International Journal of Research in Pharmacy and Pharmaceutical Sciences
ISSN: 2455-698X
Impact Factor: RJIF 5.22
www.pharmacyjournal.in
Volume 3; Issue 1; January 2018; Page No. 32-40

Sources of drug informations at Libyan community and private pharmacies

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Abstract
The aim of this study was to identify information resources of medicines used by the community and private pharmacists at Benghazi-Libya to update the knowledge and provide updated and effective informations to the patient and other medical professionals.
There are 50 pharmacists had received a survey comprising of 21 questions. The initial questions designed to obtain demographic data concerning pharmacist utilization of various information resources. Pharmacists asked specifically about the well-recognized reference books and journals to indicate if they are readily available at their practice site. The second part comprises of questions concerning about the pharmacist's responses and general informations regarding type of advices sought by patients and how did those responses could affect the patient-pharmacist confidence. The response to all questionnaires collected and statistically analyzed with SPSS program.
The internet was the most preferred and used source for drug information than the Pharmacopeia and Martindale. The information resources are limited, which are major barrier in effective counseling. The Pharmacist age, experience and level of education have strong effect on the choice of the source of drug informations. It seems likely that some pharmacists are more skilled than other pharmacists in patient counseling. Affiliation and the pharmacist income have a direct effect on the pharmacist prescription of drug substitutes. It was concluded that, the community and private pharmacists is an important source of drug informations and can play a vital role in promoting patient health care in the community. Thus, the pharmacists in the community and private should be trained in an appropriate fashion to meet such goals.

Keywords: information resources, community pharmacy, private pharmacy, pharmacopeia, Martindale

1. Introduction
There is continuing development and emphasis on the need to provide adequate pharmaceutical care to the patients. The pharmacists play a major role where services such as counseling and answering drug information (DI) requests are provided resulting in cost saving and treatment effectiveness. [4] While doctor of pharmacy programs usually includes a course that tackle DI resources and provide the future pharmacists with tools to answer reliably DI requests, many traditional bachelor of pharmacy programs do not include such course even as a topic. In the faculty of pharmacy at Benghazi University, there are courses, which give such informations.
In most community pharmacies, the international pharmacopoeia must be available and the pharmacy should have an internet access, which will allow regular patient questions to be answered. This source gives drug information without the knowledge of how to assess a DI resource and therefore the validity of the obtained informations especially those from the internet, could not be taken as a serious source of informations as that present in the international pharmacopeia. Drug Information handbook is a quick reference to commonly used drugs in concise format arranged alphabetically by generic drug name and includes brief informations about some combination of drugs.
Internet resources (including general internet website informations) are commonly used in community pharmacies setting and are often considered adequate for answering general questions from patients, but they differ in quality, update frequency and in their suitability to answer specific DI requests. All pharmacists in this study used the internet during the working hours, as DI purposes.
The available tertiary resources in the pharmacy were the “British National Formulary” (BNF) followed by "Drug Information Handbook". The "Middle East Medical Index" (MEMI) which was available in some pharmacies. BNF (British Medical Association and Royal Pharmaceutical Society) published twice a year (March and September). It provides authoritative and practical information on the selection and clinical use of medicines in a clear and concise manner [4].
Varieties of questions asked to the community pharmacists every day. The most common questions related to drug doses, availability, adverse drug reactions, drug-drug interaction, toxicity, pharmacotherapy, the mechanism of action, contraindication, methods and route of administration. It is impossible for any community pharmacists to remember everything about drugs and that is why it is important for them to have up-to date relevant knowledge and easy access to evidence-based information on medications. Specially, they must know where to find drug information, how to evaluate them and how to apply them to specific patients. The most commonly type of questions received from the patients was those related to drug safety in pregnancy and lactation

(19.5%) followed by the dosage forms and routes of drug administration [1, 5]. Additionally, due to the war conditions at our city (Benghazi) which creates different mode of life, that experienced by the people, plus the prevalence of hypertension, diabetes mellitus, hypothyroidism, hyperthyroidism and cancer, there are other types of the regular questions, which is daily search an answer from the pharmacists at the community and private pharmacies.

The failure to choose the best resources of information may compromise the quality of the patient care resulting in unnecessary patient suffering and increased health care expenditure. Failure to choose the best possible information resources and answer correctly a drug related questions may not only invite questions from patients. It is very essential for community pharmacists to stay abreast of current events in health care clinical guidelines, new therapeutic molecules and their indications either by attending professional national, international conferences, seminars, symposiums, workshops or from the information provided by pharmaceutical companies and its medical representatives. However, the variation in content, speakers, sponsors, and level of topics limit their usefulness and less reliable compared to other sources of information [5].

Community pharmacists efficiently looked upon to provide accurate, up to-date, reliable, unbiased or two sided information in the fast-paced environment of community pharmacy. Pharmacists therefore need access to comprehensive information sources on medication. Generally, there are three categories of drug information [5].

