REPUBLIC OF TURKEY
YEDITEPE UNIVERSITY
GRADUATE SCHOOL OF HEALTH SCIENCES

A PILOT STUDY ON RATIONAL DRUG USE AND DRUG USE HABITS

PHARMACIST

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ISTANBUL – 2011

A PILOT STUDY ON RATIONAL DRUG USE
AND DRUG USE HABITS

A THESIS SUBMITTED TO

THE GRADUATE SCHOOL OF HEALTH SCIENCE

OF

THE YEDITEPE UNIVERSITY

BY

ESRA ÇELİK

IN THE PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF

MASTER OF SCIENCE

IN

CLINICAL PHARMACY

ADVISOR

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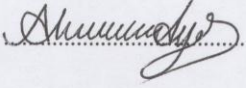**ASSIST. PROF. DR. PHILIP MARTIN CLARK**

ISTANBUL - 2011

DEDICATION

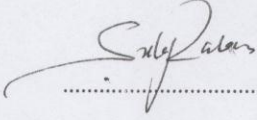*To my unique mom and to my little Yağmur.*

Yüksek Lisans (Master) öğrencisi. Esra Çelik'in   çalışması jürimiz tarafından Klinik Eczacılık Anabilim Dalı Master tezi olarak uygun görülmüştür.

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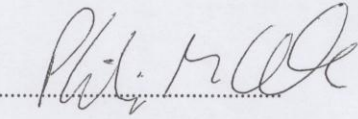
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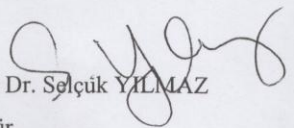|		
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ONAY

Yukarıdaki jüri kararı Enstitü Yönetim Kurulu'nun 23/.01/.201.2   tarih ve ..../.=./........ sayılı kararı ile onaylanmıştır.

Prof. Dr. Selçuk YILMAZ

Müdür

ACKNOWLEDGEMENTS

ABSTRACT

Celik E. A Pilot Study on Rational Drug Use and Drug Usage Habits. Yeditepe University Institute of Health Sciences Clinical Pharmacy Master Thesis. Istanbul, 2011.

Purpose: Irrational drug use and unused drug waste are considerable problems in the modern world. In this study, the main aim was to assess the rational drug use habits and awareness of unused drug wastage among university associates.

Materials & Method: The study began with an Unused Drug Gathering Campaign on the campus of Yeditepe University in Istanbul, Turkey. The participants in the campaign were asked to complete a questionnaire about drug use habits and awareness of unused drug waste. 65 participants out of a total of 107 people who were involved in the campaign agreed to complete the questionnaire. The survey questions were formulated based on a literature review, and a score system that measured rational drug use habits was also constructed in the light of the literature. Higher score meant more rational drug use. The results were compared to find any correlation or differences.

Result and Conclusion: The mean rational drug use score was 7.14, a relatively high figure. There were no statistically significant differences between rational drug use and socio-demographic parameters. Behavioral patterns related to rational drug use and awareness of unused drug wastage among members of the faculty of pharmacy was generally different from that of other participants. Most of the irrational use problems may be able to be solved by appropriate education. To improve rational drug use, doctors and pharmacists should be competent to educate the public properly. Pharmacists are the most accessible health care professionals for the patient, and have an important role in enhancing rational drug use, and warning about the negative effects of unused drug waste. The need for public health education should be emphasized. Further studies should be conducted to assess the drug use habits of the public; in addition, health care professionals and particularly community pharmacists should encourage the public to correct any harmful drug use behavior.

Key words: Rational drug use, unused drug waste, drug usage habits, compliance, pharmacy role on drug use

ÖZET

Çelik E. Akılcı İlaç Kullanımı ve İlaç Kullanım Alışkanlıkları Üzerine Bir Pilot Çalışma. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Klinik Eczacılık Mastır Tezi. İstanbul, 2011.

Amaç: Akılcı olmayan ilaç kullanımı ve kullanılmayan ilaçların israfı mordern dünyanın önemli problemleri arasındadır. Çalışamada esas amaç, bir halk modeli olaraka üniversite öğrencilerinde akılcı ilaç kullanım alışkanlıklarını ve kullanılmayan ilaçların israfı konusundaki farkındalığı değerlendirmektir.

Materyal & Metot: Çalışma İstanbul Yeditepe Üniversitesi içerisinde gerçekleştirilen Kullanılmayan İlaç Toplama Kampanyası ile başlamıştır. Kampanya katılımcılarının ilaç kullanım alışkanlıkları ve kullanılmayan ilaç israfı konusundaki anketi cevaplamaları istendi. 107 katılımcının 65'i anketi yanıtlamayı kabul etti. Anket soruları literatür değerlendirmesi sonucu oluşturuldu ve akılcı ilaç kullanımı alışkanlıklarını ölçen bir skorlama sistemi oluşturuldu. Puan yükseldikçe ilaç kullanımı daha aklıcı olarak yorumlandı. Sonuçlar aralarındaki herhangi bir ilişki ya da farklılığı bulmak amacıyla birbirleriyle kıyaslandı.

Bulgular ve sonuç: Akılcı ilaç kullanımı skoru ortalaması oldukça yüksek olarak 7,14 bulunmuştur. Sosyodemografik özellikler ile akılcı ilaç kullanımı arasında istatistiksel olarak anlamlı bir fark bulunamamıştır. Genel olarak, akılcı ilaç kullanım alışkanlıkları ve kullanılmayan ilaç israfı eczacılık fakültesi ile diğer üniversite üyeleri arasında farklı bulunmuştur. Akılcı olmayan kullanım ile ilgili çoğu problem eğitim ile çözülebilinir. Akılcı ilaç kullanımını arttırabilmek için, doktor ve eczacılar halkı uygun şekilde eğitebilecek kadar iyi bir eğitim almalıdırlar. Eczacılar hastanın en ulaşması en kolay sağlık uzmanı olarak akılcı ilaç kullanımını geliştirme ve kullanılmayan ilaç israfının negatif etkileri konusunda uyarmada önemli bir role sahiptir. Halk eğitiminin önemi vurgulanmalıdır. Genel toplum alışkanlıklarını belirlemek için çalışmalar yapılmalıdır ve tüm dünyayı etkileyecek düzeye ulaşmadan, sağlık çalışanları özellikle de eczacılar konuyla ilgili yapılan hataların düzeltilmesi için teşvik edilmelidir.

Anahtar kelimeler: Akılcı ilaç kullanımı, kullanılmayan ilaç israfı, ilaç kullanım alışkanlıkları, uyunç, ilaç kullanımında eczacının rolü

CONTENT

ABBREVIATIONS

AIDS: Acquired Immune Deficiency Syndrome

DRP: Drug-Related Problems

FIP: International Pharmaceutical Federation

HAART: Highly Active Antiretroviral Therapy

MUR: Medicine use reviews

OTC: Over The Counter

RDU: Rational Drug Use

SGK: Social Security Agency

WHO: World Health Organization

USA: United States of America

YUDIC: Yeditepe University Drug and Poison Consultancy Unit

TABLES

1.INTRODUCTION

Life is a very complicated process. To live it well, people have to have some criteria. The most important and the easiest criteria to lose is health. WHO (World Health Organization) defined health as "a state of complete physical, mental and social well-being not merely absence of disease or infirmity" [1].

Health status can be easily changed and everybody is a patient nominee. As a result, the health sector is everlasting. From the diagnosis to suitable therapy of a disease is a complicated process. This process has many different participants such as health care professionals, nurses, pharmacists, medicine producers, medicines, patients, the belief and culture of the patient etc. In this thesis, the role of medicine and usage habits of it in treatment is the main topic.

Any chemical substance, which may be natural or synthetic, that has a medical or pharmacologic affect on the body is defined as a pharmaceutical product or medication or medicine or drug [2]. The proper use of any medicine has vital importance due to the effects on the body. Any mistake regarding the medicine can result in a permanent problem or a sequela.

As early humans tried different plant, animal, and mineral substances, they realized that some substances produced specific effects. They were then able to use the substances that had beneficial effects to achieve desired results, and they passed their knowledge of these "drugs" from generation to generation [3].

In the modern world, there many much drug molecules on the market and yet there are still there are incurable diseases which affect many people. Research continues and everyday new findings appear to cure diseases. In this sense, the use of the medication has gained more importance recently. Wrong use, unsuitable use,

insufficient use or overuse of medication do not just interact with the therapy, they and can also harm the patient.

The drug use habits of people can give information about future needs of patients receiving therapy, and is one of the top issues about medicine among social and clinical medicine researchers. Patient-centered therapy is a result of this approach. Because of the necessity to know patient needs as the real determinant for their consumption of the drugs, scientists study drug use habits, their causes and results. In the study, the main aim is to find out the consciousness status of people who is conscious about medication use, and disposal habits by the point of view of drug use habits.

2. CLINICAL PHARMACY SERVICES, UNUSED DRUGS ANDRATIONAL DRUG USE

The responsibility of health care professionals has great significance and in recent decades, the pharmacist's role in therapy has been improving. Many factors have an influence on prescribing and have expanded the pharmacist's role from a passive dispenser to an active participant in the therapeutic decision-making team [4].

Emphasis on the importance of the correct use of medicine lead to recent emergence of the terms "pharmaceutical care" and "clinical pharmacy". Hepler and Strand in 1990, defined pharmaceutical care as a new way of looking at the responsibilities of the pharmacist and pharmacy services. According to them, pharmaceutical care can be defined as "A patient-centered practice in which the practitioner assumes responsibility for a patient's drug-related needs and is held accountable for this commitment" is the updated definition [5].

Pharmaceutical care focuses on the responsibility of the pharmacist to meet all of the patient's drug-related needs, be held accountable for meeting those needs, and help the patient in achieving his or her medical goals through collaboration with other health care professionals [5].

As a radiant issue pharmaceutical care generated the discipline "clinical pharmacy". Clinical pharmacy is the term defined as a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness, and disease prevention. The practice of clinical pharmacy embraces the philosophy of pharmaceutical care; for the purpose of ensuring optimal patient outcomes, it blends a caring orientation with specialized therapeutic knowledge, experience, and judgment [5,6]. All the services performed by pharmacists practising in hospitals, community pharmacies, nursing homes, home-based care services, clinics and any other setting where medicines are prescribed and

used are included in clinical pharmacy [7]. Thus, "clinical" does not mean hospital only in terms of clinical pharmacy.

Promoting the correct and appropriate use of medicinal products and devices is the main goal of clinical pharmacy activities. Clinical pharmacist's activities are summarized as: consulting, selection of drugs, drug information, formulation and preparation, drug use studies and research, pharmacokinetics/ therapeutic drug monitoring, clinical trials, pharmacoeconomy, dispensing & administration, teaching & training. The aims of these activities are to maximize the clinical effect of medicines, to minimize the risk of treatment-induced adverse events and to minimise the expenditures for pharmacological treatments born by the national health systems and by the patients. [7,8].

The profession of the pharmacist play a key role in reducing medical errors by making appropriate interventions at each stage. Listing potential harm to the patient, appropriate pharmacy interventions that can increase patient safety can be counted as the key steps in the medication-use process [9]. There are a lot of studies and researches confirming the positive effects of pharmacist's consultance on therapy. Zermansky et al. examined the impact of a clinical pharmacist intervention on prescribing for elderly outpatients in the United Kingdom among 1188 patients. The invertention groups had significantly more drug changes like reducing dose or taking intervals, correcting duplications etc. resulting in significant cost savings [10]. Goodyer et al conducted a randomized controlled study of a disease-specific intervention in which a clinical pharmacist provided intensive in-home medication counseling. The intervention group's health status improved significantly compared with control group. Patients benefited from medication counseling as a result [11]. Some other studies evaluated a clinical pharmacist intervention involving elderly patients discharged from community hospitals and taking more than 3 medications for chronic conditions. As a result, the intervention group was receiving fewer medications than the control group and less complex drug regimens, they were more

knowledgeable about the purpose of their medications, and were more compliant with their regimens [12].

2.1. Rational Drug Use

Correct and appropriate use of medicines is the most important part for the therapy of a disease. In this concern, in 1985 WHO defined the term of Rational Drug Use (RDU) as "where patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community" at the Nairobi Conference [13,14]. In this process, the government, drug industry, health care professionals mainly doctors and pharmacists and society have a responsibility. Since any mistake in the process can lead to breaking of the whole chain [15].

Pharmaceutical care and clinical pharmacy terms were evolved to ensure RDU while aiming to reduce waste and increase the patient's quality of life.

In terms of medical, socio-economical and legal aspect, RDU attained more significance nowadays. Factors that have enhanced realization for rational drug use are [16]:

1. Drug explosion: The number of drugs available for particular indication increased and this condition led to an incredibly complicated choice of appropriate drug.

2. Efforts to prevent the development of resistance: Because of irrational use of drugs, new efficacious & life saving antimicrobial drugs have fallen into demise due to the developed resistance to these drugs.

3. Growing awareness: In the modern world, information about drug development, uses and adverse effects can spread from one end of the planet to the

other end with amazing speed through media and highly developed information technology.

4. Increased cost of the treatment: Economic burden on the public as well as the government have become increasingly heavier due to increasing cost of the drugs. This can be reduced by RDU.

5. Consumer Protection Act: Extension of medical knowledge and awareness of patient rights in medical profession may restrict the irrational use of drugs.

RDU might be examined by focusing on any number of variables including [17]:
-Provider characteristics,
-Patient characteristics,
-System variables like accessibility, availability, risk, treatment alternatives, public policy
-Drug modalities

These variables are effective individually and also they can interact each other. They will be explained in the related topic.

RDU is strongly related to the continuous support of drug information. Every step of the decision making process for RDU requires adequate drug information. Drug information must be objective, correct, complete, up-to-date, accessible and utilizable, also it must be continually improving [18].

When the RDU cannot be accomplished, irrational drug use is evident. Irrational drug use has several negative consequences to community, environment, patients, economics and resources. Drug wastage, environmental pollution, increased mortality and morbidity, increased adverse drug reactions and hospitalization and wasted economical resource can rank as the consequences of irrational drug use.

From correct diagnosis to therapy, several factors affect the improvement of health status. However, in the terms of medical therapy the real determinant is the patient, whether or not he or she is in hospital. It really seems to be a paradox that patients remain largely passive in consultations while needing to be active in their own medicines management and behavior changes. The general approach in consultations remains giving advice with the expectation that health-care professional's expertise will lead to patient compliance. Health-care professionals are frustratingly aware that this approach doesn't work but continue to struggle with it for want of a better strategy [19]. To make patients stick to the therapy some approaches evolved such as compliance, adherence and concordance.

2.1.1. Definition of the Terms Compliance, Adherence and Concordance

Instead of compliance or adherence, some researchers are using the term concordance to acknowledge the more active role that the patients should play in negotiating the treatment regimen. The term compliance implies that the patient takes orders from the health professional, the term adherence highlights the need to persuade and enlist the patient's cooperation, and the term of concordance is defined as an agreement reached after negotiation between a patient and a health-care professional that respects the beliefs and wishes of the patient in determining whether, when and how medicines are to be taken [20].

Patient preference is important, since it directly translates into patient satisfaction. In this regard, patient satisfaction is highly correlated with being compliant with the treatment regime and improved patient care [17].

Patients also show immensive variation in their desire for level of involvement and shared decision making. A national survey in the United States of America (USA) showed that about half of population prefer to leave decisions ultimately to their doctor whilst nearly everyone wants to be offered choices and asked their opinion [21]. Some patient may perceive as oppressive a shared decision-making

approach inflexibly imposed by practitioners [22]. While the majority of patients prefer patient-centered communication some say they actually do not like it and want more directive styles with clear and strong advice [23]. However, even this group seems to gain satisfaction from a more patient-centered approach [19].

An authoritative review highlighted the need to move beyond the belief that patients should 'comply' or even 'adhere' to the treatment regimens. The suggestion of the review was that the roles and responsibility of prescriber and patient must change to allow for a more constructive concordant relationship to be established [24].

In Turkish, there is no word meaning separately for the terms of compliance, adherence and concordance. Compliance term is used in general for all of them meaning the patients adhering to the therapy to focus RDU.

2.1.1.1 Compliance

The term of compliance is defined as: "the extent to which the patient follows the health professionals' advice and takes the treatment". This view of a rather passive, obedient patient, while perhaps an approach expected and preferred by some patients, is increasingly a demode model of care [19,25,26].

In another vision, compliance encompasses the patient's "active participation in his or her own health care: seeking medical advice, keeping appointments, following implicit and overt recommendations concerning life style, diagnostic investigations, and medical and surgical regimens" rather then being passive [27].

2.1.1.2. Adherence

Definition of the patient adherence is "the extent to which a person's behavior (taking medication, following a diet, and/or executing lifestyle changes) corresponds with agreed recommendations from a health-care provider" [19,28].

In this approach, the patients are more active then in compliance. Warmth and empathy, self-disclosure, listening carefully to patients' views and providing emotional support results in greater satisfaction, improved adherence and lower levels of defiance [19].

2.1.1.3. Concordance

In some researches, the term concordance is used, instead of compliance or adherence, to acknowledge the most active role that the patients should play in negotiating the treatment regimen. The term "concordance" relates to a process of the consultation in which prescribing is based on partnership. The term concordance is defined as "an agreement reached after negotiation between a patient and a healthcare professional that respects the beliefs and wishes of the patient in determining whether, when and how medicines are to be taken and the primacy of the patient's decision is recognized" [19,20]

Considering to accept that patients will decide how and when to use their therapy is an advance. Acknowledging this can empower the patient, help to establish patient-centered care in real meaning and encourage concordance [24].

The health-care professionals have a considerable responsibility for concordance to make patients actively involve their drug regimen. Exploring the patient's knowledge, beliefs ,life style, what is understood from conversation, explaining patiently the condition, treatment options, benefits, precautions, common side effects, asking, listening, repeating back, inviting response, and welcoming any expression of any disagreement or acknowledgement are necessary initial steps.

Offering opinion, trying to achieve a shared decision, arranging follow-up, supporting as appropriate, asking patient for his or her thoughts on what might help in managing medicines taking are also involved in the process [19].

Pre-requisites are cited by Britten for concordance in consultations which include [29]:

- Sharing power willingly and a commitment to giving appropriate weight to patient values and goals

- Without making assumptions, open discussion of the options with explicit enquiry as to patients view

-Adequate sharing of information including uncertainties to arrive at a decision

-Letting the patient talk as well as listen

-Giving time to think

The actual and scientific meaning of compliance, adherence and concordance are given but generally terms compliance, adherence and concordance are used interchangeably and this has generated some confusion. In this thesis, the term compliance will be used for all of these expressions, meaning patients' application of therapy in real life [30].

2.1.2. Patient and therapy

If the steps of diagnosis, prescription, and dispensing of medical treatment are correctly followed, the most important part of RDU is the patients, because actual determinants are the patients by themselves as they take their therapy. In general, the patients tend to deny their illness and since it is a complex and challenging task to carry out all requirements regarding illness [31]. Acceptance of therapy by patient has crucial importance due to this determinant role.

The compliance of the patient is affected by factors like age, education, care in drug taking, support of family and friend, beliefs of patient, symptoms of illness, pharmaceutical form of the drug, frequency of drugs, etc [8,31,32].

Many variables play a role in compliance with any given medical regimen, for any given patient. Due to the complexity of these variables determining compliance, they can be divided into different groups is necessary like as below:

-The illness

-Sociological factors

-Patient's knowledge of their disese

-Patient's knowledge of their medication

-The medical regimen

-Medication side effects

-Patients' beliefs and attitude toward health and illness

-Involvement of spouse and family support

-The doctor –patient relationship

-Psychiatric factors

-Adequate information

The Illness

Potency of drug, hospitalization due to the illness and diagnosis of the problems caused by illness do not correlate consistently with the degree of compliance [33,34]. There is no consistent evidence indicating that sicker patients have better compliance with their therapy than healthier ones [35].

Sociological Factors

According to most studies (with the ratio of 1/3), there is no consistent correlation between socio-economic status, age, sex, education, occupation, income,

or marital status and compliance. [33,34,36,37]. However, these factors can be determinant when the specific region, condition and population are selected. For example, elderly patients do not usually comply to the medical regimen but this is not only related with age only, it is also probably related to memory and sensory impairments [38]. So compliance and demographic data do not correlate with each other, they only have predictive value.

Patients' Knowledge of Their Disease

Although, educational attempts alone individually do not demonstrate any consistent effect on compliance, [39] especially in chronic conditions, patients need to know all aspects of their illness, symptoms, what happens if the therapy is not accepted and necessary changes on life style.

Educational interventions can be useful. Involvement of the family, continuity of care, simpilfied dosage adjustment and good doctor – patient communication can also increase positive effects of the intervention on compliance [35].

Patients' Knowledge of Their Medications

Information about the functions of drugs that have been prescribed for the patients, can decrease compliance errors. In addition, according to one study, knowing of the name of the drug that have been prescribed decrease errors in compliance [36]. In a study conducted in the United Kingdom it was found that exploring how patients' drugs worked for them was effective in revealing their beliefs about medicines, and often led naturally on to a candid account of actual use [40].

