Drug Information for Community Pharmacies: Survey on Needs and Use of Drug Information with Special Focus on New Information Technology

معلومات دوائية لصيدليات المجتمع: مسح احتياجات واستعمالات المصادر الدوائية مع التركيز على المصادر التكنولوجية الحديثة

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Abstract

The purpose of this study was to determine the sources and needs of drug information for community pharmacies in Palestine. A fifteen item questionnaire was distributed to community pharmacies. Out of approximately one hundred fifty community pharmacies who received the questionnaire through An-Najah university pharmacy trainee students, one hundred eighteen community pharmacies filled in and returned the questionnaire to the researchers. The questionnaire included background information and questions regarding sources of drug information available to pharmacists and the most commonly drug-related questions encountered by community pharmacies. Approximately ninety per cent of community pharmacists have *Martindale or British Pharmacopoeia* as a reference textbook but less than one per cent have other important primary sources of information like periodicals or continuing education courses. Computer set-up and Internet services are available for some community pharmacies. Community pharmacists were most often asked questions about drug price, over-the-counter drug selection, pediatric drug dosage and drug use in pregnancy and lactation. The conclusion is that, few drug information sources are available for community pharmacies in Palestine and this inadequacy in drug information constrains the community pharmacists in Palestine from providing patients with appropriate drug education and hinders them from playing an important role in health services as a drug information provider.

ملخص

هدف هذه الدراسة هو تحديد مصادر واحتياجات المصادر المعلوماتية الدوائية لصيدليات المجتمع في فلسطين إستبيان مكون من 15 سؤال تم توزيعه على صيدليات المجتمع مائة وثمانية عشرة صيدلية قامت بتعبينه واعادة الاستبيان من أصل 150 صيدلية تم توزيع الاستبيان عليها. يحتوي الاستبيان على أسئلة عن مصادر

المعلومات الدوائية وكذلك حول أكثر انواع الاسئلة التي يواجهها الصيادلة أثناء صرف الادوية حوالي 90% من الصيادلة لديهم كتاب (Martindale) أو دستور الادوية البريطاني كمرجع علمي دوائي ولكن أقل من 1% لديهم مصادر معلومات اولية مثل المجلات العلمية او مصادر التعليم المستمر اكثر انواع الاسئلة التي يواجهها الصيادلة هي اسعار الادوية، الادوية بدون وصفة اختيار الدواء المناسب، الجرعة الدوائية للأطفال والادوية اثناء الحمل والرضاعة. الاستنتاج هو ان هنالك مصادر دوائية قليلة لصيدليات المجتمع في فلسطين وإن هذه الندوة في مصادر المعلومات الدوائية تقلل من قدرة الصيادلة على تزويد المرض بالمعلومات الدوائية المناسبة وتقلل من قدرة الصيادلة على لعب دور مهم في تقديم الخدمات الصحية والمعلومات الدوائية.

Introduction and Aims

The population size in the West - Bank of Palestine is 1,9 million capita with an annual national growth rate of 3.1% [1]. The number of community pharmacies in West-Bank is approximately six hundred twenty which means that there is a good pharmacy providers to population ratio (one community pharmacy serves approximately three thousands individuals). The large number of functioning community pharmacies leads to high business competition and sometimes non-scientific. Community pharmacies in Palestine are private and licensed from the ministry of health (MOH) based on the pharmacy practice law conditions which include that the owner must be a registered pharmacist and that the pharmacy must have an updated copy of either *British Pharmacopoeia* or *Martindale*. To be registered, the pharmacist must hold a certificate of B.Sc in pharmacy from an accredited school, must have completed a training period of approximately six months in a pharmacy based unit and have passed the pharmacy qualification exam set by the ministry of health and the pharmaceutical association. Pharmacy graduates of Palestinian colleges of pharmacy are exempt from this exam. There are three colleges of pharmacy in Palestine, two in West-Bank and one in Gaza strip. The larger of the three, is the college of pharmacy at An-Najah National University in Nablus which started in 1994 and currently have approximately five hundred students studying in this college. The other college in West-Bank started in 2002 and currently have approximately 50 students. The third college in Gaza started several years ago and have lesser number than that of An-Najah University. The duration of the pharmacy course in the college of Pharmacy is five years and during the summer holidays at the end of the third and fourth year, students train in community pharmacies which is also a 3-credit hour course requirement for both graduation and registration in the ministry of health. The pharmacy curriculum also includes a 2-credit hour course in drug information, one-credit hour course in pharmacy practice and 2-credit hour elective course in medical ethics. It is estimated that > 70% of pharmacy graduates in Palestine find their way into community pharmacies. Some make it their life-time career, starting out as employees and then becoming owners in due course.

