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Antibiotics Dispensing Patterns in The Community  
Pharmacies in Gaza Governorate

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Pharmacies in Gaza Governorate

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## **Thesis Approval**

### **Antibiotics Dispensing Patterns in the Community Pharmacies in Gaza Governorate**

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**Jerusalem – Palestine**

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## Dedication

I would like to dedicate this work to the people who are always supporting me especially in my difficult times , they gave me all the elements of success , those people are my mother , my wife ,my brothers , my sisters , my son and daughters .

Mostafa Omar El-ghosain

# **INTRODUCTION**

## **1.1 Research background**

Antibiotics are considered one of the major defense lines in the protection of the individual and public health against bacterial infectious diseases. Many of the researchers have drawn attention and concentrated many of their researches tackling the issue of drugs and antibiotics irrational use which are believed to be particularly more common in developing countries ( Benjamin , Smith and Motawi, 1996).

Knowing the meaning of term rational drug use , is very important because people may have different perceptions and meanings regarding this issue, however the World Health Organization defines Rational use of drugs : " as that requires patients receive medications appropriate to their needs, in doses that meet their own individual requirements for an adequate period of time at the lowest cost to them and their community " (WHO,1987).

This study tries to investigate the irrational dispensing of antibiotics. Within the decade after Penicillin was discovered in 1928 antibiotics were seen as wonderful drug, able to wipe out many potential fatal bacterial infections. With these new strong weapons against diseases physicians gradually expanded the use of antibiotics to infections that were not life threatening , and even to infections that were viral, for which antibiotics were ineffective, for example prescribing an antibiotic for common cold to prevent secondary bacterial infections ( Traub , 2001 ).

Other irrational use of antibiotics is the pharmacist over the counter dispensing of antibiotics without prescription. The patients also ask to buy antibiotics courses without prescription, mostly influenced by the manufacturers exaggerating in their advertising about the potency of their antibiotics. All that have contributed to the problem of spreading resistance and forming of bacterial strains which are difficult to treat .Other serious health hazards like adverse reactions, protracted illness and even death can occur by overuse and misuse of antibiotics, in addition to the financial losses by individuals and governments due to irrational use of antibiotics ( Elkhoudary , 2002 ) .

The study was conducted in Gaza Governorate, in the year 2006-2007 aiming to evaluate and investigate the antibiotics dispensing patterns in the community pharmacies in Gaza Governorate, in order to try to have an actual real view of the problem, hoping that may help our national health authorities to know how and where they can point their intervention to alleviate or even eradicate this problem.

## **1.2 Research problem**

Irrational use of antibiotics is a common practice in most of the developing countries , Gaza governorate is belonging to the developing countries style of life , unfortunately I also noticed the existence of the irrational use of antibiotics from my experience as a manager of a community pharmacy in Gaza city for more than twelve years, people in Gaza used to buy antibiotics without prescription and pharmacists used to dispense them , this problem can cause possible emergence of antibiotics

resistance which can render most of our antibiotics ineffective against microbial infections , which can endanger the life of our people by increasing the mortality , morbidity and waste of resources , this study is badly needed to try to evaluate the actual size of this serious public health problem in Gaza governorate .

### **1.3 Justification of the study**

The community pharmacies in WB and Gaza Strip are representing the major private pharmaceutical service provider to our communities, with its vast geographical distribution. More than 353 pharmacies in Gaza Strip and 190 in Gaza Governorate alone , the community pharmacies are able to deliver the pharmaceutical service almost to each and every area of Gaza governorate. About 40% of drug consumption of West Bank and Gaza Strip is consumed through community pharmacies (MOH , 2006 ) . This means that large quantities of antibiotics are consumed through those community pharmacies, in addition to that , there was a previous knowledge of the existence of antibiotics irrational use which may cause that antibiotics losing their effectiveness against microbes , it was justified to conduct the study in Gaza governorate community pharmacies to try to assess the scale of this irrational antibiotics use in that such major pharmaceutical service provider .

### **1.4 Objectives**

#### **General objectives**

To evaluate the antibiotics prescribing and dispensing patterns among patients utilizing the community pharmacies, using some of the WHO prescribing and patient care indicators.

#### **Specific objectives**

1-To collect and analyze the antibiotics prescriptions in regard to the prescribing and dispensing patterns among patients utilizing the community pharmacies in Gaza Governorate.

2- To determine the average number of drugs per prescription , to assess the percentage of drugs prescribed by generic name and to calculate the percentage of prescriptions with the antibiotics prescribed .

3- To find out the average dispensing time , to compute the percentage of drugs actually dispensed and to determine the most common antibiotic groups prescribed per patient .

4- To explore relationships of patients educational, socioeconomic and demographic status in respect to antibiotic prescriptions reviewed .

5- To compare the appropriateness of antibiotics groups prescribed in respect with the medical diagnosis of the patient .

6- To suggest recommendations for the formulation of regional and national drug policies .

## **1.5 Context of the study**

To better understand the pharmaceutical services provided in our community pharmacies, and the health sector in general, a helpful background will be presented ,geographical , demographical, socioeconomic, educational and political situation of Palestine in general including Gaza governorate specifically as the place of the study.

### **1.5.1 Geography of Palestine and Gaza governorate:**

Gaza strip is a narrow piece of land lying on the coast of the Mediterranean sea with area of 365 square Km, while Gaza governorate is located in the north of Gaza strip with an area of 74 square Km and bordering the sea from the west , the green line from the east , Jaballia village from the north and Gaza valley from the south as shown in the map (Annex 1) , Gaza governorate has three different environmental areas urban Gaza city , camp beach camp and rural almughraqa and Sea , juher aldeek villages , while historical Palestine is located in the west of Asia, between latitudes 29.30 and 33.15 north and longitudes 24.10 and 35.40 east of Greenwich. Palestine is bordered on the west by the Mediterranean, with a coastline that is 230 kilometers long; on the east by Syria, sharing a border of 70 km, and Jordan sharing a border of 360 km; on the north by Lebanon and Syria, sharing with them a border of 79 km; and on the south by the Sinai and the Gulf of Aqaba. The border from Taba, on the Gulf of Aqaba, to Rafah , on the Mediterranean, is approximately 240 km long. The Palestinian coast on the Gulf of Aqaba is 10.5 km long ,The total surface area of Palestine is approximately 27,000 km<sup>2</sup> , out of which 704 km<sup>2</sup> is water surface, constituting Lake Hula, Lake Tiberias and one half of the Dead sea ( MOH , 2006 ) .

### **1.5.2 Population characteristics and demography:**

For better understanding of the current and future social and development planning in Gaza Strip and Palestine in general , a set of indicators about the population and demographic characteristics is available mainly for the West Bank and Gaza Strip only, but for our Palestinian population living in Diaspora and other places are unfortunately not available due to very complicated technical and political reasons . The following are the latest indicators available in GS and WB , the population in Palestine was estimated 3.888 million at the med of 2006, thereof 2.444 million in the west bank and 1.444 million in Gaza strip, 12.9 % of 3.888 million which is about 506 thousands are living in Gaza governorate with capita per square Km 6,593 .About 42.6 % of the population in Palestine are refugees, according to the Palestinian Bureau of statistics . They are estimated to be 28.5% out of the West Bank population and 66.1 % out of the total population in Gaza Strip. According to the most recent estimation, 45.6 % of the population in Palestine is under 15 years, 43.9 in West Bank and 48.8 % in Gaza. The percentage of Palestinians who are above 65 years in Palestine is 3 % , this figure reached 3.3 % in the West Bank and 2.6 % in

Gaza . Sex ratio in Palestine is 102.7 males per 100 females, it is 102.8 in the West Bank and 102.5 in Gaza Strip. 45.1 % of the females in Palestine aged 15 – 49 years, out of 46.4 % in the West Bank and 43 % in Gaza strip. The median age in Palestine in the year 2006 is 16.9 years, 17.8 year in west bank and 15.5 year in Gaza strip , the crude birth rate for the year 2006 was 36.7 per 1000 , while the crude death rate in 2006 was 3.9 deaths per 1000, also it is worth to mention other important indicators like the population natural increase rate is 3.3 % in Palestine in 2006, the total fertility rate in Palestine was 5.6 in 2006 and life expectancy is 71.7 years for males and 73.6 years for females this high rate of life is due to improvement in the health standard and the gradual decrease in the infants and children death rates , also the PCBS data of the demographic health survey in 2004 revealed that , 20 % of Palestinian population in the age group 12 years and above are smokers , and there is a distinguished difference between WB & GS , where the percentage in WB is higher than GS by 7 % , taking in to our consideration that the individuals who are living in GS are suffering from harder life conditions than those who are living in WB , this result invalidate the hypothesis which said smoking can be used as a reliever of tension and a tranquilizer of the psychological pressure conditions (PCBS, 2006).