The Medical Regimen

Polypharmacy is the use of multiple medications [41], which rise compliance errors. Multiple medication indicates complexity of the regimen for the patient and discourage the patients to comply [36,42,43]. A simplified drug regimen is more effective in ensuring compliance**.** Arrangement of drug taking time around the patients' daily rituals like bedtime, after or before meals leads to better compliance [35].

Medication Side Effects

The side effect is a reason of noncompliance. Patients should be informed about side effects of the drug that have been prescribed [44].However, if the patient knows what he or she will experience, it can be easier to accomodate. Clonidine, amitriptyline like sedative drugs, lithium, aspirin, diclofenac like drugs that cause gastrointestinel distress, phenothiazines, antidepressants like drugs having anticholinergic symptoms, guanethidine like drugs that cause sexual dysfunction and steroids like drug that can cause changes in physical appeerence may be stopped or be irregularly used. [35].

Patients' Beliefs and Attitude Toward Health and Illness

The foundations of patients' beliefs are formed by personal experience, along with those of acquaintances. These beliefs could be true or misleading. Especially in asymptomatic conditions, such as hypertension or following a diagnosis, misunderstanding can be a particular problem, when the usual explanations may not be valid. Sociological studies show that patient beliefs about medicines arise from many sources and can affect use substantially, but that they are not often discussed during consultation. The acceptance of an illness is a challenging process for the

patient. The acceptance level was reflected in the way that conditions were featured, particularly when discussing their initial diagnosis. When informing the patient about his or her illness, the language and tone used could indicate major underlying tensions. Using personal pronoun for medication and illnesses were described like "my" (implying ownership, rather than 'it', implying distance) is a sign of acceptance. Appropriate adjustments such as comfortably habitual medication use indicate the acceptance of illness. Reluctance to accept their situation could be reflected by anger or denial, which hindered other lifestyle changes as well as medication use [40].

According to the literature, when the patient has the following beliefs and attitudes, compliance is better [44,45]:

- Susceptibility to the illness or its complications,

- The belief that the illness or complications of it can lead to severe consequences for life

- The belief that the therapy will decrease the effect and complications of illness

- Absence of obstacles like side effects, high cost, inaccessibility to therapy to engage in the medical regimen.

Involvement of the Spouse and Family Support

Support of family members and spouse towards the illness or the medical regimen is a very important variable influencing compliance [35]. Especially in pediatric populations, the mother's attitude and the physician are the real determinants [46,47,48]. Disorganized family, strife, emotional turmoil lead to increase in risk for noncompliance [49,50]. On the other hand, social support and close and stable relationship in the family helps in compliance [51].

The Doctor-Patient Relationship

It is of vital importance that the patient and doctor have good communications. Agreement about what is expected of the patient and dependence on instructions regarding therapy increases compliance [36,52]. Research indicated that compliance is more likely to be improved if [47,48]:

-Expectation of the patient are being met

-There is a perception of warmth and empathy in patient doctor communication

-Explanation of diagnosis is made cause of illness is understood

-Addressing questions and concerns of the patient

Psychiatric Factors

The ways in which patients characteristically deal with stress or illness may partially determine their degree of compliance [35]. Psychological aspects of the illness concept is a variable in compliance. According to Lipowski, illness concepts can be described in eight different ways individual or personal meaning of illness, injury or disability [39]:

1 illness as challenge

2 illness as enemy

3 illness as punishment

4 illness as weakness

5 illness as relief

6 illness as strategy

7 illness as irreparable loss or damage

8 illness as value

Significance of illness depends on personal experience and knowledge for an individual. This perception of the illness is conscious predominantly. However, it is also subconscious and can function as a cognitive nucleus which affect emotional or motivational responses [53].

Adequate information

Surveys show that satisfaction about given information about illness and the medical regimen can increase compliance. However, most patients indicate lack of information provided in consultation [54,55]. On the other hand, it is really suprising that patients remember about 60% of what they have been told [19,27]. The information remembered depends upon salience and time of informing in the consultation. The most likely words to be remembered are the first things said [19,56].

2.1.3 Special patient and disease groups

Different disease conditions need different approaches when the topic is RDU and compliance. Chronic illnesses should be handled individually due to their specific treatment options, life style changes etc. Patients with chronic conditions have a higher rate of noncompliance due to long-term and complex medical therapy that changes existing behavioral patterns [27].

Examples of these chronic disease and studies related to them can be seen below:

Cardiovascular Diseases:

At the present day, one of the leading causes of death is the cardiovascular disease group. Searches estimate that some form of cardiovascular disease can be observed in one fifth of the population. Noncompliance is a considerable reason for increasing number of deaths related cardiovascular disease [27]. The most wide-spread condition in the group is hypertension meaning high blood pressure which may result in stroke or heart failure. Since it is not observable that the therapy improves the health situation of the patient, the patient tends to be noncompliant or partially compliant [57]. The most common reasons for noncompliance in hypertension are [58]:

-hesitation regarding need for therapy,

-being afraid of side effects,

-difficulty in adjustment of medication dosage,

-therapy consisted of multiple drug regimen.

Diabetes

WHO describe diabetes as "a condition primarily defined by the level of hyperglycaemia giving rise to risk of microvascular damage (retinopathy, nephropathy and neuropathy)". According to the organizaton, it is associated with reduced life expectancy, significant morbidity due to specific diabetes related microvascular complications, increased risk of macrovascular complications (ischaemic heart disease, stroke and peripheral vascular disease), and diminished quality of life [59]. Recent estimates indicate there were 171 million people in the world with diabetes in the year 2000 and this is projected to increase to 366 million by 2030 [60].

Research suggests expect that diabetes care is mostly performed by patients themselves at the rate of 95%. More than taking medication, diabetes necessitates complex and strict life style changes. In addition to quite rigid dietary and exercise plans, patients should be properly taking doses of insulin and drugs [27]. So, this complex nature of therapy leads to high rates of noncompliance [19,27]. Education about self care and convincing patients to comply to medical regimen are highly essential for this patient group [61]. Especially, foot care, insulin taking etc. crucial topics have to be focused.

Elderly and Multiple Chronic Conditions

According to WHO, most developed countries have accepted the chronological age of 65 years as a definition of "elderly" or older person [62]. Due to slowing down of the metabolism related to age, chronic conditions are more likely to be found in elderly patients. Elderly patients have usually more than one chronic condition and treatment is necessary for these conditions [63]. It really seems hard to achieve RDU in this group. Existence of multiple chronic conditions leads to polypharmacy [64]. Polypharmacy can easily result in drug-related problems (DRPs), including untreated indications, drug use without an indication, improper drug selection, subtherapeutic dosage, overdosage, medication error, medication nonadherence, drug interactions, adverse drug reactions, adverse drug withdrawal events, and therapeutic failure [12].

In addition to these, elderly patients have difficulty in remembering, understanding the therapy and reading written labels and prescriptions [64,65]. Noncompliance of elderly is estimated it be got high rates, also because of these difficulties. When the elderly have a spouse, a family member or a supporter to help with their medical regimen, it improves the compliance of this patient group [64].

Pharmacist interventions, home visits, medicine remember cards, pill organizers, medication summaries can be beneficial for compliance of the elderly.

According to studies, interventions increase the compliance and decrease drug related problems in elderly [10,12].

Psychiatric disorders

One of the hard to manage group is the psychiatric group, because generally, they tend to be unaware about the need for therapy, compliance rates are very low. Anxiety and depression are leading conditions of global due to stressful life styles. The patients in this group should be assessed carefully.

It is observed in researches that when the condition is under control, the patient is more likely to abandon the anxiolytic or depression treatment procedure [66,67]. Self adjustment of dosage of benzodiazepines, is another dangerous habit that anxiolytic patients fall into [68,69]. Torun et al observed that in anxiety patients when the effects of the medication decreases, the compliance of the patient decreases, too [70]. In a study in conducted in Turkey on the patients with depression and anxiety, most patients stated having been noncompliant in the past. 29,5% of these noncompliant patients quit the therapy with the thought "I can do it without medication". This shows that if patients feel better, the risk of noncompliance will appear. So, these patients and their compliance must be controlled often. Also, 14,3% of these patients stopped taking medication because of the side effects [71].

Interventions of the pharmacist have again positive effects on the patients using psychotropic agents. In a study, interventions are found associated with decreases the use of drugs, hypnotics and long half-life benzodiazepines significantly [12].

Active collaboration of the family members is another positive factor for compliance. Along with support of the family, therapeutic interventions are also

required. Compliance can be achieved in higher rate with family cooperation in patients with psychiatric disorders [72].

AIDS (Acquired Immune Deficiency Syndrome)

Center of Disease Control and Prevention defines AIDS as a disease, at least moderately predictive of a defect in cell-mediated immunity, occurring in a person with no known cause for diminished resistance to that disease. Reported cases can be separated into groups according to the risk factors [73]:

-homosexual or bisexual males - 75%,

-intravenous drug abusers with no history of male homosexual activity - 13%,

-Haitians with neither a history of homosexuality nor a history of intravenous drug abuse - 6%,

-persons with hemophilia A who were not Haitians, homosexuals, or intravenous drug abusers – 0,3%

-and persons in none of the other groups -5%.

AIDS is a worldwide epidemic which has affected milions of the people. It has quite complex medical therapy. The innovation in effectiveness of the AIDS therapy including HAART (highly active antiretroviral therapy) provides the possibility of significantly controlling the effects of AIDS. Failure in treatment is mainly caused by low compliance rates of HAART regimen [74].

Because of the complex nature of the disease, patients cannot understand the importance of compliance to the therapy. Cancellation of medical regimen due to side effects is also possible, if the patient does not consider the life-lengthening effect of the regimen. Education given by a health care professional or a pharmacist about the disease and the therapy has vital significance in AIDS [27].

Pediatrics

The definition of a pediatric patient is the patient with age less than 12 years or a length-based weight of 36 kg or less [75,76]. Subpopulations of pediatrics is as shown below [76]:

Table 1. Pediatric subpopulations and age ranges

Pediatric Subpopulation	Approximate Age Range
newborn	birth to 1 month of age
infant	1 month to 2 years of age
child	2 to 12 years of age
adolescent	12-21 years of age

A determinant of compliance in pediatric conditions is parents attitude toward the illness and the therapy. Actually, the patients are passive in this group due to dependence of adult care giver but they less likely to follow a medical regimen than adults [77]. Acceptance of the family improves compliance in pediatric diseases [72].

2.2. Reasons for noncompliance and irrational drug use

Globally, people live in a technology era and are always trying to reach somewhere, something, someone etc. There is a stress as a routine. While this results in innovations and improvements, on the other hand, stressful life styles induce sickness and increase disease. Since, drug usage rate rises too, the importance of RDU is more obvious.

Hazardous effects of irrational drug use make it a global problem and the need for awareness for RDU is displayed increasingly. As a major part of RDU, compliance is becoming increasingly taken in to consideration by health authorities.

Estimations of WHO shows that there is only 50% compliance to prescriptions especially medications used in long term conditions [78]. When people get ill, they demand drugs and when they get them, they do not always use them according to health care professionals' recommendations [20].

Noncompliance is a complicated problem which has many variables in itself. Due to this variability, the reasons of noncompliance are numerous. To summarize them, they can be divided into groups to which the variables belong [14,79]:

-Doctor and health care professional related reasons

-System of dispensation and pharmacist related reasons

-Health system related reasons

-Patient related reasons

-Disease related reasons

-Therapy related reasons

-Drug manufacturers related reasons

-Environmental reasons

The presence of a variable, or more than one, can lead to noncompliance to the medical regimen. The groups of the reasons are discussed below:

Doctor and health care professional related reasons

At the top of the health chain is the doctor / physician. Good communication between doctor and patient is of vital importance, so the many reason for noncompliance originating from misunderstanding can be avoided.

Inadequate information about disease, therapy options, medication etc. provided by the doctor is an important factor. Not to check the patient's understanding and recall can result in noncompliance also [16,19]. When the patients do not know the mechanism of action and usual side effects of the drug, they tend to abandon the therapy [19,64]. The pressure to shorten interventions and avoid examination of the patients concerns in depth is another cause [80]. The right atmosphere, warmth and empathy is important but is not always easily achieved [19]. Giving suboptimal time to the patient can trigger noncompliance [16].

Deficient training of the medical students can result in inappropriate prescribing. In addition to this, to satisfy the patient expectations and demands for quick relief, health care professionals can prescribe drugs irrationally [16]. Lack of information about pharmacotherapy in clinical settings is a key issue. Irrational prescribing can lead to harm to the patient, recurrence of the disease, prolongation of the therapy, increased cost, etc [81]. Mistakes in diagnosis, and errors in medication regimen can also be a reason for irrational drug use and noncompliance [16]. Lack of trust in the doctor and belief that she/he is not interested in them as patients can be another reason [82].

Furthermore, an observed phenomenon is that because of the noncompliance of the patient, the doctor can increase prescription dosage. When the situation is not recognized, the risk of side effects and noncompliance can rise. In this regard, the cycle of noncompliance can be represented as a downward escalating spiral [27].

Dispensing system and pharmacist related reasons

Dispensing of medication is a huge responsibility. The pharmacists as dispensers have to be aware of this responsibility. A defective system for drug supply, not being well organized of drug authorities can be a cause leading noncompliance [16]. In some countries like Turkey, consumers can buy drug without

need for prescription and self medication is practiced [18]. Moreover, the presence of large number of medications on market is another problem [16]. Also pharmacists may advise inappropriate OTC (over the counter) medication consciously (seeking profit) or unconsciously. Sometimes the patient does not want to use extra drugs and can give up taking drugs causing noncompliance [18].

Health system related reasons

It is really important that the health care facilities must easily be accessible. Inadequate access to medical facilities and care is attributed as a reason for poor compliance [83]. Economical problems of people who do not have health insurance can also be a reason for irrational drug use and also noncompliance [27,84]. Especially in Turkey, people with the health insurance can demand prescriptions from health care professionals more easily and put pressure on the doctors to write prescriptions for them. [8,18]. Some medicines in the prescription is reimbursed. Patients may easily give up using medicines which are reimbursed. The governments are nowadays becoming more restricted. Each day more medicines are out of the reimbursed medicine list to reduce this needless burden.

Patient related reasons

As a real determinant of compliance, patient characteristics predominate in decision of compliance. In general, none of demographic factors such as age, marital status, living alone, sex, race, income, occupation, number of dependents, intelligence, level of education, or personality type have been shown to be consistently related to compliance [27]. However, these factors can have a considerable effect. Especially age and mental awareness are significant factors in the process of compliance [8]. Elderly patients have poor compliance rates as mentioned before [64,65]. Reading difficulties is another factor which might affect

compliance. Unless the patient can read the label of the drugs, medication use directions, or the prescription, he/she is not likely to be compliant to therapy [65]. Dissatisfaction of the patient is also an indicator of noncompliance. Dissatisfaction can be seen as active questioning or being anxious about therapy. [8]. When the patients get ill, they tend to be anxious and anxiety can adversely affect cognition [19]. As a habit, storage of the medicines in various places in the home may result in unintentional noncompliance [85]. Patients with multiple chronical disease and drugs can easily get mixed up and forget to take medication [27]. Particularly, patients with psychiatric conditions can abandon therapy with the idea "I can do without drugs" [71].

It is of crucial importance that the patients understand what the problem is and what they have to do, how to apply the therapy. The patients cannot comply with treatments unless they clearly understand the treatment directions with which they must comply [65]. They tend to forget a major portion of the knowledge which they learnt in consultations with the health care professional [27]. Belief that side effects will occur, the drug is useless or the illness is unimportant or etc. can be a reason for noncompliance [82].

Disease related reasons

Characteristics of the disease may affect the patient and compliance the therapy. Acute diseases can get worse, if the proper treatment is not applied. Especially in chronic diseases, failure in compliance can be seen often. Compliance to therapy is influenced by the nature of the disease. The patients tend to give up the medical regimen unless they feel the symptoms of the disease. Diseases like hypertension which develop without symptoms can be a reason for noncompliance [19,27]. Due to long term or life long treatment needs, chronic patients can be noncompliant partially or completely depending upon the state of the disease [14].

In anxiety and depression like psychiatric diseases, patients are more likely to abandon the therapy, when they feel better [71].

Therapy or drug related reasons

Features of the drug and the therapy can be the reason leading noncompliance. Complex therapy and long term usage are frequently cited as a cause for being noncompliant [83]. Improper timing of drug administration is more likely to occur if the medical regimen is complex and the administration of several medications continually or at unusual times during the day. This situation can disturb the patient and can cause him/her to quit the medication or get confused about the drugs [27,86]. Side effect of the drugs is another big problem in compliance. Intolerance of the side effects can lead to abandoning the drug, especially if a multiple drug regimen exists [86]. In addition to this, reasons such as, difficulties in swallowing, tableting errors (too small or too big pills), bad taste, passing the expiration date can result in noncompliance [82,83,86,87].

Besides, generic substitution of the original drugs which used before is an additional challenge for the patients. The patients feel insecure about the situation, and it was even found that some patients took the brand product as well as the non-branded substituted product at the same time [88]. Also, some patients were of the opinion that cheaper generic drugs were counterfeit drugs and abandon to use of the drug [89].

Drug manufacturers related reasons

Sometimes, factors related to pharmaceutical companies can influence the compliance. Advertisements for OTC drugs can convince people to buy the product,

but finally most of this kind of OTC use results in the patient stoping taking the medication [18]. Promotional activities of the pharmaceutical manufacturers affect the rational prescribing and also compliance in turn [16,90]. The quality of the containers is an aspect often neglected, but a study conducted in Texas University by Homedes et al indicates that it is very important to ensure patients' compliance. If patients do not like the container they may choose to keep the drugs elsewhere and consequently they will loose the label's information, in the end, noncompliance occurs [20]. If the prospectus, product information leaflet and/or label of the medicine is not clear, then patient cannot understand the written directions and get confused, so it can be another reason [18,82].

Environmental reasons

The environment where the patient has lived and grown up may be a factor which must be taken in consideration. Family, friends and society that have negative beliefs about drug use can influence the patients' usage. Discouragement about medicine taking is an important reason for noncompliance [72]. On the other hand, in a surrounding where there is excessive medication use this can lead irrationally use of medication [83].

Above all, if the patients are elderly mentally or cognitively impaired, the existence of a helper or a family member who remembers to collect their medication decrease the rate of noncompliance [18,65,72]. Also, if the patient is pediatric, the parents will determine the usage of the medication and their attitudes will predominate in this case. Noncompliance is inevitable, unless the parents are aware of the importance of the therapy and the disease [72,77].

2.3. Studies related irrational drug use habits

Globally, irrational drug use is a huge problem. The number of studies related to irrational drug use and compliance have risen rapidly. In developed countries, statistics can give general information about drug use patterns but in developing countries, there is not a sufficient number of pharmaco-epidemiologic studies related to the subject [81].

Social, cultural, economical properties, administrative and organizational mechanisms and education related numerous factors influence drug use [91].These factors also interact with each other and make the problem more complex [81]. Irrational drug use is a hazardous habit and as a consequence many different problems arise. Ineffectiveness in treatment and lack of safety of the therapy, exacerbation or prolongation of disease, distress and harm to the patient, increase in the cost of the therapy, and wastage of resources are the main hazards being caused by irrational drug use [16,92].

One study from Tanzania indicates that fewer than one in four patients correctly use prescribed medical treatments [93]. Reports exist from many developing countries describing patterns of drug use in a range of health settings, including hospitals, health centers, private practitioners, and pharmacies. These reports routinely highlight similar problems in drug utilization: polypharmacy, (due both to multiple prescriptions and the prescribing of fixed combination drugs) too frequent and unnecessary use of antibiotics, injections, or vitamins; use of incorrect medications to treat specific problems; and so forth [63,90]. In addition to these, hoarding expired or surplus medicines in the home, taking or giving them to friends and family members are frequently observed problems that may lead to accidental or inappropriate ingestion [31,87]. Besides this, people can give advice about medicine to friends and family and vice versa patients can seek advice from the family and friends who are not health-care professionals. Use of medication without medical

consultation may result in serious health problems. In countries like Turkey, people can buy drugs without prescription (except for controlled drugs) and so self-medication rates have been reported to be high and can be the cause of wasted resources, the emergence of resistant strains of microorganisms, and serious adverse reactions and toxicity [8,85]. Drugs are being purchased with and without prescriptions and are being stored in different places in the home. Some places in the home are not suitable for keeping drugs and can easily cause the degradation of the drug [85]. Drug use when the drug is not effective in the disease (for example upper respiratory tract infections and antibiotic use) is also a common problem. Usage of the without any clear proven beneficial effect can cause serious health related problem [18]. Mixing of the medication is often seen elderly [27]. Unnecessarily use of expensive medications result in wastage of economic resources [18].

