is increasingly important in the treatment of pathologies that may be considered as minor. Therapeutic protocols are an aid to correct dispensing.

Key words: Pharmaceutical care, protocols, laxatives, probiotics.

1. Introduction

The increasing complexity of patients' pharmacological treatment has led to a change in our way of understanding professional activity in pharmacies. Pharmaco-therapeutic monitoring, one aspect of the concept of pharmaceutical care, has transformed the pharmacist into an active and co-responsible agent for healthcare outcomes.

Drug-related problems such as non-optimum doses, inappropriate prescriptions and low treatment follow-up increase morbidity and mortality rates due to the incorrect use of drugs, and have high costs for society. As many as 30% of hospital admissions are directly linked to drug-related problems (DRP), and the most frequent causes of these admissions are avoidable adverse episodes and low adherence to treatment [1-3]. Concern is also growing about the rise in the global spread of antimicrobial resistance, which represents an added public health problem [4].

To avoid these problems as far as possible, patients require various healthcare professionals to take part in pharmacological monitoring and provide patients with adequate healthcare information. The doctor is responsible for the diagnosis in primary and specialised healthcare, while pharmacists must supervise the adherence and proper use of the treatments in conjunction with the doctor through pharmaceutical care [5-7]. In fact, in most European countries pharmacists are the only healthcare professionals who have the knowledge and the specific academic skill to provide this service [8].

The term "pharmaceutical care" was first coined by Brodie [9] in 1966 in relation to "drug-use control". It was subsequently defined by Mikeal et al. [10] in 1975, and in 1980 Brodie et al. [11] added the concept of "treatment monitoring" to guarantee its efficiency and safety. The definition of Hepler and Strand is the most widely supported so far, and was in fact adopted by the American Society of Hospital Pharmacists (ASHP) in 1992, who defined it as follows: "Pharmaceutical care is the direct, responsible

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provision of medication-related care for the purpose of achieving definite outcomes that improve a patient's quality of life" [12].

Pharmaceutical care is included as one of the duties of community pharmacists in Spain according to the specifications of Law 25/1990 on Medications, which established that the dispensation of drugs to patients must be done "following the prescription or the guidelines of science and the pharmaceutical arts in the case of medications authorised to be dispensed without a prescription, providing the patients with information, advice and instructions on their correct use". This Law also includes the terms "indication" or "therapeutic advice", which is defined as the service provided in response to the demand of a patient or user who visits a pharmacy without knowing what drug to acquire, and asks the pharmacist to suggest the most suitable remedy for a specific health problem, as formulated by the phrase "What can you give me for...?" [13].

Particularly important in the European sphere is the ResAP resolution [14] of 21 March by the Committee of Ministers of the Council of Europe, concerning the role of the pharmacist in the context of healthcare safety, and which elevates the patient's entitlement to direct contact with a pharmacist to the category of a patient's right. The pharmacist must follow a series of protocols to assess the patient's state of health and offer advice as a result; it requires this advice to be given in writing, even in the case where the patient is directed to the doctor.

These protocols serve to assess the patient's state of health, and cover aspects related to hygiene (general and personal), nutrition (type and quality of the diet), lifestyle (sports activities, free time, etc.), environmental factors (living conditions, social habits, etc.), socio-economic factors (income levels, cultural beliefs, etc.) and self-medication.

Another aspect to be taken into account in regard to pharmaceutical care is whether it should be limited merely to patient-drug relations or extended to issues

related to adherence to medication or health literacy, which would contribute to improving outcomes, albeit indirectly [15].

2. Objectives

The objective of the proposed study is to analyse the role of community pharmacists in dispensing laxatives and probiotics, products that do not require a medical prescription. This is done by: (i) describing the socio-cultural characteristics of the population that visits pharmacies; (ii) analysing the strains of laxatives and probiotics most commonly used by the respondents; and (iii) assessing the importance of pharmaceutical advice in their choice.