Community pharmacists are health-care professionals with special medication-related and oriented knowledge and experience, and they are easily accessible for the public. Behind the counter, the community pharmacists must be able to provide proper pharmaceutical counseling which is very important in pharmacy practice. In Palestine, many patients seek medical advice directly from the community pharmacies because they are faster and less expensive than the physician's. This is even more obvious in urban areas where medical services are less developed. This makes the community pharmacies in Palestine and other countries in a situation to play a major and important role in public and community health issues and in the management of a wide range of illnesses (2). Unfortunately, the pharmacy personnel in Palestine have no pharmacy continuing education programs. This makes the pharmacy personnel to be scientifically behind and un-updated on clinical pharmacology and pharmacy practice issues. For example, anti-diarrhea drugs might be sold without emphasis on oral re-hydration salts therapy, antibiotics are sold as over-the-counter even in clearly viral throat infections and many strong non-steroidal anti-inflammatory drugs (NSAIDs) are sometimes dispensed without cautioning of possible gastrointestinal side effects. This type of drug information practices by community pharmacist in Palestine and other countries raises legitimate concerns about whether pharmacy staff give the patients appropriate medical and drug advice regarding drug of choice, possible adverse or side effects and proper dose (3 - 6). Contrary to the developed countries, where flow of health and drug information is quick and efficient, in the undeveloped third world countries, the flow of health and drug information is slow and in most cases there are inadequate sources of drug and health information (7, 8).

There are evidences which show that the level of provision of drug information has the potential to increase consumer patronage and loyalty to a community pharmacy (9). There are other evidence that also show that community pharmacists intervention has positive effect on patient's medication management. In a very recent study conducted in Belgium, pharmacist intervention was needed in 4.1% of the total number of prescriptions, (20.2%)

technical and (8.4%) clinical interventions over a period of 2 weeks per pharmacy. The main problem was missing or incorrect data on administering the drug (23%); missing or incorrect advice (37.8%), dose-related problems (26.1%) and interactions or contra-indications (20.2%) were mentioned as important clinical discrepancies. The pharmacists utilized the patient medication records to solve most of the problems and in one out of five cases, the physician was contacted [(10)]. A similar study conducted in Sweden indicated the importance of education and training of pharmacy personnel in detection of drug-related problems [(11)]. Other studies have indicated that drug information provided by pharmacists in the community pharmacy settings are associated with greater patient satisfaction with pharmaceutical care services [(12)]. Several studies have indicated that patients do have a wide variety of questions about their medications and although the internet is emerging as an important source of information, the pharmacist can still play a key role in providing drug information for patients regarding their medications [(13)]. The implications of this should become more apparent as the number provider community pharmacies increases and the satisfaction of customers become a competitive issue among those providers.

The objectives of the study were to find out what drug information resources do the community pharmacists in Palestine use? What are the most important types of drug information problems or questions they face? And what is their opinion about usefulness, reliability, availability and completeness of the sources? This research is part of a survey on community pharmacy practice in Palestine.

Design and Methods

A questionnaire survey on drug information resources in community pharmacies in Palestine was carried out during the academic year 2002/2003. Approximately one hundred fifty questionnaires were actually distributed to community pharmacies by the fourth and fifth grade An-Najah pharmacy students who were training in community pharmacies in Qalqilia, Nablus, Tulkaram, Jenin, Ramallah, Jersualem and Hebron cities and rural areas. One hundred eighteen of the community retail pharmacies filled in and returned the questionnaire through the pharmacy student trainees to the researchers several days/weeks after they get the questionnaire. The information sought in the questionnaire were: working hours, number of working personnel, availability and type of reference texts, journals or periodicals at practice sites, drug and medical CDs, computer / internetaccess, frequency and types of drug information questions received, sources of drug information used, needs for a drug information service, and constraints limiting their ability to fulfill drug information needs at practice sites. The fifteen-item questionnaire assessed the following major domains: personal use of drug information in daily practice, types of drug information questions faced by community pharmacists and specific use of drug information to solve presented drug related problems. Questions were presented as yes- no options or open written questions as seen in appendix 1 in the end. The analysis of the data was carried out by extracting answers from the questionnaire and categorizing them and analyzing using *Excel* for windows.

