



The Research and Evaluation of Drug-use Habits of People in North Cyprus

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ABSTRACT

The purpose of this study is to determine the drug-use habits in North Cyprus and to prepare a demographic study of drug wastage. A total of 450 questionnaires containing 36 questions were handed out in 5 major cities of North Cyprus. Participants' pharmaceutical consumption habits and basic knowledge on rational use were compared with respect to their education level and living cities. People in Cyprus are using leftover medications in case of a need of 63.1%. Most of the participants get their medication with prescriptions (43.5%) and also pay attention to expiry dates while purchasing (80.6%). The main reason behind the leftover medication is the end of the illness or treatment. The second-highest leftover group is antibiotics (17.5%). According to the comparison of data between education levels and cities, rational drug use is statistically low for lower education levels ($P = 0.002$) and the Guzelyurt region ($P = 0.002$).

Keywords: leftover medications, medical education, pharmacology, rational drug use

INTRODUCTION

Rational drug use is the practice of providing patients with the required medical dose without compromising their clinical requirements at the lowest possible cost within an adequate time period (Akıcı et al. 2004). The basis of rational drug use is to determine low-cost but effective and safe treatment; to choose the appropriate drugs based on the appropriate dosage, time frame, and treatment process; to provide adequate information to the patient; and finally, to evaluate the final results (World Health Organization. The Pursuit of Responsible Use of Medicines: Sharing and Learning from Country Experiences; March 2012). The patients are also a part of this process, as well as the doctor, pharmacist, and any other health care professional.

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State of the literature

- The researchers of the present study aim to investigate the people of TRNC in terms of their drug use habits as well as the use of expired.
- Educating patients about drug use is very important in the prevention of irrational use of drugs.
- One of the strong points of this study is its focus on the need to draw attention to the necessity of investigation across the country, primarily at which step the rational drug usage has been hindered and in which areas and how much education is required.

Contribution of this paper to the literature

- The results of this study prepare the necessary ground for the development of useful materials that can be used to teach the correct use of drugs for patients in North Cyprus.
- The present study is first of its kind in the country and shed light to the lack of any work in this area.
- This study can be qualified as an example for other future work on the correct use of medicines, the prevention of their waste and the instructions for the development of educational materials on how the medicines should be disposed of correctly.

The patient is responsible for following the instructions of the doctor and other common denominators for the medication and its use. Failure to follow the instructions of the doctor, nurse, or pharmacist results in improper use of the medication. Mistakes made in the use of medications could either lead to unexpected outcomes or prevent the desired outcome from being achieved. Patients need to make sure that they listen carefully and fully understand the instructions given by the healthcare professionals. At this point, the most common mistake made by patients is to take action with their own knowledge about the drug instead of following the doctor's instructions. Patients' own knowledge or any advice that has not been given by healthcare professionals should not be held above the doctor's instructions (Celik, Sencan & Clark, 2013) Additionally, failure to follow the prescribed doses and usage instructions, lack of knowledge about the preservation and disposal of the drugs, keeping the expired drugs at home, and using leftover drugs are some of the patient-oriented irrational drug use that causes drug wastage and increases the cost of the treatment.

Proper education on rational drug use is essential in prevention irrational drug use. The purpose of this study is to prepare the essential materials to educate the patients in North Cyprus on rational drug use. The objectives are to determine the drug-use habits within North Cyprus as well as to prepare a demographic study of drug wastage by investigating the usage of expired drugs or drugs that are not being used for any reason. This study is the first study to determine drug-use habits in North Cyprus. The results of this study will provide the basis for the preparation of educational materials for future studies on rational drug use.

MATERIAL AND METHODS

This research was based on another research performed by the Ministry of Health (The Social Security Institution) in the Republic of Turkey which has not been published yet. The aim of that study was to investigate the pharmaceutical consumption habits of people living in Turkey and their perspective on rational drug use.