3. Material and Methods

3.1 Materials

This is a transversal descriptive and observational study based on 500 surveys of patients suffering from chronic or acute constipation whose lifestyle habits may affect the onset or aggravation of their symptoms.

To ensure the survey is representative, the number of respondents was selected according to the following formula, which has been described for studies when the total units of observation are unknown or when the population is over 10,000 people [16]:

The respondents were chosen at random between women and men aged between 18 and 90 years who visited the pharmacies in the study seeking a product or advice for treating constipation. Pregnant women were excluded from the study, as this group commonly suffers from constipation [17], although not associated with a health problem. Also excluded were patients who did not wish to take part in the study or who did not complete the questionnaire.

The data were collected in person in pharmacies near three hospitals in the Madrid Region in 2014 and 2016. The pharmacies selected in the study zone are all part of the official network of supervised practical work experience undertaken by pharmacy students

before obtaining their degree. This network was created by the Complutense University and the Professional Association of Pharmacists in Madrid [18].

During the data collection campaign, surveys were done to determine socio-demographic variables and compile information on the ailment and its treatment. These surveys contained questions on the pharmacological treatment for constipation, and on non-pharmacological treatments used in a coadjuvant or substitutory way at certain times; issues such as the use of laxatives, probiotics and alimentary fibre; and questions on personal data and lifestyle, including alcohol and tobacco consumption and physical exercise regime.

The questionnaire employed techniques for the validation of questionnaires and surveys to assess therapeutic compliance levels applied in clinical practice (Morisky-Green, Hermes, Herrera Carranza and SMAQ compliance tests) [19-22]. It consists of five parts: a first part to compile information on the use of laxatives, their possible adverse effects and the main source of information and advice for their correct use. The second part refers to the use of diet for the treatment of constipation. The third part introduces the knowledge of products containing probiotics, and their possible interactions. The fourth part assesses lifestyle habits such as the frequency of physical exercise, alcohol and tobacco consumption, and use of medication for chronic or long-term treatment. The fifth part collects personal data to classify the responses according to criteria of age, sex and type of constipation suffered by the respondent, among others.

3.2 Statistic Analysis

The data were processed in a computerised Microsoft Excel 2011 database created for this purpose, and the statistical treatment was done with the

SPSS program version 21.

4. Results

4.1 Characteristics of the Study Population

The total number of respondents is 500. As seen in Table 1, the ratio of women to men is 77.62% versus 22.38%. In terms of age range, 2.60% are aged under 30, 36.75% are aged between 31 and 60 years, and 60.65 % are over 61. Another factor measured was the employment situation of the participants in the study, where three groups can be differentiated: active, in the case of 81.14% of the respondents; retired, 17.6%; and unemployed, 1.26%. The next variable measures the level of studies declared by the respondents. As seen in Table 1, 9.42% have primary studies, while 90.58% of the survey respondents have medium and/or higher studies. The last socio-demographic variable measured in this part of the study is the respondents' nationality, showing that 89.27% people have Spanish nationality and 10.73% are foreign.

Significant differences can be observed when comparing the population data in the sample analysed and the data on the general population compiled by official government bodies in the Madrid Region, giving an idea of the representativeness of the sample. The only data in the general census of the Madrid Region that are similar to the data on the people who visit pharmacies seeking medication refer to nationality (87.40% Spanish nationality, 12.60% foreigners).

The rest of the data differ very significantly from the official data. This may be due to the fact that the data do not correspond to people who visit the pharmacy to acquire a laxative or a probiotic, but to people affected by an ailment due to problems of constipation. In cases where the person visiting the pharmacy was not the same as the person suffering from constipation, they were given the questionnaire to take home and be answered by the affected person.

Table 1 Characteristics of the study population, compared to the Community of Madrid.