Other countries like Arab emirate and Kuwait have use three-drug source of informations. Primary source of information includes research articles published in scientific journals they are the most up-to-date and cutting-edge. Secondary sources of information include bibliographic indexing, and abstracting services they are useful for quick and selective screening of primary literature. Tertiary sources of information such as books, review articles, and monographs, are probably the most commonly used reference materials as they provide easy and convenient access to consistent information [3].

Availability and reference of those information resources by the community pharmacists will empower the pharmacists to provide efficient information about complicated questions related to medicines thereby reducing the medication errors. Many studies carried out in Jordan, Kuwait, Palestine, Saudi Arabia and other countries have found that the information resources are either unavailable or drug related enquiries were answered without consulting a reference sources. In some other studies, the pharmacists working at community pharmacies were unable to answer the enquiries efficiently [3].

The prevalence and usage of electronic references in community pharmacies were rather low at Malaysia. Efforts should be increased to encourage wider usage of electronic references and patient medication records in community pharmacies to facilitate pharmaceutical care [6]. Additionally, the use of tertiary sources of drug information was more common among community pharmacists in Penang, despite the benefits of using primary information [2].

2. Materials and methods

The pharmacists had received a survey comprising of 21 questions. The initial questions designed to obtain demographic data concerning pharmacist utilization of various information resources. Pharmacists asked about the well-recognized reference books and journals to indicate if they are readily available at their practice site. The second part comprises of questions concerning about the pharmacist's responses and general informations regarding type of advices sought by the patients and, how those responses could affect the patient-pharmacist confidence. There are many factors, which may affect this relationship between the pharmacist and the patient, firstly the pharmacist background, behavior, and the used source of drug information.

The response to all questionnaires collected and statistically analyzed with SPSS program (Statistical package for social science students, version 2012). This study carried out on the pharmacists at the private and hospital pharmacies at Benghazi city, Libya.

3. Results and discussion

The pharmacists who subjected to this study were in the age range of 25-45 years. Eight percent of them were about 25 years, 54% of the pharmacists were in the age range of 25-35 years. About 38% of the pharmacists were in the age range of 35-45 years as shown in the Table 1 and Figure 1 respectively.

Table 1: Age range.

	Sample	Ratio
Less than 25 years	4	8.0
35-25 years	27	54.0
45-35 years	19	38.0
Total	50	100.0

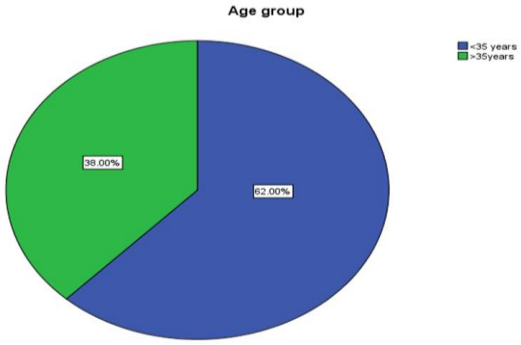

Fig 1: The age of the pharmacists subjected to this study.

The age was an important factor in the maturity of the pharmacist to prescribe the drug and give the correct and up to date informations to the patient. The pharmacists of the medium age period were the largest part of this study sample, which is a good indication of the responsibility of those young pharmacists at this study.

Table 2: Education level.

	Sample number	Ratio
Medium level	1	2.0
High level	4	8.0
Bachelors	42	84.0
Higher than bachelors	2	4.0
No answer	1	2.0
Total	50	100.0

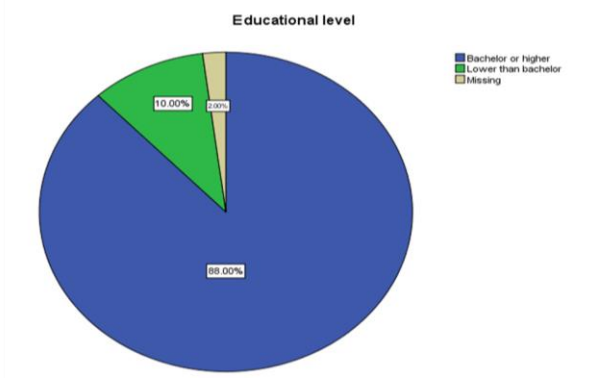

Fig 2: Education level of study samples.

Those pharmacists (50) were graduated at different levels of education starting from medium level, higher diploma, Bachelors and higher than the bachelor's degree as shown in Table ***2***. These differences in the levels of education reveal different answers gathered during this study. Figure 2 shows that 88% of our pharmacist sample have bachelor's degree and higher which means that this study have trigger the most educated pharmacists present at Libyan community.

Table 3: Experience year.