This research is focused on the 5 major cities of the Turkish Republic of Northern Cyprus, and 450 questionnaires were handed out according to the last population census: 150 questionnaires in Nicosia, 100 in Famagusta, 100 in Kyrenia, 50 in Guzelyurt, and 50 in Iskele (North Cyprus State Planning Organization. Census Results; December 2011). The questionnaires were handed out in May 2015 and contained 36 questions. The differences between the pharmaceutical consumption habits of people according to their education and cities and their basic knowledge on rational use of medications were evaluated by the statistical program SPSS 18. Pearson's chi-squared test was used and $P < 0.05$ was considered to be statistically significant. This research was approved by the local ethical committee.

RESULTS

Demographic information

The participants of this study live in the cities of Nicosia (33.3%), Famagusta (22.2%), Kyrenia (22.2%), Guzelyurt (11.1%) and Iskele (11.1%). The number of the male participants was 55.6%; 30.3% of all participants were between ages 25–34 and 22.0% between 35–44; 52.5% were university or higher graduates; and 71.9% had jobs. The participants who work in the health sector were 8%.

Information on Illness and the Medication Used

In this study, 26.7% of all participants had chronic illnesses which include hypertension (37.8%), diabetes (19.2%), dyslipidemia (16.9%) and the rest was variety of other chronic illnesses (26.1%). While 74.5% of the participants didn't use any medication at all, 15.8% of them used 1–2 medications. 48.9% of the participants didn't use any medications while 39.2% used 1–2 apart from what they use for their chronic illnesses. There was no medicine in the homes of 4.5% of the participants, 39.2% of the participants had 1–2 and 27.9% had 6–10 medicines in their homes. 55.8% of the purchased drugs were bought in the last 1 month and 29.3% of them were purchased in the last 2–3 months. While 80.6% of the participants check the expiration date of the medicines, 19.4% don't check it. The reasons behind the participants purchased medicines, 79% were for treatment during illness, 18% were in order to be ready for possible illnesses, and 14.2% were to get protection from illnesses. 42.3% of the participants used the remaining medicines in the last week, 21.0% in the last 8–15 days, and 14.2% used in the last 16–30 days.

While 63.1% of the participants answered the question "Do you use the existing medicine again?" with yes, 36.9% answered no.

The reasons behind not using the remaining medicines again were; the illness was overcome (50.4%), the medicine's expiration date was reached (14.7%), and the doctor prescribed a new medicine (10.4%) and they stopped using the previous medication. While 49.2% of the participants stated that they consult a doctor before using the remaining medicines, 30.7% stated that they consult a pharmacist, and 19.9% stated that they consult no one. The reuse of the non-expired drugs was 44.4%, 33.3% of the participants stated that they throw the remaining medicine away, and 6.9% said that they give them to a health institution. As participants stated, 50.6% of them throw away any kind of drugs without separating groups, 18.2% throw away eye drops, and 17.5% throw away antibiotics. While 74.7% of the participants throw drugs into trash while disposing them, 12.1% put them into medical waste containers, and 7.8% throw them into the toilet. When it comes to expired drugs, 74% of the participants stated that they throw them away, 18.9% destroy them, and 2.4% stated that they use them or give them to a pharmacy. While 79.0% of the participants know how to store the drugs, 21.0% did not know how to store them. In addition, 72.1% were aware how to store the syrups according to their groups, and 27.9% did not. While 52.2% were aware of the ways to store the suspensions according to their groups, 47.8% of participants did not know that. 54.1% of the participants stated that they did not know how to store disposable needles injected intramuscularly, and 45.9% stated that they know how to store them. While 70.2% knew how to store ointments, creams, gels, and pomades, 29.8% had no knowledge on the issue.

The rate of correctly answering the question "Where do you store the tablets?" was 80.9%; the rate of correctly answering "Where do you store the syrups?" was 50.0%; the rate of correctly answering "Where do you store the medications you prepare by diluting or store as powders?" was 62.6%; the rate of correctly answering "Where do you store disposable needles injected to intramuscular area?" was 70.0%; and the rate of correctly answering "Where do you store ointments - creams - gels - pomades?" was 74.7%.