There are some research in Turkey and different countries related irrational drug use as seen below [27]:

Approximately 125,000 people with treatable cases die each year in the USA because they do not take their medication properly. A review indicates the following statements.

-12-20% of patients take other people's medicines.

- Approximately 1/4 of all nursing home admissions are related to improper self-medication.

- 60% of all patients cannot identify their own medications.

- 14-21% of patients never fill their original prescriptions and do not refill also.

- 30-50% of all patients ignore or otherwise agree instructions concerning their medication.

In a study conducted in Saudi Arabia, 37% of Saudi households in Saudi Arabia indicated that they never checked the expiration date of a medication prior to consumption. Self-medication was prevalent among households participating in this study, with a mean 20,6% of Saudi households citing that family members took drugs

prescribed for their friends or other family members and 43,9% purchased medical products based on the advice of friends or family members. In other Gulf countries, the incidences were 29,8% and 49,4%, respectively. Additionally, 80,8% of the households studied sought the advice of a pharmacist to recommend medications for them [94].

Özçelikay et al researched drug usage in university students in Ankara. Results showed that participant students stated taking medication without seeing a healthcare professional at the incidence of 90,2%. Self medication is extremely frequent in faculties of pharmacy, medicine and veterinar. Also, 13,1% of the participants said that they stopped taking medication when feeling better and dispose of the surplus medicines, 6,7% of them discontinue the therapy and give medications to others, % 6,0 of them hoard surplus medicines [95].

In a university hospital in Ankara, Ozkan et al studied patients' behaviour when they were ill. According to the results, 28,6% of the patients discontinue the therapy before the specified time, 34,9% of them do not read drug prospectuses, 28,3% of them do not check the expiry date of the drugs. Drug use on the advice of relatives or friends is stated by 25,6% of the participants and 22,6% of them give advice to others. With 44.8% incidence, they said that they had unused drugs at home. There is a connection found between education level and frequency of seeing doctor. When education level increases, frequency of seeing doctor significantly increases, too [31].

A investigation performed in Kayseri in Turkey, it was found that there were unused analgesic medication in the examined houses with the rate of 84,6%. 24,0% of these are bought without prescription in pharmacies, %10,8 of them are bought from another store [96].

A descriptive study was performed among 692 non-medical personnel servicing at two military bases in December 2006. The study concluded that 61,6%

of the respondent are being fully compliant to treatment regimen, 18,6% complete the all medications given, 49,1% store medication and when expired dispose them, 42,9% keep the medications in a medicine chest or special drawer, 42,2% keep them in refrigerator. Moreover, 88,4% of the participants are sensitive about expiration date of the medications [14].

A investigation conducted in different regions of the northern United Arab Emirates searched habits of use and home storage of drugs. According to the results, when disease state, 45% of the participants admitted using stored medicines without medical consultation, while 55% of them used drugs after medical consultation. Among the latter group, only 57% of the participants completed the treatment course. The habit of sharing medicines with family members, relatives and friends was cited by 86% of the sample studied throughout the study period [85].

A national study performed in USA showed that 25% of the all the population takes five or more medication per week. When specifically consideration of the elderly, this percentage rises to about 50% with 44% of men and 57% of woman taking 5 or more medication every week. 12% of each sexes taking 10 or more prescription per week highlighting polypharmacy [97].

In Bangladesh a report of a small study at local level showed that polypharmacy rates are quite high and can cause serious health problems. Especially in drug supply, irrational drug use continue to exist [90]. Polypharmacy can increase side effects and the risk of toxicity and irrational use worse the situation.

A study from Belgium indicated that 1/3 of the medicines found in home are kept in unsuitable conditions and the owners of them are not aware that drugs can be easily degraded if the appropriate storage cannot be provided [98].

Meric et al conducted a study in psychiatry deparment of a teaching hospital with the patients taking medications due to anxiety and depresssion in Turkey. 76,2%

of anxiolytic drug users and 51,4% of the antidepresssant users admitted that they quit the therapy. 60,7% stated that they had a noncompliance experience in the past. Of these noncompliant patients, 29,5% stopped taking the medication with the idea "I can do it without medication" and 14,3% stopped the medication because of the side effects Especially the patients stated that when the they felt better, they stopped their medications. Some of them also admitted that they can change the dosage of the medication by themselves without consulting a healtcare proffesional and they quit the therapy when they experinced side effects [71].

In a research among elderly patients, Arpaci et al. reported that 78% of the participants used drugs that helped their friend, 82% self- medicated, 32% are glad to use medication, 27,3% kept their medications in a unspecified cabinet [64]. In a research that examined the awareness of Turkish population about medication reported 20% of the population bought medication without prescription. They also stated that they bought medication on the advice of friends, relatives, pharmacist-pharmacy technicians or based on their own experience [98].

Sorensen et al. studied risk factors via home visits in New South Wales and Western Australia. During the home visit, irrational drug use related potential risk factors such as poor adherence, expired medications, number of prescribers and dispensers for all drugs found in the home, medication hoarding, multiple storage locations of drug, lack of a medication administration routinely, presence of discontinued medication repeats, and the patient's understanding of generic versus trade names were identified [99].

As seen in studies mentioned above, irrational drug use habits are a common problem all around the world. Like these studies, there are numerous other studies showing different aspects of the problem. The suggestion for decreasing irrational drug use will be discussed in the related section.

2.4. Unused drugs and Medicine wastage

With the increase in the number of the chronic diseases in world, drug usage has increased greatly. As a part of the global problem of irrational drug use, unused drugs and medicine wastage are often neglected. However it is becoming a huge issue to handle.

Definition of an unused drug is "a drug which is purchased, whether according to a prescription or not, but which is not administrated [100]. Unused drugs compose a risk to public health through poisoning and suicide when not protected, when allowed to accumulate in the home and to pollute the environment through poor disposal [101]. Hoarding is a habit can cause unused drugs to build up in the home. Hoarding was defined in cases where multiple drugs were retained in the home, particularly when drugs were no longer needed or had expired [99].

Hoarding and the presence of the unused drugs at home finally leads to wastage of the medication. The definition of medication wastage is "any drug product, either dispensed by a prescription or purchased over the counter, that is never fully consumed" [94]. It may be because of poor compliance of patients, excessive and irrational prescribing, or the lack of control of the sales of prescription medications in the community pharmacy [102,103].

Medicine wastage not only causes unnecessary economical loss in health system. It also causes environmental pollution if the drugs are not disposed of properly, higher suicide and poisoning rates. There are lots of studies indicating that living animates which were exposed to medicine contaminated media underwent anatomically, physiological, reproductive and behavioral changes [104].

Statistics related to unused and expired medicines [105]:

• In the USA in 2007, of the 4 billion prescriptions to be filled, the elderly patients

will waste more than $1 billion worth of drugs.

• Approximately 15 million people used pharmaceuticals incorrectly in 2005.

• The home medicine cabinet is one of the most common sources of illicit pharmaceuticals.

• Medication errors cause 700,000 emergency room visits every year.

•90% of non-institutionalized seniors used at least one medicine and 40% of them used 5 or more medicines each week.

• Elderly patients take between 2 to 7 prescription medicines daily and nationally use up more than 30% of all medicines prescribed.

• A major source about accidental poisoning of children results from medicines at home and 36% of these cases occur in the grandparents' homes.

• Four out of five patients leave their doctor's office with at least one prescription and this figure is much higher in Turkey.

The picture seems to be bleak. Some causes of medicines wastage which have been detected [78,106,107]:

- Medicines are dispensed but remain uncollected

- Patients are healing and no need their medication any more or the belief exists that the patients healed and do not take their medication

- Due to side-effects, the patients cannot comply the medications

- Medicines prescribed during a hospital stay, such as antibiotics, are continued unnecessarily when the patient returns home

- Acute (time-limited) medicines are transferred onto the repeat prescription record and issued every time that a repeat prescription is generated

- Seasonal drugs stay as a repeat prescription all year

- Some patients tend to stockpile "just in case" medicines and re-order repeat medication that they do not need.

-Non-equivalent pack sizes of medicines prescribed simultaneously can cause to the slow accumulation of "extra" doses. this can result in significant amounts of waste in time

-Death of the patient

-Drugs that were changed by prescriber remain at home but are no longer required.

-Noncompliance for any reason of the patient

-Supply errors

-Inappropriate directions for usage

-Worrying of the patients about running out of medicines

-Not identifying the patients name of the medicines and forgetting what they are for

-Advertisements by pharmaceutical industries

-Usage of drugs without prescription

-Medicine samples dispensed in appropriately

- Lack of the education and lack of awareness of the patient

-Self medication

In Turkey, patients can buy medication without prescription. However, 70% of the people with health insurance prefer to consult a doctor and apply a pressure on doctor to write prescription which is composed of drugs the patient wanted. This pressure is often applied to make the doctor write drugs that are believed to be useful just in case. Doctors cannot resist this irrational pressure [108]. The situation is also enhance the formation of the unused and waste medicines.

The number of studies related to unused and waste medicines has risen in the last decade. Generally, although the medicine return campaigns underestimate the real wastage since people tend to flush down the toilet drugs or dispose of with household rubbish, they can be beneficial as a real status suggestion [109]. Some of the studies related the subject can be seen below:

In Great Britain, the incidence of medication wastage is found enormous. Published research suggests that 50% of patients are noncompliant with the dosage of their prescription medicines. In a survey of 111 British households, the quantity and types of medicines at home were searched to calculate the frequency of therapeutic duplication, medication waste, and unnecessary hoarding of medications. According to the results, 51% of medicines in the household were not used currently. 40% of the medication found at home had expired. Another survey by a British television station indicated that each year ~33% of the population in England could not complete the course of a prescribed drug regimen fully. In addition to these, nearly 25% of adults surveyed in the same study admitted to having unused medicines in their homes [94].

Sorensen et al. studied medicine related risk factors by home visits and the found that: the average number of current medications taken by the patients in the study was 9,9; whereas the average number of medications found in the home was 14,7. Medications in the home consisted of vitamins, over-the-counter (OTC) medication, and herbal products some of which were said to be taken regularly, also medication taken 'just in case' and medication not currently taken [99].

Coma et al. investigated returned medicines to community pharmacies in Barcelona and a questionnaire was conducted among the participants. The results showed that: the main reason (28,2%) why drugs were returned was the expiry date. In 24,9% of the cases the patient's health status had improved and there was no need for the drug. In 20,8% the patient had died [110].

Seehusen and Edwards conducted a study about medication disposal and beliefs. The study among 301 patients observed that more than half of the patients reported storing unused and expired medications in their homes, and more than half had flushed them down the toilet. Only 22,9% of the participants reported returning drugs to a pharmacy for disposal. 14% of participants reported returning unused or expired medications to a health care provider [87].

Leach et al. conducted a survey of prescribed medicines in 192 homes, broadly representative of households in England and Wales. The average home had 2-3 containers of medicines; 56% of these drugs were being used currently, 6% of them in occasional use, and 28% were never used. 20% of all oral antibiotics in the study were found to be wasted [111].

A study from Canada examined the unused drugs turned in at pharmacies over an 8 weeks period. People were asked why medicines they had obtained had not been taken. 26,6% responses stated that the person they had been prescribed for had died. Other reasons included expiration of medicines with the incidence under 25% and it was followed by physician-directed change and "patient felt better," each of them with a incidence of just over 11%. Allergic reactions were cited by 8% of patients and slightly more than 7% admitted that they "did not want to take" the medications. More than 10% of the drugs returned were older than 5 years, and 20% of the drugs were OTC drugs and 72,4% of them were prescription medications. People brought back nearly 60% of the drugs in the original prescription. More than 6% of returned drugs as drug samples came from physicians' offices, either by way of a patient or directly from the health care professional's office. And surprisingly it was noted that 1,1% of the returned items were not medication, but things ranging from benzene to false teeth [112]. Another research conducted in Canada stated that most wasted form of drugs was topical. Lotions, creams, ointments and etc are wasted most according to this study [57].

In Turkey a study from Antalya suggested that 80% of homes investigated have unused drugs [31]. Another study conducted in Ankara showed the result that unused drug existence rate was 61,3% [14].

In brief, unused drugs existence and the wastage rates are quite high globally. Health authorities have to try to solve these issues immediately before a permanent hazard results.

2.4.1. Economical considerations

Irrational drug use habits and noncompliance are main causes of unused drugs and medication wastage. Many studies suggest that about 50% of the patients do not comply with the prescribed medication [92]. Hospital costs because of patient noncompliance are estimated at $8,5 billion each year [27]. The global view shows that medication waste is a huge problem. Medication wastage is an extravagant burden on health economics. The cost of the medication wasted and the proper disposal cost are extremely high. In addition, medical time consumption is another indirect result of it. Governments, health care providers, and consumers have to work together to find ways to control these unnecessary costs while continuing to provide quality health care for their nations [94].

The economic aspects of medicine wastage can be summarized in the light of the researches below:

In Great Britain, the medicines returned to pharmacies each year for disposal is around £230 million worth and it is estimated that a great deal more is disposed of by patients themselves, often in environmentally harmful ways like dispose of with household rubbish or flushing down the toilets [92,109]. According to another report in England, the value of the medicines return as unused was £100 million annually in 2007 [19]. However, this figure almost remain certainly underestimated the full cost of drugs wastage and as it is based only on unused drugs that are actually returned due to robust data. It is estimated that as much as 10 per cent of all prescribed medications are wasted and this would mean up to £800 million-worth of drugs are wasted annually in just primary care. Moreover, the full cost of wastage is not just the cost of the drugs themselves. Governments have to pay for returned drugs to be destroyed also [78].

A research from Saudi Arabia and Gulf countries showed that families in Saudi Arabia and other Gulf countries spent totally $150 million on medications that were never consumed [94]. In another study conducted in Canada, antihypertensive drugs

were most commonly associated with medication wasting, followed by analgesics/anti-inflammatory agents, in terms of total dollar value. The results parallel comparable studies performed in Israel and Algeria [113,114]. In a relatively small state like Oklahoma, it is estimated that between $2,3 to $7 million worth of unused prescription drugs are destroyed in nursing homes annually [94]. As much as $1 million worth of prescription drugs are wasted each year in San Mateo County – a small county in California, USA and had a population of 718,451 - since patients die or their medications are changed by health care professionals [115].

In 1996, a study conducted in Alberta, Canada counted in drug returns over a two month period and stated that people making returns brought back an average of 60% of the drugs from the original prescription drugs. The dollar value of these medicines was over $700,000 over two months period, when extrapolated to include the whole province [112]. According to a similar study from Houston, Texas conducted over a six month period in 2002 for oral pills alone, wastage for the state was estimated $53 million [116]. Based on the research conducted in the United Kingdom in 2004, medication wastage was estimated at between £30 and £90 million per annum [109]. Pharmaceutical Management Agency assumed an expenditure of $565 million for medications in 2005 [117]. This value 6% equates to $34 million dollars wasted in New Zealand potentially [109]. In a survey carried out in England and Wales, an estimate suggests that roughly £23 million of prescription medication (%5-6 of the total) is wasted each year [111].

Public health expenditures was 13,7 billion TL (Turkish Liras) in 2002 while it increased to 35,3 billion TL in 2007. For the same years, total Social Security Agency (SGK) health expenditures were 7,6 billion TL and 20 billion TL respectively. Furthermore, in 2008 SGK's health expenditures rise up to 30 billion TL. In 2008, the market for prescription medicine increased at a rate of 9 per cent to 12 billion TL (9,3 billion dollars). Drug expenditure per person was $136 [18].

According to a report from Ankara Trade Chamber, about medication wastage, it was assumed that 7% of unused drug in pharmacies are disposed of because of expiration. 60% of the medication kept at home expire without even being used. The cost of these medicine waste are around 500 million dollar in Turkey in 2006 [107].

In 2007, the value of sold drugs was $14 billion in Turkey and medication expenditure per person was $200. Financing of the social security foundations is a macroeconomical problem in Turkey and SGK had 8.6 billion TL of the total. The total drug cost of SGK is around 40-50% of the whole SGK expenditures [14].

A cross-sectional study with elderly people in 2001 estimated that 2,3% of all drug costs is from medication wastage. In the USA, this would represent over $1 billion in medication wastage in the elderly population [118]. Considering that there is an aging population, this value will be greater in the future.

To see the real dimension of the medicine waste and unused drugs, economical aspects of the problem should be reviewed. The review which is above, saying that there have to be an exit for the problem until it has grown enough to become a catch-22 situation.

2.5.   Solutions for Increase Rational Drug Use and Decrease Wastage

As previously discussed, irrational drug use and medicine wastage are problems which are both global and hard to solve. To improve the situation, not only health care professionals, medical staff and pharmacist have a responsibility, in addition governments, the public, patients, managers of pharmaceutical industry, education system and media have a responsibility [17].

Any National Drug Policy should be concerned with the supply of safe, efficacious and suitable medication, and in the way that drugs are prescribed and dispensed by all health personnel by governments [119].

As the first step to reducing irrational use and medicine wastage, patient and the health care provider's education should be invested in by governments. Clear information about disease state, consequences of the disease, role of the therapy and realistic expectations related to therapy should be focused on in the patient education. Patients' education should be provided by the pharmacist, health care provider and nurses, may be the first step in filling this educational gap. [57]. The main topics of the educational programme are hazards of irrational drug use, compliance, results of medication wastage and stockpiling medication [31]. Patients have to be educated especially if they have a chronic condition. Compliance not only to a medical regimen but also to life style changes are necessary. Diabetes, asthma, hypertension, hyperlipidemia are examples of common diseases about which related education programmes should be held in community [61,84]. In addition to the education programs, facilitating attempts to improve compliance may be helpful to the patient. Rewarding of the patient tangibly either by the physician or a family member is one method. Some patients may like contingency contracting about the compliance in medical regimen. Making home visits and pill counting are other methods to follow up the patient. Recall services by pharmacist or the health care professionals can be useful especially in the elderly [120].Simplified medical regimen and organization of administrated medication around daily rituals like meal times, before going to sleep etc., can enhance compliance. Ensured support of a family member or the spouse may be a positive effect on patient compliance. Good communication and warmth in personal relationship with the physician is necessary for continuation of the therapy [35]. For elderly patients and/ or patients having complicated medication therapy, use of a pill organizer can make control of the treatment easier and thereby can reduce the noncompliance problems [65].

Information providers are also educated regarding topics focused on appropriate therapy selection for each patient. This can be achieved by proper information supplied about the best treatment selection with respect to patient outcomes, quality of life, compliance and treatment cost [57]. Most students who receive the traditional pharmacology education have some difficulties in clinical practices of prescribing and informing the patient. In many countries, pharmacology is taught theorically and this causes errors in practices. More personalized prescribing and patient centered approach should be focused on the education [81]. On the other hand, interns base their choices of prescribing on the example of their teacher. In medical curricula, in addition to the diagnostic reasoning, therapeutic reasoning should be given more attention [121]. Clinical pharmacology and therapeutics courses may be helpful in practical learning [122]. It is much easier to teach good practices than to change the established habits of practitioners [119].

In addition to other factors, pharmacist interventions have been shown to assist in improving patient knowledge of medical therapy [63]. Due to direct contact with patients, pharmacists have the advantage of being able to detect compliance problems of the patient more easily. [27]. The pharmacist is often the only member of the health care team who has access to information about all of the patient's drugs [123]. Community-based pharmacist should share this information with the physician to improve compliance and patient centered approach [27].

There are many studies which investigate irrational drug use and wastage rates but they are not enough to see the whole of the picture. The home visit method is an important method to detect risk factors about drug related problems of the patient and noncompliance. For example, these kinds of studies are funded by the Australian government with the aim of decreasing the rate of medicine related problems [99].

Another suggestion is the Trial Prescription service in which pharmacists dispense 7-14 days' supply of a newly prescribed regimen and monitor the response of the patient. If the patient can tolerate the therapy, the remainder is supplied and the

pharmacist receive fee for every supply and also for documentation of results of the trial prescription, generally. This service has been applied in some Canadian provinces since mid-1990s. In this way, the patient can be monitored, because the patient will go to the pharmacy to have his regimen dispensed and it can help that the pharmacist can ask questions aiming to explore whether the medication is being using or not. In England and Wales since 2005, a similar system has been applied. However, in this system the supply of newly prescribed medicines is in small installments and using the new pharmacy based repeat dispensing system procedure. Both of these can help to minimize the build up of unused drugs generated through excess supply without unduly increasing in workload [101].

Medicine use reviews (MURs) also can be beneficial. MURs were introduced in the 2005 community pharmacist contract in United Kingdom. MURs imply accredited pharmacists conducting structured reviews with patients taking drugs for chronic diseases, periodically. To establish how the drugs are being used and any problem that may exist, these reviews may be taken into consideration all around the world [78].

The possibility of the re-use of unused medicines has been discussed several times, it seems to be useful option and for some time, one United Kingdom charity has been recycling unused medication for humanitarian aid [101]. It is considered that this can help the environment, low income families and reduce medication-related costs at the county hospital. In 2005, San Mateo County recycled 6000 prescriptions and saved of $1.4 million [115].   Also in France, there is an organization involved with recollection and recycling of unused medications. All returned medicines that are assessed as recyclable are donated to a charity [124]. According to the data, about one-quarter of returned medications which are potentially suitable for re-use are returned as unused. Approximately two-fifth of these are essential medicines [101].