	Sample number	**Ratio**
1-5 years	30	60.0
5-10 years	10	20.0
10-15 years	2	4.0
More than 15 years	4	8.0
No answers	4	8.0
Total	50	100.0

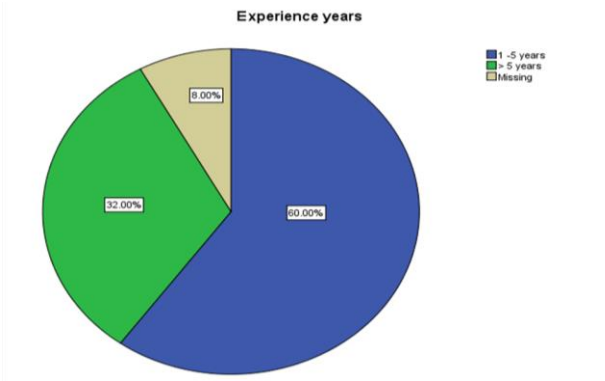

Fig 3: Experience years of the study samples.

Those 50 pharmacists have different levels of work experience starting from 1-15 years and more, which gives their answers a serious mode and responsibility as shown in Figure 3 and Table 3. About 60% of the pharmacist sample have 1-5 years' work experience, which shows, how the recent pharmacist could solve the problems that they may face when they get a new drug names at the prescriptions. Twenty percent of the pharmacists have 5-10 years' work experience, which reveals more maturity in solving such problems. 4% and 8% of the pharmacists who have a 10-15 years and more are suggested to be more experienced and seemed to have less problems than the first group of the pharmacists which could be concluded in the subsequent results.

Table 4: Pharmacist`s work place.

	Sample number	Ratio
National branch	10	20.0%
Private branch	38	76.0 %
No answers	2	4.0 %
Total	50	100.0%

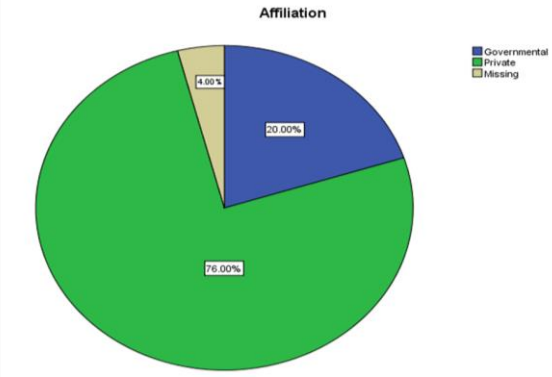

Fig 4: Pharmacist distribution on the work place.

The data present at Figure 4 and Table 4 show the work places of the pharmacists who answer the study`s questions and who did not react positively to the study survey. About 20% of the pharmacists employed at the national branch, whereas 76% of the pharmacists employed at the private branch. The other 2% of the pharmacists have not answer the survey, which might be due to unawareness of those pharmacists.

Table 5: The first preferred source of drug informations.

	Sample number	**Ratio**
Internet	11	22.0
Pharmacopeia	7	14.0
Martindale	30	60.0
Others like BNF	2	4.0
Total	50	100.0

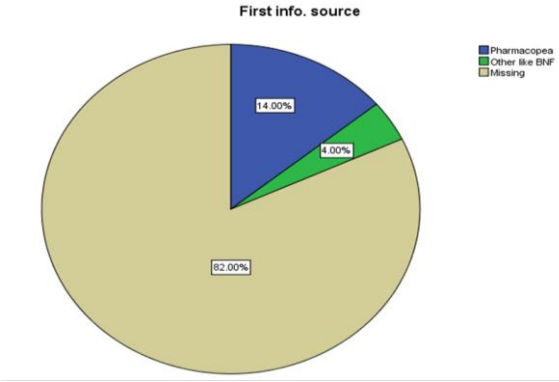

Fig 5: First source of drug information.

About 22% of the pharmacists found that, searching for drug informations through the internet network is the quicker and easiest method to get more informations about the new drugs, which face them during the prescription time as shown in Table 5. The important factor in using the internet for drug and medicine information is for pharmacist to analyze whether the information source is authoritative, reliable, up-to-date,

and unbiased. While, 14% of the pharmacists prefer to use the British or the United States pharmacopeias which apparently to be not present in most private and hospital pharmacies from this percent of users. About 60% of the pharmacists prefer the Martindale book as a source of drug informations. Martindale appears as the more available book at both private and national sector. Only 4% of the pharmacist's population of this study prefer the use of the Britch national formulary or other books as a first aid to know any drug informations when they face a new drug (Figure 5).

Table 6: Second source of drug informations.