The question "How frequently do you store pill/tablet type medications out of the package?" was answered as "never" by 76.8% and as "rarely" by 15.1%. While 84.2% stated that they never use the deposited and candied syrups, 10.2% said that they use them rarely.

When asked how much time there is between the time of preparing a diluted medication and the expiry date, 33.3% answered 1 week, 27.7% answered that they did not have any experience, and 17.7% answered less than a week. A group of 51.1% among the users knew whether injection needles have an expiration date or not, 28.8% said that they had no idea about injection needles, and 20.1% said they did not know. When asked who paid for the medications, 81.1% said that they pay for themselves, and 22.2% said that they use insurance.

According to the relation analysis results conducted according to the cities, the situation of using a drug again was meaningfully higher in Iskele area ($P = 0.00$). Thus, Iskele was the region with the lowest possibility of having leftover medications. The comparison between the all cities according to the storage place for tablets was statistically significant ($P = 0.002$). Taking this question as the base, the most conscious were the people of Kyrenia, Famagusta, Iskele, Nicosia, and Guzelyurt, respectively. When the storage place of the medications in powder form or prepared by diluting, no meaningful difference was encountered between cities according to the analysis result ($P = 0.11$). When asked about the storage place of disposable needles injected into intramuscular areas, according to the city analysis, a meaningful difference was observed between the cities ($P = 0.002$). When this question was taken as the basis, the most conscious were, respectively, Magusa, Kyrenia, Iskele, and Lefkosa, and everyone from Guzelyurt answered this question wrong. According to the answers given to the question "How much time is there between the time of preparing a medication that is prepared by diluting and the expiry date?" there was a statistical significance between the cities ($P = 0.015$). For this question, Magusa, Iskele, and Guzelyurt mostly gave the answer "a week," which was accepted as the correct answer. The regions Lefkosa and Kyrenia answered that question usually as "We never had such experience in our homes." According to the relation analysis result and the question "Do you know whether the injector/needles of the medications applied as injection have an expiry date or not?" there was no statistically significant relation between the variables. According to that, the status of knowing whether injector/needles have an expiry date or not shows statistically significant differences according to the cities ($P = 0.000$). Taking this question as the basis, the most aware were, respectively, Nicosia, Kyrenia, and Iskele. When taking all questions showing significant difference between cities into consideration, Guzelyurt stands out as the first region to be educated on rational drug use.

The storage place of ointments, creams, gels, and pomades is significantly different according to education levels of participants ($P = 0.044$). The number of people answering this question correctly was significantly high among the people with a university or higher level of education. People in the regions with low-education levels should be educated on how to store the drugs properly, and medical personnel should warn the patients when providing the medications.

There was a statistically significant relation between the variables of participants' education level and storing the pill/tablet-type medications as unpacked. Storing frequency of pill/tablet-type medications unpacked shows a significant difference according to education ($P = 0.002$). The number of people correctly answering this question as "never" was significantly higher among people with high school or the equivalent and university or higher level of education than the primary school or lower graduates. In the light of this data, is it clear not only that people need education about storing medications in their own packages or boxes but also individuals with a low education level should be warned by medical personnel on that issue.

A statistically significant relation was found between the questions “What is your education level?” and “Do you know whether the injector/needles of the medications applied as injection have an expiry date or not?” According to that, knowing whether injector/needles have an expiry date shows meaningful differences according to education level ($P = 0.016$). As the result of the statistical analysis, knowing whether the injector/needles of the medications applied as injection have an expiry date or not is directly proportionate to education level. The number of people giving the answer “yes” among those with a university or higher education level was significantly higher than the other levels.