### **1.5.3 Palestinian economy :**

Since the signing of the Oslo agreement in 1993 by both the Palestinian Liberation Organization and the government of Israel ,the Palestinian National Authority (PNA) was established 1994 and the Palestinian territories are experiencing autonomy , due to different political and economical problems Alaqsa Intifada started in September 2000 , according to the World Bank , the Gross National Product in Palestine has been subjected to high fluctuations during the last five years. The Gross National Product (GNP) was 5,454 million US\$ in 1999 and decreased to 4,169 million US \$ in 2005. The ( GNP) per capital was 1,806 US \$ in 1999 and decreased to 1,039 US\$ in 2005 . The Gross Domestic Production per capital was 1,496 US\$ in 1999 and decreased to 955 US\$ in 2005 , the Palestinian economy suffered another decline in 2006 , as a result of the domestic and international political difficulties , the real Gross Domestic Production is estimated to have fallen within a range of 5 to 10 percent , more than 75 % of households in Gaza strip were considered poor by end of 2006 , with an increase in the number of hard cases , and arise of unemployment rate in Gaza from 30.3 % in 2005 to 34.8 % in 2006 ( IMF& World Bank , 2007 ) .

The PCBS reported that the number of Palestinian workers in Israel decreased from 135,000 in 1999 to 36000 in 2005 . The workers in Gaza and the West Bank decreased from 453,000 in 1999 to 135,000 in 2005 due to the political situation and current crisis (MOH 2006) . The median daily wage for Palestinian wage employees was NIS 65.4 in WB and NIS 57.7 in GS , this hard situation forced 47.8 % households in the Palestinian Territories to reduce their expenditures on basic needs during the current crisis , 27.2 % of households received humanitarian assistance during the fourth quarter of 2005 , while 67% of the households reported that they need assistance ,UNRWA is rated the highest provider 58 % of assistance to poor households , followed by PNA institutions like Ministry of Social Affairs at 15.6 % , with relatives at 11.6 % , labor unions at 8.1 % and charity institutions and committees including Zakat at 4.4 % ( PCBS , may 2006 ) .

### **1.5.4 Socio-Political Situation:**

The current political crisis since the starting of ALQSA Intifada in the year 2000, is severely affecting the political, economical and even the social aspect of our people in Gaza and the West Bank. This current situation is greatly characterized with uncertainty, instability, unrest and economic slow down, which in turn affect badly the social relationships among our population by the lack of tolerance, forgiveness and respect. Due to the psychological impact of the aggressive Israeli attacks and violent measures against our people. So we can see the above mentioned conditions have increased the level of poverty which in turn badly affects our social life. So the number of registered divorces in 2005 totaled 4,211 in the Palestinian Territory, increase of 6.3% compared with 2004, of them 2,466 in the West Bank representing 58.6%. In Gaza Strip, registered divorces totaled 1,745 in 2005 representing 41.4% of the total registered divorces in the Palestinian Territory. The crude divorce rate 2005 totaled 1.1 divorces per 1000 population. This rate varies by region; it is lower in the West Bank than in Gaza Strip at 1.0 and 1.3 respectively ( PCBS , End 2006 ).

Currently after the hamas led government took over full control of Gaza Strip on 15 June 2007 , and the fatah led government separated in WB , things became more deteriorated with Israel and other international and regional powers impose a sever inhuman embargo against our people in GS , causing almost a complete blockade of each and every thing necessary for our people agriculture , industry and trade causing the close down of thousands of factories , construction companies and workshops , this led to the conclusion that tens of thousands of our people lost their jobs which caused both the unemployment and poverty rate to reach a catastrophic limits .

### **1.5.5 Educational situation:**

The PCBS survey results in 2005 show that , 7.5 % of Palestinian individuals aged 15 years and above finished their university education bachelor and above level , and 14.4 % of individuals did not finish any of the educational level , the results show a difference between males and females in their educational level , 9.2 % of males finished their university education bachelor and above level , while only 5.8 % of females finished up to that level , also 10.5 % of males did not finish any educational level , while 18.4 % of females did so , in Gaza strip the distribution of the population 15 years and above according to their educational levels is as follows 6.7 % are illiterate , 6.5 % can read and write , 16.2 % finished their elementary level, 33.6 % finished their preparatory level , 24 % finished their secondary level , 4.6 % finished their intermediate diploma and 8.4 % finished their Bachelor and above level of education ( PCBS , 2006 ) .

### **1.6 Palestinian health system**

The Ministry of Health (MOH) is the main health care provider in Palestine where health services are provided almost free of charge for citizens who have government health insurance, MOH is supervising 31.6 % of the general hospitals , 57.7 % of total hospital beds in 2005 and 56.5 % of primary health care clinics in 2004 , while the other health care providers are, the United Nations Relief and Work Agency (UNRWA), which supervising one hospital , 1.25 % of hospital beds in 2005 and 7.3 % of primary health care clinics in 2004 , the Medical Services for Police and General Security serving police men and their families , health services of national and international Non Governmental Organizations (NGOs ) are supervising 35.5 %

of the general hospitals , 29.8 % of total hospital beds and 36.3 % of PHC clinics , then finally the private sector for profit, which supervising 31.6 % of general hospitals , 11 % of total beds and still growing . The MOH is the health authority responsible for supervision, licensure, regulation and control of the whole health services provided in Palestine (PCBS 2006).

### **1.7 Pharmaceutical service providers in Gaza Strip**

The pharmaceutical service in both the West Bank and Gaza Strip is mainly provided by the following four providers the Ministry of Health, the private community pharmacies, Non Governmental Organizations and the United Nations Relief Work Agency health service ( MOH 2006 ).

### **1.8 Palestinian essential drug list**

Early after the establishment of the Palestinian Authority in 1994 the developing of the Palestinian Essential Drug List (EDL), developed under the umbrella of the World Health Organization and with their full support, the available drugs in Gaza and the West Bank were included in one list . the drugs in the list were compared to the last version of WHO EDL and classified accordingly and approved by the year 2000. The formulary is structured on 30 therapeutics groups. Then the EDL coded according to the therapeutic groups and dosage form to be a unified coding system for Palestine (Strevele and Siekek , 2004 ).

The current Ministry of Health Essential Drug List includes 458 pharmaceutical preparations, while more than 4000 drugs are available in the Palestinian market (MOH , 2002).

### **1.9The Community pharmacies distribution in Palestine**

In Palestine, the number of private ( public ) community pharmacies was 1,026 in 2005, 673 in the WB and 353 in GS, this leads to a ratio of 3,219 persons per pharmacy ( 2,999 in WB and 3,597 in G S ). In Gaza Governorate alone there are 190 pharmacies for the population of 514 ,000 which means we have a very low ratio of 2,791 persons per pharmacy . Actually the large number of pharmacies is due to the increased number of graduated pharmacists from local universities. Young graduates with no other employment options invest in private pharmacies in order to secure employment and income . In 2006 more than 10 new pharmacies are opened in the Gaza governorate alone ( MOH , 2006) .

### **1.10 Control and supervision of private community pharmacies practice**

The Ministry of Health (MOH) represented by the General Administration of Pharmacy (GAOPh) is regulating, registering, supervising and controlling the activities of the private community pharmacies in Gaza Governorate and the Palestinian territories as a whole (Obeidallah , Mahariq, Barzeq, Zemli, Piva and Valasquez , 2000).

## CHAPTER ( 2 )

### LITERATURE REVIEW

#### Introduction

Pharmacy has been defined as that profession which is concerned with the art and science of preparing from natural and synthetic sources suitable and convenient materials for distribution and use in treatment and prevention of diseases . It embraces a knowledge of the identification, selection, pharmacologic action, preservation, combination, analysis, and standardization of drugs and medicines . It also includes their proper and safe distribution and use, whether dispensed on the prescription of a licensed physicians, dentist, or veterinarian, or, in those instances where it may legally be done, dispensed or sold directly to the consumer.

A pharmacist, is the only expert on drugs, for expertise regarding drugs requires knowledge in depth in all the aspects of pharmacy as explained in the definition of the term pharmacy above .

The physician, the dentist ,and the veterinarian may prescribe drugs and be mainly interested in the effect of those drugs on the patient, their therapeutic value, and toxicology.