	Sample number	Ratio
Internet	23	46.0
Pharmacopeia	16	32.0
Martindale	7	14.0
Others like BNF	1	2.0
No answer	3	6.0
Total	50	100.0

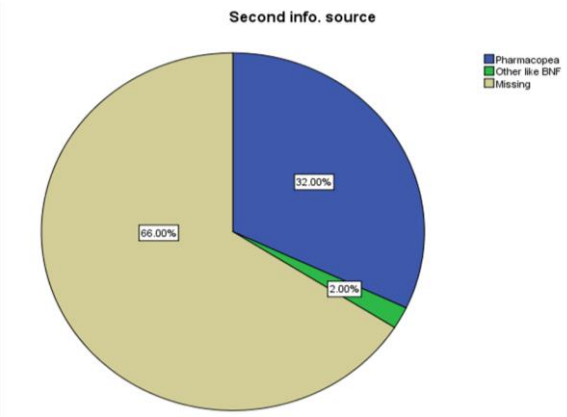

Fig 6: Second source of drug informations.

Most pharmacists answer regarding the use of the second source for the required drug informations shown in Table 6. A 46% of the pharmacists strongly prefer the internet source, while 32% of the pharmacists have use the pharmacopeia as the second preferred informations source, 14% of the pharmacists prefer Martindale as second source of drug informations. Only 2% of the pharmacists prefer to use the British national formulary or other books as a second aid to know any drug informations when they face a new drug (Figure 6), 6% of the pharmacists have not answer, which might be authorized to unavailability of those drug information sources at the work place.

Table 7: Third source of drug informations.

	Sample number	Ratio
Pharmacopeia	8	16.0
Martindale	4	8.0
Others like BNF	10	20.0
No answer	3	6.0
Total	50	100.0

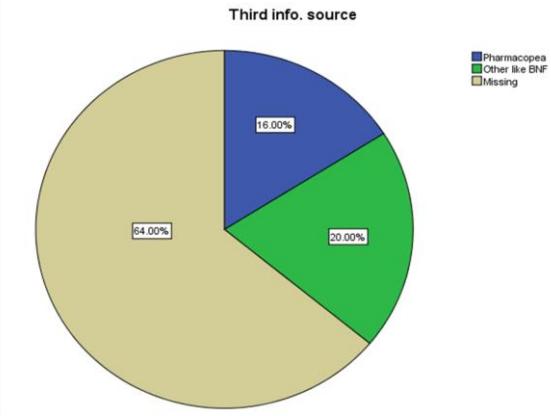

Fig 7: Third source of drug informations.

A 64% of the pharmacists group used in this study did not regard the use of the third source for searching the unknown drug informations although that 20% of them find the use of other sources like drug journals and BNF is beneficial to be third source for new drug informations as shown in Table 7. Additionally, 16% of the pharmacists prefer to use the pharmacopeia as the third source for drug informations (Figure 7), those part of the pharmacists should be the group, which have, use other sources than the pharmacopeia as the first source of drug informations.

Table 8: The time required for internet search.

Time	Sample number	Ratio
5-10 minutes	34	68.0
10-20 minutes	10	20.0
30 minutes-1 hour	2	4.0
More than 1 hour	4	8.0
Total	50	100.0

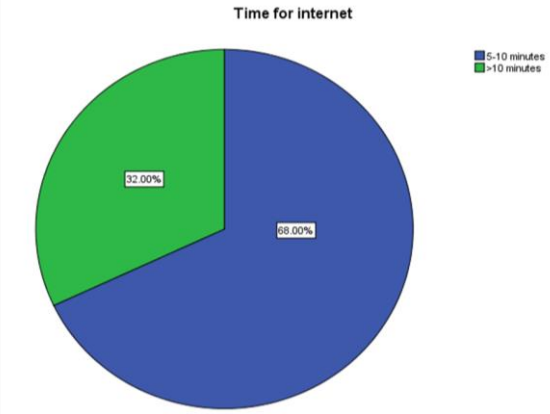

Fig 8: Time required for internet search.

Most pharmacists (68%) of the survey sample decided that only 5-10 minutes enough time used for drug informations search from the internet network, which shown clearly from Figure 8 and Table 8. About 20% of the pharmacists decided to find that 10-20 minutes is the more appropriate time for

searching new drug informations at the internet. While the other 4% of the pharmacists need more time up to 1-hour internet searching time to find the new drug informations. About 8% of the pharmacists have not answer this question, which suggests that those pharmacists might need longer time or they did not pay any efforts to search drug informations when they face new drugs.