Unused medications are controlled by registered pharmacist for suitability of possible re-use using. The medication has to have some criteria for re-use [101,115,124]:

-Over six months remaining to expiration date

-Being complete and not adulterated patient pack

-For devices, an unbroken security seal

-Not having special storage requirements

-Not being controlled drug

-Blisters and single dose packaging are preferred.

On the other hand, motivation of the patient can be effective in compliance and it can be achieved by combining understanding of condition, the treatment regimen and faith in the physician. The patient should be motivated to accept the treatment plan and make it part of his/her life. In fact, any health care service provider has to accept that the patient will decide whether use and how to use of his/her therapy and acknowledging this can empower compliance [24].

In spite of the existence of many studies, there is still not enough data about the subject. Drug usage patterns such as prescribing, dispensing and use should be understood deeply. These kinds of studies are increasing around the world focusing on solving the major problem of irrational drug use. International comparisons of drug usage patterns can help in sharing experiences, evaluating possible solutions, learning health care systems' effect, learning from successful practices and interventions, aiming to achieve good patient related outcomes, and providing efficient use of health care system [125].

WHO defines essential medicines in 1977 as those that satisfy the priority health care needs of the population and produced the first model list of essential drugs [126,127]. 12 countries thought of as developing nations had such a list of medicine by 2003, and the number got greater. Now, it is estimated the number of countries over 100. Linking these formularies with standard treatment guidelines has been observed to improve patient compliance and positive outcomes [4]. These

guidelines are intended for the primary stages of the health organizations (primary care units) and focused on prescribing for wide spread diseases in the related nations [82]. Medical authories must update the essential drug list on time and circulate it. The formularies must monitor safe and suitable use of essential medicines and enforce a uniformed regulation for promotional literature [16].

As a suggestion, carefully keeping documentation of the patient activities like appointment attendance, may be helpful to follow the patient's situation regarding compliance [27].

Concerning storing medication to reduce waste, both the pharmacist and the manufacturers have a responsibility. The conditions under which medication must be stored have to be stated clearly for the patients. The pharmacist must explain if there are any special conditions for storing the medication or using cool places for storage. Also, it has to be emphasized that the medication should be kept away from the reach of the children. The places should be selected according to these criteria. Preserving medication appropriately safeguards health and decreases losses related to deterioration. On the other hand, the pharmacist should keep the medication until it reaches to the patient and he/she must be careful about the storage conditions, special situations and the temperature of the community pharmacy [85].

In many developed countries, no medication except OTC products can be bought without a prescription from a community pharmacy. This rule is theoretically in force in many of the countries also in Turkey although it is not put into practice. It varies between with the regions but about 70% of the medicines in Turkey are purchased with a prescription in order to get benefit from paybacks of the health insurances [108,128,129,130].

As a result, previous tried or recommended solutions are not the only solutions for the problem of noncompliance; it can be solved in different ways. This was just a summary of the literature; creative thinking may be helpful in the future.

2.6 Doctor's and Pharmacist's Role

As a global issue, rational drug use is a multifaceted subject. The role of the governments, drug authorities, society, manufacturers, education systems, media, patients and other health care workers cannot be denied but the most important role belongs to the doctors and pharmacists.

Different countries have different education systems and the training of doctors and pharmacists vary. So, prescription and dispensing habits cannot be the same in diverse countries and they vary also [119].

The role of doctors and pharmacists will discussed in below in detail:

2.6.1. The Role of the Doctors

Doctors have a key role in the issue of rational drug use. As the top of the health chain, doctors have vital importance in the system. The authority of prescribing is given to them and prescribing is one of the most crucial parts of the rational drug use.

The responsibility begins with the right and evidence based diagnosis of the patient in rational drug use. There are numerous drugs for a definite indication and the number increases with the conducting of scientific studies and with time. They differ in terms of bioavailability, mode of action, toxicity, side effects, contraindications, interactions, usage, dosage regimen and treatment cost. For the most suitable treatment regimen, the doctor has to choose the most appropriate and safe drug for the properly diagnosed patient. The doctor has to be well educated about drug information and also has to know health and drug policies (that is, the legislation related to drugs and health) and attitude of the Ministry of Health of the country that he/ she lived in. Evidence based drug selections should be made depending on these. The cost of the drugs is also the responsibility of the doctors in

rational drug use. To achieve this, while doctors choose suitable drug for patient, they should consider the policies of social security institutions and ministry of health, the economic and social indicators of the country and its related legislation [130,131].

The steps to consider in the safe and appropriate drug selection can be summarized as [15]:

-The correct and evidence based diagnosis

-The decision of whether the medication is necessary or not

-Knowledge of the mechanism of the action, side effects, contraindications, interactions of the drug

-Adjustment of the dosage for the patient

-Making the patient compliant to therapy

-Evaluation of the treatment cost

-Availability of the drug

Doctors have to keep in mind some risk factors during diagnosis and while determining the medical regimen. These factors can influence selections of the drug, dosage and diagnosis of the disease. The risk factors are [17]:

-Age: Elderly or pediatric patients should be assessed specificially.

-Gender: Woman can be prone to unwanted effects of many medicines.

-Socioeconomic status: The costs of tests used in diagnosis and in the medical regimen should be taken into consideration.

-Living arrangement: For example, there are reports that elderly people living alone, or people who are fearful of forgetting to take medicines on time, might take daily drug regimen all at once. Simplified medical therapy, adjustment of medicine taking times with daily habits, and enlisting the help of the family members, friends and/or other health professionals may be helpful.

-Support system: The knowledge of the availability of family members and friends that are in touch with the patient is important.

-Multiple pathology: Existence of more than one disease can result in conflicting drug therapies. The patient in this state should be examined carefully.

Medical education is a hard to handle issue, but it is very important to train well-informed doctors for the health system. Teaching in medical disciplines tends to underline making a right and appropriate diagnosis based symptoms. Sufficient importance is not given to the subjects of treatment with medication and pharmacotherapy. Although the vital importance of rational prescribing is agreed generally, the teaching of pharmacotherapy to undergraduate medical students is not satisfactory in many countries [81,121]. As a responsibility of the healthcare professional, rational prescribing has to be taken in consideration in medical education.

According to one study, medical students and general practitioners prescribe similar drugs whereas drugs prescribed by clinical specialist were more potent drugs out of a broader range of drug classes [121]. Clinical experience, effectiveness of the medicine, and side effects of the medicine are the factors that both general practitioners and clinical specialists based their drug choice on. Besides, these general practitioners choose medication to a considerable extent on standard treatment guidelines and clinical specialists on scientific literature [121]. In another study, the effectiveness and side effects of the drugs, clinical experience, scientific research, journal articles, the social security of the patient and the price of the drugs were found to be the factors that the physicians consider while prescribing [107].

Although the right diagnosis and suitable drug selection is important, the real determinant of rational drug use is the correct use of the medication by patients. The mission of doctors in achieving compliance of patient is many-sided. The proper approach to the patient; warmth, empathy, giving adequate information, listening attentively, understanding the patient's beliefs, attitudes and life style, and encouraging the patient to be compliant can be counted as the part of this mission.

Creating the right atmosphere between the doctor and the patient is also the task of the doctor in compliance. Warmth in relation between the doctor and the patient positively affect compliance. Empathy is another key word. The doctor should listen the view of the patient and understand the patient. This can provide emotional support and result in greater satisfaction of the patient [19]. Deficiencies in communication can cause serious results. In USA, 98 thousand people are dying annually due to medical errors and most of them are caused by communication deficiencies [82].

To improve patients' compliance, literature recommends a list that can be seen below [27,132]:

-Providing clear and direct instruction

-Making patients understand that the treatment is really important for themselves

-Regular contact with patient

-Explaining the importance of compliance and contuinity of the therapy

-Teaching patients to self- monitor

-Helping the patient to perceive the situation and necessary information

-Simplifying the drug regimen and tailoring it to the patient's schedule

-Building self-efficacy

-Setting the realistic expectation for the treatment

-Sharing responsibility with the patient

One of the most important parts of the doctor's mission to improve compliance is the giving of information. For RDU, the proper drug information is really important. In the guideline of prescribing that was published by WHO, the information that should be given to the patient is summarized as follow [108,133]:
-Need for the medication

-Benefits of the medicines for the disease

-The effects of proper use and improper use

-Side effects, the progress of them, seriousness and the ways of coping with them

-Instructions including how and when to take drug, exact dosage regimen, the time needed to use and storage conditions of the drug

- Warnings include when not to take the drug, the maximum dosage, the need to complete the therapy.

- Check-up schedule (Follow up)

- The situations which the patients have to see doctor before the check-up

- The information that will be needed from the patients in check-up

In addition to these, informing the patient about unexpected drug effects is also the responsibility of the doctor. Awareness of pharmacovigilance is very important for the safety of the patient. Following of the patients' activities carefully and documenting them is necessary to interfere when there is an unexpected problem [27].

In brief, the role of doctors in rational drug use and reducing waste is vital. As the top of the health care chain, if they work in an orderly way and consciously about the subject, they can help to prevent noncompliance, irrational drug usage habits and unnecessary waste of medication.

2.6.2. The Role of the Pharmacists

As an integral part of the health chain, the pharmacist is one of the most important professions for rational drug use. Community pharmacies provide primary health care services in many countries and are the most easily accessible health care provider.

Prescriptions are pharmacist oriented writings. The information on the prescription is written with the purpose of being understood only by the pharmacist. The authority for preparing the drugs and giving them to the patients is given entirely to the pharmacists. With the responsibility of this authority, the pharmacist has to

inform the patients about the proper use of the medications. The pharmacists should dispense the prescribed medicines correctly and at the right time, correct the mistakes if there is a problem related to the prescription via cooperation with the doctor, inform the patients properly about the usage, warnings, instructions and the storage conditions of the medications verbally and/or in writings and control therapy of the patient [15,18].

It is necessary that the patients' health is guarded by pharmacist in every place where pharmacy services have been provided. Need of contribution by pharmacist in rational prescribing and appropriate use of medicines is a principle that International Pharmaceutical Federation (FIP) defined. Other principles at the basis of the pharmacy services defined by FIP are [8]:

-Providing medication and other medical products

-Following up their use

-Giving consultation service and providing appropriate information service to patient

-Aiming for provision of individual care by all pharmacy services

-Defining these services clearly

-Supplying these services to whole related region

The pharmacist is in the best position to reduce unnecessary burden of medicine waste in the health care system. They are most accessible front line health care provider. The optimal role for patient education results from the easily accessibility of the pharmacists. If there are proper incentives through government and industry based programs, the pharmacists can focus on filling the void of patient education, increasing compliance rates of the patient and improving the outcome of the patients [57]. There is a different dialogue with the community pharmacists from the formal consultation between the patients and the doctor. The pharmacy is an ideal vehicle to improve compliance via its accessibility and the informality of its environment [92].

Especially in countries like Turkey where increased workload and paper work exist, the doctors cannot find enough time to inform the patients. In these cases, the pharmacists' role in primary health care and rational drug use is increased [134,135]. In Turkey, especially most of the people who do not have social security cover use the pharmacist as the primary health care provider and they do not choose to see the doctor [31]. The pharmacists should be seen as part of the seamless pathway of patient care especially for patients with chronic conditions [92].

The influence of pharmacists on prescribing practices can be seen daily in every conceivable practice situation. Noone is infallible, neither are health professional. The benefits of a variety of clinical pharmacist interventions have been documented [4]. Pharmacist interventions have been reported as helping to improve patients' knowledge of medication. Optimization of the medical regimen includes switching a patient to a more appropriate drug, decreasing total numbers of drugs taken daily, alteration of therapy to a more suitable one for the patients, patient education and follow up of the patient. Especially in chronic conditions, medication therapy management services provided by pharmacists can improve overall medication therapy [63]. There is some research which concludes that any kind of pharmacist interventions can reduce the number of medications that the patient takes [136,137]. By simplifying the medication regimen, patients are able to understand the treatment and the positive effect of remembering to take their medicines. Interventions by the pharmacist have the ability to highlight high risk patients for therapy alterations to avoid adverse drug reactions [138]. Pharmacist interventions that consisted of patient education and careful follow up can improve compliance. There are some studies showing that pharmacist interventions and education can increase compliance to the therapy [139,140]. Patients' understanding of their therapy can result in involvement in their own healthcare and encourage the compliance. In addition to this, pharmacist interventions have the ability to help prevent therapeutic duplications by prescribers [63]. The involvement of a pharmacist in the care of patients that have complicated medication therapy, especially older adults, is one of the most common techniques for decreasing drug

related problems. Drug related problems are noteworthy cause of death due to medical errors [12].

Pharmacies are the most accessible points for pharmacovigilance and the pharmacists report adverse drug reactions. Pharmacist has to inform patients about this subject and encourage them to declare when there is a DRP. In a study conducted in Istanbul Turkey awareness about pharmacovigilance was examined. Only 17,2% of the participants had adequate information about the subject and only 21% of them reported an observed adverse drug reaction in a year [141]. The pharmacists have to be educated to be ready to report adverse drug reactions especially in developing countries like Turkey.

The role of the pharmacist in providing information on self-care and self-medication is stressed frequently by WHO. Also, pharmacist has to provide necessary information about storage conditions [85]. In addition to these, as in the case of prescribed medicines, the pharmacist has to inform patients about OTC drugs. OTC drugs also have interactions, and side effects like other drug, and information provided by pharmacists about OTCs is important as well as that related to prescribed medicines [108].

Furthermore, according to the suggestion of the authors of the quoted articles pharmacists, having direct contact with patients who are engaged in their drug treatment, have a better ability to detect compliance problems [27]. So, the pharmacist may be able to increase compliance and improve patient care simply through having more frequent patient contact and being more easily accessible [63].

Pharmacist is one who has direct involvement in a patient's treatment plan, has direct and frequent contact with physicians, and can have an active role in changing or altering a patient's medical regimen. The pharmacist is often the only member of the health care team who has access to information about all of the patient's drugs [123]. The pharmacist can share this information with the doctor to improve compliance and patient care [27].

The approach and attitude of the pharmacist to the patient is an also important factor. The patient should trust in pharmacist [142]. The pharmacist should be close, perceptive and offer to help patients. The pharmacist should listen carefully to the patients' needs, expectations and perceptions and then take an active role.

As a result, the role of the pharmacist in rational drug use is as important as the doctors'. Pharmacists know the drugs best and they are the unseen guards of the healthcare chain. They are in the optimum position to make the patients aware of rational drug use and thus reduce pharmaceutical waste.

3. STUDY DESIGN AND METHODOLOGY

3.1. Aim of Study and Hypothesis

The aim of the study is to make an assessment of drug usage habits and awareness of unused drugs and RDU among the people who joined the campaign. The hypotheses are listed below:

-There is a relation between rational drug use habits and demographics (gender, socio-economic status, education, etc.).

-Unused drugs and expired drugs are mostly disposed of as junk.

-There is a relationship between awareness of waste/unused medicine and rational drug use habits.

-Medicine cabinets and special boxes are generally places where drugs are kept.

-Patients believe that injectable drugs are more potent than other formulations/routes of administration.

-Alternative care is not refused and on the contrary is used in normal life and during sickness.

-There is a relation between alternative care use in normal life and during sickness.

-Patients tend to take drugs before seeing a medical advisor.

-Patients generally do not check the expiry dates of their medications.

-The people who use medicine on the advice of a relative also give advices about drug to their acquaintances.

-Patients that have relatives working in health care system tend to have better drug use habit.

-Patients think that they know what and why they are using their drugs.

-Patients get upset when a generic drug is substituted for a familiar brand.

3.2. Type of Study

The study was linked to the unused medicine collection campaign that was conducted in Yeditepe University 26 August Campus between 26 April - 18 June 2010 and expended to 6 August 2010 by Yeditepe University Drug and Poison Consultancy Unit (YUDIC). The study is an epidemiological study and survey method was administrated through a personal interview for data collection.

3.2.1. Survey Method

The term survey describes a type of study that consists of asking people to respond to questions.   Although surveys usually are considered to have a "nonexperimental" design, they have more in common with the more scientific "true experimental" or "quasiexperimental" type studies if done properly. Surveys are an excellent research tool because they are relatively inexpensive and allow quick data acquisition. Generally, surveys are ideal for collecting data about people's attitudes, behaviors, knowledge, and personal history [143].

3.2.1.1. Modes of Survey Administration

3.2.1.1.1. Personal Interviews

Generally, personal interviews yield the highest cooperation and lowest refusal rates. They allow for longer, more complex interviews. They have high response quality. Also, this method takes advantage of interviewer presence. Multi-method data collection can be performed. However, this is the most costly mode of

administration. Data collection period is longer and interviewer concerns can interfere with the results [144].

3.2.1.1.2. Telephone Interviews

Telephone interviews are less expensive than personal interviews. This method allows randomized samples of general population to be analyzed. Short data collection may save time for studies. Control and supervision of interviewer is also an advantage of this method. The study can be generalized because of the samples of general population. The response rates are high but there is the risk of unservicable telephone numbers and nonresponsive calls. Questionnaire use may be constrainted. In addition to these points, as a disadvantage, it is difficult to administer questionnaires on sensitive or complex topics [144].

3.2.1.1.3. Mail Survey

Generally, mail survey method is the lowest cost mode of survey. Mail survey can be administered by a smaller team of people. Accessing otherwise difficult to locate, busy populations is possible. Respondents can look up information or consult with others. Nonetheless, using mail survey, it is difficult to obtain cooperation with interviewer. No interviewer can be involved in collection of data. For a substantive study, there is a need for good sampling. Slow data collection period is one of the down sides of this method. Mail survey is also more likely to need an incentive for respondents [144].

3.2.1.1.4. Web Survey

Web surveys have low cost like other web based survey types. Web survey can reach international populations. Less time is required for implementation. Complex

skip patterns can be programmed. Sample size can be greater. However, it cannot generate random samples of general population. Differences in capabilities of people's computers and software for accessing web surveys can be a risk factor [144].

For this reason, web surveys should be well- designed.

3.2.1.2. Selecting the Survey Method

Criteria for selecting paper questionnaire with personal interview are can be summarized as follows. First of all, the highest cooperation and lowest refusal rate of this method could make people want to be involved. Sample size would not be so great and cost of questionnaire could be affordable. Data collection would also not take so much time due to small sample size. The questionnaire is complex and needs the presence of the interviewer.

3.3. Population and sample

The population studied was the people who participated in voluntarily the campaign in Yeditepe University. There are 18000 students and 2000 staff in the Yeditepe University 26 August Campus.

People who participated in the campaign were asked to complete the questionnaire. The questionnaire was conducted among whoever consented to answer and brought unused drugs for the campaign. One hundered and seven persons got involved in the campaign and brought unused medicines and 65 of them agreed to answer the questionnaire.

3.4. Place of Study

The study was conducted in Yeditepe University 26 August Campus located in Kayisdagi-Atasehir in Istanbul. There are twelve faculties, one foreign language academy, one vocational academy, two foreign language preparatory schools and two dormitories in the campus. Participation of all students, teaching and research staff and the other personnel was requested voluntarily for The Unused Drug Collection Campaign.

3.4.1. Campaign Publicity

The campaign was publicised in different ways. First of all, weekly e-mails were sent to university mail of all students and staff. Posters about the campaign were distributed to the panelboards in all buildings of the campus. T-shirts that carried the advertisements of the campaign were worn and vocal announcements were made especially at the time of Yeditepe University May Fest 2010.

3.5. Questionnaire Design

A survey method was used to assess knowledge and attitude about unused drugs and drug usage habits of the participants. The questionnaire was designed by researcher of the thesis.

3.5.1 Setting of the Questions

A general literature review was carried out before defining the questions. International and national questions about rational drug use, unused drugs and stockpiling drugs were defined and listed. Eighty one questions were structured, then they were reduced to 57 questions. Finally, 21 open and close ended questions, some of them (16th, 20th, 21th and 22th questions) containing substatements, were selected for the questionnaire (Appendix 1).

There were two different parts of the questionnaire: The sociodemographic part and drug use/unused drug consciousness part. Sociodemographic part consisted of the first seven questions, the 9th question and the 10th question. The second (drug use) part included the rest of the questionnaire.

Mostly close ended questions were selected, only seven questions were open ended.

3.3.2 Comprehensibility of Questionnaire

The pilot study was conducted with three volunteers from the general population. Afterwards some parts of the questionnaire were changed and modified to avoid any misunderstanding. After modifications, comprehensibility was tested again with three different volunteers and no misunderstanding was observed with twenty one questions.

3.3.3 Content of Questionnaire

The questions were recorded at Yeditepe University Drug and Poison Consultancy Unit (YUDIC) and published in the university. The first seven questions

were sociodemographic (age, gender, education, social security, faculty and position, chronic disease existence and chronic drug use).

The 8th question aimed to find out the reason for participation in the campaign.