Results

The average working hours for community pharmacies in Palestine is nine (9) hours daily with a range of 2 to 14 hours depending on the location of the community pharmacy and the security situation. The average number of workers in community pharmacies was 2.8 with at least one certified pharmacist and one certified pharmacy technician. When data regarding the types and sources of drug information available at community pharmacies in Palestine were analyzed, the majority of community pharmacists indicated that they have reference pharmacy and pharmacology textbooks, but almost none have indicated the availability of periodicals and other primary source of drug information. Table one shows the results in response to questions about the type of drug informational sources available and being used by community pharmacists. The results also shows (table 1) that very few community pharmacies have more than on drug information resource at the same time (e.g. Textbooks and Internet access, or Textbooks and Medical software). However, a relatively high percentage of community pharmacies have reference textbooks and computer system that can be used as a source of drug information if internet access or up-to-date medical software are available. Statistical analysis clearly indicates that community pharmacies have access to reference textbook more than any other type of drug information resources.

Table (1): drug information resources available for community pharmacists in Palestine.

	Type of Information Source Available at the Practice Site	Percentage of Community Pharmacies who has that resource.
1.	Reference text books	90%
2.	Periodical and Journals	< 1%
3.	Computer setup	47%
4.	Medical software	6%
5.	Internet access	29%
6.	Therapeutic newsletter	< 1%

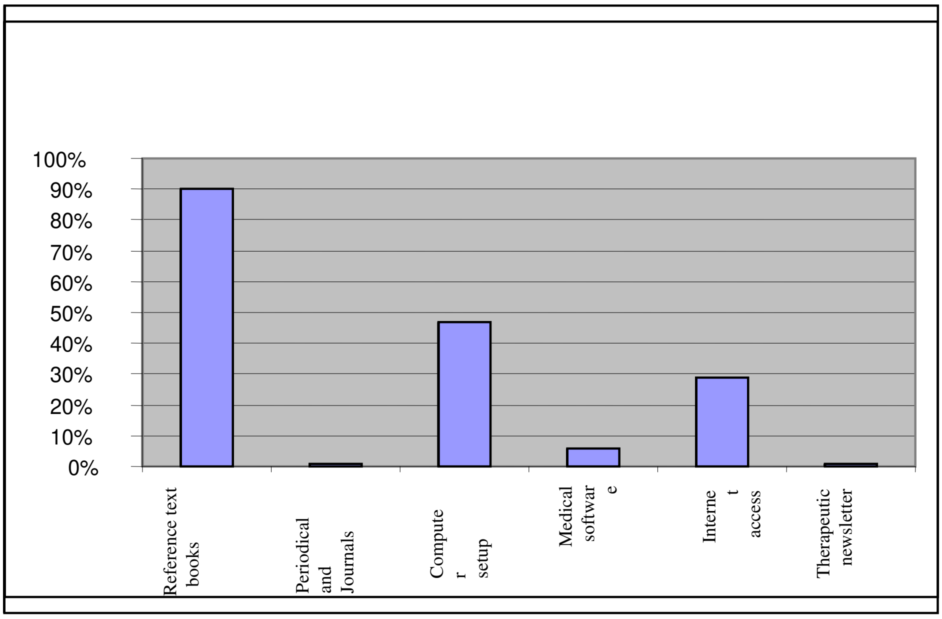

Figure (1): Types of drug information resources available at community pharmacies in palestine

