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MANAGEMENT OF ACUTE DIARRHEA BY COMMUNITY PHARMACIES

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Abstract

Pharmacists are the most accessible healthcare professionals and they are often involved in managing diarrhea symptom.

Aim of the study was to evaluate the practices of Republic of Armenia pharmacy employees when managing diarrhea, with specific focus on medicine dispensing, pharmaceutical care and also consumer preferences about medicines. The survey was conducted among 284 pharmacy employees selected randomly sampling during 2019-2021. Primary information was collected using a questionnaire. Pharmacy employee in Armenia was asked about their knowledge and dispensing recommendations to manage diarrhea. On each question is attached diagram or table. The results were analyzed with SPSS statistical software, version 12.0.

Diarrhea is considered a common symptom, about which patients very often seek the advice of a pharmacy staff. Pharmacy employees dispense a large number of drugs for diarrhea every day. The most common medicines recommended by them were Antimotelities, then Probiotics, Intestinal adsorbent, Antibiotics, Oral rehydration solutions and Antimicrobial. The most common demanded medicines by consumers were also Antimotelity medicines, Antibiotics, then Probiotics, Intestinal adsorbent, oral rehydration solutions and Antimicrobial. Pharmaceutical advice given by pharmacy staff on medicine use and side effects was poor. In question what are the major side effects of medicines you are offered, most pharmacy staff (55%) did not respond, 20% of pharmacy employees noted side effects on the gastrointestinal system, 7% on the nervous system. 8% of pharmacy employees noted allergic reaction and 10% other different side effects. According to the study, the majority of pharmacy employees receive information about over-the-counter drugs of for diarrhea from sources on the Internet. Only few participants used formularies, standard tables, professional books and lectures.

It is important to improve pharmacy employees' knowledge in the area of Pharmaceutical care during minor illnesses such as diarrhea and to develop pharmaceutical care algorithms that will help the pharmacy employees in consumer consultation.

Keywords: *pharmaceutical care, pharmacy employee, diarrhea, minor ailment, oral rehydration solutions*

Introduction

Pharmacists are the most accessible health-care members. They provide valuable information to people who visit the pharmacy for the treatment of minor ailments both in high and low-to middle income countries [*Laliberté M, 2012; Alfadl A et al., 2018; Ibrahim M et al., 2018*]. Minor ailments are common or uncomplicated conditions which can be diagnosed and managed without medical intervention [*British Medical Association et al, 2010*]. Many patients depend on community pharmacists for

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treating minor ailments like pain, fever, constipation, and acute diarrhea, and for achieving optimum patient care pharmacists must be knowledgeable about treatment guidelines [*Sancar M et al, 2015*]. Diarrhea is one of the most common diseases worldwide, including in Republic of Armenia (RA). According to World Health Organization (WHO), diarrhea is a major public health threat with nearly 1.7 billion cases annually worldwide occurring in all age groups [*Alexander A et al, 2016*]. Despite acute diarrhea is considered as one of the most common health problems in the world, and the Global Burden of Diseases reported that diarrhea was the major cause of death among all ages, about 1.3 million deaths, and 2.3 billion illnesses were due to acute diarrhea in 2015, it remains a minor aliment that is managed by community pharmacists. The most common etiology of acute diarrhea in adults is viral infections which are self-limited conditions [*Doe W et al., 1981; Troeger C et al., 2017; Rhee G et al., 2019*]. The inappropriate treatment of diarrhea involves the use of antibiotics when they are not indicated. The use of adsorbents, antimotility agents, and antiemetics are also considered inappropriate because of the controversial information on the efficacy and safety of these medications. WHO released the manual for the treatment of diarrhea in 2005, to guide the use of medications for the treatment of diarrhea, especially for the use of antibiotics. The ultimate goal is to reduce the mortality from diarrhea in developing countries [*WHO, 2015; Shitemi C, 2018*]. The treatment consists of 3 main goals which are to prevent dehydration by oral rehydration salt, to continue nourishing, and to reduce the duration and severity of diarrhea by using zinc supplements [*Ibrahim M et al, 2018*]. Even though WHO has released the manual for the treatment of diarrhea for decades, inappropriate drug treatment and inadequate patient counseling on food and fluid intake still exist. A few quantitative studies have investigated the prevalence and characteristics of non-compliance to the diarrhea treatment guidelines [*Pray W et al., 2010; Behera P et al., 2021*]. Pharmacy employees can play a useful role in the prevention and treatment of diarrhea and its often encountered complication-dehydration [*FIP, 2005*]. Pharmacists can be seen and consulted without appointments, they are a good source of primary healthcare services especially in poor resource setting countries [*Ibrahim M et al, 2018*]. Quality of pharmacy services represents optimum patient care to meet consumer's or patient's needs. There must be a minimum standard of practice in pharmacy setting. The International Pharmaceutical Federation (FIP) has recommended set of areas and domains e.g. supply of over-the-counte medicines for self-care, and interaction with patients as minimum requirements for practice [*FIP, 1997*]. It is important to ensure that the right patient receives the appropriate medicine in the correct dose and form that is rational medicine use [*Helper C, Strand L, 1990*]. The roles of pharmacy employee have evolved from product oriented, dispensing of medicines to more patient-focused services such as the provision of pharmaceutical care, which includes the identification, prevention and resolution of medicine-related problems [*Bennadi D, 2013*].