The 9th question was also a demographic questions, it asked for the number of family members.

The 10th question was related to whom the drugs belonged to.

The rest of the questionnaire consisted of questions about drug usage habits, awareness about unused drugs and rational drug use. The 11th question investigated how drugs had been provided by participants.

The 12th question and 13th question explored what the participants used to do with expired or wasted drugs and remaining drugs at the end of the therapy.

The 14th question was targeted to learn the thoughts of participants on the reason for having unused drugs at home.

The 15th question was to find out the place drugs were kept.

The 16th question examined the participants' opinion of the definition of "a drug".

The preferred source of information about drugs and to whom the participants would consult about adverse drug reactions were investigated by the 17th and the 18th questions, respectively.

The 19th question explored the beliefs about which dosage form is the strongest.

The 20th question consisted of 20 statements about use of alternative care, preference of getting information about drug, advice of OTCs, drug usage on advice, stockpiling drugs at home, confusing the indication of drugs, drug usage before seeing a health care professional, checking expiration date, advising drug to acquaintances, thoughts about healing effect of drugs, proper use of drug, forgetting taking drug, wrong use of drugs, having relatives on health care system, knowledge about indication, habit of reading package insert, asking pharmacist how to use drugs, generic drug use. Participants were supposed to say "Yes" if they agreed with the statement and "No" if they did not agree.

The 21st question also had statements like question 20th but they were about choices of prescribing.

The 22nd question was about reasons of quitting drug use and it also had statements like the 20th and the 21st questions such as side effects, healing, completing drug regimen, doctor's advice to stop taking drug, if the participants felt drugs were useless, not understanding usage direction, end of therapy.

The 6th, 7th, 16th, 21st and 22nd questions were omittted due to inadequate answers.

The survey (Turkish and English version) is in Appendix 1.

3.3.3.1 Rational Drug Use Score

In the light of the literature [18], a score system was evolved to measure RDU. It is consisted of 10 statements from the 20th question such as, medication use before seeing a health care profession, checking expiration date, drug use with the advice of a person who is not a health care professional, inappropriate use of medications, forgetting to take drugs, wrong or different drug taking in self medication, knowing the effects and indication of the drugs at home, reading package inserts, asking how

to use and if they upset by the substitution of generics. For these statements, answers which were compatible with RDU were graded 1 point and the sum of the points gave the RDU score. To make groups, 0-4 points were considered "bad" RDU habits, 5-7 points were considered "fair" RDU habits and 8-10 points were considered "good" RDU habits.

Table 2. Statements' score in RDU score

Statements	Score of "YES"	Score of "NO"
I use drug with the advice of a person who is not a health care professional	0	1
I use medication before seeing a health care profession	0	1
I check the expiration date of the drugs	1	0
I sometimes use my medications not as instructed by doctor or the pharmacist	0	1
I forget to take drugs	0	1
I have used different or wrong medicines unnecessarily by myself before.	0	1
I generally know the effects and indication of the drugs at home	1	0
I read the package inserts of the drugs	1	0
I ask to my pharmacist how to use the medications	1	0
I have reservations about use of generic drugs substitution	0	1

3.3.4. Data Analysis Technique

Questionnaire results were recorded by the researcher to Excel documentation programme. For analysis, SPSS Version 17 Statistics Software was used. Descriptive statistics, cross-tabs, Fisher's exact test (when a group had less than 5 participants at 2x2 tables), Chi square test, t test were used aiming to find the differences in distribution between demographic characteristics and other parameters. Cramer's V correlation coefficient was used in correlation. Kuder-Richardson 20 formulation is used to evaluate reliability of the questionnaire. Experts were consulted to assess content validity of the questionnaire. $P<0.05$ was accepted as significant.

4.RESULTS

In this chapter the results of frequency, cross-tabulation and Chi square tests analyses were tabulated and summarized. This section is mainly composed of two parts. The first part presents the frequency distribution of variables (demographic, drug usage habits and beliefs on medication (behavior), RDU scores) used in the study and the second part the cross-tabulations.

4.1. Frequencies

4.1.1. Demographics

4.1.1.1.   Age

Table 3. Age group distribution

Age groups	Frequency (n)	Percent (%)
18-24	29	44,6
25-29	9	13,8
30-39	8	12,3
40-49	9	13,8
50 and older	5	7,7
Unanswered	5	7,7
Total of answered	60	92,3
Total	65	100,0

The age distributions of the participants were as seen at the Table 3. The most frequently represented (44,6%) participants belonged to the 18-24 age group. The 25-29 and 40-49 groups were at 13,8% percentage, and secondary sequence. 12,3% of the participants were in the age group 30-39 and 7,7% of them were 50 and older. 7,7 percent of the participants did not answer this question. It was expected and observed that due to being conducted in university, most of the participants were in the 18-24

age group. Other groups of participants were generally consisted of staff or teaching staff and workers in the university.
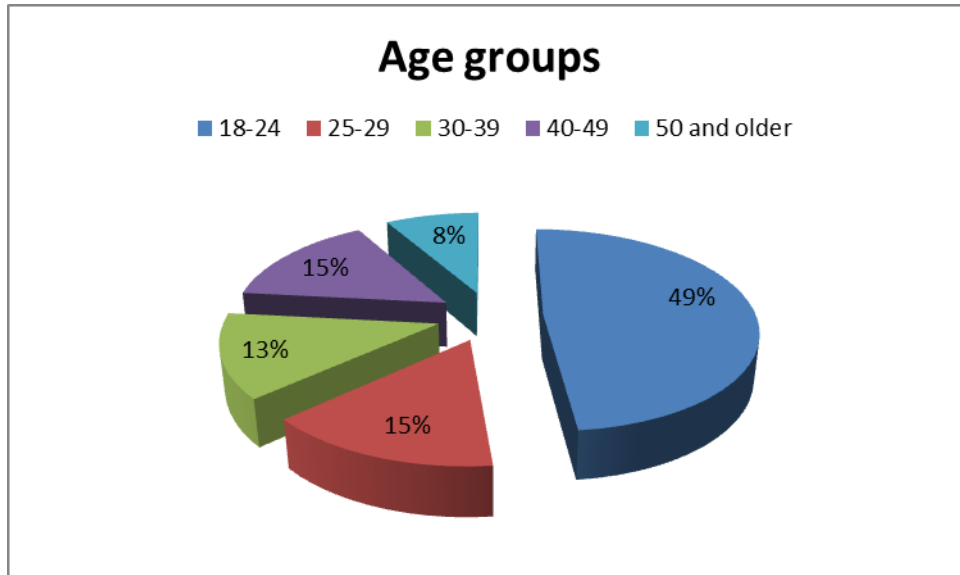
Figure 1. Age group distribution

4.1.1.2. Gender

Table 4. Gender distribution

Gender		Frequency (n)	Percent (%)
Answered	Female	51	78,5
	Male	13	20,0
	Total	64	98,5
Unanswered		1	1,5
Total		65	100,0

51 females and 13 males answered the gender question and majority (78,5%) of participants were female while 20% of the respondents were male. There was one respondent who did not answer this question.

4.1.1.3.   Education

As the study was conducted in the university, this rate is not a suprising figure. Most of the respondents (n=36) had university education with the rate of 55,4%. Besides, 18,5% of the respondents had a doctorate degree, 10,8% of them graduated from college, 3 people from high school and 2 people from primary school who were thought to be staff. Also, 7,7% of the respondents had a master degree.

Table 5. Distribution of education level

Education level	Frequency (n)	Percent (%)
Primary school	2	3,1
High school	3	4,6
College	7	10,8
University	36	55,4
Master	5	7,7
Doctorate	12	18,5
Total	65	100,0

4.1.1.4.   Occupation

Table 6. Occupation distribution

Occupation	Frequency (n)	Percent (%)
Pharmacy teaching staff	10	15,4
Pharmacy student	28	43,1
University personnel and student	27	41,5
Total	65	100,0

The distribution of the respondents to various occupation groups which were "pharmacists", "pharmacy students" and other university members except the faculty of pharmacy allied ones which was called as "university personnel and student", the question was grouped. Most of the respondents (43,1%) were pharmacy students. 41,5% of them was university personnels and students. 10 respondents were from the

pharmacy teaching staff. Almost 60% of the participants of the survey were from the faculty of pharmacy.

4.1.1.5.   Health Insurance

This question on the health insurance status of the participants allowed the participants to choose two answers. Participants mostly had SGK Insurance as the health insurance (74%). Fourteen of the 48 participants with SGK Insurance also had a private health insurance as a secondary health insurance.

Table 7. Health insurance distribution

Health insurance		Frequency (n)	Percent (%)
Answered	SGK Insurance	48	74,0
	Private Health Insurance	3	4,6
	No health insurance	3	4,6
	Total	54	83,1
Unanswered	Total	11	16,9
Total		65	100,0

4.1.1.6.   Hometown

Eleven participants did not answer the question regarding the participants' hometowns. Fifteen people were from Istanbul. Elazığ, Kayseri and Samsun were the cities where most of the respondents came from after Istanbul. There were two people from abroad and the cities of Ankara, Antalya, Bandırma, Bitlis, Çorum, Edirne, Eskişehir, Hatay, Kahramanmaraş, Kırşehir, Konya, Malatya, Mardin, Mersin, Muğla, Nevşehir, Niğde, Sinop, Sivas, Tokat, Trabzon, Van and Zonguldak had representatives who participated in the questionnaire.

4.1.2. Drug Use Habits

4.1.2.1. Owner of the Unused Drugs

The question regarding the owner of the unused drugs was open ended and the answers were grouped. According to answers, most of the gathered drugs belonged to all family members of the participants (32,3%). Twenty nine percent of them only belonged to the participants, 10,8% to parents, and 4,6% to grandparents. The other groups were as represented in Table 8. In spite of the different distribution appearance, all answers represented family members, friends and neighbours.

Table 8. Drug Owners Distribution

Owner		Frequency (n)	Percent (%)
Answered	All family member	21	32,3
	Participant	19	29,2
	Family and neighbour	1	1,5
	Grandparents	3	4,6
	Parents	7	10,8
	Spouse	1	1,5
	Child	1	1,5
	Spouse and child	2	3,1
	Family and friends	2	3,1
	Family	1	1,5
	Another family	1	1,5
	Siblings	1	1,5
	Total	60	92,3
Unanswered	Total	5	7,7
Total		65	100,0

4.1.2.2. Supplying the Drugs

The question regarding supplying the drugs allowed the choice of two options. Results showed that SGK is the most preferred way of obtaining medications (n=44). Out of the pocket purchase was the second choice of drug supply (n=36). Private health insurance was quite often preferred with 20 participants. Doctor samples were another supplying method which respondents chose and also acquaintances, practice pharmacy were the options that existed.

4.1.3.   Surplus Drugs

As seen at Table 9, keeping medicine "at home" is the most often observed habit regarding (61,5%) with surplus drugs. Hoarding of drugs is wide-spread as expected. Among respondents, 16,9% took drugs to the pharmacy, 7,7% threw them out with garbage, 6,2% took them to a health care unit and 4,6% gave them to someone else. Other options were chosen by 3,1% of the respondents.

Table 9. Distribution of disposing surplus drugs habits

What do with surplus drugs?	Frequency (n)	Percent (%)
Junk to garbage	5	7,7
Take to pharmacy	11	16,9
Take to a health care unit	4	6,2
Keep at home	40	61,5
Give to someone else	3	4,6
Other	2	3,1
Total	65	100,0

4.1.3.3.   Expired Drugs

According to the answers declared, junking is the most frequently used disposing method for expired drugs (52,3%). Taking them to pharmacy (18,5%), flushing down to the toilet (7,7%), taking to the health care unit (4,6%) and other (16,9%) were the options that participants chose.

Table 10. Distribution of disposing expired drugs habits

What do with expired drugs?	Frequency (n)	Percent (%)
Junk	34	52,3
Take to pharmacy	12	18,5
Take to a health care unit	3	4,6
Flush down to the toilet	5	7,7
Other	11	16,9
Total	65	100,0

4.1.2.5. Reason of Wasted Medicines

The question was asked to find out the causes leading the problem of wasted medicines. This question also allowed two options. Healing of the patient was the most preferred option which 30 of the respondents chose. Hoarding the drugs that were believed to be necessary at home was the secondary option (n=28). Expiration of the drugs (n=25), the patient is feeling better (n=8), not wanting to take drug (n=8), changing of the drug by the doctor (n=7), side effects of the drugs (n=7), death of the patient (n=3), doctor drug samples (n=3) and other (n=1) options was also chosen by respondents.

4.1.2.6 Storage Place of the Drugs

With the percentage of 61,5% special box or container was the most frequently used storage place for the drugs. On the contrary to expectations, medicine chest was the secondary preferred option (13%). Twelve percent of the participants said that they kept the drugs in the refrigerator while 4,6% of them kept the drugs in pochette.

Table 11. Distribution of storage places of the drugs at home

Storage place of the drugs	Frequency (n)	Percent (%)
Medicine chest	13	20,0
Special box or container	40	61,5
Refrigerator	8	12,3
Pochette	3	4,6
Other	1	1,5
Total	65	100,0

4.1.2.7. Consultant When Adverse Effects Occur

Most of the participants declared that they consult a physician when adverse effects were seen (55,4%). Twenty five percent of the participants reported to consult a pharmacist. "Both the doctor and pharmacist" was another option which respondents chose (Table 12).

Table 12. Distribution of preferred consultant for adverse effects

Preferred consultant of adverse effects	Frequency (n)	Percent (%)
Doctor	36	55,4
Pharmacist	16	24,6
No consultant	1	1,5
Other	2	3,1
Both doctor and pharmacist	10	15,4
Total	65	100,0

4.1.2.8. Consultant for Drug Information

As expected, the pharmacist was chosen as the most frequently preferred drug information consultant by the respondents (55,4%). Among the respondents, 35,4% consulted the doctor, 1,5% a nurse and 1,5% an acquaintance who used drug while 6,2% chose "other" option (Table 13).

Table 13. Distribution of preferred consultant for drug information

Preferred consultant for drug information	Frequency (n)	Percent (%)
Doctor	23	35,4
Pharmacist	36	55,4
Nurse	1	1,5
Acquaintance who used drug before	1	1,5
Other	4	6,2
Total	65	100,0

4.1.2.9. The Strongest Dosage Form

Table 14. Distribution of believed the strongest dosage forms

		Frequency (n)	Percent (%)
Answered	Injection	60	92,3
	Syrup	1	1,5
	Other	3	4,6
	Total	64	98,5
Unanswered		1	1,5
Total		65	100,0

People tend to believe that an injection is the most potent form of medication. To examine this statement, the question was asked to respondents and results were found as anticipated in the hypothesis. Injection was considered as the strongest dosage

form with a percentage of 92,3%. Other (4,6%) and syrup (1,5%) options were also chosen while none of the participants chose the "tablet-capsule" option.

4.1.2.10 "Yes" or "No" Questions About Drug Use Habits

The question is composed of the statements that respondents would choose "Yes" if they agree and "No" if they do not agree.

a. *Alternative Care*

The question has two parts such as disease state and normal life.

Table 15. Distribution of altenative care taking at disease state

Alternative care usage at disease state	Frequency (n)	Percent (%)
I use alternative care during my disease	40	61,5
I do not use alternative care during my disease	25	38,5
Total	65	100,0

61,5% of respondents declared that they used alternative care during their disease while 38,5% of them said vice versa.

Table 16. Distribution of altenative care taking at normal life

Alternative care usage at normal life	Frequency (n)	Percent (%)
I use alternative care in my normal life	23	35,4
I do not use alternative care in my normal life	41	63,1
Unanswered	1	1,5
Total	65	100,0

Most of the respondents stated that they do not use alternative care in normal life (63,5%).

b. *Satisfaction with drug information*

Respondents generally received satisfactory drug information when they consulted, as they said (70,8%).

Table 17. Distribution of satisfaction in drug information

Satisfaction in drug information	Frequency (n)	Percent (%)
I generally get satisfaction when consult about drug information	46	70,8
I cannot generally get satisfaction when consult about drug information	16	24,6
Unanswered	3	4,6
Total	65	100,0

c. *Advice on OTCs*

Table 18. Distribution of the frequency of pharmacist's advice on OTCs

Pharmacist advice on OTCs	Frequency (n)	Percent (%)
My pharmacist advise me about OTCs	30	46,2
My pharmacist do not advise me about OTCs	32	49,2
Unanswered	3	4,6
Total	65	100,0

As seen in Table 18, rate of the pharmacist who gave advice of OTCs (46,2%) and the pharmacist who do not give OTC advice (49,2%) was nearly equal.

d. *Drug use on the advice of a person who is not a health care professionals*

Respondents mostly (95,4%) chose the option that stated, "I cannot use a drug with the advice of a person who is not a health care professional".

Table 19. Distribution of drug use with advice of a person who is not a health care professional

	Frequency (n)	Percent (%)
I use drug on the advice of a person who is not a health care professional	3	4,6
I do not use drug on the advice of a person who is not a health care professional	62	95,4
Total	65	100,0

e. Hoarding medicines at home

Table 20. Distribution of frequency of medicine hoarding

	Frequency (n)	Percent (%)
I hoard medicine at home	27	41,5
I do not hoard medicine at home	38	58,5
Total	65	100,0

Although the percentage of not hoarding medicine at home was higher (58,5%), percentage of hoarding medicine was found to be quite high (41,5%).

f. Confusion about the existence of more than one drug

Table 21. Distribution of the frequency of patient confusion when >1 drug is prescribed

	Frequency (n)	Percent (%)
I can get confused if there is more than one drug in my therapy	6	9,2
I do not get confused if there is more than one drug in my therapy	58	89,2
Unanswered	1	1,5
Total	65	100,0

Most of the respondents agreed the statement "I do not get confused if there is more than one drug in my therapy" (89,2%).

g. Medication use before seeing a health care professional

Table 22. Distribution of medication use habit before seeing a health care professional

	Frequency (n)	Percent (%)
I use medication before seeing a health care profession	41	63,1
I do not use medication before seeing a health care profession	22	33,8
Unanswered	2	3,1
Total	65	100,0

Sixty three percent of the respondents admitted that they can use medication before seeing a health care profession (Table 22).

h. Checking expiration date

Table 23. Habits of checking expiration date of the drugs distribution

	Frequency (n)	Percent (%)
I check the expiration date of the drugs	62	95,4
I do not check the expiration date of the drugs	2	3,1
Unanswered	1	1,5
Total	65	100,0

Among the participants, 95,4% reported that they check the expiration date of the drugs. As in contrary to expectation in hypothesis, most of the participants said that they check the expiration date of the drugs.

i. *Giving advice to acquaintances about medication*

Table 24. Distribution of advice given to acquaintances about medications

	Frequency (n)	Percent (%)
I give advice to acquaintances about medication	38	58,5
I do not give advice to acquaintances about medication	27	41,5
Total	65	100,0

As an irrational habit, most of the respondents said that they gave advice to acquaintances about medication (58,5%).

j. *Thought about usefulness of the drugs*

Table 25. Distribution of thoughts about usefulness of the drugs

	Frequency (n)	Percent (%)
I think drugs help me to get better	59	90,8
I do not think drugs help me get well	5	7,7
Unanswered	1	1,5
Total	65	100,0

Most of the respondents (90,8%) thought the drugs were useful in healing process and said that "I think drugs help me to get well".

k. *Inappropriate use of medication*

As a inappropriate habit, the statement "I sometimes use my medications differently from that stated by doctor or the pharmacist" (35,4%) was chosen less frequently than the statement "I use my medications as instructed by doctor or the pharmacist" (64,6%).

Table 26. Distribution of the inappropriate use of medication

	Frequency (n)	Percent (%)
I sometimes use my medications not as instructed by doctor or the pharmacist	23	35,4
I use my medications as stated by doctor or the pharmacist	42	64,6
Total	65	100,0

l.   Health care center visit to have prescription

Only 36,9% of the respondents admitted that their going to health care center was to obtain a prescription while 61,5% of them said that was not their motive for going.

Table 27. Distribution of whether the patient visits health care center to obtain prescription

	Frequency (n)	Percent (%)
To make the doctor prescribe, I go to a health care center	24	36,9
I do not go to a health care center to make the doctor prescribe	40	61,5
Unanswered	1	1,5
Total	65	100,0

m.   Forgetting to take drugs

The rate of forgetting to take drugs (47,7%) and not forgetting to take (49,2%) were observed to be almost equal.

Table 28. Distribution of forgetting to take drugs

	Frequency (n)	Percent (%)
I forget to take drugs	31	47,7
I do not forget to take drugs	32	49,2
Unanswered	2	3,1
Total	65	100,0

n.   Wrong or different drug taking in self medication

Most of the respondents reported that they have never used different or wrong medicines unnecessarily by themselves before (86,2%).

Table 29. Distribution of the wrong or different drug taking by patients themselves

	Frequency (n)	Percent (%)
I have used different or wrong medicines unnecessarily by myself before.	9	13,8
I have never used different or wrong medicines unnecessarily by myself before	56	86,2
Total	65	100,0

o.   Knowing a health care worker

Among the respondents, %83,1 have an acquaintance who is a health care worker to consult with.