The nurse may administer a drug and be concerned with dosage forms, routes of administration, and toxic manifestation, but the pharmacist is the only expert on drugs. It is his legally granted responsibility to handle drugs, it is his professional responsibility to know all about those drugs, no educational program other than that in pharmacy provides the background to understand completely every thing about drugs, the pharmacist and the pharmacist alone, is in that unique position of embracing complete drug expertise (Gerbino , 2005).

Pharmacy has been inseparable from man kind's history since it fulfils one of our most basic needs of protecting ourselves from diseases , the beginnings of pharmacy are ancient. When the first person expressed juice from a succulent leaf to apply to a wound, this art was being practiced. In the Greek legend, Asclepius, the god of the healing art, delegated to Hygieia the duty of compounding his remedies. She was his apothecary or pharmacist. The physician-priests of Egypt were divided into two classes: those who visited the sick and those who remained in the temple and prepared remedies for the patients. In ancient Greece and Rome and during the Middle Ages in Europe, the art of healing recognized a separation between the duties of the physician and those of the herbalist, who supplied the physician with the raw materials from which to make medicines. The Arabian influence in Europe during the 8th century AD, however, brought about the practice of separate duties for the pharmacist and physician. The trend toward specialization was later reinforced by a law enacted by the city council of Bruges in 1683, forbidding physicians to prepare medications for their patients. In America, Benjamin Franklin took a pivotal step in keeping the two professions separate when he appointed an apothecary to the Pennsylvania Hospital , the development of the pharmaceutical industry

since World War II led to the discovery and use of new and effective drug substances. It also changed the role of the pharmacist. The scope for extemporaneous compounding of medicines was much diminished and with it the need for the manipulative skills that were previously applied by the pharmacist to the preparation of cachets, pills, plasters, and lotions. However, the pharmacist continues, to fulfill the prescriber's intentions by providing advice and information; by formulating, storing, and providing correct dosage forms; and by assuring the efficacy and quality of the dispensed or supplied medicinal product ( Encyclopedia Britannica , 2006 ) .

## **2.1 Community pharmacy**

The community pharmacy means any place under the direct supervision of a pharmacist where the practice of pharmacy occurs or where prescription orders are compounded and dispensed other than a hospital pharmacy or a limited service pharmacy ( Google , 2006).

Most persons when thinking of pharmacy tend to think first of the community pharmacist. This generalization is numerically justified and widely acceptable , in the United States it is estimated there are 200,000 licensed pharmacists in practice, about 74% are community pharmacists, 19 % are hospital pharmacists , and the rest are in other areas of the profession (Gerbino , 2005) , also in Palestine almost more than 70% out of more than 1565 registered pharmacists are community pharmacists, there are 1,026 community pharmacies 673 in the West Bank and 353 in Gaza Strip with 3,667 average population per pharmacy ( MOH , 2006 ) .

In the West Bank and Gaza strip against laws and regulations , patients and any person can purchase medicines over the counter OTC , most notably ,antibiotics are simply dispensed upon a patients request. Community pharmacies purchase all their needs of drugs and medical supplies directly from local pharmaceutical manufactures and from the 50 drug wholesalers and distributors in the WB and GS.

It is estimated that in 1995 – 1996 , private community pharmacies sold drugs and disposables totaling approximately US\$ 20 million. Drugs, cosmetics and baby milk are also available in community pharmacies , physicians are prohibited by law from directing their patients to specific pharmacies. The law also prohibits the advertising of drugs in newspapers and magazines and on radio and television. Regrettably, however, pharmaceutical companies do not always adhere to the international Code of Ethics in their promotion ( Obeidallah , Mahariq, Barzeq, Zemli, Piva and Valasquez , 2000 ) .

## **2.2 The role of community pharmacist**

A community pharmacist can advise on health. It is a word which is very familiar to us but it also carries a lot of complications and different perceptions . According to the World Health Organization, health is a state of complete physical, mental and social well-being and not merely absence of any illness. To make the above

definition of health practical we have to depend upon a Health care team coordination, a health care team is the group of people who share a common health goal and common objectives determined by community needs (Ishita , Kaushik and Dureja , 2004 ).

A community pharmacist is the professional who would be in direct access to the public and whose duties are widely sought after by the public and patients. He dispenses medicines with a prescription and in certain cases without a prescription where applicable like OTC drugs , as he is the person who will be in direct contact with the public, he has to play an important role in decreasing the mortality and morbidity in the public by enhancing the proper utilization of his knowledge , Community pharmacy practice evolved in the post second World War period, a pharmacist not only began to perform functions that were new to pharmacy, but they began to innovate functions and make original contribution to literature. The popular patient oriented practice and drug use control came into practice, there is a need to make community pharmacist a key towards better health care, the community pharmacist can take part in health promotion campaigns, locally and nationally, on a wide range of drug related and health related topics like( Ishita , Kaushik and Dureja , 2004 ) .

### **2.2.1 Nutrition counseling:**

A community pharmacist can make, significant contributions in assuring an adequate nutrition by advising his patients about basic food needs, keeping to correct improper food habits in children, advising on special requirements, suggesting special diet instructions for diabetic patients and people with food allergy and participating in school lunch programs and schemes especially in rural areas (Ishita , Kaushik and Dureja , 2004) .

### **2.2.2 Rational Use of Drugs:**

A community pharmacist can perform the administration of the medication, provide information on the storage of the medication and wherever necessary he can counsel the patient. Education regarding the disadvantage of polypharmacy can also be given to the patient. Drug information system should be set up and access to adverse drug reaction system should be made , a community pharmacist should do therapeutic drug monitoring and he should have a sound knowledge of genotype reporting like predictive pharmacology, drug information awareness programs should be conducted to make people aware of side effects of certain OTC drugs , example Aspirin - a wonder drug also has many side effects like gastric ulceration; asthma and large doses may cause tinnitus , regular use of paracetamol can cause harm to the liver, considering the above examples, in the best interest of public health a community pharmacist can provide counseling to common people unaware of these side effects, (Ishita , Kaushik and Dureja , 2004) .

Moreover the definition of an OTC product should be that " which does not require the prescription of a registered medical practitioner but which can be sold only under the supervision of a pharmacist" , in a nut shell there should be rational use of drug which is the right drug for the right patient in the right dose at right time. A community pharmacist is one of the inevitable members of the health care team who

can help to achieve the goal of rational use of drugs by following good pharmacy practices. It is found that interventions by pharmacists in explaining the patients about medicines prescribed to them can significantly enhance patient knowledge of correct use of medicines from 56 % to 90% per cent, there is yet another role of the community pharmacist that is enhancing the availability of essential drugs needed to his community (Ishita , Kaushik and Dureja , 2004 ) .

### **2.3 Anti-infective drugs**

Anti-infective are those agents that are used for the treatment of infections by suppressing or destroying the causative microorganisms ( bacteria, mycobacteria, fungi, protozoa, or viruses ) , anti-infective agents should be used only when , a significant infection has been diagnosed or strongly suspected , and only when an established indication for prophylactic therapy exists , abuse of these agents causes super-infections, cross-sensitivity and cross-resistance , resulting in inappropriate treatment and in consequent adverse reaction in addition to wastage of money , the term antimicrobial agent includes agents synthesized in the laboratory as well as those natural antibiotics produced by the microorganisms ( Khatib and Daoud , 2003).

### **2.4 Antibiotics**

Antibiotic substances are chemical compounds produced as a result of metabolic activities of living cells and which inhibits, in very low concentrations, the growth of microorganisms. While antibiotics have been isolated from tissues of higher plants and animals, the term generally has come to refer to inhibitory substances of microbial origin , but more recently the term is widely referred to a class of natural and synthetic compounds that inhibit the growth of or kill other microorganisms , from the standpoint of chemotherapy and pharmacology, two significant steps mark the historical development of the field of antibiotics : number one, is the discovery by chain, Florey, and associates at Oxford University of the unusually favorable therapeutic and pharmacological properties of extracts of cultures of the mold *Penicillium notatum* , found to produce penicillin by Fleming in 1929, and number two, Dubos discovery in 1939 of tyrothricin and its in vivo efficacy against certain virulent bacterial infections , as results of these studies, and particularly because of the demands due to the World War II, a remarkable huge efforts were imparted to the research for new antibiotics , during the decade 1940 - 1950 , a large number were described, and in the following years still more were reported and research in this field continues, more than 4000 are known today (Gerbino , 2005 ) .