		Sample	C. Madrid
Sex	Women	77.62%	52.04%
	Men	22.38%	47.96%
		$p < 0.0001$	
Age ranges	Under 30 years old	2.60%	31.12%
	31-60	36.75%	46.98%
	Over 61 years old	60.65%	21.90%
		$p < 0.0001$	
Nationality	Spanish	89.27%	87.40%
	Foreign	10.73%	12.60%
		p NS	
Employment situation	Actives	81.14%	73.81%
	Retirees	17.60%	12.59%
	Unemployed	1.26%	13.60%
		$p < 0.0001$	
Level of reached studies	Primary studies	9.42%	54.65%
	Middle or higher education	90.58%	45.35%
		$p < 0.0001$	

4.2 Strains of Laxatives and Probiotics Most Commonly Acquired by the Respondents and the Importance of Pharmaceutical Advice in Their Choice

Fig. 1 shows the data on the therapeutic group of laxatives, and reveals that the most widely used are bulk-forming laxatives, with 37.14%, followed by contact laxatives, with 33.28%. The next method is the use of enemas, with 22.30%, and in a lesser proportion, laxatives with osmotic action. Emollients or stool softeners represent only 0.22% of the total.

In terms of active principles, shown in Fig. 2, the most widely used are isphagula with 34.8% and cascara sagrada with 15.47%. These are followed by *Aloe ferox* and glycerine in proportions of around 9.00%, and sodium phosphate and Bisacodyl at slightly over 8.00%. Finally, the least used are lactulose (7.03%) and sodium citrate with 4.50%.

The probiotic strains most used by the respondents are *Saccharomyces boulardii* (34.00%) and *Lactobacillus acidophilus* (33.33%), both with a significantly higher rate than the combinations of several strains, which represent 19.58% and 13.09% respectively, as shown in Fig. 3.

As these products are used for a range of ailments, a

question was asked about their use, as shown in Table 2, with the following result: the most commonly used treatment for diarrhoeal processes was *Saccharomyces boulardii* (60.87%), followed by the combination *Bifidobacterium lactis* + *L. acidophilus*, with 26.09%. *Lactobacillus acidophilus* and the combination *L. acidophilus* + *L. rhamnusus* + *B. lactis* were used equally for the treatment of constipation, in both cases with 40.00%. *L. acidophilus* is the most used for the regeneration of intestinal flora. The proportions of use as gastrointestinal protectors are very similar, between 13.00% and 36.00%, whereas *S. boulardii* is used as a protector of the urogenital system, although in a very low proportion.

4.3 Professional Advice on Use

Four responses were established in regard to the question of who advised the patients on which laxative or probiotic to use: pharmacist, doctor, advertising, other people. As seen in Fig. 4, 50.00% of people consume laxatives as the result of a doctor's prescription, and 36.84% on the advice of a pharmacist. Both these healthcare professionals account for most of the advice on the use of the most