To overcome it is possible, due to the uniting the knowledge and will of all doctors in the world

If the diarrhea is self- medicated using over-the-counter preparations, good advice should be provided by the pharmacies because diarrhea can be a symptom of a wide range of diseases [*Barr W, Smith A, 2014; Porteous T, 2016*]. An important prerequisite for that is an appropriate assessment of the patient. However, good advice is an important criterion not only for patients, it can provide an important competitive advantage [*WHO, 2006; Merks P et al., 2014*]. For pharmacotherapy of diarrhea in Republic of Armenia there are medicines available that require a medical prescription. These are primarily antibiotics (such as tetracycline, levomycetin, ciprofloxacin, azithromycin and metronidazole) and antimicrobial medicines (such as nifuroxazide). In addition to oral rehydration solutions , the active ingredients loperamide, probiotics, adsorbents (such as smectite dioctaedric) are available as a over-the-

counter for self-treatment. There is insufficient data on how pharmacy employees in Republic of Armenia manage common medical conditions.

Thus, this study aimed at evaluating the practices of Republic of Armenia pharmacy employees when managing diarrhea, with specific focus on medicine dispensing, pharmaceutical care and also consumer preferences about medicines.

Material and methods

This study is a cross-sectional study that analyze the pharmacy staff of community pharmacies in Armenia during 2019, 2020 and the first trimester of 2021. The survey was conducted among 284 pharmacy employees selected randomly sampling. Primary information was collected using a questionnaire (structured questionnaire) and as a result of statistical processing of the data obtained during a sociological survey we received the final result.

The questionnaire survey method developed on the basis of WHO manual on the treatment of diarrhea, taking into account the specifics of work [*WHO, 2017*].

Number of questionnaires distribution in the Republic of Armenia was determined by The Survey System Version 11.0, taking into consideration the volume of the surveyed, the first type error is with 5% probability ($\alpha = 0, 05$), the evaluation accuracy is 3% ($\Delta = 3\%$). We considered the worst-case scenario - P = 0.5, since the results of similar studies conducted in Armenia were not found.

$$n = \frac{N \cdot z^2 \cdot p \cdot q}{N \cdot d^2 + z^2 \cdot p \cdot q}$$

Where n - sample size; N- pharmacies of the Republic of Armenia, z – probability of the error of the first type (α), p- estimated proportion, d - tolerated margin of error.

$$n = \frac{1096 \cdot 1.96^2 \cdot 0.5 \cdot (1-0.5)}{0.05 \cdot 1096^2 + 1.96^2 \cdot 0.5 \cdot (1-0.5)} = 284$$

Taking into account the multiple content of the survey, we have presented questionnaires approved by YSMU Ethics Committee. Analyzes of other data related to pharmacy activity assessment will be commented later.

The results of this study were made by statistical methods that were universally recognized. The collected data were registered in statistical the SPSS software package (version 12.0).

Results

As a result, a total of 284 pharmacy employees, one person per store, were included in this study.

Data collected from community pharmacists were compiled, analyzed and discussed below.

The results of the questionnaire survey carried out among pharmacy employees with different ages, qualifications and experiences.