DISCUSSION AND CONCLUSION

It is well known that patients are one of the important participants of rational drug use. Increasing adherence to their treatment is believed to prevent the outcomes of irrational drug use. (WHO 1987; De Vries 1993; De Vries 1994; Pollock 2007; Holloway 2011). For increasing their adherence, the most effective methods are to be found at the improvements of drug use or health (Haynes 2005). In this study, we tried to determine patient’s knowledge, habits, and attitude toward drug use in Northern Cyprus as a first step of improvement in drug use.

Bilgili and Karatay stated in their study that medicines in the home should be stored in cupboards or medicine chests used for that purpose only, apart from food and beverages, in cool places, where children cannot reach and in their own packages in a place where they won’t be affected by the heat and light. Bilgili and Karatay(2005) underlined that drugs with packages’ expiration date distorted or not visible and with warn-off packages that make it hard to understand what drug it is should be destroyed immediately. Drug storage conditions depend on the drug group; thus, the drug types asked about and included in this study were tablets, syrups, medications prepared by diluting (namely suspensions), injected medications applied to intramuscular areas, and ointments, creams, gels, and pomades. Based on these drug groups, only for the suspension group was refrigerator accepted as the correct answer for storage. People in North Cyprus most prefer to store their medications in the kitchen, with a rate of 76.1%. Most of the mentioned drugs were in tablet form. In concordance with Gocgeldi et al., the current study accepted to be correct that drugs should be stored in a special box or cupboard, and 42.9% of the participants said they store their medications in a medicine cabinet or a special drawer. In the study of Gocgeldi et al. (2009) 42.2% of the participants stored their drugs in the refrigerator, but as the drugs weren’t classified according to their groups in that study, that rate includes drugs that should be kept in the refrigerator. In a study conducted in Adana, 45.1% of the participants stored their dugs in the refrigerator (Pinar, 2010).

According to the study results, most Cypriots are using an unpacked drug again in case of need. Purchase time of most of the drugs was within the last month. The main reason given for not using the drug again was that the illness or treatment ended. In the study conducted by Ozkan et al., 28.6% of the participants stated that the doctor stopped them

using the medications before the full treatment time was up, but the specific reasons were not sought (Ozkan et al. 2005). In the study of Gocgeldi et al. (2009) the rate of using medications as instructed was 61.6%, and more than half of the participants stated that the prescription written by the doctor was not explained enough. It was observed that as the result of misuse of the drugs, storing surplus drugs increased meaningfully. Taking this data into consideration, awareness should be raised among pharmacists to explain the prescriptions more clearly and in more detail.

When the people in Cyprus were asked the reason for purchasing the medications in their homes, the answer "for treatment during illness" had the highest rate with 79.0%. The rate of the medications bought to be ready for a potential illness was second with 18.0%. In Pinar's study conducted in Adana (2010), 28.9% of the participants got drugs prescribed by a doctor to keep them in their homes; in the study of Gocgeldi et al. conducted in Ankara, that rate was 43.6%. In light of these data, it can be told that the people of Cyprus buy less medicine to keep in the home, and because of this, drug risk is less than in Ankara and Adana. At the same time, 42.3% of the people in Cyprus have used the drugs they have in the last week, and again there is an importantly higher rate toward preventing drug risk here. According to our views on these data, doctors should be warned not to prescribe medicines to store at home for a potential illness. Ocan et al. (2014) indicates that the number of households of medication in Northern Uganda were for on-going treatment (48%); 'leftover' (30.5%) and anticipated future use (21.6%). This data is similar but the medication for on-going treatment has much higher percentage in our study.

When they were asked about not using the existing medication one more time, half (50.4%) of the people leaving the treatment incomplete answered that they stopped because the treatment and/or illness had ended. As most of the people in North Cyprus buy drugs during illness, it is not surprising that they stop using them when the illness ends. The rate of those who do not use the drugs after they are expired was 14.7%, and that rate also shows the residual drug rate in North Cyprus. In the study conducted by Yapici et al. in Mersin, almost half of the participants stated they stopped using the drug before the time they should finish it, and as the reason, they said that they thought they were not ill anymore. When taking these data into consideration, it can be seen that the rates of the participants in Mersin and North Cyprus were in accordance. In the study Ozcelikay conducted in Ankara, the rate of the ones saying "I would stop using the drug once the illness is over" was 23.9%, and the rate of the ones saying "I would apply the advice of the doctor completely" was 76.1%; but it is thought that the reason for these rates were not because of the awareness of the people but because of the way the questions were asked and the question options.