### **2.5 Self medication**

The World Health Organization (WHO) defines self-medication as the selection of medicines by individuals to treat self-recognized illnesses or symptoms (WHO, 2000 ) ' it does not distinguish or mention whether a prescription was presented when buying the drug. Trying to ascertain use of antibiotics with or without prescriptions is some times confusing , because repeat prescriptions, and prescriptions for others may be presented at the point of drug sale. In addition, a doctor or a nurse cannot ensure that patients take medicines as instructed. Unless a health worker administers medication, any drug, including antibiotics, may be used differently than intended , self-medication is often seen as an important determinant of irrational, improper antibiotic use. However, the patient's decisions about whether and how to use antibiotics are themselves influenced by more fundamental factors, like example lack of access to appropriate health care, poverty, the stigma associated with having certain illnesses, and so forth. Interventions to improve antibiotic use should also address these underlying determinants of self-medication decisions, rather than focusing exclusively on the phenomenon itself , there is an impressive database on self-medication and general drug use practices in the world, and attempts have been made to provide a

general review of the subject. Self-medication is practiced widely and is by far the most common medical action ,quantitative assessments of antibiotic use in the community self-medication or prescribed vary widely, and probably reflect local drug-use cultures (Radyowijati and Haak , 2002).

In a community study in Brazil, antibiotics were the group of medicines that were most often used in self-medication (Haak ,1988) .

In a Nigerian community, all members admitted that they had used an antibiotic at least once for a variety of symptoms, and a majority of them stated that they had treated themselves once or more with antibiotics before consulting a physician , Surveys of pharmacy sales confirm these high rates of self-medication with antibiotics. In Nigerian pharmacies, oral or inject able antibiotics were the second most frequent treatments sold for dysentery and diarrhea (Igun ,1987).

In some settings, one particular antibiotic may be extremely popular. In Brazil, one of the most common types of medicines used in self-medication is oxytetracycline (Haak, H , 1988)

The drug is widely used to treat all kinds of intestinal disturbances, and regarded as a practical intestinal stabilizer.

In China, 18-70% of children with ARI were self-medicated with antibiotics (Hui, Li, eng Dai and Foy 1997).

When privacy is important, self-medication may offer a way to remain anonymous. Especially when a social stigma is involved For example, a sexually-transmitted disease , were patient is ashamed and want secrecy , direct purchase of an antibiotic from a pharmacy enables the patient to avoid shameful or embarrassing complaints, ( Hui ,Li, Zeng , Dai and Foy 1997) .

## **2.6 The problem of irrational use of drugs and antibiotics**

The irrational use of pharmaceutical drugs, contributing to increasing resistance by microbes that cause infectious diseases to anti-microbial medicines, was one of the more interesting issues brought up at the World Health Assembly (WHA). The World Health Organization says that anti-microbial resistance is one of the world's most serious public health problems. A major cause is the wrong use of medicines ,though the WHA debated these inter-related issues, measures to control irrational drug use were downplayed because some major developed countries did not want the spotlight to be placed on the marketing tactics of drug companies , worldwide, more than 50% of all medicines are prescribed, dispensed or sold inappropriately, and 50% of patients fail to take them correctly , these startling facts were presented by WHO officials at a briefing for WHA participants on "Irrational use of medicines damages health and wastes resources." , also Only two thirds of the world's population have regular access to medicines, and of the people who do receive medicines, more than half of those people are prescribed medicines incorrectly, and of the people that are prescribed medicines, more than half of those people fail to take them correctly , arithmetically, that would mean that less than a quarter of medicines prescribed are used appropriately ( WHA , 2005 ) .

Data on trends in medicines use showed that the average number of drugs used increased from 1990 to 2003 from 2.2 to 2.7 per patient. Only 40-50% of patients were treated in compliance with standard treatment guidelines.

The following are WHO data on the adverse consequences of irrational drug use:

- 4% to 10% of hospital in-patients suffer an adverse drug reaction in developed countries. This is estimated to be the fourth to sixth leading cause of death in the US and costs \$130 billion in the US and 466 million pounds sterling in the UK yearly.
- There is an anti-microbial resistance increase, up to 70-90% to original first-line antibiotics for dysentery (shigella), pneumonia (pneumococcal), gonorrhoea, and hospital infections (Staph. Aureus).
- New cases of hepatitis B and C are estimated from 2.3 to 4.7 million and 160,000 new cases of HIV per year, resulting from 15 billion injections per year, half of which are non-sterile.

The WHO officials said that a very little is being spent to promote rational use of medicines. The global sales of prescription drugs in 2000 were \$282.5 billion and drug promotion costs in the US were \$15.7 billion the same year. In 2002-03, global WHO expenditure was \$2.3 billion, of which the WHO expenditure on promoting rational drug use was only 0.2%.

The WHO is trying to tackle the issue through training programs, advocacy, the essential medicines list, and a WHO global strategy on anti-microbial resistance.

The WHO indicated that there was inadequate implementation of rational medicines use in countries, with only 26% of countries having a national strategy and only 50% of countries having public education in the past few years.

Irrational drug use is a very serious global public health problem and much more policy implementation is needed at national level. It was concluded that Rational use could be greatly improved if just a fraction of the resources spent on medications were spent on improving use.

It was highly recommended by WHO that countries implement national programs to improve medicines use, scale up successful interventions and implement measures to address community medicines use (WHA, 2005).

## **2.7 Potential determinants of antibiotics use**

In the following review a discussion will be presented of the information obtained from well-designed scientific studies, on factors that can influence the use of antibiotics by health providers, dispensers and community members in the developing countries like Palestine. These practices tend to be determined by complex and multi-level mix of medical, cultural, psychological, economical and policy making factors. If we can understand these factors, we can easily develop more effective programs and policies to address the problem of inappropriate antibiotic use.

### **2.7.1 Determinants related to prescribers:**

Interestingly physicians' practices are largely determined by what they know about diseases and about correct proper prescribing guidelines, but there is little evidence to support this assumption. There are frequent discrepancies between biomedical knowledge and prescribing practices. Knowledge may be necessary for good practice, but improving knowledge may not improve prescribing. Peer norms and the local medical culture are other important influences on antibiotic prescribing.

Prescribers in developed countries may fear legal action for not practicing evidence-based medicine, but their colleagues in developing countries may be more concerned about losing clients if they do not deliver a fast cure. Many doctors report that patient demand influences their prescribing decisions. Giving a prescription is perceived as the easiest way to end a consultation, but little is known about whether patients can be satisfied by less harmful drugs than antibiotics.

Financial incentives are an important factor to prescribers, and fear of losing business or the higher profit margins of expensive drugs may result in inappropriate practices. Some physicians believe their reputations would suffer if they do not prescribe desired antibiotics. This economic rationale is especially strong in private settings where patients pay for services (Radyowijati and Haak, 2002).

The pharmaceutical industry has a strong financial incentive to market drugs to doctors and pharmacists in developing countries. Despite many reports on commercial pressures in drug prescribing, most of this literature is like stories. Little is known about how this influence works, and how it is able to encourage health care providers to use specific product, the ability to provide appropriate therapy may be limited by the lack of functioning laboratories, although physicians do not always use laboratory facilities when they are available. Consistency of drug supply can also affect prescribing. Prescribers in health facilities may adjust prescribing practices to whatever drugs are in stock. (Radyowijati and Haak, 2002).

### **2.7.2 Determinants related to dispensers:**

Most of the dispensers of antibiotics in developing countries range from commercial pharmacies, public sector facilities, to dispensing physicians, and retail shops, in addition to traditional healers. Each dispensing system can contain formal, informal and illegal, aspects of antibiotic distribution. Pharmacy clerks with a wide range of backgrounds commonly handle daily activities in pharmacies. In different countries many customers do not differentiate between untrained street vendors and pharmacists, and all are regarded as knowledgeable. This variety of settings and people makes studying dispenser-related determinants of antibiotic use a difficult challenge (Radyowijati and Haak, 2002).

The level of knowledge of dispensers about illness and correct use of antibiotics has not been well researched. Dispensers are usually prepared to negotiate the type and quantity of drugs with customers, and clients' purchasing power is often the ultimate deciding factor. Dispensers frequently defer to clients' ideas on appropriate care and necessary medicines. It is often difficult to differentiate whether pharmacy attendants or customers determine the medicines to be purchased, unless an observational study was conducted in the spot (Radyowijati and Haak, 2002).

Drug dispensers have considerable important influence on community drug use. The dispenser is not only expected to be knowledgeable on biomedical concepts, but also to be familiar with popular and folk traditions. Many people prefer to purchase drugs directly from pharmacies instead of physicians because of easier accessibility, lower cost, and closer cultural and social ties. Although quantitative aspects of dispensing have been studied, little is known about the characteristics of dispensers and the role they actually see for themselves, pharmacists' dispensing is also influenced by pressure and sales incentives from their suppliers. Despite reports on marketing methods from a few countries, little is actually known about industry practices in promoting antibiotic sales through pharmacies (Radyowijati and Haak, 2002).