Table 9: The time required for Pharmacopeial search

Time	Sample number	Ratio
5-10 minutes	9	18.0
10-20 minutes	23	46.0
30 minutes-1 hour	10	20.0
More than 1 hour	3	6.0
No answer	5	10.0
Total	50	100.0

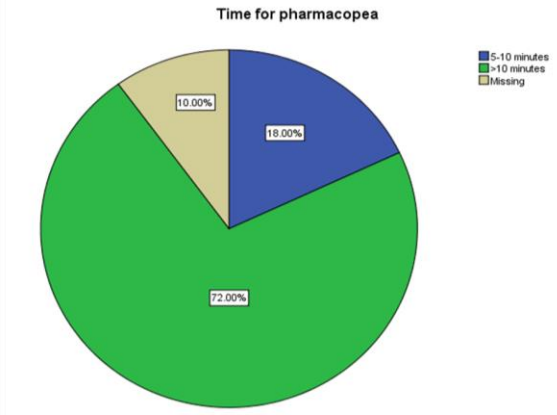

Fig 9: Time required for drug information search in the pharmacopeia.

About 18% of the pharmacist sample found that 5-10 minutes an enough time for the pharmacopeial search for the new drug informations, 48% of the pharmacists found that more than 10 minutes up to 20 minutes is an enough time to search new drug informations in the pharmacopeia as shown in Figure 9 and Table 9 respectively. Figure 9 shows that 26% of the pharmacists need more time approximately 1 hour to search in the pharmacopeia, while 10% of the pharmacists have not answer this question, which indicates the un-exact time they need to get the proper informations about the new drugs they face.

Table 10: The time required for Martindale search.

Time	Sample number	Ratio
5-10 minutes	16	32.0
10-20 minutes	19	38.0
30 minutes-1 hour	11	22.0
More than 1 hour	4	8.0
Total	50	100.0

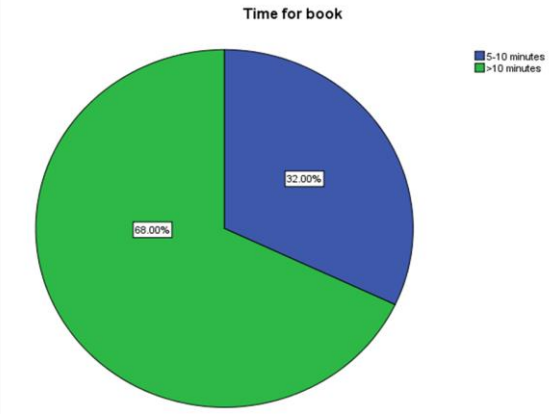

Fig 10: Time required for drug information search in the Martindale.

The time required for new drug information search using the Martindale is 5-10 minutes for 32% of the pharmacist sample used in this study. While the second group of the pharmacists require 10-20 minutes for searching a new drug informations in the Martindale presents 38% as shown in Figure 10 and Table 10 respectively. The rest (30%) of the pharmacists need more time for the new drug information search in the Martindale up to one hour.

Table 11: The most beneficial source of drug informations.

Source	Sample number	Ratio
Internet	21	42.0
Pharmacopeia	5	10.0
Martindale	21	42.0
Others like BNF	3	6.0
Total	50	100.0

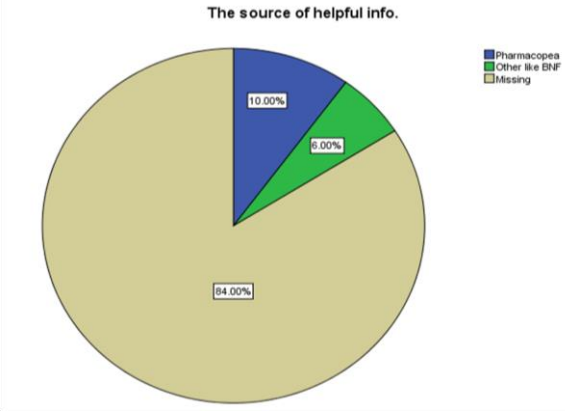

Fig 11: The most beneficial source of drug informations.

A bout 42% of the pharmacists who undergo this study agree that they could get beneficial informations about new drugs from the internet. While, 10% only of the pharmacists agree that the pharmacopeia could offer more beneficial and confidential informations about the new drugs as shown in

Table 11. On other hand, 42% of the pharmacists assure that Martindale could offer more beneficial drug informations about the new drugs, lastly only 6% of the pharmacists could show that the most beneficial informations could be obtained from the BNF and other drug information sources as shown in Figure 11.

Table 12: The quicker source of drug informations.

Source	Sample number	Ratio
Internet	28	56.0
Pharmacopeia	1	2.0
Martindale	17	34.0
Others like BNF	1	2.0
No answer	3	6.0
Total	50	100.0

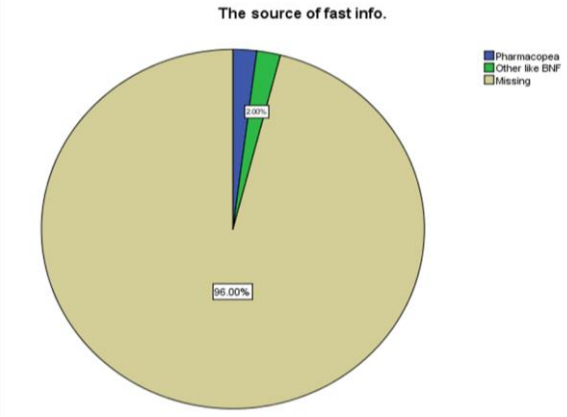

Fig 12: The source providing fast drug informations.