In the case of using the existing drugs again, it was observed that people in North Cyprus usually consult a doctor or pharmacist. While in North Cyprus the rate of those consulting a doctor was 49.2%, the rate of those consulting a pharmacist was 30.7%. This shows that the people in North Cyprus are conscious about the issue. In the study Bilgili and Karatay conducted, the people living in community clinic areas were asked from whom they

get information when they are using the stocked medications again, and the results were 72.8% said that they would consult a doctor and 26.6% said that they would consult a pharmacist. These findings are in accordance with our study with the study of Bilgili and Karatay which was conducted near community clinics and the patients could reach health care employees easily is thought to be the reason that the rate of consulting someone before using the stocked drugs again was higher when compared to the other regions. In the study of Pinar conducted in Adana, while more than half (51.9%) of the participants used the medications without consulting a doctor, 42.8% of them used drugs by consulting a doctor and 5.2% answered that question as "sometimes I use drugs without consulting to a doctor"

In the search to find what the people in North Cyprus do to the not-expired drugs, it was seen that 44.4% of the drugs were used again and 33.3% of them were thrown away. In the study of Bilgili and Karatay, 61.2% of the participants were storing the drugs until they expired and 26.8% of them were throwing them away. If we are to think that some of the surplus medications at the rate of 61.2% were used again, the study conducted in Ankara is in accordance with our study. When asked which the pharmacological groups were being thrown away or destroyed, half of the people in North Cyprus said they don't separate them and throw away all drugs they intend to. Other than that, the highest rates of not-expired drugs thrown away were eye drops, with 18.2%, and antibiotic medicines, with 17.5%. The reason for throwing away eye drops is thought to be that people don't use an unpacked eye drop again, but antibiotics having the second-highest rate is an indication of the high usage of antibiotics by the people in North Cyprus and that they should be educated in this issue. In North Cyprus where antibiotics can be purchased without a prescription, the pharmacists also should be made aware of this situation and should warn patient who buys antibiotics with or without a prescription to complete the treatment. In the study of Pinar (2010) conducted in Adana, it was found that anti-flu medications and antibiotics are the second-most misused drugs after analgesics. The reason rates of pain killers and rheumatic drugs are high in our study is that the people in North Cyprus use these medication groups in case of need, and they don't get stocked and thrown away. In the study of Bilgili and Karatay, 67.0% of the participants stated that they stopped using the antibiotic group medication because they thought they recovered from the illness and didn't use the drugs until they run out. Antibiotics are the most important group that the treatment has to be completed, but they are stocked and thrown away which shows that both the people in North Cyprus and Turkey should be educated on the issue.

In North Cyprus, when asked what is done with expired medicine, 74.0% of the participants answered "I throw away" but only 18.9% of them knew that expired medications should be destroyed and do it. In light of this data, North Cyprus people should be educated on what to do with the expired medications.

When people of North Cyprus were asked how they provide their medications, 43.5% answered with prescription, 35.0% answered without prescription, and 21.5% answered sometimes with and sometimes without prescription. The rate of using prescribed