### **2.7.3 Determinants related to community members:**

It is well known and can be easily detected that, different societies with different cultural preferences and beliefs are highly influencing drug use by Prescribers, dispensers, and consumers who are sharing similar perceptions on health, illness, and antibiotics. Antibiotics are often perceived as a very powerful almost magical medicines, can cure almost any kind of disease. Many cultures believe that antibiotics also have the ability to prevent disease. Local cultural traditions have also developed related to the use of specific antibiotics, e.g., based on color or imitating methods used in traditional medicine. People are willing to pay high prices for antibiotics, and if they cannot afford a full course, will purchase them in smaller quantities (Radyowijati and Haak, 2002).

Self-medication is often seen as an important determinant of improper antibiotic use. However, a patient's decisions about whether and how to use antibiotics are themselves influenced by more fundamental factors, e.g. lack of access to appropriate health care, poverty, or the stigma associated with having certain illnesses. Interventions should address these underlying determinants of self-medication, rather than focusing exclusively on the phenomenon itself, the decision to self-medicate or to seek care from other sources is determined by perceived symptoms, knowledge about treatment options, and their availability and accessibility. Advice may be sought from physicians, pharmacists, pharmacy clerks, paramedics, traditional healers, family, or friends at any time during an illness. Each group of advisers has its own specific characteristics, advantages, and disadvantages, Physicians influence antibiotic use in three ways: by giving verbal recommendations to buy antibiotics, by writing prescriptions, or by prescribing and directly dispensing drugs. Doctors' practices, can legitimize popular choices of antibiotics, and their previous prescribing can be an important factor in determining self-medication. Despite their importance, there is evidence that some people prefer not to consult physicians for day-to-day health problems, because of the high cost and time investment, lack of trust, or the easier availability of pharmacies, in most legal systems, qualified pharmacists must manage pharmacies, and dispensing should be restricted to drugs prescribed by a qualified physician. In practice, drugs are frequently sold without prescription, and many pharmacies conduct physical examinations or make treatment recommendations (Radyowijati and Haak, 2002).

Traditional practitioners often lack access to sophisticated medical technology, but some have started to include western medicine, including antibiotics, in their daily practice. They rarely receive training in antibiotic prescribing, and their information about drugs comes mostly from informal, non-medical sources, or from

pharmaceutical representatives, economic considerations are also important determinants of community antibiotic use. The decision to buy medicines, and the amount of it, is often influenced by factors such as a drug's price and a consumer's ability to pay. Poverty, lack of access to appropriate health care, and drug company marketing are also often believed to cause improper use of antibiotics, but these factors have not been well examined in research studies. (Radyowijati and Haak , 2002 ) .

## **2.8 World Health Organization intervention to promote rational use of Medicines**

Irrational use of medicines is a major problem worldwide , WHO estimated that more than half of all medicines were prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly. The overuse, under-use or misuse of medicines results in wastage of scarce resources and widespread health hazards. Examples of irrational use of medicines include: use of too many medicines per patient poly-pharmacy; inappropriate use of antimicrobials, often in inadequate dosage, for non-bacterial infections; over-use of injections when oral formulations would be more appropriate; failure to prescribe in accordance with clinical guidelines; inappropriate self-medication, often of prescription-only medicines; non-adherence to dosing regimes (WHO, 2006) .

WHO advocated 12 key interventions to promote more rational use, These recommended interventions were the use of clinical guidelines , development and use of national essential medicines list , establishment of a multidisciplinary national body to coordinate policies on medicine use, establishment of drug and therapeutics committees in districts and hospitals , inclusion of problem-based pharmacotherapy training in undergraduate curricula , supervision, audit and feedback , continuing in-service medical education as a licensure requirement , use of independent information on medicines , public education about medicines , use of appropriate and enforced regulation , avoidance of perverse financial incentives and finally sufficient government expenditure to ensure availability of medicines and staff (WHO, 2006).

## **2.9 Types of antibiotics**

Antibiotics are classified by various schemes or type of classifications , the two most important classifications were according to mechanism of action and according to chemical relationship , we can classify antibiotics according to its chemical relationship into Penicillins, Cephalosporin's, Aminoglycosides, Cloramphenicol, Tetracycline's and Erythromycin .Furthermore, antibiotics can be classified according to their action, some are stopping the growth of microorganism, by preventing the biosynthesis of cellular proteins and nuclear acids, so they have bacteriostatic action, while other antibiotics can be bactericidal by preventing the biosynthesis of cellular wall or cytoplasm ,Also antibiotics can be effective against different kinds of microorganisms and called Broad spectrum antibiotics , while the antibiotics which are effective only against a few kinds of microorganisms are called a narrow spectrum antibiotics, those antibiotics can be further classified to antibiotics effective against positive gram microorganisms, negative gram microorganisms, mycobacteria , protozoa and fungus (Gerbino , 2005 ) .

## **2.10 Antibiotics listed in the Palestinian essential drugs list**

Annexed number (2) includes the list of antibiotics listed in the Palestinian essential drugs list, which are currently in use in our public health facilities, while our local private health sector includes many more kinds of antibiotics which are not included in the PEDL in this study the only following groups were considered an antibiotics , Penicillin's , Cephalosporin's , Tetracycline's , Macrolides – Erythromycins , Sulphonamides & Trimethoprim , Nitrofurantoin , Fluoroquinolones - Nalidixic acid , Aminoglycosides - Gentamycin and others .

## **2.11 WHO global strategy for promoting rational use of antibiotics and Containment of antimicrobial resistance**

The WHO global strategy for containment of antimicrobial resistance addressed this challenge. It provided a framework of interventions to slow the emergence and reduce the spread of antimicrobial resistant microorganisms through , improving access to appropriate antimicrobials, reducing the disease burden and the spread of infection , improving use of antimicrobials, strengthening health systems and their surveillance capabilities, enforcing regulations and legislation , the strategy highlights aspects of the containment and finally encouraging the development of appropriate new drugs and vaccines and can be illustrated in the following activities and measures (WHO , 2001 ) .

### **2.11.1 Patients and the general community education:**

To educate patients on the importance of measures to prevent infection, such as immunization, use of bed nets , vector control , etc , to educate patients on simple easy but practical measures that may reduce transmission of infection in the household and community, such as food hygiene , hand washing , etc, to encourage appropriate and informed health care seeking behavior , to educate and inform patients and the general community on the appropriate use of antimicrobials and addition to the above , patients have to be educated on suitable alternatives to antimicrobials for relief of symptoms and discourage patient self-initiation of treatment, except in specific circumstances (WHO , 2001 ) .

### **2.11.2 Prescribers and dispensers education:**

As part of WHO global strategy the following measures must performed to promote targeted undergraduate and postgraduate educational programs on the accurate diagnosis and management of common infections for all health care workers, prescribers , dispensers , and veterinarians , 1) To educate all groups of prescribers and dispensers including drug sellers on the importance of appropriate antimicrobial use and containment of antimicrobial resistance , 2) to encourage prescribers and dispensers to educate patients on antimicrobial use and the importance of adherence to the prescribed treatments, 3) to inform all groups of prescribers and dispensers on factors that may strongly influence their prescribing habits, such as promotional activities, economic incentives, and inducements by the pharmaceutical industry ,4) and finally to educate all groups of prescribers on disease prevention including immunization and infection control issues (WHO , 2001 ) .

### **2.11 .3 Management, guidelines and formularies:**

Also the following managerial guidelines must be implemented , 1) to audit prescribing and dispensing practices and utilize external standard comparisons to provide feedback and endorsement of appropriate antimicrobial prescribing , 2) to encourage development and use of guidelines and treatment standards to enhance appropriate use of antimicrobials, 3) to empower formulary managers to limit antimicrobial use to the prescription of an appropriate range of selected antimicrobials, and in addition to that the improvement of antimicrobial use can be achieved by the proper supervision and support of clinical practices, especially diagnostic and treatment strategies (WHO , 2001 ) .



## **2.11 .4 Regulation**

Finally to link all professional registration requirements for prescribers and dispensers to requirements for training and continuing education to insure proper professional practices (WHO , 2001 ).

## **2.12. World Health Organization drug use indicators**

In 1985 WHO held a major conference in Nairobi on rational use of drugs , since that time efforts have increased to improve drug use practices , an essential tool for such work was developed by both WHO and INRUD network members to measure drug use in health facilities, that can describe drug use patterns and prescribing behaviors , finally in 1992 the present core set of indicators were standardized and finalized , these indicators could be collected in any health system and would yield the maximum of information with the minimum efforts , these core indicators are prescribing , patient care and facility indicators, which will be discussed later .