During the study, it's become clear in which diseases consumers most often ask for advice from a pharmacy employee. Diarrhea occupies the second place (28%) after acute upper respiratory tract infections (35%). The next most frequent symptoms of self-medication were pain symptoms (28%) and various disorders of the nervous system (9%) (Fig.1).

Pharmacy employees dispense a large amount of drugs for diarrhea every day, 32% up to 3 times, 31% 4-5 times and 30% 8-10 times (Fig.2).

They dispensed antimotility, oral rehydration solutions, probiotics, even antimicrobial and antibiotic medicines. The first preparations with the highest recommendation by pharmacy staff are the

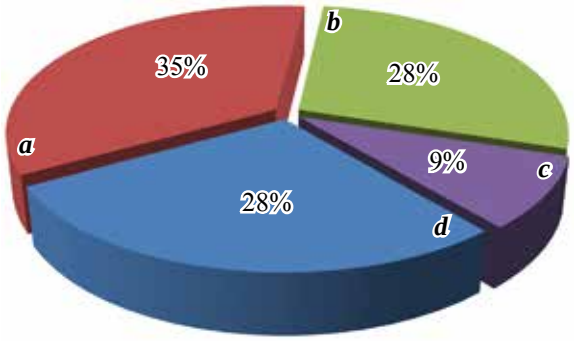

Figure 1. *The most common symptoms of self-medication Groups: (a) – acute upper respiratory tract infections, take, (b) - diarrhea, (c) – various disorders of the nervous system, (d) -pain.*

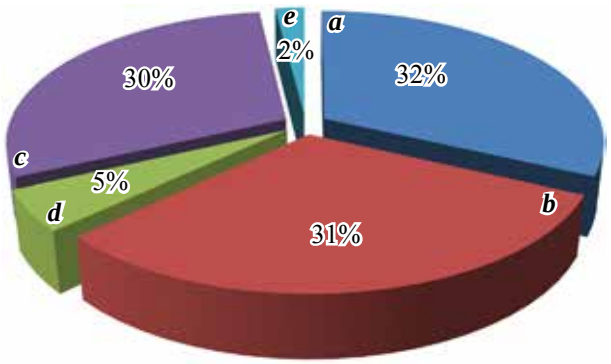

Figure 2. *Frequency of daily dispensed drugs for diarrhea. Groups: (a) – up to 3 times, (b) – 4-5 times, (c) -8-10 times,(d) – 6-7 times, (e) – 9-15 times*

active ingredient: loperamide 27% (with brand names of Imodium and Loperamide).

Next we have probiotics (21%), then intestinal adsorbent (17%), antibiotics (8%) and the least were oral rehydration solutions (7%), antimicrobial (7%). Must be noted that 10 % of participants didn't want to answer to this question. The results of the study show that the following medicines are most often sold in accordance with the client's demands for diarrhea: antimotility 27%, antibiotics 24%, probiotics 15%, then intestinal adsorbent 11%, oral rehydration solutions 5% and the least was antimicrobial 4%. Must be noted that 14 % of participants did not want to answer to this question (Table 1).

Only 42% of pharmacy employees informed patients about the proper use of drugs during diarrhea, 39% did not inform and 19% informed only sometimes (Fig. 3).

Only 26% of respondents informed consumers about the side effects of drugs for diarrhea before they were dispensed. 22% noted that they inform only sometimes, and 52% do not warn at all (Fig. 4).

In question what are the major side effects of the medicines you are offered, most pharmacy employees 55% did not respond, pharmacy employees noted side effects on the gastrointestinal system (20%): stomach and abdominal pain, nausea, constipation, vomiting. With regard to the effects on the nervous system pharmacy employees listed the following side effects (7%): dizziness, headache. 8% of pharmacy employees noted allergic reaction, 10% other different side effects (Fig.5).

Table 1.