A 56% of the pharmacists who undergo our study agree that they could get more quick informations about new drugs from the internet. A 34% of the pharmacists assure that Martindale be the second quick drug informations source as shown in Table 12 while 2% only of the pharmacists agree that the pharmacopeia. Two percent of the pharmacists agree that the BNF and other drug information sources could offer more quick informations about the new drugs as shown in Figure 12. On the other hand, there are 6% of the pharmacists have not answer this survey question, which reveal a negative point about their hesitation to answer, if they actually care for that point or not.

Table 13: Pharmacist response facing new drugs in the prescription.

Pharmacist response	Sample number	Ratio
Hesitation	2	4.0
Asking other partner	34	68.0
Answering with no knowledge	14	28.0
Total	50	100.0

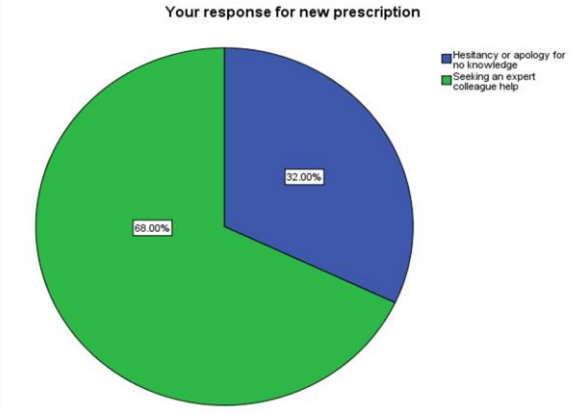

Fig 13: Pharmacist first response when facing new drugs in the prescription.

Figure 13 and Table 13 explore in details how the pharmacists sample subjected to this study react when they face a new drug in the daily prescription time. A 4% of the pharmacists show a hesitation mode to the patient when they met a new drug in the prescription. A 68% of the pharmacists seeking a help from an expert colleague, while 28% of the pharmacists answering the patient that they did not have enough knowledge about that new drug which face them during daily routine prescription.

Table 14: The most frequent patient questions during prescription time.

Question	Sample number	Ratio
Is the drug genuine	29	58.0
What is the expiry date of the drug	3	6.0
How many time should the drug be taken	1	2.0
The way of using a drug	10	20.0
What is the reason of the drug price difference between different pharmacies	7	14.0
Total	50	100.0

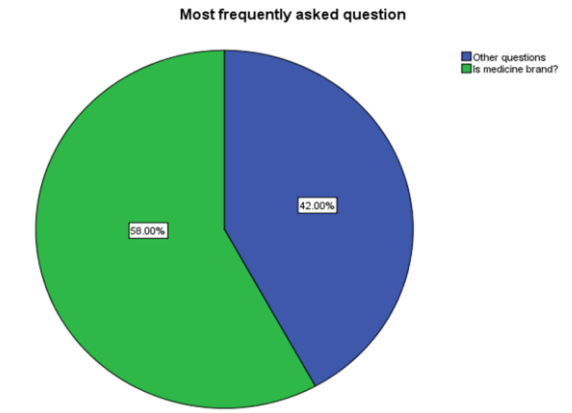

Fig 14: The most frequent patient questions during prescription time.

Figure 14 and Table 14 show a detailed information about the most frequent patient questions during prescription time to the pharmacists. A 58% of the pharmacists agree that the patients always asking them if the presented drug is genuine or not, 6% of the pharmacists assure that the patients ask about the drug`s expiry date, while only 2% of the pharmacists show that some patients care about how many times should the drug be used. A 20% of the pharmacists agree that the patients care about the way of drug usage, while there are 14% of the pharmacists assure that some patients discuss with them about the drug price difference between the different private pharmacies present at our city (Benghazi), which is another problem that must be discussed with other authorities.

Table 15: The most beneficial (sure or trusted) source of drug informations.

Source	Sample number	Ratio
Internet network	22	44.0
Pharmacopeia	3	6.0
Martindale	23	46.0
Others like BNF	1	2.0
No answers	1	2.0
Total	50	100.0

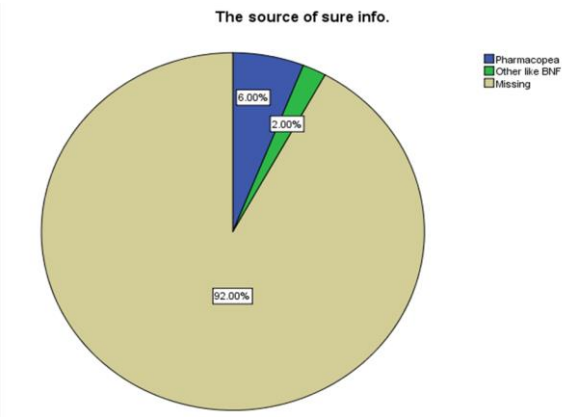

Fig 15: The source of sure drug informations.