In general the objectives of a drug use study by means of indicators can be summarized and will fall into the following four categories , describing current treatment practices from carefully selected groups of facilities and patients , comparing the performance of individual facilities or prescribers , periodic monitoring and supervision of specific drug use behaviors and finally assessing the impact of an intervention (WHO , 1993 ) .

### **2.12.1 Prescribing indicators:**

These five drug use indicators were developed to measure the rational use of drugs performance of health providers by measuring their pharmaceutical prescribing practices , these indicators are as the following , the first prescribing indicator is the average number of drugs per encounter which used to measure the degree of poly pharmacy, it can be calculated by dividing the total number of different drug products prescribed by the number of encounters surveyed , the second indicator is the percentage of drugs prescribed by generic name which is used to measure the tendency to prescribe by generic name it can be calculated by dividing the number of drugs prescribed by generic name by the total number of drugs prescribed , the third indicator of this kind is percentage of encounters with an antibiotic prescribed which is used to measure overall level use of this important , costly and commonly overused form of drug therapy , this indicator can be calculated by dividing the number of patient encounters during which an antibiotic is prescribed by the total number of encounters surveyed , only the above mentioned indicators were selected in this study , while the other two prescribing indicators which are the percentage of encounters with an injection prescribed and the percentage of drugs prescribed from essential drug list were not used in this study (WHO , 1993) .

### **2.12.2 Patient care indicators:**

These indicators were covering both clinical consultation and pharmaceutical dispensing , only two of these indicators were selected for this study , the first one is the average dispensing time which is used to measure the average time that personnel dispensing drugs spend with patients , this indicator can be calculated by dividing the

total time for dispensing drugs to a series of patients , by number of encounters , while the second indicator is percentage of drugs actually dispensed , this indicator is used to measure the degree which health facilities are able to provide the drugs which were prescribed , and can be calculated by dividing the number of drugs actually dispensed at the health facility by total number of drugs prescribed multiplied by 100 .

The other three patient care indicators which were not included in this study are the average consulting time , the percentage of drugs adequately labeled and patient knowledge of correct dosage ( WHO, 1993 ) .

### **2.12.3 Facility indicators:**

These two indicators measure the availability of facility specific factors which support rational use , such availability of copy of essential drug list and the availability of key drugs , these indicators were not selected in this study (WHO , 1993 ) .

## **2.13 Studies relevant to antibiotics dispensing in community pharmacies**

In the following pages the most possible related studies will be presented, which are available about antibiotic using and dispensing in the developed countries, the developing countries, Arab countries and finally in Palestine, unfortunately it was very hard to find those few studies which are related to this study especially in the Arab countries and Palestine .

### **2.13.1 Developed countries studies:**

Recent antibiotic use is a risk factor for infection or colonization with resistant bacterial pathogens. Demand for antibiotics can be affected by consumers' knowledge, attitudes, and practices. In the United States 1998–1999, the Food borne Diseases Active Surveillance Network Food Net conducted a population-based, random-digit dialing telephone survey to understand the consumer attitudes and use of antibiotics, including questions regarding respondents' knowledge, attitudes, and practices of antibiotic use. Twelve percent had recently taken antibiotics; 27% believed that taking antibiotics when they had a cold made them better more quickly, 32% believed that taking antibiotics when they had a cold prevented more serious illness, and 48% expected a prescription for antibiotics when they were ill enough from a cold to seek medical attention. These misguided beliefs and expectations were associated with a lack of awareness of the dangers of antibiotic use; 58% of patients were not aware of the possible health dangers , this study concluded that National educational efforts are needed to address these issues if patient demand for antibiotics is to be reduced ( Vander and et al 2003).

To study patterns of outpatient antibiotic use in the United States, focusing on broad-spectrum antibiotics, a Cross-sectional survey in three 2-year periods (1991–1992, 1994–1995, and 1998–1999), Was conducted by the National Ambulatory Medical Care Survey, a nationally representative sample of community-based outpatient visits by patients visiting community-based outpatient clinics' rates of overall antibiotic use and use of broad-spectrum antibiotics, were measured. All comparisons were made between the first study period (1991–1992) and the final study period (1998–1999) , the results of this survey were as the following, Between 1991–1992 and 1998–1999,

antibiotics were used less frequently to treat acute respiratory tract infections, such as the common cold and pharyngitis. However, use of broad-spectrum agents increased from 24% to 48% of antibiotic prescriptions in adults and from 23% to 40% in children, use of broad-spectrum antibiotics increased across many conditions, increasing two- to three fold as a percentage of total antibiotic use for a variety of diagnoses in both adults and children, by 1998–1999, 22% of adult and 14% of pediatric prescriptions for broad-spectrum antibiotics were for the common cold, unspecified upper respiratory tract infections, and acute bronchitis, conditions that are primarily viral so this study concluded that antibiotic use in ambulatory patients is decreasing in the United States. However, physicians are increasingly turning to expensive, broad-spectrum agents, even when there is little clinical rationale for their use (Steinman , Gonzales , Linder and Landefeld , 2003 ).

In Spain in a study to identify the factors associated with prescription requirement to dispense, a cross-sectional study carried out on a sample of 166 pharmacists in North-West Spain. The study showed that a proportion of 65.9% of pharmacists dispense antibiotics without any prescription. This proportion is 83.5% for non steroidal anti-inflammatory drugs, 46.3% for ACE inhibitors, 13.4% for benzodiazepines and 84.8% for oral contraceptives. A higher requirement prescription was found to be associated with the antecedent of a specialty training of the pharmacist and his or her age . A low prescription requirement is associated with the condition of being owner of the pharmacy , with a high economic level of the population attended and with the size of the pharmacy . This study concluded that the proportion of pharmacists who dispense drugs without a prescription is extremely high. These results suggested that in order to increase quality of dispensing, it is necessary to increase pharmacist education and direct efforts of awareness primarily at pharmacists in charge, who were young and work in large pharmacies (Caamano , Tome-Otero , Takkouche and Figueiras , 2004 ).

In Australia in a study to determine the pattern of antibiotic use in the Australian community, 1990-1995, and compare it with the pattern in other developed countries , a survey of data from the national database on drugs dispensed in Australia (1990-1995), an international database on retail drug sales (1985-1994), and Australian prescriber surveys (1994, 1995). The main outcome measures of this study were: National and international retail sales of oral antibiotics (defined daily doses [DDDs]/1000 population/day) and antibiotic prescriptions dispensed through community pharmacies by drug type; antibiotic prescribing profiles for common conditions. The results of this study showed that the use of Antibiotic in Australia remained steady between 1990 and 1995, with an estimated 24.7 DDDs/1000 population/day dispensed through community pharmacies in 1990 and 24.8 DDDs/1000 population/day in 1995. Amoxicillin, although declining in use, remained the most dispensed antibiotic. Compared with the other countries surveyed, Australia had the highest percentage use of tetracycline's, such as doxycycline, and the lowest percentage use of fluoroquinolones.

Use of trimethoprim-sulfamethoxazole and flucloxacillin declined in Australia. In new cases of upper respiratory tract infection or pharyngitis, an antibiotic prescription was recorded for 57% of urban patient encounters and 73% of rural patient encounters. This study concluded that Antibiotic use in Australia is high, as in many other developed countries, but did not increase between 1990 and 1995. The overall

profile of antibiotic use in Australia by drug class was similar to that in the United Kingdom. Antibiotics were still commonly prescribed for upper respiratory tract infection which is usually viral), more commonly by rural than by urban general practitioners (Mc Manus, Hammond, Whicker, Primrose, Mant and Fairall, 1997).

Although antibiotics in the United States are to be prescribed by a health care provider, the extent to which they are obtained by other means is not known. A survey was conducted of 101 stores in three neighborhoods--one primarily Hispanic; one primarily black, non-Hispanic; and one primarily white, non-Hispanic. The results showed that antibiotics were available in all stores in the Hispanic neighborhood (n = 34), but in none of the others.

This survey study concluded that if efforts to rationalize the use of antibiotics are to be successful, the beliefs and cultural norms of subpopulations must be considered, and interventions must be culturally relevant (Larson and Grullon, 2004).

In a study to assess the extent of antibiotic self-medication in a Swedish population, a postal questionnaire was distributed to 1000 randomly selected subjects. The antibiotics used were in all reported to have been obtained with a prescription except in three cases.

Thus, this study concluded that prescribers are the primary target for interventions to optimize antibiotic use (Svensson, Haaier-Ruskamp and Lundborg, 2005).