Medicines suggested by pharmacy staff and demanded by consumer

Therapy dispensed	Number of medicines (percent)	
	suggested by pharmacy staff	demanded by consumer
Antimotility (loperamide)	27%	27%
oral rehydration solutions (Rehydron)	7%	5%
Intestinal adsorbent	17%	11%
Probiotic	21%	15%
Antibiotics	8%	24%
Antimicrobial	7%	4%
No response	10%	14%

Figure 3. *Consultation about proper use of drugs for diarrhea*

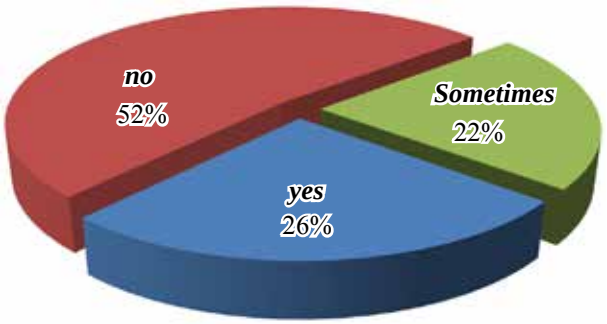

Figure 4. *Consultation about side effects of drugs given for diarrhea*

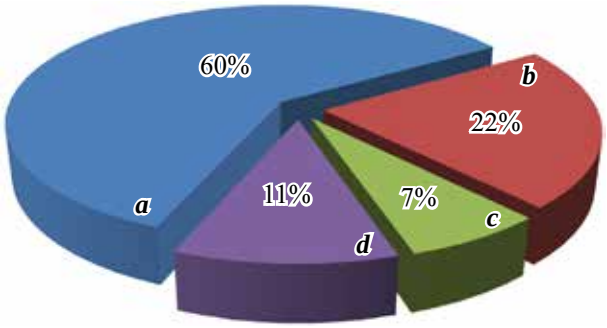

Figure 5. *The major side effects of medicines offered by pharmacy employees4*
Groups: (a) – did not respond, (b) – side effects on gastrointestinal system, (c) – side effects on nervous system, (d) – other different side effects

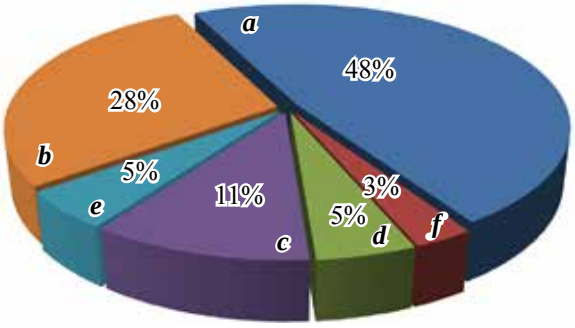

Figure 6. *The information source of pharmacy employees about drugs for diarrhea*
Groups: (a) – internet, (b) – leaflets, (c) – professional books, (d) – the media, newspapers, television, (e)-lectures, (f)- formularies, standard pharmaceutical care algorithm

According to the study, 48% of pharmacy employees receive information about diarrhea over-the-counter drugs from sources on the Internet, 28% from leaflets, 5% from the media, newspapers, television. A small number of pharmacy staff used formularies, standard pharmaceutical care algorithm (3%), professional books (11%) and lectures (5%) (Fig.6).

Discussion

According to our research, diarrhea is considered a common symptom, about which patients very often seek the advice of a pharmacy staff. Pharmacy employees dispense a large number of drugs for diarrhea every day. In such a case, consumers need proper and standardized pharmaceutical advice, so pharmacy staff must have a necessary knowledge and provide appropriate pharmaceutical care for this symptom, including referral to a doctor if necessary.

According to our study antimotility group of medicines (with active ingredient loperamide) was the most dispensed medicine during diarrhea. Pharmacy employees recommended loperamide with different brand names. Parallel to it we have only few percent of pharmacy employees in our study recommended and dispensed a pack of oral rehydration salt to the patients. This is not surprising as other study has also reported similarly low rates of oral rehydration solutions [*Ibrahim M et al, 2016*] and high rates of antimotility agents, antimicrobials and adsorbents recommendations in the management of adult diarrhea, though these drugs have no therapeutic value [*PAHO, 1996*] and are not endorsed by the World Health Organization (WHO) guidelines. The WHO contribute oral rehydration solutions to treat acute diarrhea, and emphasizes this approach for pharmacists in the publication 'The Treatment of Acute Diarrhea – Information for Pharmacists' [*WHO, 1997*]. However, as it turned out in our study, very few pharmacy employees in Armenia follow this appropriate advice. Financial factor for pharmacy could be a reason for this inappropriate advice. In Republic of Armenia as in other countries with poor resources rehydration salts are very cheap medicines, while other medicines for diarrhea are much more expensive and they can bring more benefit to the owners of the pharmacies. That's why pharmacy staff often recommend more expensive medicines than cheaper ones.