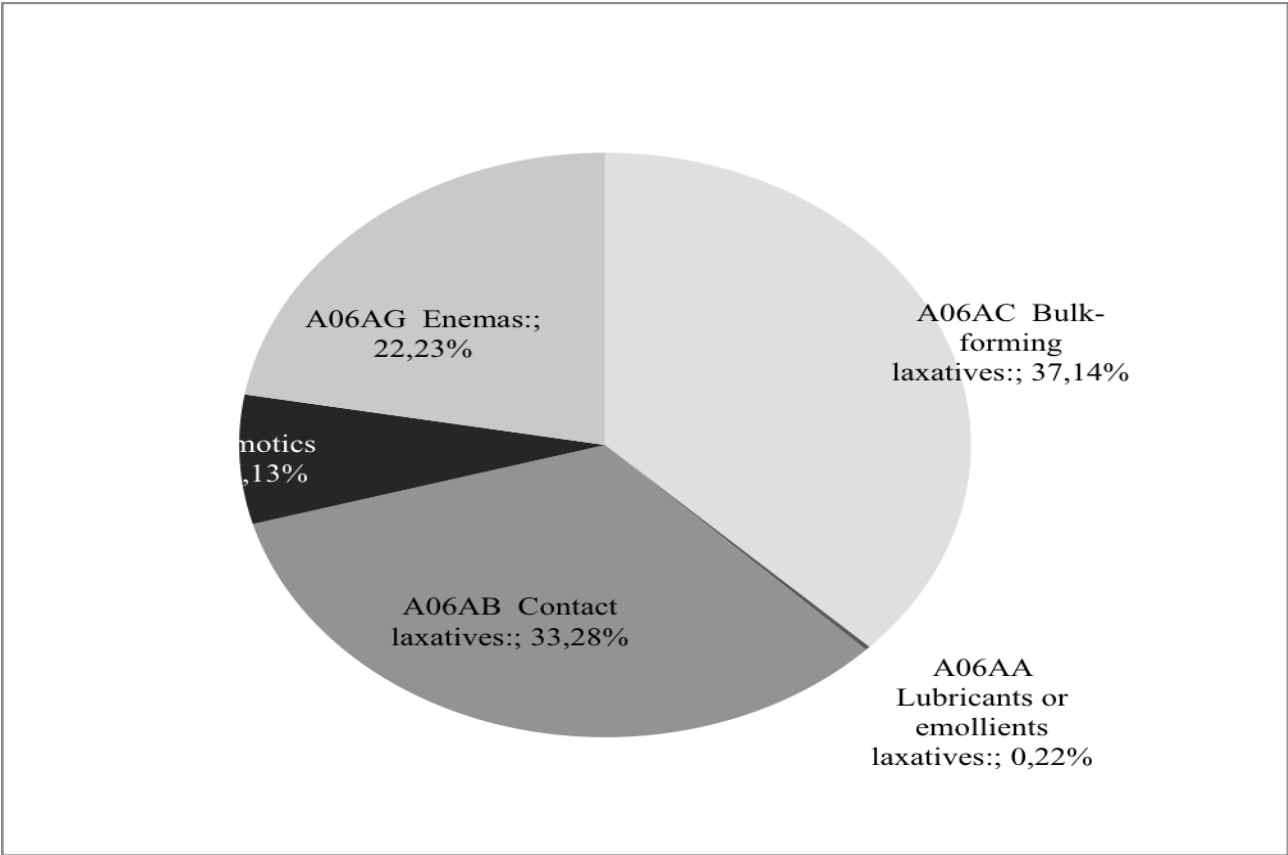


Fig. 1 Types of laxatives most consumed by respondents.