The three reference text books most frequently found in community pharmacists' libraries were *Martindale or British Pharmacopoeia*, *Goodman and Gilman's The Pharmacological Basis of Therapeutics* and *Katzung Basic and Clinical Pharmacology* (14-16). The last two being available in only thirty seven (37%) percent of the pharmacies. Although the results showed that 90% of the workers in community pharmacies have pharmacy reference textbooks, the majority of the community pharmacies used these reference books only occasionally. One possible reason for this is either the language barrier or the difficulty to get the needed information as quickly as needed. This might not be the case with *Drug Facts and Comparisons* textbook which is easy to easy and is available as a pocket version and a drug interaction book. Furthermore, the *Drug Facts and Comparisons* textbook is up-dated monthly by the publisher by adding the new sheets to the textbook. The *Drug Facts and Comparisons* is one of the most popular tertiary drug information resource among community pharmacist in USA. Less than 1% of the community pharmacies receive any kind of scientific periodicals or therapeutic newsletters. The results also showed that 47% of community pharmacies have a computer setup and 6% of them have medical and pharmacy CDs. Although just only 29% of the community pharmacies have internet access, the majority (79%) believe that in the future the Internet will be indispensable for community pharmacies. Only twenty four percent (24%) of those who have internet access (approximately 7% of the tested sample) search for drug information when they face a drug information problem. Instead most pharmacists use old tertiary drug information resources to search for information about drug related questions. Most pharmaciests (approximately ninety percent) consider medical representatives and pharmaceutical companies brochures as their primary source of drug information. Actually, the majority of the community pharmacies had their last pharmacy course several years ago since most practicing community pharmacies have graduated before 2000.

When the data concerning the most commonly type of questions encountered by community pharmacies were analyzed, we found that the non-scientific question regarding the price of the prescription or drug is the most commonly type of question being encountered by community pharmacists. This might be due to the poor local economy, competition and availability of charitable clinics that dispense drugs at very low prices. Scientific questions related to drug information like over –he-counter drug selection (OTC), doses, possible drug adverse reactions and pediatric/childhood drug safety were also encountered but with no statistical significance of one type of question over the other, all being in the statistical range of 6 - 12%. Finally, no electronic labeling is available and most drug use instructions and drug related questions are given verbally by the community pharmacies or written vaguely on the drug package.

Table (2): Types of drug information questions faced by community pharmacists in Palestine.

	Type of drug information questions most commonly encountered by community pharmacists in Palestine	**Approximate frequency of the question being encountered (percentage)**
1	Pediatric / Childhood drug safety.	10%
2	Pregnancy and lactation drug safety.	6%
3	Drug doses	12%
4	Adverse drug reactions.	11%
5	Drug substitutes / equivalents.	8%
6	Drug / OTC selection for un-complicated health conditions.	12%
7	Drug identification	6%
8	Drug Price	30%

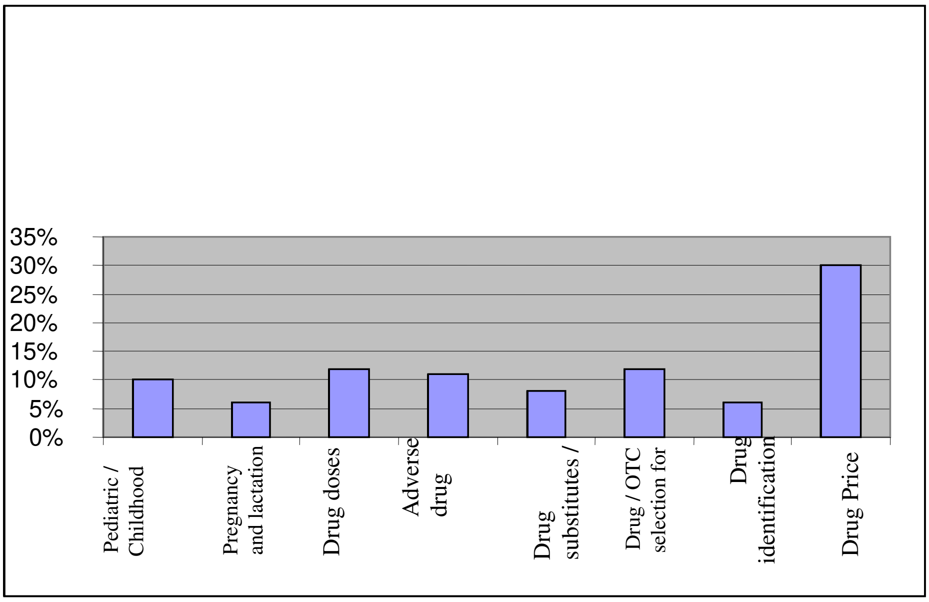

Figure (2): Type of drug information inquiries most commonly encountered by community pharmacies in Palestine.