The most beneficial (sure or trusted) source of drug informations was also attractive point of this study. Table 15 shows that 44% of the pharmacists use the internet network as the first and more trusted drug informations source, although that there are many warning comes yearly from the WHO about the diversity of those web sites and the assurance of the drug informations present on it. A 6% of the pharmacists accord the pharmacopeia as the most trusted drug informations source as shown in Figure 15, while 46% of the pharmacists accord the Martindale as the most trusted drug informations source, lastly only 2% of the pharmacists accord the BNF and others as the most trusted drug informations sources. Only 2% of the pharmacists have not answer this question.

Table 16: Difficulty in finding drug informations.

Answers	Sample number	Ratio
Yes	7	14.0
No	43	86.0
Total	50	100.0

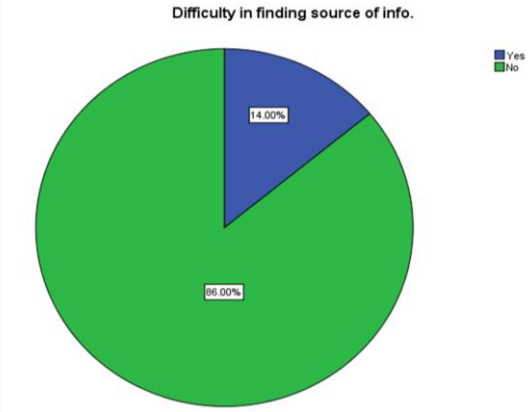

Fig 16: Difficulty in finding drug informations.

Difficulty in finding drug informations when the pharmacists face new drugs in the prescriptions shown clearly at Figure 16 and Table 16. Whereas 14% of the pharmacists experience a difficulty in finding drug informations from the different sources, while 86% of the pharmacists haven't pass any difficulty in finding drug informations from the different sources and this could be related to the higher education level and the medium aged pharmacists participated at this study which shown in first part of our results.

Table 17: Pharmacist behavior in drug absence.

Pharmacist behavior	Pharmacist number	Ratio
Apology (missing)	9	18.0
Generic substitute	26	52.0
Advising to another pharmacies	15	30.0
Total	50	100.0

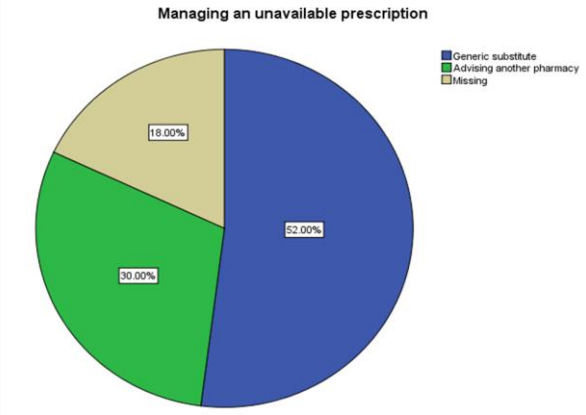

Fig 17: Pharmacist behavior in drug absence.

Pharmacist behavior with the prescription holders in case of drug absence at the pharmacies additionally discussed in this study questionnaire. Figure 17 and Table 17 show that 52% of the pharmacists trying to dispense the drug substitute from other company, or two drugs with same drug dose or concentration present in the prescription. That pharmacist ratio appears to be the largest group of pharmacist who participate at this study and this behavior might be due to pharmacist experience. A 30% of the pharmacists behave to advice the patient to go to other near or far pharmacies where

they could find the missed drug, 18% of the pharmacist did not strive with this absence and they stay simply with apology that they did not have the missed drug.

Table 18: Convincing the patient with drug of alternate brand.

Answers	Pharmacist number	Ratio
Difficult to convince	10	20.0
Easy to convince	40	80.0
Total	50	100.0

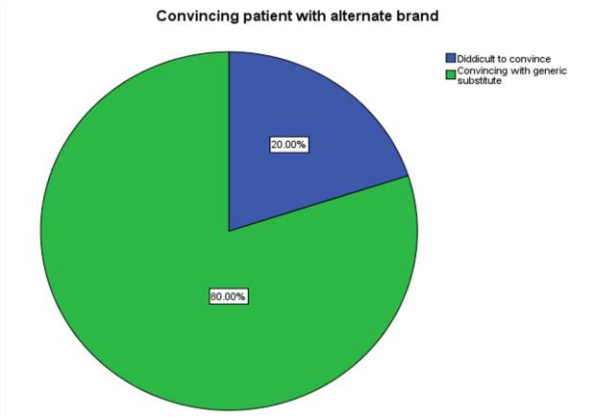

Fig 18: Convincing the patient with drug of alternate brand.