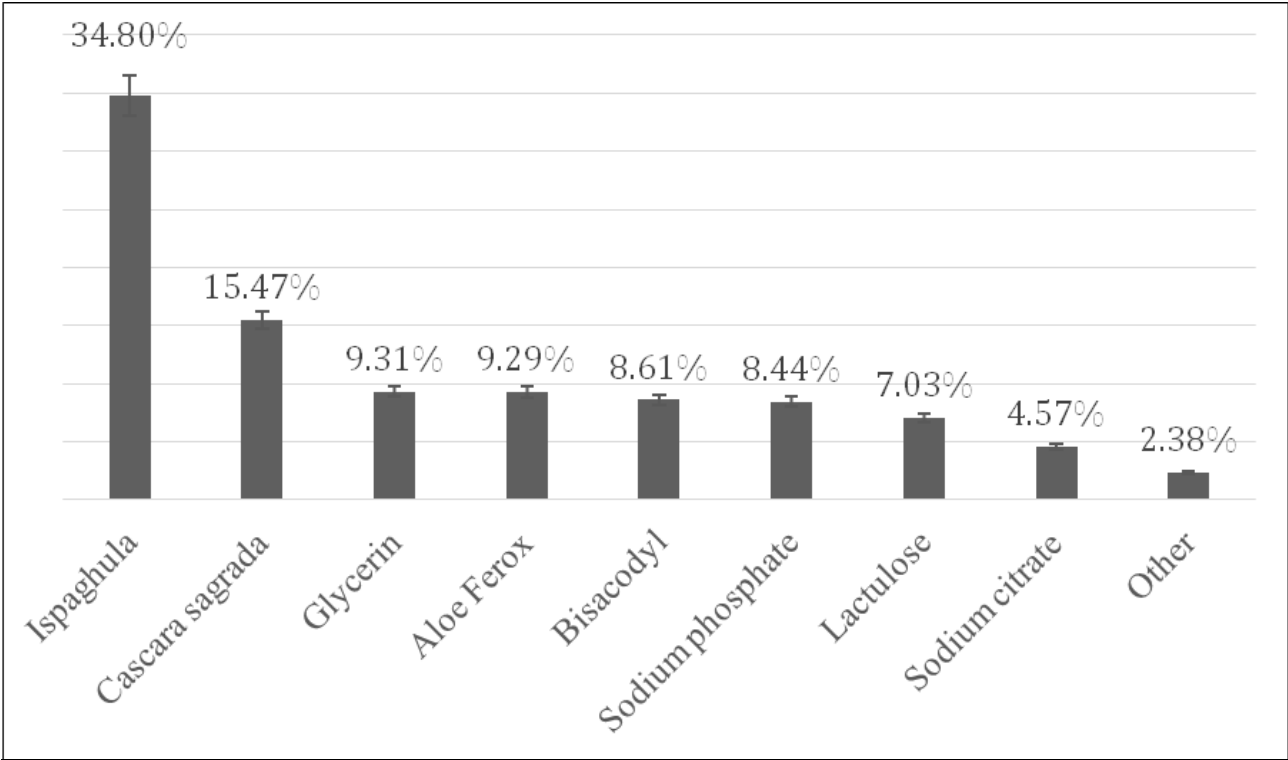


Fig. 2 Active ingredients of laxatives most consumed by respondents.

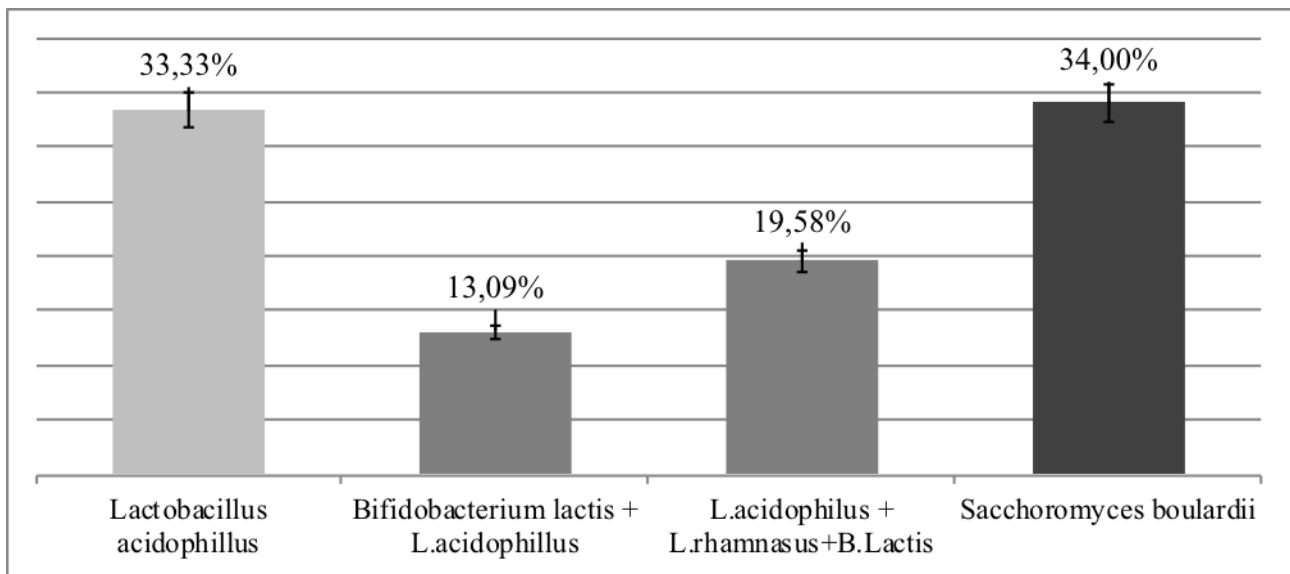


Fig. 3 Probiotic strains most consumed by respondents.