In a study was conducted to measure the rates of antiviral and antibiotic prescribing for patients diagnosed with influenza in the United States. This study was performed by a retrospective analysis of visits to ambulatory clinics and emergency departments in the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey with a diagnosis of influenza that occurred in seven influenza seasons between 1 October 1995 and 31 May 2002 (n=1216). In the results obtained from this study there were an estimated 22 million visits with a diagnosis of influenza to community ambulatory clinics (88% of visits), hospital ambulatory clinics (3%) and emergency departments (9%) in the United States between the 1995--1996 and the 2001--2002 influenza seasons, inclusive. The sample was 63% adults, 44% male and 84% white and 16% black. Physicians prescribed antivirals in 19% of visits and antibiotics not associated with an antibiotic-appropriate diagnosis in 26% of visits. This study concluded that physicians prescribed antiviral medications to 19% of patients they diagnosed with influenza; the proportion that would have been clinically appropriate is unknown. In contrast, physicians prescribed apparently inappropriate antibiotics to 26% of these same patients, a rate that, encouragingly, decreased over time (Linder, Bates and Platt 2005).

In one New Zealand town, a study was conducted to describe the use of antibiotics and to investigate relationships between antibiotic use and gender, age, and socioeconomic status, by extracting data from dispensing computers in all community pharmacies in the town. All dispensing of antibiotics to residents in the town were identified. The results obtained were as the following, 42% of residents in the town received one or more dispensing of antibiotics in 2002. These people, on average, received 2.1 dispensing. Children received antibiotics more often than adults, females

more than males and there was a strong relationship between socioeconomic status and antibiotic dispensing. This study concluded that , the rates of antibiotic use in the community are strongly influenced by age, gender and socioeconomic status(Norris , Becket and Ecke , 2005 ).

In Greece, a study was conducted to look for factors that affect attitudes to antibiotic use in Greek urban settings, more specifically to study the pattern of antibiotic use among adults and parents in the community . By using a questionnaire-based survey, the researchers conducted 323 face-to-face interviews 173 adults, 150 carers of children . In the adult group, 74.6% admitted using non-prescribed antibiotics, while only 22.7% of parents had administered non-prescribed antibiotics to their children. Around 50% of adults discontinued therapy earlier, more than 10% did not follow the correct dosage instructions and about 55% admitted using leftover antibiotics. Of the parents, 18.7% discontinued therapy earlier and 7.3% admitted keeping leftover antibiotics. The above results showed that adults were likely to show unsatisfactory compliance and to use non-prescribed antibiotics, while parents were less likely to use non-prescribed antibiotics for their children and were more compliant (Mitsi , Jelastopulu , Basiaris , Skoutelis and Gogos , 2005 ).

In South Carolina USA, a study was conducted to investigate in a sample of Latinos the practices of antimicrobial drug importation and use of non prescribed antimicrobial drugs. In interviews conducted with 219 adults, the researchers assessed health beliefs and past and present behaviors consistent with acquiring antimicrobial drugs without a prescription in the United States. Many (30.6%) believed that antimicrobial drugs should be available in the United States without a prescription. Furthermore, 16.4% had transported non prescribed antimicrobial drugs into the United States, and 19.2% had acquired antimicrobial agents in the United States without a prescription. A stepwise logistic regression analysis showed that the best predictors of having acquired non prescribed antimicrobial drugs in the United States were beliefs and behavior consistent with limited regulations on such drugs. Many persons within the Latino community self-medicate with antimicrobial drugs obtained without a prescription both inside and outside the United States, which adds to the reservoir of antimicrobial drugs in the United States (Mainous , Cheng , Garr , Tilly , Everett and Mckee , 2005 ).

### **2.13.2 Developing countries studies :**

Vietnam is a developing country, in Hanoi city the private pharmacies took over the majority of drug distribution, in a case study, a purposive sample of the private community pharmacies in Hanoi, explored management, including dispensing inventory and financing, using the concept of triangulation .Observations and interviews of customers were complemented by stock inventory and interview of pharmacy staff. In all 1833 encounters were studied during two weeks, out of which 286 were children, less than 1% of customers came with prescriptions and 94.9% decided by themselves which drugs to buy. Antibiotics represented 17% of which 90% were broad spectrum . Ampicillin dominated ,both in children and adults . 50% of antibiotics were given for 2.5 days or less , less than 50%of the drugs ED on dispensing and even less in inventory , antibiotics and Vitamins were the most commonly sold drugs, antibiotics are said to be the most profitable drugs (Chuc and Tomson , 1999) .

In Bangkok, Thailand the pattern of antibiotic dispensing by drug store personnel was examined , ten well- trained medical students simulated patients presented to 40 randomly selected drug stores with common complaints, namely urethral discharge , acute watery diarrhea, fever with sore throat, coryza , skin infection and acute dysuria .Analysis of medications obtained revealed that 50-100% of drug stores dispensed antibiotics for each condition. co-trimoxazole, ampicillin ,chloramphenicol , penicillin V and tetracycline were commonly given , most antibiotics were dispensed inappropriately with respect to choice of drug and duration of treatment(Thamlikitkul , 1988 ).

In Kathmandu , Nepal a study to assess the antibiotic dispensing by drug retailers was conducted for rationality, safety and compliance with existing government regulations. A standardized cases of dysuria in a young adult male and acute watery diarrhea in a child were presented by a mock patient to retailers at 100 randomly selected pharmacies. Results all retailers engaged in diagnostic and therapeutic behaviors beyond their scope of training or legal mandate .Historical information obtained by retailers was inadequate to determine the nature or severity of disease , or appropriateness of antimicrobial therapy. 97% of retailers dispensed unnecessary antimicrobials in diarrhea, while only 44% recommended oral dehydration therapy and only 3% suggested evaluation by a physician. 38% gave antimicrobials in dysuria , yet only 4% adequately covered cystitis and only 7% referred for medical history and physical examination necessary to guide therapy (Wachter , Joshi and Rimal , 1999).

In Kampala, Uganda The concept of pharmaceutical care is neither well developed nor adequately documented, therefore an attempt to identify and quantify the various service components of community pharmacy practice in Kampala, Uganda's capital city, two pharmacies operating retail outlets were chosen out of about 110 in Kampala, this study involved an 8-month observation period at the two pharmacies, combined with a data collection form to record demographic characteristics of respondents and parameters such as self-medication, pharmacy initiated therapy, prescription filling, patient/non-patient clients and treatment received, the results were as following 567 observations were made. Just less than half of 564 respondents (44.3%), were females compared to males (55.7%). The study found that clients over the age of 12 years seeking pharmaceutical services were 8-fold (93.1%) more likely to be the very patients compared to children. Slightly over thirty percent of respondents (32.3%) were third party patients. About fifteen percent (14.7%) of respondents came to fill prescriptions, 28.8% to receive pharmacy-initiated therapy and 56.5% came for self-medication with all drugs including antibiotics at 22.4%. Most clients (75.2%) received treatment. The availability of a drug at the pharmacy was found to be a significant predictor of whether treatment was received, with the client age acting as a confounding variable (Anyama and Adome , 2003).

In Kenya, a survey of antibiotic sale behaviors in retail chemist shops in Nairobi revealed that about 64% of chemists sell antibiotics without prescriptions from doctors. Most shops sold under dose drugs according to the request of the patient. The practice is more common in peri-urban than city centre chemists. Out of the 128 chemist shops visited, 82 sold the antibiotic, 33 sent the patients to go and see the doctors while 13 did both. Sixty eight per cent of the chemists in the city centre recommended the taking of full antibiotic course to the patients while only 46% in

peri-urban centers did so. Even after the recommendation, some of the chemists still sold under dose drugs. Some of the drugs were sold in envelopes without any instruction at all and none of the drugs sold were fully labeled. Only seven chemists sold septrin, the brand of co-trimoxazole requested by the patients, the rest sold various brands of the drug some of whom still labeled the brands 'septrin', so Antibiotic sale behaviour in Nairobi is a contributing factor to antimicrobial drug resistance (Indalo, 1997).

In Brazil, to determine the percentage of pharmacies that attend the public and sell antibiotics without medical prescription in a medium-sized city, and analyze the variables involved in this procedure, a 107 of the 136 pharmacies registered in the selected city were evaluated. These pharmacies were visited by actresses who simulated having a sister with symptoms of a non-complicated rhino-sinusitis, so that they could obtain antibiotics without a medical prescription. Each pharmacy was visited only once; the only variable in the simulated clinical setting was the report of fever temperature, which was randomly assigned between 38.5 and 40 degrees Celsius, the results of this study were as follow Antibiotics were offered in 58% of the pharmacies, and this offer was increased to 74% after the actresses insisted on having them. In 65.4% of the pharmacies, the actresses were attended by a pharmacist, and 84.2% of them said they would sell antibiotics. When the request for antibiotics was denied (26%), only 7.5% was due to absence of prescription. The most frequent reason for refusal to sell antibiotics, was because the attendant deemed it unnecessary (46.6%), the study concluded that Antibiotics can be easily bought in the great majority of the pharmacies in this town without a medical prescription and a clear indication and Fever temperature did not modify the attendant's indication of the drug (Volpato, de Souza, Dalla Rosa, Melo, Daudt and Deboni 2005).