medication is higher than using medication without prescription, which indicates that people in North Cyprus are conscious about that issue. It is thought that the participants who gave the answer "sometimes" make their choice according to their illness status, the intensity of the pain, and/or if they have encountered a problem like this before. In the study Bilgili and Karatay conducted in Ankara in the areas near community clinics, when the individuals were asked how they got their medications, 52.6% said from a pharmacy with a prescription and 33.8% said from a pharmacy without a prescription. That finding is also in accordance with our study. In another study conducted in Ankara, the rate of those answering "I would buy without consulting a doctor," namely without prescription, was 75.5%, and the rate of those answering "I wouldn't buy without consulting a doctor," namely with prescription, was 24.5%; it was suggested that the people in the area should be educated on rational drug use. The difference between these studies is thought to stem from the areas in which the studies were conducted and the dates on which the studies were conducted. In the study of Pinar conducted in Adana, 51.9% of the participants said they use medications without consulting a doctor, and 5.2% said they sometimes use drugs without consulting a doctor. It can be deduced that the people of Adana, of whom 57.2% use drugs without consulting a doctor, use more not-prescribed medications than the people of North Cyprus and need education on the issue. The changes recently made in the health sector in Turkey prevent non-prescribed drug use, and it is expected that if the studies are repeated, the rate of drug use without prescription will be much lower. Similar regulations are needed in North Cyprus as well.

Of the participants in this study, 80.6% answered yes and 19.4% answered no to the question "Do you check the expiration date while buying medications?" In the study Gogeldi et al. conducted in Ankara, 88.4% of the participants stated that they are sensitive to the issue of expiration date of the medication. However in another study conducted in Ankara, 28.3% of the participants answered no to the question. As the result of the study, Yapici et al. (2011) conducted in Mersin, 79.3% of the participants said they check the expiration date of the medications they purchase. As an average, in these studies and our study, 8 out of every 10 people are sensitive about the expiry date of the medications. The small differences between the studies are thought to occur because of the differences in the education level of the participants.

When the drug storage data of the study's sample group was conducted, we observed with our question about whether they know where to store the drugs or not, the majority of participants said that they know where to keep medications in the tablet, syrup, ointment, cream, gel, and pomade groups, but they also said that they are not sure where to store the suspensions and intramuscular needles. The next question traced whether participants know the correct storing conditions, and the majority knew the storage places of drugs such as tablets, powder medications, muscular needles, and ointments, creams, gels, and pomades, but in their knowledge on storing syrups, it was seen that half of them were correct and the other half were wrong on the issue. This data shows drugs are stored in the correct places in

North Cyprus, but also these data can be improved by warning the patients by the pharmacists while purchasing the medications.

Under the light of the questions additionally asked about the correct storage conditions and use, it was observed that the majority of Cypriots (76.8%) do not store pill/tablet group medicines as unpacked, and again the majority (84.2%) answered the question "How often do you use the deposited/candied syrups?" as "never" and showed that they are conscious on this issue. We took "a week" as the correct answer of the question "how long is the expiration date of a medication prepared by diluting after water is added to it?" It was seen that 33.3% of Cypriots answered correctly with the highest rate, and the second-highest rate was "less than a week", with 17.7%. Again it was observed that 51.1% of the people in North Cyprus answered yes to the question "Do you know if the needle and injectors have an expiration date or not?"

In our study, no statistically significant difference was found between the situation of using an unpacked medication again, namely without consulting a doctor, and education level. However, other studies carried out in Turkey showed that drug use without consulting a doctor increases with education level, but seeking information from the doctor increases (5,6). In these studies, it was found that the higher the level of education, the higher the rate of reading the package insert. It also is thought that the people reading the package insert have knowledge concerning the storage conditions of the medication (Pinar, 2010 & Ozkan et al. 2005). In our study, the answer "I decide on where to store the drug by reading the package insert" was accepted as correct, and this rate was really high and in accordance with the other studies. In the study of Ozkan et al. (2005) the general idea that "the higher the education level is, the higher rational drug use is" is dominant and, as a part of rational drug use in situations such as storing places of some medications, storing medicines out of a cupboard, and knowing if the injectors have an expiration date or not, is in accordance with our study. The study conducted by Mirza and Ganguly (2016) in Western India stated that urban people follow the appropriate dose and duration of medicines than rural people which is similar to the study.

If a general assessment is to be given, there is a directly proportional relation between the education level and rational drug use, and it is a fact that rational drug use spreads if the individuals are educated on the issue.

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