About 20% of the pharmacists assure that some patients are difficult to convince with drug substitute as shown clearly in the Figure 18. Additionally, 80% of the pharmacists assure that the patient could be easily convinced with drug substitute when the genuine drug missed from the pharmacy as shown in Table 18. This authorized to the good communication skills of that group of pharmacists and the ability to manage the patient with the drug substitute.

Table 19: Patient convincing signs.

Answers	Pharmacist number	Ratio
Facial expressions	15	30.0
Buying or taking the drug	35	70.0
Total	50	100.0

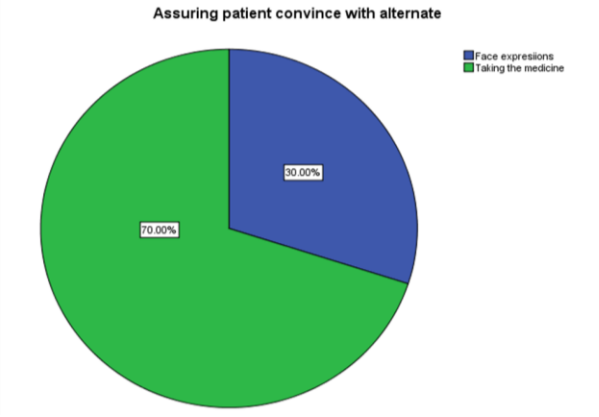

Fig 19: Patient convincing signs.

Patient convincing signs with drug substitutes appears normally as good facial expressions or by taking the drug from the national pharmacy or buying the drug from the pharmacy. Table 19 shows that 70% of the pharmacists assure that patient convincing with drug substitutes realized via taking or buying the drug substitutes, while 30% of the pharmacists assure this convincing mode via the patient`s facial expression as shown in Figure 19.

Table 20: Available informations affect patient confidence to the pharmacists.

Answers	Pharmacist number	Ratio
Yes	50	100.0

Table 21: Pharmacist hesitation disturbs the patient-pharmacist confidence.

Answers	Pharmacist number	Ratio
Yes, sure	34	68.0
Relatively, no	15	30.0
No	1	2.0
Total	50	100.0

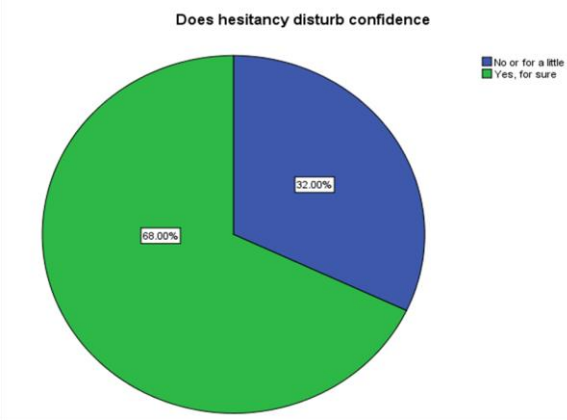

Fig 20: Pharmacist hesitancy affects patient confidence to the pharmacists.

Table 20 shows that 100% of the pharmacists agree that the presented drug informations from the pharmacists affects directly on the patient confidence to the pharmacists. Figure 20 and Table 21 show that 68% of the pharmacists assure that the mode of pharmacist hesitancy during drug dispensing to the patient would reflects a negative sign on the relationship between the pharmacist and the patient, which subsequently disturbs the patient confidence on the pharmacist. A 32% of the pharmacists assure that the mode of pharmacist hesitancy during drug dispensing to the patient would have no effect or relatively not so strong to effect on the patient confidence to the pharmacist.

4. Conclusion

This study designed in the form of initial questions to obtain demographic data concerning pharmacist utilization of various information resources. The internet was the most preferred and used source for drug information than the pharmacopeia and Martindale. The Pharmacist age, experience and level of education reveal a good effect on the choice of the source of drug informations. The second part comprises of questions concerning about the pharmacist's responses and general

informations regarding type of advices sought by patients. Subsequently, how those responses could affect the patient-pharmacist confidence. It seems likely that some pharmacists are more skilled than the other pharmacists in patient counseling. Affiliation and the pharmacist income have a direct effect on the pharmacist prescription of drug substitutes. Finally, the pharmacists in the community should trained in an appropriate fashion to meet such goals.

This study give an indication that each pharmacy at the two levels national and private should have an internet source to facilitate the search for drug informations. Additionally there must be an official accredited web site, which contains confidential informations about each drug. This web site should be updated and revised weekly from an academic regulatory office to ensure the correctness of the drug informations used by the pharmacists.

5. References

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