Table 30. Distribution of the situation of a knowing a health care worker

	Frequency (n)	Percent (%)
I know a health care worker who I can consult with	54	83,1
I do not know a health care worker who I can consult with	11	16,9
Total	65	100,0

p.   Knowing the effects and indication of the drugs at home

Table 31. Distribution of knowledge of the effects and indication of the drugs at home

	Frequency (n)	Percent (%)
I generally know the effects and indication of the drugs at home	62	95,4
I do not know the effects and indication of the drugs at home	3	4,6
Total	65	100,0

Most of the participants thought that they know the effects and indications of the drugs which were at home (95,4%). As declared in the hypothesis, most of the participants reported that they know the effect and indication of the drugs at home.

q.   Reading package inserts

Table 32. Distribution of the situation of reading package inserts

	Frequency (n)	Percent (%)
I read the package inserts of the drugs	62	95,4
I do not read the package inserts of the drugs	3	4,6
Total	65	100,0

According to Table 32, 95,4% of the respondents stated that they read the prospectuses of the drugs.

s. Asking how to use

Asking to the pharmacist for directions of drug use was a more common habit (%86,2) than not asking (12,3%).

Table 33. Distribution of consultation of the pharmacist for drug use

	Frequency (n)	Percent (%)
I ask to my pharmacist how to use the medications	56	86,2
I do not ask to my pharmacist how to use the medications	8	12,3
Unanswered	1	1,5
Total	65	100,0

t. Reservations about the use of generic drugs substitution

Table 34. Distribution of the situation about annoying to use generic drugs

	Frequency (n)	Percent (%)
I have reservations about use of generic drugs substitution	23	35,4
I do not have reservations about use of generic drugs substitution	42	64,6
Total	65	100,0

Generic drug use mostly annoyed the participants with the percentage of 64,6% while 35,4 of them did not get annoyed.

4.1.2.11 Rational Drug Use Score

The mean of the RDU score was 7,14 with a standard deviation of 1,52. The minimum value was found to be 3 (min=3) and the maximum value was found to be 10 (max=10). The mean value was higher than expected.

As mentioned in the methods, RDU score groups were formed. 0-4 points were considered as "bad" RDU habits, 5-7 points were considered "fair" RDU habits and 8-10 points were considered "good" RDU habits.
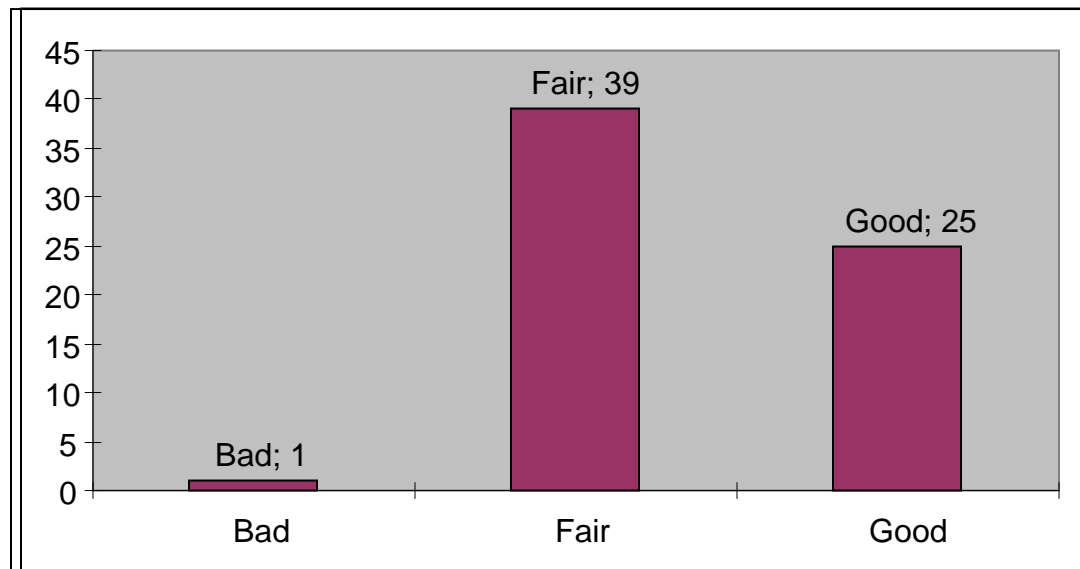
Figure 2. Distribution of RDU score

However, because of only one participant was grouped as having bad RDU habits, analysis were affected and differences in distribution cross-tabulation results were found insignificant. To solve this problem, a second grouping was used according to the mean value. Participants who had a RDU score higher than 7,14 was considered as having "good RDU" and participants who had lower RDU score was considered as having "fair RDU" habits.

Table 35. Distribution of the RDU score groups

RDU score groups	Frequency (n)	Percent (%)
Lower than mean value of RDU score	38	58,5
Higher than mean value of RDU score	27	41,5
Total	65	100,0

As seen at the Table 35, respondents mostly had fair RDU habits with the lower score than the mean value of the RDU score according to the questionnaire (58,5%). Only 41,5% of them had a higher score than the mean value of the RDU score and they were grouped as "Good RDU".

4.2. Cross-Tabulation

4.2.1. Cross-tabulation with demographics

4.2.1.1. Occupation and Alternative care usage during disease

Table 36. Occupation and alternative care usage during disease crosstabulation

			Occupation			
			Pharmacy Teaching Staff	Pharmacy student	University personnel and student	Total
I use alternative care during my disease	Yes	Count (n)	5	**22**	13	40
		Percent (%)	12,5%	55,0%	32,5%	100,0%
	No	Count (n)	5	6	**14**	25
		Percent (%)	20,0%	24,0%	56,0%	100,0%
Total		Count (n)	10	28	27	65
		Percent (%)	15,4%	43,1%	41,5%	100,0%

There is a statistically significant difference between occupation and the answers to the statement "I use alternative care during my disease" ($p<0,05$ $p=0,049$). The number of pharmacy students who declared their use of alternative care during their disease was more than expected and the number of the university personnel and students who reported not using alternative care during disease was less than expected.

4.2.1.2. Occupation and alternative care usage in normal life

Table 37. Occupation and alternative care usage in normal life crosstabulation

			Occupation			
			Pharmacy Teaching Staff	Pharmacy student	University personnel and student	Total
I use alternative care in my normal life	Yes	Count (n)	5	**13**	5	23
		Percent (%)	21,7%	56,5%	21,7%	100,0%
	No	Count (n)	5	14	**22**	41
		Percent (%)	12,2%	34,1%	53,7%	100,0%
Total		Count (n)	10	27	27	64
		Percent (%)	15,6%	42,2%	42,2%	100,0%

The distribution of the occupation and alternative care use in normal life is significantly different. The difference is statistically significant ($p<0,05$ $p=0,046$). The number of pharmacy student who use alternative care in their normal life is found more than expected and the number of university staff and students not using alternative care in normal life is more than expected.

4.2.1.3. Occupation and giving advice to acquaintances about medication

Occupation and giving advice to acquaintances about medication distributed differently. The difference which is between them is statistically significant (p<0,05 p=0,006). The proportion of university personnel and student who do not give advice to acquaintances about medicines was found to be more than expected.

Table 38.Occupation and giving advice to acquaintances about medication crosstabulation

			Occupation			
			Pharmacy Teaching Staff	Pharmacy student	University personnel and student	Total
I give advice to acquaintances about medication.	Yes	Count (n)	9	19	10	38
		Percent (%)	23,7%	50,0%	26,3%	100,0%
	No	Count (n)	1	9	**17**	27
		Percent (%)	3,7%	33,3%	63,0%	100,0%
Total		Count (n)	10	28	27	65
		Percent (%)	15,4%	43,1%	41,5%	100,0%

4.2.1.4. Gender and giving advice to acquaintances about medication

Because the number of males who answered negatively was lower than 5, Fisher exact test was applied. The difference between gender and giving advice to acquaintances about medication found statistically significant (p<0,05 p=0,036). The proportion of males who do not give advice to acquaintances about medication were lower than expected.

Table 39. Gender and giving advice to acquaintances about medication crosstabulation

			Gender		Total
			Female	Male	
I give advice to acquaintances about medication.	Yes	Count (n)	27	11	38
		Percent (%)	71,1%	28,9%	100,0%
	No	Count (n)	24	**2**	26
		Percent (%)	92,3%	7,7%	100,0%
Total		Count (n)	51	13	64
		Percent (%)	79,7%	20,3%	100,0%

4.2.1.5. Occupation and medication use before seeing a health care professional

Table 40. Occupation and medication use before seeing a health care professional crosstabulation

			Occupation			Total
			Pharmacy Teaching Staff	Pharmacy student	University personnel and student	
I can use medication before seeing a health care profession	Yes	Count (n)	8	**22**	11	41
		Percent (%)	19,5%	53,7%	26,8%	100,0%
	No	Count (n)	2	6	14	22
		Percent (%)	9,1%	27,3%	63,6%	100,0%
Total		Count (n)	10	28	25	63
		Percent (%)	15,9%	44,4%	39,7%	100,0%

According to data, occupation and medication use before seeing a health care professional was found to be different. The difference between groups was found

statistically significant (p<0,05 p=0,017). The number of the pharmacy students who use medication before seeing a health care profession was more than expected.

4.2.1.6. Gender and health care center visit to have prescription

The distribution of the gender and in terms of visits to health care center to obtain a prescription is found different. The difference between groups is statistically significant (p<0,05 p=0,035). Males who go to a health care center to obtain a prescription from the doctor is more than expected.

Table 41. Gender and health care center visit to have prescription crosstabulation

			Gender		
			Female	Male	Total
To obtain prescription, I go to a health care center	Yes	Count (n)	15	**8**	23
		Percent (%)	65,2%	34,8%	100,0%
	No	Count (n)	35	5	40
		Percent (%)	87,5%	12,5%	100,0%
Total		Count (n)	50	13	63
		Percent (%)	79,4%	20,6%	100,0%

4.2.2. Cross-tabulation with statement answers

4.2.2.1. Alternative care use in normal life and during disease

There is a correlation between alternative use in normal life and during disease (p<0.05 p=0,000). The correlation is low and positive (r=0,466).

Table 42. Alternative care use in normal life and during disease crosstabulation

			I use alternative care in my normal life		
			Yes	No	Total
I use alternative care during my disease	Yes	Count (n)	21	18	39
		Percent (%)	53,8%	46,2%	100,0%
	No	Count (n)	2	23	25
		Percent (%)	8,0%	92,0%	100,0%
Total		Count (n)	23	41	64
		Percent (%)	35,9%	64,1%	100,0%

4.2.2.2. Wrong or different drug taking in self medication and drug use with the advice of a person who is not a health care professionals

Table 43. Self-medication and drug usage by advice crosstabulation

			I can use drug with the advice of a person who is not a health care professional		
			Yes	No	Total
I have used different or wrong medicines unnecessarily by myself before	Yes	Count (n)	2	7	9
		Percent (%)	22,2%	77,8%	100,0%
	No	Count (n)	1	55	56
		Percent (%)	1,8%	98,2%	100,0%
Total		Count (n)	3	62	65
		Percent (%)	4,6%	95,4%	100,0%

It is found that there is a correlation between wrong or different drug taking in self medication and drug use with the advice of a person who is not a health care

professionals (p<0,05 p=0,048). The correlation between them is found low and positive (r=0,336).

4.2.2.3. Medication use before seeing a health care professional and giving advice to acquaintances about medication

The correlation between medication use before seeing a health care professional, and giving advice to acquaintances about medication was observed (p<0,05 p=0,004). There is a low and positive correlation between them (r=0,359).

Table 44. Self-medication and giving advice about medication crosstabulation

			I can use medication before seeing a health care profession		
			Yes	No	Total
I give advice to acquaintances about medication	Yes	Count (n)	30	8	38
		Percent (%)	78,9%	21,1%	100,0%
	No	Count (n)	11	14	25
		Percent (%)	44,0%	56,0%	100,0%
Total		Count (n)	41	22	63
		Percent (%)	65,1%	34,9%	100,0%

4.2.2.4. Forgetting to take drugs and inappropriate use of medication

There is a correlation between forgetting to take drugs and inappropriate use of medication (p<0,05 p=0,003). The correlation found low and positive between them (r=0,375).

Table 45. Forgetting to take drugs and inappropriate use of medication crosstabulation

			I sometimes use my medications not as recommended by doctor or the pharmacist		
			Yes	No	Total
I can forget to take drugs.	Yes	Count (n)	17	14	31
		Percent (%)	54,8%	45,2%	100,0%
	No	Count (n)	6	26	32
		Percent (%)	18,8%	81,3%	100,0%
Total		Count (n)	23	40	63
		Percent (%)	36,5%	63,5%	100,0%

4.2.3. Cross-tabulation with RDU score groups

The groups of RDU score is classified as lower than mean group and higher than mean group. Lower than mean group is called fair RDU habits having and higher than mean group is called good RDU habits having.

4.2.3.1. RDU score and gender

In the hypothesis, there was an expectation of finding difference RDU score groups and sociodemographic properties. As a demographic property, gender was compared with RDU score groups.

Table 46. RDU score distribution of gender

	Gender	N	Mean	Std. Deviation
RDU score	Female	51	7,2941	1,44629
	Male	13	6,3077	1,43670

T test is applied to define difference in distribution of RDU score and gender. Female has higher RDU score than males as statistically significant (p<0,05, 0,032).

4.2.3.2. RDU score groups and occupation

As a demographic property, occupation was compared with RDU score groups. There was not any difference found in distribution of occupation and RDU score groups (p>0,05).

Table 47. RDU score groups and occupation crosstabulation

			RDU score groups		
			Lower than mean	Higher than mean	Total
Occupation	Pharmacy teaching staff	Count (n)	6	4	10
		Percent (%)	60,0%	40,0%	100,0%
	Pharmacy student	Count (n)	19	9	28
		Percent (%)	67,9%	32,1%	100,0%
	University member other than pharmacy	Count	13	14	27
		Percent (%)	48,1%	51,9%	100,0%
Total		Count	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.2.3.3. RDU score groups and education

Education was compared with RDU score groups, as a demographic parameter. There were no difference found statistically significant between RDU score groups and education.

Table 48. RDU score groups and education crosstabulation

			RDU score groups		
			Lower than mean	Higher than mean	Total
Education	Primary school	Count (n)	1	1	2
		Percent (%)	50,0%	50,0%	100,0%
	High school	Count (n)	3	0	3
		Percent (%)	100,0%	,0%	100,0%
	College	Count (n)	4	3	7
		Percent (%)	57,1%	42,9%	100,0%
	University	Count (n)	22	14	36
		Percent (%)	61,1%	38,9%	100,0%
	Master	Count (n)	3	2	5
		Percent (%)	60,0%	40,0%	100,0%
	Doctorate	Count (n)	5	7	12
		Percent (%)	41,7%	58,3%	100,0%
Total		Count (n)	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.2.3.4. RDU score groups and surplus medicines

It was expected in hypothesis that there were a difference in distribution between unused drugs disposal habits and RDUscore groups so RDU score groups and surplus medicine disposal habits were compared. There were no statistically significant difference found in distribution of them (p>0,05).

Table 49. RDU score groups and surplus medicines crosstabulation

			RDU score groups		
			Lower than mean	Higher than mean	Total
Surplus medicines	Junk to garbage	Count (n)	4	1	5
		Percent (%)	80,0%	20,0%	100,0%
	Take to pharmacy	Count (n)	8	3	11
		Percent (%)	72,7%	27,3%	100,0%
	Take to a health care unit	Count (n)	2	2	4
		Percent (%)	50,0%	50,0%	100,0%
	Keep at home	Count (n)	21	19	40
		Percent (%)	52,5%	47,5%	100,0%
	Give to someone else	Count (n)	2	1	3
		Percent (%)	66,7%	33,3%	100,0%
	Other	Count (n)	1	1	1
		Percent (%)	50,0%	50,0%	100,0%
Total		Count (n)	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.2.3.5. RDU score groups and expired drugs

For expectancy in hypothesis, RDU score groups and expired drugs disposal habits were compared. There were not any statistically significant difference found between them (p>0,05).

Table 50. RDU score groups and expired drugs

| | | | RDU score groups | | |
			Lower than mean	Higher than mean	Total
Expired drugs	Junk	Count (n)	23	11	34
		Percent (%)	67,6%	32,4%	100,0%
	Take to pharmacy	Count (n)	8	4	12
		Percent (%)	66,7%	33,3%	100,0%
	Take to a health care unit	Count	0	3	3
		Percent (%)	,0%	100,0%	100,0%
	Flush down to the toilet	Count (n)	2	3	5
		Percent (%)	40,0%	60,0%	100,0%
	Other	Count (n)	5	6	11
		Percent (%)	45,5%	54,5%	100,0%
Total		Count (n)	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.2.3.6. RDU score groups and giving advice to acquaintances about medication

RDU score groups and giving advice to acquaintances about medication was found to be different. The difference between them is statistically significant (p<0,05 p=0,003). The number of participants who had good RDU behaviour and who gave advice to acquaintances about medication was found more than expected.

Table 51. RDU score groups and giving advice to acquaintances about medication crosstabulation

			RDU score groups		
			Lower than mean	Higher than mean	Total
I give advice to acquaintances about medication	Yes	Count (n)	28	**10**	38
		Percent (%)	73,7%	26,3%	100,0%
	No	Count (n)	10	17	27
		Percent (%)	37,0%	63,0%	100,0%
Total		Count (n)	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.2.3.7. RDU score groups and inappropriate use of medication

The Fisher exact test was used due to existence of a group which is less than 5 participants. There is a difference between distribution of the RDU score and inappropriate use of medication. The difference is statistically significant (p<0,05 p=0,000). The number of respondents with good RDU who sometimes use their medications not as recommended by doctor or pharmacist was found less than expected. This is resulted in different distribution.

Table 52. RDU score groups and inappropriate use of medication crosstabulation

			RDU score groups		
			Lower than mean	Higher than mean	Total
I sometimes use my medications not as recommended by doctor or the pharmacist	Yes	Count (n)	20	**3**	23
		Percent (%)	87,0%	13,0%	100,0%
	No	Count (n)	18	24	42
		Percent (%)	42,9%	57,1%	100,0%
Total		Count (n)	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.2.3.8. RDU score groups and forgetting to take drugs

Table 53. RDU score groups and forgetting to take drugs crosstabulation

			RDU score groups		
			Lower than mean	Higher than mean	Total
I can forget to take drugs.	Yes	Count (n)	27	4	31
		Percent (%)	87,1%	12,9%	100,0%
	No	Count (n)	**11**	21	32
		Percent (%)	34,4%	65,6%	100,0%
Total		Count (n)	38	25	63
		Percent (%)	60,3%	39,7%	100,0%

There was a group which have less than 5 participants so the Fisher exact test was applied. RDU score groups and forgetting to take drugs was compared. The difference between these two groups was found statistically significant (p<0,05 p=0,000). The number of participants with fair RDU score who did not forget to take their drugs was found less than expected.

4.2.3.9. RDU score groups and wrong or different drug taking in self medication

Because only one participant was in the group, the Fisher exact test was used. In distribution of RDU score groups and wrong or different drug taking in self medication was compared. The difference is found statistically significant (p<0,05 p=0,046). The number of participants with good RDU score who have used different or wrong medicines unnecessarily by themselves is found less than expected.

Table 54. RDU score groups and wrong or different drug taking in self medication crosstabulation

			RDU score groups		
			Lower than mean	Higher than mean	Total
I have used different or wrong medicines unnecessarily by myself before	Yes	Count (n)	8	**1**	9
		Percent (%)	88,9%	11,1%	100,0%
	No	Count (n)	30	26	56
		Percent (%)	53,6%	46,4%	100,0%
Total		Count (n)	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.2.3.10. RDU score groups and medication use before seeing a health care professional

It is found that RDU score groups and medication use before seeing a health care professional distributed differently. The difference between them is statistically significant (p<0,05 p=0,003). The number of respondents with fair RDU score who use medication before seeing a health care profession is found less than expected and the number of respondents with good RDU score who have not used medication before seeing a health care profession is found more than expected.

Table 55. RDU score groups and drug use before seeing a health care professional crosstabulation

Crosstab

			RDU score groups		
			Lower than mean	Higher than mean	Total
I use medication before seeing a health care profession	Yes	Count (n)	**29**	12	41
		Percent (%)	70,7%	29,3%	100,0%
	No	Count (n)	7	**15**	22
		Percent (%)	31,8%	68,2%	100,0%
Total		Count (n)	36	27	63
		Percent (%)	57,1%	42,9%	100,0%

4.2.3.10. RDU score groups and knowing a relative working in health care system

It is expected in hypothesis that there was a difference in distribution between knowing a relative working in health care system and RDU score groups so they were compared. There was not any difference found in distribution of them.