Table 2 Most consumed probiotic strains, according to the purpose of use.

	Diarrhea treatment	Constipation treatment	Intestinal flora regeneration	Gastrointestinal protection	Urogenital sys. treatment
	a	b	b, c	b, c, d	a, b, c, d
	$p < 0.05$				
<i>Lactobacillus acidophilus</i>	13.04%	40%	61.54%	36.36%	16.67%
<i>Bifidobacterium lactis</i> + <i>L. acidophilus</i>	26.09%	0%	7.69%	13.64%	16.67%
<i>L. acidophilus</i> + <i>L. rhamnus</i> + <i>B. Lactis</i>	0%	40%	7.69%	22.73%	16.67%
<i>Saccharomyces boulardii</i>	60.87%	20%	23.08%	27.27%	50%
	$p < 0.05$	p NS	p NS	p NS	p NS

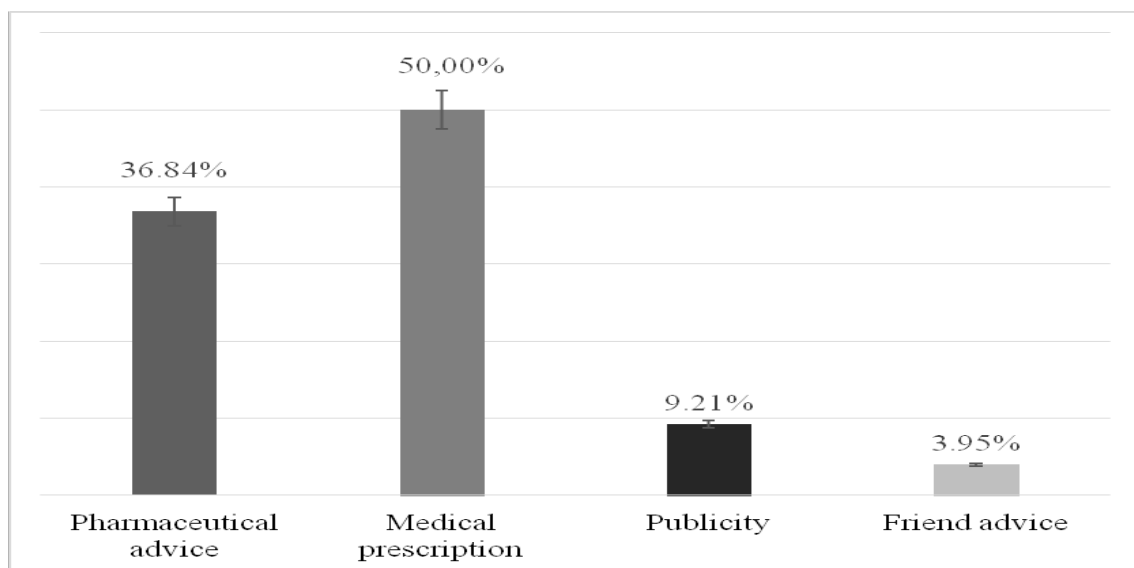


Fig. 4 Source of information and advice for the consumption of laxatives.