In a similar study conducted in Hong Kong in 1996, the authors found that community pharmacists were most often asked questions about over-the-counter drugs, drug dosage and drug identification and that the most important drug information sources for community and pharmacists were their own knowledge and work-place reference texts (17). Another study conducted in Quebec / Canada showed that more than 60 percent of the practicing pharmacists had at least 10 reference texts and that the majority of pharmacists were actively involved in a variety of clinical pharmacy services like providing drug information to consumers or health professionals (18). In contrast, un-official survey on community pharmacists in USA found that approximately 50% of community pharmacies had internet access at work and that 45% of the community pharmacists use the internet to look for investigational drug trials, 34% for course work degree programs and 61% for continuing education (19).

Discussion

Generally speaking, there are three categories of drug information [20]. Journals containing original articles are the primary source of information. They are the most up-to-date and the best sources of information. The major disadvantages of the primary sources is that they need a lot of time to read and cost a lot of money. Secondary sources of information such as bibliographic, indexing and abstracting services are quite useful for quick and selective screening of the primary literature but they are expensive to acquire and maintain. The tertiary source of information such as books provide easy and convenient access to information and are probably the most commonly used reference materials. Their major disadvantage, however, is that their information tend to lag behind those in journals and abstracting services. The use of the proper and correct drug information source is of great importance to practicing community pharmacist since it will positively reflect on patient's health outcome [21]. The presence of dedicated pharmacists in community pharmacies who are provided with proper drug information resources can be a valuable resource for physicians regarding information about complex drug-drug, drug-food interactions and drug adverse reactions. Actually, studies have shown that in such conditions, pharmacists can cut medication errors in half [22]. The opposite is true, the lack of drug information resources or the utilization of old drug information can create medication problems and negatively affect the patient's health. For example, dispensing retinoic acid derivatives for the treatment of acne in pregnant patients or dispensing vitamin B-complex to a patient with Parkinson's disease treated with L-Dopa/carbidopa or dispensing diclofenac sodium for a patient with a history of gastric ulcer would have a serious consequences on the patient [23, 24].

In well developed countries, the problem of drug information inquiries are partially solved by the operating drug information centers. These information centers are widespread now in USA, Europe and Asian countries and offer useful drug informational services to health professionals and are having a positive impact on patient care [25-27]. Operating pharmacists in developed countries also benefit from the widely available internet services [28]. The importance of the drug information center for developing countries was pointed out by several previous publications [29]. These drug information centers must be financially supported by the world health organization (WHO) and other international health organizations to help un-developed countries offer better drug and poison information for health professionals and the public. We believe that such a drug information center is more beneficial to the community when it is part of the teaching curriculum and continuing education for health professionals. Therefore, the center must be located in a medical teaching institution.

The internet service provides excellent drug information sites for community pharmacists, probably the www.uspharmacist.com is being one of the most commonly utilized internet sites by pharmacists in USA as a source for continuing education and up-to-date information on new drugs and drugs that are being withdrawn from the market. Other important drug information internet sites being used in USA and Europe is shown in the table three below :

Source	**Web site**
Australian Prescriber	www.australianprescriber.com/
CMA Infobase (guildelines)	www.cma.ca/cpgs/
Cochrane Library	www.cochranelibrary.com/
Drug and Therapeutics Bulletin	www.which.net/health/dtb/main.html
Drugs of Choice	www.cma.ca/catalog/252.htm
Food and Drug Administration (USA)	www.fda.gov/cder/
Goodman and Gilman	www.mcgrawhill.ca/medical/hardman.htm
Iowa drug info service	www.uiowa.edu/~idis/idisnews.htm
Medical Letter	www.medletter.com/
Prescrire International	www.esculape.com/prescrire/
Therapeutics Letter	www.ti.ubc.ca/pages/letter.html
Therapeutic Choices	www.cdnpharm.ca/
Worst Pills, Best Pills	www.citizen.org/hrg/

According to the results of this study the community pharmacists in Palestine, compared to those in other developed countries, use traditional and inadequate drug information sources. The Ministry of Health (MOH), the Palestinian Pharmaceutical Association and the Colleges of Pharmacy in Palestine ought to educate community pharmacies concerning new technologies and sources of drug information should be increased among the pharmacists. The pharmacy school curriculum in the three colleges of pharmacy must educate and train pharmacy students on drug information resources and how to get, use and evaluate these drug information resources. Actually, the situation in Palestine demands the presence of pharmacists who are specialized as drug information providers. To attain this we need to develop a pharmacy curriculum that allows some of the pharmacy students to spend their final year in learning and training on using drug information technology to become a pharmacy specialist in drug information who can operate drug information units in health care centers / hospitals in Palestine. Furthermore, the curriculum must include a course on competitive intelligent business thinking in order to be able to implement the science of drug information in customer satisfaction and patient’s health outcome. Finally, it is of great importance that the syllabus of drug information courses in the colleges of pharmacy in Palestine to include a critique learning process of primary source literature. The students must be able to scientifically criticize original articles and judge on the worthiness and validity of data available in primary source literature.