Table 56. RDU score groups and knowing a relative working in health care system

			RDU score groups		
			Lower than mean	Higher than mean	Total
I know a health care worker who I can consult with	Yes	Count (n)	31	23	54
		Percent (%)	57,4%	42,6%	100,0%
	No	Count (n)	7	4	11
		Percent (%)	63,6%	36,4%	100,0%
Total		Count (n)	38	27	65
		Percent (%)	58,5%	41,5%	100,0%

4.3. Reliability and Validity of Questionnaire

For reliability of the questionnaire, consistence of the items was evaluated by using the formulation Kuder-Richardson 20. It was found that the questionnaire was quite reliable (0,79). For content validity of the questionnaire, it was concluded by experts that the content of the questionnaire was valid.

5. DISCUSSION

The aim of the thesis was to make an assessment about RDU habits and find any correlation or difference existed between them. Due to the participants sample being made up from volunteer people and relatively low participation rate to questionnaire, the results were affected.

The mean of RDU score was found 7,14 (max score was 10) but 58,5% of the participants had score that lower than mean (Table 35). In study conducted in Adana, mean was 68,4 with the maximum score 94,6 [18]. The results were found parallel. It is normal to have high mean with the participants who were mostly from faculty of pharmacy and participants who had high education level. On the other hand, it is interesting that number of good RDU group was found lower than expected.

The age group 18-24 was the group in which nearly half of all participants were included (44,6%), as seen at the Table 3. This was expected because the campaign was conducted in a university. The other groups are from teaching staff and university personnel as expected. There was no statistically significant difference in distribution of RDU score and age groups. The small sample size could be a cause for the lack of significant correlation.

78,5% of the participants were female (Table 4). This made the sample different from the universe because of being volunteer of the participants rather than choosing them. However, it could be said that it was because women are more informed and willing about the subject of RDU and unused drugs. On the other hand, although it was thought that women would be more conscious about the subject, in terms of distribution of RDU score and gender, there was not a statistically significant difference. However, it is surprising that in distribution of the RDU score and gender, females found as had higher RDU score. A study conducted in Adana about drug usage habits found no difference in distribution of RDU score and gender

[18]. The results of that study are not compatible with the results of the thesis due to different sampling.

About education, 55,4% of the respondents declared that they had a university degree (Table 5). Total of university, master and doctorate degree holders was 81,6% whereas in a study conducted in Konya 30,7% of the participants had graduated from college [145] and in the study of Pinar in Adana, 36,3% of the participants had graduated from primary school and only 17,5% of them had university degree [18]. The rate of higher education level can be a result of selection of a university to conduct the campaign. The rest of the participants (18,4%) are thought to be personnel of the university (cleaning, security and etc.) RDU score and education did not distribute statistically differently as like in the studies in Konya and Adana [18,145].

According to the Table 6, most of the participants were pharmacy student (43,1%). To assess the difference between the pharmacy faculty and the whole university this grouping was made. The total of participants who were members of the pharmacy faculty was 58,5%. Because of the high participation rate, it can be proposed that pharmacy faculty is more sensitive about unused drugs and RDU. It was surprising that a significant difference could not be found between RDU and occupational groups. Because most of the participants were from the faculty of pharmacy, it was expected that good RDU would be high in pharmacy student and teaching staff. The results are found interesting in this sense.

SGK is the health insurance which most of the participants had (74%) as seen at the Table 7. 25,9% of the participants had secondary health insurance (private health insurance). Altogether, 30,5% of the participants had private health insurance, and 95,4% of the respondents had some form of health insurance. In the study which was conducted in Adana, SGK rate was 80,4% of the participants and private health insurance rate is just 0,6% [18]. 90,1% of participants had SGK and only 1% of them had private health insurance in the study which was conducted by Canbolat made in

Konya [18]. In another investigation which was conducted in a health college in Manisa, 85,8% of the participants had health insurance [91]. The reason for the higher private health insurance higher rate could be that the university supplies SGK and private health insurance to its employees. So participants who have two health insurance could be staff at the university. There was not a statistically significant difference found between the RDU score and health insurance in our study or in either of the studies conducted in Adana or Konya [18,145].

Contrary to the expectation in hypothesis, none of the sociodemographic markers and RDU distribution were found significantly different, except gender. The reason can be cause of small sample size or situation of the unproven relation of RDU and sociodemographic properties.

67,7% of the participants prefer SGK to supply their medicines. As the SGK is the main purchaser of medicine in Turkey, this can be expected. It is interesting that private health insurance as the supply way rate (30.8%) is more than answers having private health insurance (30,5%). The difference may result from participants who left the question about health insurance unanswered.

According to the Table 9, most frequently participants keep surplus medicines at home (61,5%) and 7,7% of them dispose of the surplus medicines to garbage. In total, %72,8 of the participants dispose of the surplus medicines irrationally. Only 23,1% of the participants prefer rational methods of disposal such as taking them to the pharmacy or a health care unit. In the drug usage habits study in Adana, 17,9% of participants were hoarding their medicines at home [18] whereas in an investigation conducted in Madigan Army Medical Center in Washington, USA, 56,4% of the participants were found hoarding at least 1-5 medicines at home [87]. Our results are compatible with the study in USA while was not compatible with the result of Adana study. It is interesting that although participants were mostly highly educated and more than half of them were member of pharmacy faculty, irrational disposing methods rate are quite high. Hoarding medicine at home appears to be a remarkable

problem. There was no difference found in the distribution between RDU score and disposing habits of surplus medicines. Perhaps the small number of participants may account for the lack of significance.

About expired drugs, chucking out them was the behaviour which 52,3% of the participants chose (Table 10). "Other" unspecified options were interestingly prefered by 16,9% of the participants. In total, 60% of the participants declared that they disposed expired drugs irrationally via junking or flushing down the toilet. 23,1% of the participants took the expired drugs to the pharmacy or a health care unit as a rational habit for disposal. In a study in Northern Arab Emirates, 84% of the participants were found to be throwing expired drugs away as waste [85]. Another study in a region of Washington, USA found that 35,2% of the participants rinsed expired drugs down the sink, and 53,8% of them flushed down the toilet but only 21% of them believed that it is an acceptable method to dispose by rinsing down a sink whereas 35,7% of them believed that by flushing down a toilet safer disposal was achieved [87]. In the Adana study, 49% of the participants threw expired drug into the garbage [18]. The results in these studies and the thesis run parallel to each other. In addition to these, there is no difference in distribution of the answers of RDU score groups and expired drugs habits. It is perhaps surprising that a group which was formed mostly of member of pharmacy faculty had irrational disposing behaviour and most of the participants were not conscious about appropriate disposing methods. Perhaps participants were not aware of their community pharmacies are equipped to dispose of expired medication. Perhaps too pharmacies are not exercising this duty.

It is expected in hypothesis that unused drugs and expired drugs are mostly disposed of as junk. However, unused surplus medicines were mostly kept at home (61,5%) whereas expired drugs are disposed of as junk by 52,3% of the participants. The gap between the results may have resulted from the idea of that unused drugs could be used another time in diseases but expired drugs could not be used. Also, not knowing acceptable methods of disposal may be another cause of the irrational

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disposing. A correlation between the habits of unused and expired could not be found.

About the believed reason of wasted medicines formation were mostly, "healing of the patient" and "hoarding medicines at home" in our thesis. In an unused drug gathering campaign in Otago, New Zealand, it was found that the reasons for the returns were mostly "death of the patient", "expired medicines" and "the person felt better" [109]. In another study in Alberta, Canada, the most frequent answers of forming unused medicines were "the death of the patient, expired medication and physician directed change" [112]. The selected reasons in these studies are like each other but dissimilar to our thesis. Regional and cultural differences may be contributing factors.

As shown in Table 11, special box or container was most preferred place to store medications (61,5%). Contrary to our hypothesis, medicine chest was selected by 20% of the participants. In total, 86,1% of the participants arranged a special place for their drugs but it is not clear whether the selected place is away from children, heat, light and moisture to protect the medicines. In the studies which have been conducted in Turkey, a study in Ankara showed that 42,9% of the participants preferred a special box or medicine chest and 42,2% of them preferred refrigerator to keep medications [14] while the result of the Adana study was that 45,1% of the participants kept medications at refrigerator, 23,2% kept them at medicine chest and rest at cold places, dark places and place that is suitable at the prospectuses [18]. The warmer climate of the Adana may be a cause of higher keeping in refrigerator. The results of the studies were parallel to each other but not to the thesis. There were no significant differences found in the distribution of RDU scores and medication storage places.

When adverse effects were seen, 55,4% of the participants chose to consult a doctor (Table 12). It is interesting that most of the participants were the member of pharmacy faculty but only 24,6% of the participants said they would choose to

consult the pharmacist. On the other hand, 95,4% of them chose to consult a health care professional. In a study conducted in Ankara, it was found that 77,4% of the participant chose to consult a doctor for adverse effects [15]. The result of the studies can be said to be similar. In terms of distribution of consultant when an adverse effect occurs, answers and RDU score groups, there were no statistically significant differences.

Regarding consultant for drug information, as shown in Table 13, the pharmacist is the most frequently preferred consultant was the pharmacist (55,4%). The doctor was the second option which 35,4% of the participants chose. In general, 90,8% of the participants chose a health care professional to consult to get drug information. The high rate of preference for a pharmacist could be explained by the fact that the most of the participants were from the faculty of pharmacy. There was no correlation between choosing consultant when an adverse effect occurs, and consultant for drug information.

As expected in hypothesis, the injection form of medication is believed to be most potent form by 92,3% of the participants. It is thought provoking that although most of the participants were members of the pharmacy faculty, and informed about medications, a form of medication is specified to be the most potent. It could be postulated that some traditional beliefs could not be changed by education. In a study in Ankara similar results were found. 77,1% of the patient chose the injection as the most potent form [31].

About alternative care use, 61,5% of the respondents declared their use of alternative care for disease states (Table 15), whereas only 35,4% of them used alternative care in normal life (Table 16). It is quite interesting that the respondents more often tended to use alternative care when they got ill than in normal life. In the study which was conducted in Adana, alternative care use was accepted by 44,7% of the participants [18]. These results are similar. A correlation was found between alternative care use in normal life and in disease state. This was also anticipated in

the hypothesis. To clarify, participants who used alternative care in normal life also used it in disease. Recently, alternative care options have been described as more safe and "natural" so people believe generally that the natural is harmless awhile the drug has side effects. To impose this was a market strategy of these products and they succeeded in increasing the use of alternative care products by public.

The number of pharmacy students who used alternative care at disease state and in normal life was found more than expected. This can be due to up-to-date knowledge on alternative care options in their education. University personnel and students other than from the pharmacy faculty who used alternative care at disease state were found less than expected. The explanation for this may be that they preferred to use medicine to alternative care due to being informed about necessity of the medication and higher education rate related being in university. Also, university personnel and students other than from the pharmacy faculty who preferred alternative care at normal life was found more than expected. The situation could be a sign of a trend to use alternative care as prevention for diseases.

According to Table 17, 70,8% of the participants were generally satisfied when consulting about drug information. It is an encouraging indication for the future to consult about drug information. Being in a university environment may be the reason for this finding.

It was nearly at an equal rate that the participants stated their pharmacist advised them regarding OTCs or not (Table 18). The equality of the answers reflected the increasing use situation of OTCs in Turkey.

As a rational habit, 95,4% of the participants did not use a drug on the advice of a person who was not a health care professional (Table19). In the Adana study, 92,1% of the participants declared the same statement [18], whereas the rate in Saudi Arabia was 43,9% and in Gulf countries, it was 49,4% [94]. In another study held in Ankara showed that 25,6% of the participants admitted their use of drugs on the

advice of acquaintances [31]. Our results are similiar to the Ankara and Adana studies and not to those held in Saudi Arabia or Gulf countries. It may be suggested that drug use on the advice of a person who is not a health care professional is not a common habit in Turkey. Most of the participants were occupied in university either as personnel or student, and were therefore also conscious about RDU.

Hoarding medicine at home was found in nearly half of the participants as shown at Table 20 (41,5%). According to the study conducted in Ankara, 44,8% of the participants had unused medication at their homes [31], while in a study conducted in the Northern Arab Emirates, 99% of the participants had them [85]. In a survey carried out in British households, 25% of the respondents admitted to having unused medicines at home [94]. In another study conducted in Konya, 40,3% of the participants said they kept unused medicines at home [145]. The results are similar to the studies in Turkey but not to the British and Northern Arab Emirates studies. It can be said that hoarding rates can change from country to country. On the other hand, hoarding rates are quite high, as indicating irrational use and medication waste. The public should be educated about not keeping medicines at home and using medicines as needed and instructed by doctor or pharmacist. The high rates are also surprising because most of the participants were associates of pharmacy faculty.

89,2% of the participants answered "No" to the statement "I get confused if there is more than one drug in my therapy" (Table 21). It is interesting that an increased drug number does not enhance the confusion. One factor for this high rate may be involvement in the faculty of pharmacy and selecting a university for the study.

According to Table 22, most of the participants admitted their use of medication before seeing a health care professional (63,1%). A study which was held in a university in Ankara showed higher results for the same subject (90,2%)[95]. In another study from Ankara, 75,5% of the participants used medication before seeking a medical help [15]. In the Adana study, similar results were found. 57,1% of the

participants admitted their medication use before a seeing a health care professional [18]. In Northern Arab Emirates, the rate of using medication before medical consultation was 45% [85]. Almost all of these results are parallel to each other except the high rate in Ankara, and relatively low rate of the Northern Arab Emirates study. It was proposed that some of the participants who use medication before seeking medical help were from the faculty of pharmacy. The number of the pharmacy students who use medication before seeing a health care profession was found more than expected ($p<0,05$). Being a student at the faculty of pharmacy could enhance self-medication. On the other hand, it is interesting that self medication rate in Turkey is quite high, although the RDU score mean showed high results.

The number of pharmacy students who use medication before seeing a health care profession was found more than expected. This finding can be assumed to be normal because pharmacy students have knowledge about drugs, diseases and symptoms, and may self-medicate before seeing a health care profession; therefore the finding related to the pharmacy students may be a result of self-confidence on drug information. On the other hand, it is not known whether their educational level was enough to give advice about medication due to not knowing which classes they had taken.

The number of respondents with fair RDU score who use medication before seeing a health care profession was found less than expected, and the number of respondents with good RDU score who did not use medication before seeing a health care profession is found more than expected (statistically significant), and this possibility was not mentioned in the hypothesis. It is interesting that participants with fair RDU score used less medication before seeing a health care profession than participants with good RDU score. It is compatible with the general results and the result that participants with good RDU score did not use medication before seeing a health care profession.

As a rational habit, checking expiry date is found at quite a high rate, as shown at the Table 23 (95,4%). In a study held in Ankara, 88,4% of the participants checked their medication's expiry date [14]. Similarly, in the study of Adana this rate was found as 84,1% [18]. On the other hand, 37,0% of the Saudi households in Saudi Arabia declared that they never checked the expiry date of a medication prior to consumption [94]. These results are compatible with each other. It is encouraging to being able to say that consciousness about expiration date has improved in last decades.

Proportion of the giving advice to acquaintances about medication rate was found to be 58,5% (Table 24). In the Adana study, 14,9% of the participants gave advices to their acquaintances about medication [18]. In a study held in Ankara, 22,6% of the participants admitted giving advice about medication [31]. Another study from Ankara showed similar result with the rate of 24,5% [15].The results in the literature were not parallel to the result of our thesis. As a different dimension of self medication, giving advice about medication is an important issue. Misplaced self- confidence about drug information can have dangerous consequences. On the other hand, the high rate could be caused by high participation rate from the pharmacy faculty. Males who gave advice about medication was found lower than expected (statistically significant). It can be said that males tend not to take risks when giving information about medication.

The number of participants who had good RDU behaviour and who gave advice to acquaintances about medication was found more than expected (statistically significant). It could be assumed to be a contradictory statement if the sample were the general public but the sample was made up mostly of members of the pharmacy faculty and this may explain the high rates of advice to acquaintances.

Contrary to the expectation in hypothesis, there was no correlation found between giving advice to acquaintances about medication and medication use on the advice of a person who is not a health care professional (p>0,05). It can perhaps be

explained as the participants who seek advice about medication did not give advice about medication. It is found that the participants group who seek advice were not from faculty of pharmacy.

The number of pharmacy students who gave advice to their acquaintances about medications was found to be more than expected (statistically significant). It could be said that pharmacy students trusted their knowledge on drug information very much and it is not known that their education is enough to give advice about medication due to not knowing their classes.

Although not mentioned in hypothesis, there was a correlation found between medication use before seeing a health care professional and giving advice to acquaintances about medication. Both of the habits were linked with self-confidence in knowledge of drugs. It can be said that the participants who gave advice about medication and who used medication before seeking medical help by theirselves, were members of the pharmacy faculty.

90,8% of the participants thought drugs helped them to get better (Table 25). This can be an important clue for compliance. Because when the patient do not believe in that drug is necessary to heal, he/she may quit to taking them. In this sense, compliance is a sign of RDU.

As a rational habit, 64,6% of the participants use their medication as instructed by the doctor or the pharmacist (Table 26). The study in Adana, 84,8% of the respondents declared their medication use was as instructed by a health care professional [18]. In Konya research, 93,7% of the participants reported the same [145]. The results were parallel in spite of the results of the thesis being a bit less than the others. 35,4% of the participants used their medication improperly. This reflects another aspect of self-medication or wrong use of medicines and this problem should be focused on to increase RDU.

The number of respondents with good RDU who sometimes use their medications other than as recommended by a doctor or pharmacist was found less than expected (as statistically significant). This supports the hypothesis that participants with good RDU habits are more aware of the appropriate and rational use of medication.

Most of the participants stated not going to health care center to have prescription filled (61,5%). Similarly, 71,1% of the participants of Adana study accepted to go health care center to have prescription for stockpiling medicine at home [18]. In Turkey, patients buy medication without a prescription. However, 70% of the people with health insurance prefer to consult a doctor and apply a pressure on a doctor to a write prescription composed of drugs the patient wants. This pressure is often applied to make doctor write drugs that are believed to be used just in case. Doctors cannot resist this irrational pressure. Due to economical difficulties, the number of drugs that can be written on a prescription decreased from five to four in 2001. Theoretically the case would be beneficial but in practical it did not work [108]. According to new arrangement in Turkey, the doctor can prescribe needed medicine without any restriction about the quantity but the amount can be up to therapy for 3 months [146]. Although most of the participants did not go health care center to have prescription, 36,9% of them went and it is a quite high rate related to increase in waste of medication. People should be made aware about unused drugs, rational drug use and negative effects of the unused medicine waste.

The number of the males who go to health care center to make the doctor prescribed was found more than expected (statistically significant). It can be a sign of that males more than females tend to hoard drugs.

The rate of the participants who forget to take drugs and not forget was nearly equal (Table 28). As a compliance problem, interestingly, forgetting to take drugs was found quite high, although most of the participants were members of the pharmacy faculty and the age group was mostly 18-24. As not mentioned in

hypothesis, the number of participants with fair RDU score who did not forget to take their drugs was found statistically significantly less than expected. It is interesting that respondents with fair RDU habits forgot to take their drugs less than those with good RDU scores.

Although not mentioned in hypothesis, there was a statistically significant correlation between forgetting to take drugs and inappropriate use of medication. The connection between them could not be explained. Further studies about the subject should be conducted.

Wrong use of medication is another aspect of the irrational use of medication. 86,2% of the participants said they have never used different or wrong medicines unnecessarily by themselves (Table 29). In a study in Ankara, 13,2% of the participants admitted their wrong medication use before [15]. These results were parallel. It is expected that due to the high participation rate of the faculty of pharmacy, wrong use rates would not be found high. As a part of self medication, low rates of wrong use are seen as a hopeful indicator for the future to solve the problem. The number of participants with good RDU score who used different or wrong medicines unnecessarily by themselves is found less than expected (statistically significant) and this is not mentioned in hypothesis. It also supports the result that participants with good RDU habits had awareness of medication use, and used medication rationally.

There were a correlation found between wrong or different drug taking in self medication and drug use on the advice of a person who is not a health care professional. 84,6% of the participants said "No" to both statements. It showed that most of the participants were conscious of the need to consult a health care professional rather than self-medicate, or take the advice of a non-informed acquaintance.

83,1% of the participants know a health care worker who they can consult about medication (Table 30). The university has faculties of medicine, pharmacy and dentistry and it is likely that participants know someone who is a health care worker or a student of these faculties. As not anticipated in the hypothesis, participants who know a health care worker did not have a higher RDU score. There was not any statistically significant difference found between RDU score groups and knowing a health care worker.

"I generally know the effects and indication of the drugs at home" statement was accepted by 95,4% of the participants (Table 31). It was expected by the hypothesis as patients thought that they knew what their drug was and why their drug was used. The high education level and pharmacy faculty participation may be causes for the high rate. On the other hand, the statement is linking hoarding medicines at home, which is interesting.