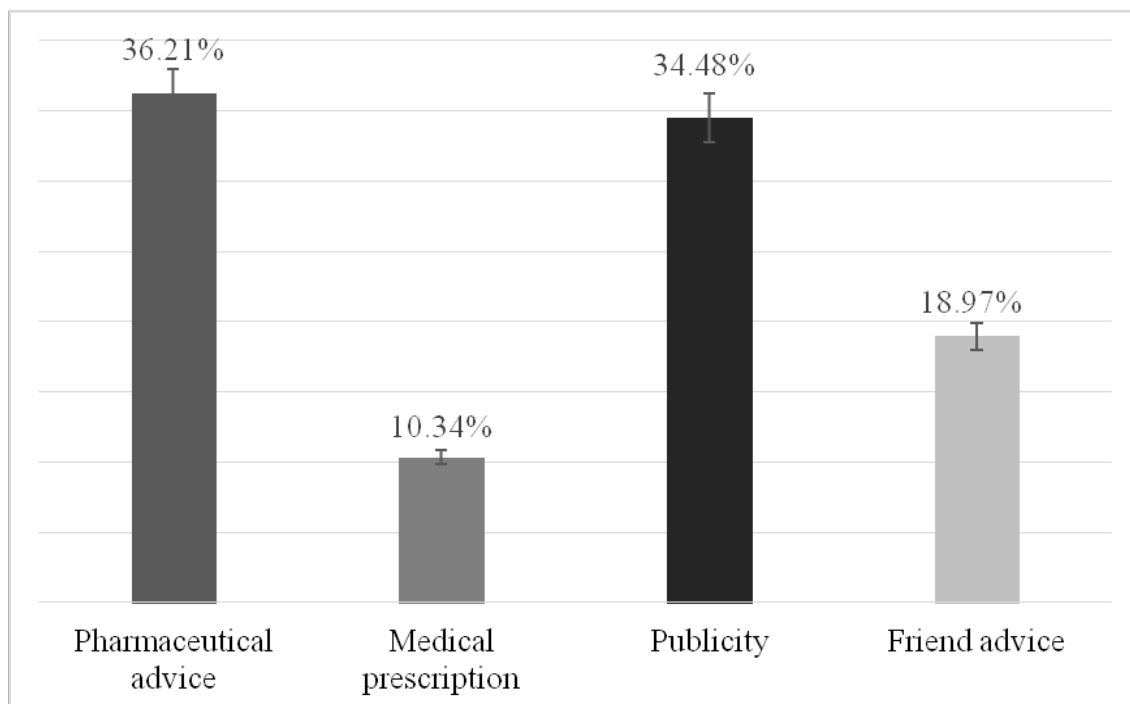


Fig. 5 Source of information and advice for the consumption of probiotics.

suitable laxative. Advertising or the advice of an acquaintance comes far behind, with 9.21% and 3.95%. Fig. 5 shows the results for probiotics, where pharmacists are the professionals most frequently consulted about their use, with 36.21%, followed by advertising (34.48%), and other people's advice, with 18.97%. In this case doctors are the least consulted healthcare professionals, with 10.34%.

5. Discussion

The main reasons professional pharmacists are the most frequently consulted as a source of information and advice in the choice of probiotics, and in similar proportions to doctors in the case of laxatives, may be due to the fact that these products have not been financed by the national healthcare system since 2012 [23]. Their elimination from the national healthcare system and the growing economic crisis has caused a significant decline in their use, leading to health problems in patients who require their consumption. This led a 2013 study by the Sociedad Española de Medicina de Familia y Comunitaria (Spanish Society for Family and Community Medicine) to propose that

laxatives should once again be financed by the national healthcare system in order to avoid their under consumption and the consequent health problems in patients [24]. This situation has meant that pharmacists have now become the most important figure for recommending healthcare products that do not require a medical prescription.

It is important for pharmacists to develop protocols to inform and regulate their use to avoid their misuse. The knowledge of the social conditions and lifestyle habits of people with disorders relating to constipation is essential to correct risk conducts. The study therefore begins by analyzing the employment and cultural situation of people suffering from this ailment.

The profile of the respondents coincides with that of Mearin [25] in 1998, who reports that it affects more women than men, in a ratio of 3 to 1. In our case this figure is slightly exceeded by the number of women who visit the pharmacy to acquire a laxative or probiotic (Table 1). In relation to age, there are a majority of people aged over 61 who visit the pharmacy, as also indicated by Abyad and Mourad [26]

in 1996, who note that over 65s have the highest incidence of constipation.