Our research discovered probiotics are also most recommended by pharmacy employees, though according to literature, there is no evidence to support the prescribing of probiotics for adults with diarrhea [*Leemans L, Pharm B, 2013*]. Antibiotics and antimicrobial medicines were not widely recommended treatment options in this study. This is contrast to the study in Qatar that have shown that antibiotics are often widely used (44%) in the management of diarrhea [*Ibrahim M et al, 2016*]. Although we have a low percent of antibiotic and antimicrobial recommendations, however, taking into account the fact that they are included in prescription medicines list in the Republic of Armenia, and pharmacy staff can recommend only over-the-counter medicines, it was believed that consultation with these drugs should be expelled at all. Beside this according to standard treatment protocols from the WHO, this treatment is not appropriate for diarrhea.

When we study medicines that a consumer demands during diarrhea without consulting a pharmacy employee, it is surprising since a large number of consumers require and buy antibiotics during diarrhea. Even though every medicine used in self-care needs responsibility, the high rate of antibiotic use in self-medication needs special emphasis. This inappropriate use could be life threatening to severely ill patients and could contribute to reported widespread bacterial resistance to antibiotics. In this case, the rational use of antibiotics can only be carried out by a knowledgeable pharmacy employee.

The research reveals that the antimotility group medicines and oral rehydration solutions mention in advice of pharmacy employee and consumers preferences are practically the same. Consumers may not have enough information about the advantages and disadvantages of these medicines

Although pharmacy employees dispense large amounts of diarrhea medicines every day, research shows that most consumers do not receive adequate pharmaceutical care for the medicines dispensed. Most pharmacy staff do not inform patients about the rules for using the drug. It is a matter of concern that very few pharmacy employees warn patients about possible side effects of drugs

before dispensing them. According to the WHO, it is considered a risk factor for drug use.

The study also tested the knowledge of pharmacy staff about the side effects of the medicines they offered. Most pharmacy employees (55%) did not answer that question. It can be assumed that they avoided answering question because they did not have sufficient knowledge and information about the side effects. Good advice is helpful for the patients or consumers but there is a need for improvement among community pharmacists in Republic of Armenia. Without sufficient knowledge of the side effects of the drug, pharmacy staff cannot provide a consumer with the necessary information about the risks associated with medicines. Similar, in a recent study in Germany and Qatar, where the authors reported poor quality counseling for acute diarrhea [*Ibrahim M et al, 2016; Langer B et al, 2018*]. The German study showed that information about dosage was the most commonly provided, while the least common information given was about side effects. The study in Qatar also highlighted the fact that the counseling practices were below expectation. In this case consumer can use medicines without realizing the actual damage to their health, which can be the cause of further health problems. Information about medicines that pharmacists receive comes mainly from subjective sources, which often do not contain all the information about the disadvantages of the drug.

According to the study, the majority of pharmacy employees receive information about over-the-counter drugs of for diarrhea from sources on the Internet. Only few participants used formularies, standard tables, professional books and lectures. Although the drug leaflet was not a source of information for the dominant employees, it is still considered the most reliable. It can be assumed that employees are looking for more accessible information about drugs, since most of them unexpectedly used a mass source of information, namely the Internet. But information on the Internet cannot be tightly regulated and can be confusing and even misleading. We must also note that many of the professional literature and lectures may also contain biased information as they are sponsored by pharmaceutical organizations. That is why it is important for the pharmacy worker to use independent sources of information. The foregoing confirms the need to create and provide objective standardized professional pharmaceutical information. A study conducted in Nigeria showed that almost 73% of pharmacy staff trust the package insert and use it as a source of information.

Conclusion

Appropriate steps should be taken to improve the quality of pharmaceutical care provided by pharmacists during diarrhea, which will allow the consumer to evaluate the advantages and disadvantages of medicines more realistically, use the drug in rational way. Pharmacy staff needs a professional, independent and standardized source of information. Research data can be considered as an indicator that pharmacy care algorithms can be developed for minor ailments like diarrhea, which will help the pharmacist, facilitate his work, save time and, if necessary, refer the patient to the doctor.Continuing education on prevention and control of diarrhea is recommended nationwide, to increase public awareness about oral rehydration solutions and encourage pharmacists to promote its use in diarrhea irrespective of age.

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