As an accepted rational habit, the rate of reading prospectuses is found quite high (95,4%). In a research that was conducted in Muğla University among managerial staff, 96,6% of the participants read prospectuses [147] while in a study in Ankara, the rate of the participants who admitted not reading prospectuses was found to be 34,9% [31] and in Konya study, only 8,7% of the participants said that they have never read prospectuses [145]. Results are parallel to each other but the result of the Ankara study was a bit lower than the others. Reading the prospectuses is a way to make patients themselves informed about the medication. However, in general, there is no sign of understanding the prospectuses which they read. Maybe, instructions for the patients (in lay language) will helpful to improve reading rates.

Most of the participants asked their pharmacist how to use their medications (86,2%). In the Konya study, the rate of asking how to use medications which was in prescription was found 90,0% [145] whereas in the Adana study, only 30,2% of the participants asked their doctor how to use their prescribed medications [18]. The results can be assumed as compatible with each other. It is a sign of RDU and

although most of the participants were from the faculty of pharmacy, the high rate of asking how to use was thought provoking.

According to the results, reservations about the use of generic drugs substitution was found in 35,4% of the participants. In a study which was conducted in Oslo, Norway, 29% of the patients were anxious when they started using generically substituted products [148]. The results are compatible but the topic is newly noticed and there are not enough studies to assess the effect of generic substitution on patients compliance. The same drug molecule has generally the same effects on the body. Generic substitution is a way to prevent excessive economical loss for the original drugs. For economical reasons, generic medications should be explained to patients, so they do not refuse them. The high rate of acceptance can be caused by high awareness of drug information of the well educated participants.

6. CONCLUSION

In summary, RDU score is found quite high in the thesis and the effect of pharmacy faculty was seen in the whole study. On the other hand, consciousness about unused and waste medicines should be improved by education because although the participants were generally well educated, they did not know the correct disposal methods and a big portion of them hoarded medicines at home. Places where was medication kept at home should be selected rationally away from children, heat, light and moisture if special conditions apply they should be arranged to protect medicines from decomposition and medicine waste. The need of consultation for adverse effects and drug information should be focused on in education of health care professionals and also in the public. Alternative care options should be explained as needed and their claims to be "natural" were not correct because they have also chemicals like drugs. Only, proven alternative care options and trusted pharmaceutical properties should be used. The pharmacist has to know the effects and risks of alternative care and should sell them ethically.

Taking advise of a person who is not a health care professional about medication is not common. However, especially member of pharmacy faculty trust their own knowledge of drug. They used medication by themselves and gave advice about medication to their acquaintances. It is normal for teaching staff of pharmacy faculty but not for the students. Their education was not completed and they could make mistakes about the issue. They have to be warned about being careful when the subject is medication use.

Hoarding medicine at home is a growing problem which has to be solved. It leads to self medication and increase the amount of waste medicines. Primarily, pharmacy students, doctors and also public should be informed about the risk of medicine wastage, economical loss and environmental effects.

Checking the expiry date, reading prospectuses, believing in the usefulness of the drugs are seen at high rates. If the participants were assumed to be well educated, the public should also be educated about checking the expiry date to decrease medicine waste, and reading prospectuses to be aware of the medicines which they used. Believing in the usefulness of the drugs enhances compliance to the therapy as a rational belief.

Health care center visits to have prescription should be limited. This habit can be linked to hoarding medicines and also result in medicine waste. Governments should also take actions to reduce needless visits to health care centers.

Forgetting to take medicines is another problem to solve. There are many way to solve it. Recently, even apps on cell phones exist to remind patients about medicine taking. Pill organizers, alarms and arrangements of the administration times with daily rituals are common solutions. The support of the family is also helpful, especially for chronic patients. The pharmacist should monitor the patients' situation and intervene if needed.

Asking the pharmacist how to use the medication is found high but it is necessary to improve this to prevent the wrong use of medications. The pharmacist should encourage patients by asking if they understood the explanation about medication use or not. The pharmacist should ask the patient to explain how they should take the medication.

Hesitation about generic use is another concern to be focus on. The patients should understand why they are needed and why they should use generic medications. Substitution of generic drugs can prevent a huge loss in health economy. Pharmacist should explain the necessity of them when supplying their medicines.

As a result, in the thesis the role of the pharmacist was emphasized. The results cannot be generalized to the public because of the voluntarily participation and not reflecting the public. To improve RDU, doctor and pharmacist should be educated well enough to educate the public correctly. Most of the irrational use problems can be solved by education. The need of the public for education should be highlighted. Governments should encourage education to enhance RDU and to decrease the negative effects of wastage. Pharmacists are the most accessible to the patient and have an important role to improve RDU habits. As a clinical pharmacy service, pharmacist interventions has the ability of educating patients. The importance of clinical pharmacy appears in this sense.

LIMITATIONS

The study was planned firstly to measure the compliance rate of the participants but because of the voluntary nature of the questionnaire, not enough data could be obtained to satisfactorily assess this parameter. As an alternative indicator of compliance, we attempted to define and measure rational drug use. In this case too, low participation rates in the questionnaire restricted the results and the type of analysis that could be performed.

In addition, the distribution of socio-demographic values was not parallel to that of the general public, or even the university in general, due to the participation being voluntary, and being conducted on a university campus, rather than a selected public area. The data relating to the unused drugs collected during the campaign will be analyzed and used in another study.

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APPENDIX A: QUESTIONNAIRE (Turkish- Orginal)

Sayın Katılımcımız,

Bu anket, toplumumuzda kullanılmayan ilaçlar ve ilaç kullanım alışkanlıklarına ilişkin veri toplamak amacı ile hazırlanmıştır. Anket yaklaşık 10 dakikanızı alacaktır.

Araştırma, Yeditepe Üniversitesi 26 AĞUSTOS yerleşiminde yer alan herkesi kapsamaktadır. Katılım gönüllülük üzerine kurulmuştur. İlaç Toplama Kampanyamıza destek verdiğiniz, anketimize katıldığınız için çok teşekkür ederiz.

Saygılarımızla,

Ecz.Esra ÇELİK	**Yrd.Doç.Dr.Philip Martin CLARK**	**Uzm.Ecz.Nazlı ŞENCAN**
Yeditepe Üniversitesi	**Yeditepe Üniversitesi**	**Yeditepe Üniversitesi**
Eczacılık Fakültesi	**Eczacılık Fakültesi**	**Eczacılık Fakültesi**
YIZDA Koor.	**Klinik Eczacılık Dept.**	**Sosyal Eczacılık Dept.**

1. İsim (Zorunlu değil)……………………..
2. Doğum yılı/ yeri
3. Cinsiyet
4. Eğitim durumu / Sağlık güvencesi

   a. Okuma yazması yok   a. SSK
   b. İlk   b. Özel Sağlık Sigortası
   c. Orta   c. Yok
   d. Lise   d. Diğer……………….
   e. Yüksek okul
   f. Ünv.
   g. Yüksek lisans
   h. Doktora

5. Görev

   a. Eczacılık fakültesi öğrencisi
   b. Eczacılık fakültesi öğretim üyesi
   c. Eczacılık fakültesi dışındaki üniversite öğrencisi veya çalışanı

6. Sahip olunan kronik hastalık/lar: Kaç yıldır biliniyor?

   a. ……………..
   b. ……………..
   c. ………………
   d. ………………

7. Sürekli kullanılan ilaçlar / kaç yıldır kullanılıyor?
a. ………………
b. …………..
c. ………………
d. ………………

8. İlaç toplama kampanyamıza katılma nedeniniz?

9. Aynı hane içinde kaç kişi yaşıyorsunuz?.....

10. Kampanyamıza katılarak teslim ettiğiniz ilaçlar aile içinde kim/lere ait?

…………………………………

11. İlaçlarınızı nereden/nasıl temin ediyor sunuz? **(En çok iki tane seçenek işaretleyiniz)**
a. SGK
b. Kendi paramla (cepten)
c. Doktor numunesi
d. Tanıdık / Komşu ve arkadaştan
e. Yurtdışı
f. Özel sağlık sigortası
g. diğer…..

12. Elinizde tedaviden ilaç artarsa ne yaparsınız? **(lütfen sadece tek seçenek işaretleyiniz)**
a. çöpe atarım
b. eczaneye götürürüm.
c. bir sağlık kuruluşuna götürürüm.
d. evde saklarım.
e. başkasına veririm.
f. Diğer……………………….

13. Elinizde tarihi geçmiş veya bozulmuş ilaç kaldığında ne yaparsınız? **(lütfen sadece tek seçenek işaretleyiniz)**
a. çöpe atarım
b. eczaneye götürürüm.
c. bir sağlık kuruluşuna götürürüm.
d. lavaboya veya tuvalete dökerim.
e.Diğer……………………..

14. Sizce, evde kullanılmayan ilaç olması aşağıdakilerden hangisi/lerine bağlıdır? **(En çok iki tane seçenek işaretleyiniz)**
a. Son kullanma tarihinin geçmesi
b. Gerekli olur diye düşünülerek alınan ilaçların evde bulundurulması
c. Bir yakının vefatıyla kalan ilaçlar

d. Hastanın iyileşmesi

e. Doktorun ilacı değiştirmesi

f. Sağlık personeli dışında birilerinin tavsiyesiyle ile alınan ilaçlar

g. İlacın yan etkilerinin görülmesi

h. Hastanın kendini iyi hissetmesi

i. İlaç kullanmak istememek

j. Doktor numuneleri

k. Diğer………………………..

15. İlaçlarınızı genellikle nerede saklarsınız? **(Lütfen tek seçenek işaretleyiniz)**

a.Ecza dolabında

b.Özel bir çekmece ya da kutu içerisinde

c. Buzdolabında

d. Poşet içinde

e. Diğer…………………………

16. Sizce hangileri ilaç kapsamı içerisine girer?

		EVET	/	HAYIR
a.	Doktorun reçete ettiği ürünler	O		O
b.	Devlet tarafından geri ödenen sağlık ürünleri	O		O
c.	Eczanede satılan ürünler	O		O
d.	Kozmetik ürünlerin bazıları	O		O
e.	Vitaminler ve destek amaçlı kullanılan ürünler	O		O
f.	Çaylar	O		O
g.	Diğer………………………………..			

17. İstenmeyen ilaç etkisi görüldüğünde kime danışırsınız?

a.Doktor

b. Eczacı

c. İlacı daha önce kullanan yakınlar

d. Danışmam

e. Diğer…………………………

18. İlaç bilgisi almak icin öncelikli olarak kimi tercih edersiniz? **(Lütfen tek seçenek işaretleyiniz)**

a. Doktor

b. Eczacı

c. Hemşire

d. İlacı daha önce kullanan yakınlar

e. Diğer…………………………

19. Sizce aşağıdakilerden hangisi en güçlü ilaç formudur?

a.Enjeksiyon (iğne)

b.Tablet-kapsül

c. Şurup

d. Fitil

e. Diğer

20. Aşağıdakilerden katıldıklarınızı **EVET** ve katılmadıklarınızı **HAYIR** olarak işaretleyiniz.

	EVET	HAYIR
a1. Hastalığım sırasında alternatif tedavi (besin destekleri, bitkisel tedaviler, akapunktur, vb.) kullanıyorum.		
a2.Normal yaşamımda alternatif tedavi (besin destekleri, bitkisel tedaviler, akapunktur, vb.) kullanıyorum.		
b.İlaç bilgisi almak için danıştığımda genelde tatmin edici bilgi alabiliyorum.		
c.Eczacım bana reçetesiz ilaç veya takviyelerden öneriyor.		
d.Sağlık çalışanı olmayan (komşu, arkadaş, aile vb.) birinin tavsiyesiyle ilaç kullanabilirim.		
e. Evde ilaç biriktiririm.		
f.Birden fazla ilaç kullanmam gerektiğinde hangisinin ne için olduğunu karıştırdığım olur.		
g. Hasta olduğum durumlarda sağlık personeline başvurmadan önce ilaç kullandığım oluyor.		
h. Genellikle kullandığım ilaçların son kullanma tarihini kontrol ederim.		
i. Akraba /arkadaş/ aileme ilaç tavsiye ettiğim oluyor.		
j. Genelde hastalığım için kullandığım ilaçların şikayetlerimi azalttığı düşünüyorum.		
k.İlacımı doktorun/ eczacının anlattığı şekillerde almadığım/alamadığım olur.		
l.İlaç yazdırmak için sağlık ocağına giderim.		
m.İlaç almayı unuttuğum oluyor.		
n. Herhangi bir şikayet ya da hastalığım için kendi kendime gerekli olandan farklı ve yanlış ilaç kullandığım oldu.		
o. Yakın çevremde ilaç kullanımına ilişkin bilgi alabileceğim sağlık çalışanı (doktor, eczacı, hemşire vb.) var.		
p. Çoğunlukla evde olan ilaçların hangi hastalık için ve hangi durumda kullanılacağını biliyorum.		
r.İlaçların prospektüslerini okurum.		
s. Eczacıma ilaçlarımın nasıl kullanılacağını sorarım.		
ş. Muadil ilaç kullanmaktan rahatsızlık duyabilirim.		

21. Sağlık ocağına ilaç yazdırıyorsanız bu ilaçları neye göre belirlersiniz?

	EVET	HAYIR
Muayene olurum ve şikayetime göre verilen ilaçları alırım.		
Daha önce kullandım ve faydasını gördüm		
Her an ihtiyaç olabilecek ilaçları (ağrı kesici vb.) yazdırmak isterim		
Danışılan bir doktorun tavsiyesi		
Akraba/ arkadaş/ komşu tavsiyesi		

Eczacı tavsiyesi		
Doktorun geçen sefer yazdığı ilaçları yazdırırım		
Diğer…………………………..		

22. Hangi durumlarda ilaç kullanmayı bırakırsınız?

	EVET	HAYIR
a. Yan etki yaptığını fark ettiğimde		
b. Şikayetlerim azaldığında ya da bittiğinde		
c. İlaç bittiğinde		
d. Doktor almama gerek kalmadığını söylediğinde		
e. Faydasını görmediğimi düşündüğümde		
f. İlacın nasıl kullanılacağını anlamadığım / anlatılmadığında		
g. Doktorun almamı önerdiği süre bitince		

APPENDIX B: QUESTIONNAIRE (English)

May 2010

Dear Participant,

The questionnaire has been prepared to obtain data about unused drugs and drug use habits.   It will take 10 minutes to answer.

The study comprise all people who is in Yeditepe University 26 August Campus.
Participation is voluntary. Thank you for participation in the Unused Drug Gathering Campaign.

Pharm. Esra ÇELİK
Yeditepe University
Faculty of Pharmacy
YUDIC Coor.

Assist Prof.Dr.Philip Martin CLARK
Yeditepe University
Faculty of Pharmacy
Clinic Pharmacy Dept.

Assist Prof.Dr .Nazlı ŞENCAN
Yeditepe University
Faculty of Pharmacy
Social Pharmacy Dept.

1. Name (not obligatory)……………………..
2. Date of birth/ hometown
3. Gender
4. Education   /   Health insurance

a.   Do not know writing   a. SGK
b.   Primary   b. Private Health Insurance
c.   Secondary   c. Don't have health insurance
d.   High school   d. Other
e.   College
f.   University
g.   Master
h.   Doctorate

5. Occupation

a. Pharmacy student
b. Faculty of pharmacy teaching staff
c. University student or personnel other than pharmacy

6. Chronic diseases that you suffer from ……………..
   a.   ……………..
   b.   ………………
   c.   ………………

7. Medicines that you use regularly
   a.   ………………
   b.   …………..
   c.   ………………
   d.   ………………

8. Reason to participate to our campaign?

9. How many people do you live with?

10. Whose are the medications which you have brought?

11. How do you supply your medication? **(You can choose max. 2 options)**
  - e. SGK
  - f. I buy my medication by myself
  - g. Doctor drug sample
  - h. Acquaintances
  - i. Abroad
  - j. Private health insurance
  - k. Other…..

12. What do you do if you have surplus medicines at home? **(Please choose only ONE option)**
  - a. I junk them in the garbage
  - b. I take them to pharmacy
  - c. I take them to a health care unit
  - d. I keep them at home
  - e. I give them to someone else
  - f. Other………………………….

13. What do you do if you have expired or decomposed medicines at home? **(Please choose only ONE option)**
  - a. Junk them to garbage
  - b. Take them to pharmacy
  - c. Take them to a health care unit
  - d. Flush them down to toilet
  - e. Other………………………..

14. What is the reason to have unused medication at home? **(You can choose max. 2 options)**
  - a. Expired drugs
  - b. Keeping just in case drugs at home
  - c. Death of the user
  - d. Healing of the patient
  - e. Changing drug by doctor
  - f. Drugs that were taken by a advice of acquaintances who is not a health care worker
  - g. Side effects of medication
  - h. Feeling better of the patient
  - i. The user didn't want to continue taking the medication
  - j. Doctor drug samples
  - k. Other………………………..

15. Where do you store your medicines at home **(Please choose only ONE option)**
  a. Medicine chest
  b. Special box or container
  c. Refrigerator
  d. Pochette
  e. Other……………………………

16. Which ones of the following are drug?

	YES /	NO
a. Prescribed products by doctor	O	O
b. Health product reimbursed by the government	O	O
c. Products which are sold in pharmacy	O	O
d. Some cosmetic product	O	O
e. Vitamins and health supplements	O	O
f. Herbal teas	O	O
g. Other…………………………………..		

17. Who do you consult with when adverse effect occur?
  a. Doctor
  b. Pharmacist
  c. Acquaintances who have used medicine before
  d. I do not consult
  e. Other…………………………

18. Who do you prefer for drug information? **(Please choose only ONE option)**
  a. Doctor
  b. Pharmacist
  c. Nurse
  d. Acquaintances who have used medicine before
  e. Diğer…………………………

19. What is the strongest dosage form of the drugs? **(Please choose only ONE option)**
  a. Injection
  b.Tablet-capsul
  c. Syrup
  d. Suppository
  e. Other

20. Please select **YES** if you agree the statements, **NO** if you do not agree

	YES	NO
a1. I use alternative care during my disease		
a2. I use alternative care in my normal life		
b. I can generally get satisfaction when consult about drug information		
c. My pharmacist advise me about OTCs		
d. I use drug with the advice of a person who is not a health care professional.		
e. I hoard medicines at home.		
f. I can get confused if there is more than one drug in my therapy		
g. I use medication before seeing a health care profession		
h. I check the expiration date of the drugs		
i. I give advice to acquaintances about medication		
j. I think drugs help me to get better		
k. I sometimes use my medications not as instructed by doctor or the pharmacist		
l. To make the doctor prescribed, I go to a health care center		
m. I forget to take drugs		
n. I may have used medicines in a mistaken or unnecessary way.		
o. I know a health care worker who I can consult with.		
p I generally know the effects and indication of the drugs at home.		
r. I read the prospectuses of the drugs.		
s. I ask to my pharmacist how to use the medications.		
ş. I have reservations about use of generic drugs substitution.		

21. If you go a health care unit, what kind of drug you would like him/her to prescribe?

	YES	NO
I see a doctor and use whatever medicines are prescribed for me		
I take the medicines which I have used before and which helped me		
I want "just in case" medicines as a back-up		
Advise of a doctor		
Advise of an acquaintances		
Advise of a pharmacist		
I want the medicines which the doctor prescribed last		
Other……………………………..		

22. When you stop to take drugs?

	YES	NO
a. When side effects occur		
b. When I am healed or get better		
c. When the box, container, course etc of medicine is finished		
d. When the doctor says, ''You don't need to take this medicine anymore''		
e. When I think it is not helping me		
f. When I do not understand how to use the medicine or if it has not been explained to me		
g. When the period that the doctor advised me to take medicine is completed		

CURRICULUM VITAE

ESRA ÇELİK

Esra Çelik was born on 24.10.1984 in Istanbul -Turkey. She changed two school until graduted from primary school with degree. She took first place in Sabri Çalışkan High School when she graduated in 2002. She entered Yeditepe University Faculty of Pharmacy in 2003. First year at the university, she went to Preparatory School to learn foreign language. She was elected as faculty representative in 2007. She graduated with a B.Sc. (Pharmacy) degree in 2008 and the topic of her Graduation Project was thalidomide analogues and their possible antibacterial effect in pharmaceutical chemistry. After graduation, she started to work in Yeditepe University and founded Yeditepe University Drug and Poison Information & Consultancy Unit (YUDIC) as a part of PEPIRC (PharmacoEconomy and PharmacoEPIdemiology Research Center) in September 2008. In the same year, she started her M.Sc. degree in Clinical Pharmacy Programme and her M.Sc. thesis entitled *"A pilot study on rational drug use and drug use habits"* under the supervision of Assist. Prof. Dr. Nazlı Şencan in the Department of Social Pharmacy in Yeditepe University and also co-advisor of Assist. Prof. Dr. Philip Martin Clark in the Department of Clinical Pharmacy in Yeditepe University. She leaded the Unused Drug Gathering Campaign in 2010 in Yeditepe University and studied about the subject pharmaceutical waste. Esra Çelik is currently employed as the coordinator of YUDIC in Yeditepe University.