The most widely consumed laxatives include Ispaghula (a bulk-forming laxative), which has not been funded by the national healthcare system since 2012 (although since 2013 [27] it can be prescribed in certain circumstances). This product can provoke abdominal swelling and distension (albeit infrequently). The other laxative most requested by the respondents is cascara sagrada (a stimulant laxative), which contains anthraglucosides that are responsible for most of its activity and acts in the large intestine by increasing peristalsis. Its bitter principles (due to its aloin content) can also aid digestion [28]. Another less widely known therapeutic action of cascara sagrada is its use in the treatment of haemorrhoids. Possible adverse reactions include abdominal distension and electrolytic alterations [29], so it must be used under pharmacotherapeutic supervision.

In regard to the consumption of probiotics, the most widely used strains are *Saccharomyces boulardii* and *Lactobacillus acidophilus*, while products containing a mixture of probiotics are less used, both in the case of *L. acidophilus* + *L. rhamnosus* + *B. lactis* (19.58%) and *B. lactis* + *L. acidophilus* (13.09%). Some studies indicate that the presence of *Bifidobacterium* may have anti-inflammatory effects on patients who suffer from irritable bowel syndrome (IBS), as stated by McCarthy et al. [30]. It is also worth noting the low use of *Lactobacillus acidophilus* for the treatment of diarrhoea although this is its primary indication, whereas it is frequently used to protect the gastrointestinal and immune system, despite the absence of sufficient scientific evidence to support this [31].

The other most widely used probiotic strain in this study is *Saccharomyces boulardii*, a natural yeast that is not genetically modified and is isolated from the bark of the litchi tree. It is nonpathogenic, has a trophic effect on human intestinal mucosa [32],

triggers the release of immunoglobulin A (secretory IgA) [33], and is mostly used in the treatment of diarrhoea, either deriving from the use of antibiotics or other types of diarrhoea (from infection with *Helicobacter pylori*), as stated by McFarland et al. [34] or to treat patients suffering from infections caused by other bacteria such as *Clostridium difficile* [35]. The mechanisms of antidiarrhoeal action in *Saccharomyces boulardii* mainly involve two types of pharmacodynamic properties: (i) the inhibition of certain bacterial toxins and/or their pathogenic effects; (ii) direct impact on the intestinal mucosa that leads to trophic effects and anti-secretory actions and stimulates immunity; (iii) intestinal and anti-inflammatory effects [34].

The high rate of pharmaceutical advice requested in the use of these products highlights the role played by the pharmacists in their dispensation and the importance of maintaining protocols for pharmaceutical care that contribute to ensuring their efficiency and safety. Laxatives and probiotics are pharmaceutical products used in minor ailments, which may lead to serious pathologies. This makes the professional task of the pharmacist all the more important as he or she can provide protocols to maintain treatment adherence, in cooperation with the doctor where necessary.

6. Conclusions

(i) The profile of the people who visited the pharmacy to acquire laxatives and probiotics is predominately women, in a significantly higher percentage than the gender gap in the population of the Madrid Region, and people aged over 61. (ii) Most of the laxatives used belong to the therapeutic subgroup of bulk-forming and osmotic laxatives and correspond to cascara sagrada and ispaghula. (iii) The most commonly used probiotic strains are *Lactobacillus acidophilus* and *Saccharomyces boulardii*, and they are used to treat diarrhoea and for gastrointestinal protection. (iv) The pharmacist's

intervention in resolving doubts and recommending the most suitable product for the patient's needs was predominant in the case of probiotics and very high in the case of laxatives.

This work is the basis of a doctoral thesis presented in the 2016-2017 academic year, but there are possibilities to continue with the study, which may be: (1) expand the study to patients with certain characteristics, both age and pathological (elderly, over 50 years of age, children, IBS patients, ...), or by increasing the number of centers where the study is carried out (which would increase the diversity of areas and patients); (2) also include other OTC drugs, such as anti-flu or antihistamines.

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