Pharmacy is an information intensive profession that demands effective use of technology to manage an ever-expanding body of knowledge. It's impossible for any pharmacist to remember everything about drugs and that's why it's important for community pharmacists to know where to find drug information, how to evaluate them, and how to apply them to specific patients. New pharmaceutical products are constantly launched and others are being discontinued which poses a challenge to community pharmacist to remain updated. The practice of pharmacy involves an element of risk. Failure to choose the best possible product or failure to correctly answer a drug – related question may not only invite queries from patients and regulators but also raise doubts about the pharmacist's professional qualification. Adverse effects of drugs and drug-drug interactions are another critical domain for community pharmacists who are being challenged to develop a greater understanding and detection methods of adverse drug reactions and developing ways to reduce them. Research about drug information and access strategies by community pharmacists requires the development of a Palestinian Drug Information Network. Although the Internet is widely perceived to be the answer to disseminating information, it remains the least favored source of drug information among professionals, especially in regional and remote locations. Limited access to technology and doubts about the quality of web-based information were expressed concerns.

Under the current situation, where the economical instability is major factor in shaping pharmacy practice, the community pharmacist must have a leading a role in areas like pharmaco-economics which can afford the patients and health professionals with methods in minimizing drug costs and expenses without affecting therapeutic outcome. Furthermore, the community pharmacists can lobby the ministry of health to up-grade the pharmacy practice law in order to have easy but practical aspects of registration and renewal of license. Finally, the community pharmacist must lead the public in issues regarding drug awareness and drug utilization rationale especially under disastrous conditions.

Conclusions and Recommendations

Based on these results, it can be concluded that drug information resources in community pharmacies in Palestine have to be improved. All pharmacies should have material resources for basic drug information. Apparently there is a need for information about available sources of information. The use of information sources and the qualifications to use them must also be enhanced so that routine questions can be answered in all pharmacies. In addition there is also a need for centres with larger information resources. Smaller pharmacies could use these centres for questions that cannot be answered with their own resources. Organised information services could be developed using existing organisations, e.g. university colleges of pharmacy / medicine and the Palestinian Pharmaceutical Association. Before that, the goals of pharmacy drug information and the duties of various information agencies should be defined so that the resources meet the need for the services. On addition, the educational abilities of pharmacists to give information and their attitudes towards drug information should be improved.

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ملحق رقم (1)

هذا الأستبيان لأغراض أكاديميه وبحثية فقط

1. عنوان الصيدلية (البلد):
....
2. عدد ساعات العمل:
....
3. عدد العاملين في الصيدلية (صيادلة ومساعدين)
....
4. هل يوجد لديك كمبيوتر
....
5. هل يوجد لديك خدمة الأنترنت
....
6. هل يوجد لديك اسطوانات علمية وطبيه
....
7. هل يوجد لديك مراجع صيدلانية وطبية حديثة (أذكرها : كتب أو دوريات)
....
8. ما هو مصدرك للمعلومات عن الأدوية الجديدة (أذكرها)
....
9. ما هي العوامل التي تؤثر على اختيارك لدواء ما (السعر، الفاعلية، العلاقة مع الشركة أخرى: أذكرها)
....
10. هل تؤيد تبديل الأدوية الأجنبية الموصوفة الى أدوية محلية عربية
....
11. هل تبيع أدوية عشبية
....
12. هل تبيع مضادات حيوية بدون وصفة طبية
....
13. ما هي أكثر الأسئلة العلمية التي تواجهها في الصيدلية (أذكرها)
....
14. ما هي أهم المشاكل التي تواجهها مهنة الصيدلة في فلسطين.
....
15. كم عدد الوصفات الطبية التي تحتوي على مهدئات (مشتقات BZD) تقوم بصرفها اسبوعيا"
....
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