In Mexico, Mexico City in a study conducted in order to assess the purchase of antimicrobials in a peri-urban community, six local drug stores were randomly selected. A social worker made five visits to each pharmacy and she observed the events during the purchase of the drug and applied a structured questionnaire to the customer immediately after the transaction. Antibiotics were the majority (29%) of the drug sales. Of all purchasers of an antibiotic 43% did it without medical prescription and 72% answered that a physician had influenced on the purchase. Duration of the antibiotic therapy was specified in one out of three prescriptions that were examined and only in 28% of the sales the purchase was enough for a treatment duration of more than four days. The researchers in this study recommended that more information, from similar surveys in drug stores in other settings, is needed to support the reinforcement of actions to control the sales of antibiotics in the community (Calva, Ceron, Bojalil and Holbrook 1993).

In Badinh district of Hanoi, Vietnam, a survey on the use of antibiotics purchased through retail pharmacies was conducted. The survey found that purchasers visit a pharmacy when they or those who felt they needed antibiotics had minor symptoms such as cough (34.1%), sore throat (32.5%), stomach upsets (10.0%) and diarrhea (8.8%). The most often purchased antibiotics were ampicillin (31.1%), amoxyllin (16.7%), cotrimoxazol (11.6%), tetracycline (5.2%) and cephalixin (4.8%). The median of the purchased quantity was 10 tablets, the mean 11.34 tablets. About 30% of the purchasers intended to take antibiotics for three days or less. The mean cost of a antibiotic purchase was US\$1.27. The main reason for not taking a full course of

antibiotics was not economic constraint, but the purchasers' poor knowledge about antibiotics. Logistic regression analysis indicates that age of purchasers, length of symptoms and kinds of treatment used before visiting a pharmacy could be used as predictive variables for the decision to buy antibiotics in preference to alternative drugs. Antibiotics are used when illness lasts longer than one week and antibiotics have not yet been taken. Antibiotics are also purchased by young rather than old people. This study concluded that the availability of antibiotics as over-the-counter drugs in pharmacies is a threat to public health in Vietnam. and there is a need for better health education about the rational use of antibiotics in the general public (Van Duong , Binns , and Van Le , 1997) .

In the industrial city of Nagpur, India, a study was conducted to determine the patterns of use of antimicrobial drugs in the general population, an interviews of pharmacists and clients were carried out in a stratified, random sample of 34 pharmacies to determine beliefs and practices in prescribing and self-prescribing of antibiotics by complaint, choice of drug, dose, duration, cost, age and sex of the consumers. The study showed that drugs were dispensed without prescription despite prohibition by the Indian Pharmaceutical Act. Sales of antimicrobial drugs accounted for 17.5% of 511 purchases and 23.3% of expenditures for drugs. Proprietary brands of penicillin's, co-trimoxazole and tetracycline's were dispensed most often 64.8%. The most common indications were upper respiratory, gastrointestinal and nonspecific complaints. The median number of units obtained was 5.0, at a median cost of \$0.50 per purchase, usually taken for less than five days. Repeat purchases were made without consulting a physician. Almost two thirds of purchases (63.9%) were for males, mainly under the age of ten years. Clients had poor knowledge of the indications, side effects, adverse reactions and appropriate duration of therapy. The dispenser viewed himself as a businessman rather than a professional and rarely offered unsolicited advice. Co-prescribing of 'tonics' added to costs and decreased the purchasing power for antimicrobial drugs. Most purchases of antimicrobial drugs in community pharmacies in Nagpur were for minor indications and were limited by the purchasing power of the consumers. It is doubtful that the choice of drug and the short duration of therapy would be effective for serious infections(Dua , Kunin and White , 1994 ) .

### **2.13.3 Arab Countries studies:**

In the Arab countries, a very few studies were founded related to this study, one study was conducted in Egypt, Alexandria to assess the pattern of drug supply from pharmacies, whether by prescription, recommendation from the pharmacist or a request for a particular product by the client, the drugs dispensed from 25 pharmacies, each from a different area of Alexandria, were investigated. Two three-hour study visits were made to each pharmacy to collect data on all drugs dispensed. A total of 1174 products were supplied; 28% on prescription and 72% over-the-counter sales (17% of the latter were recommendations from pharmacists). The range of products supplied with and without a prescription were similar.

This study resulted, that a total of 232 anti-infective products were dispensed during the observation period accounting for 19.8% of all items. Of these 232 items, 35.8% were prescribed by physicians, 13.8% were recommended by pharmacists and 50.4% were sold to clients on request. The results showed that 23.7% of the prescriptions for

anti-infectives included more than one anti-infective product. Five clients requested two different anti-infective products, this study concluded that, the patterns of drug use in Alexandria share many characteristics with developing countries. The majority of drugs were dispensed without a prescription or advice from pharmacists; about 60% of the items were requested by clients compared with 40% which were dispensed with professional advice from physicians or pharmacists. Thus, opportunities for ensuring the appropriateness of therapy were limited. Drugs for which risks are considered high are in common use, both with and without a prescription. These findings raise questions about the availability and uptake of drug information by health professionals and their clients in a city which possesses characteristics that would be expected to be favorable to the promotion of rational drug use. They are of importance in the undergraduate and postgraduate education of pharmacists and other health care professionals (Benjamin, Smith and Motawi, 1996).

In Jordan a study to evaluate sources, patterns and appropriateness of antibacterial drug consumption within the Jordanian population was conducted. It used a structured random interview to customers arriving at community pharmacy stores seeking antibacterial medication for systemic infections. Dispensed antibacterial drugs belonged to eight different main classes of systemically used antibacterial drugs in accordance with the Anatomical Therapeutic Chemical (ATC) classification system. Just less than one-half of all dispensed antibacterial drugs were without a prescription (46%), either via self-medication (23.2%) or pharmacist recommendation (23.1%). Inappropriateness in use was seen in 29.9% and 34% of the prescribed and non-prescribed over-the-counter antibacterial drugs, respectively. No uniformity in the treatment profile of the different treated complaints was seen. This study showed great misuse and abuse of antibacterial drugs and hence there is a need to force regulations to control community use of antibacterial drugs and to increase awareness of the consequences of their inappropriate and uncontrolled use in Jordan (Al-Bakri, Bustanji and Yousef, 2005).

In Kingdom of Saudi Arabia, a study was conducted to assess antibiotic misuse by the community, Opinion of the population about the indications of antibiotics usage and their compliance with the prescribed antibiotics. This study is community based. A randomly selected sample of 100 residents in Riyadh City were interviewed regarding their knowledge, attitude and practice towards antibiotics, only 80 of them had heard about antibiotics. Sixteen percent of them have used antibiotics without a doctor's consultation. Fever, common cold and difficult swallowing, in order of frequency, are the most common indications for antibiotic use as taken from the participants this study revealed that unfortunately antibiotics can be bought over the counter without a written prescription, people consider many ill defined symptoms as indications for antibiotic use, and non compliance with doctor's advice is high. This study recommend that there is a need to study the outcome of self-administration of antibiotics in more details, Legislation is required to control the sale of antibiotics over the counter, Improvement of public health education about the role of drugs in health care to avoid use of antibiotics without a doctor's consultation and Health education regarding compliance with the physician's instructions (Azab, 2000).

In Kuwait in a study to determine the rationale and the pattern of antibiotic prescription for dental management. A questionnaire was distributed to 200 dental practitioners working in the Ministry of Health dental centers in Kuwait. The

questionnaires sought answers to the clinical and non-clinical factors; signs, clinical conditions and dental treatment modalities for which the practitioners would prescribe antibiotics. The results of the 200 questionnaires sent out, 168 (84%) respondents returned fully completed forms. A total of 107 (63.7%) of the respondents were males. Of respondents, 90% would prescribe antibiotics for patients with elevated body temperatures and evidence of systemic involvement, gross or diffuse facial swelling and closure of the eye due to inflammatory swelling. However, over 50% would prescribe antibiotics for cases with localized fluctuant swelling without any systemic involvement, while 59.6% would prescribe for patients with difficulty in swallowing as a result of an oral infection. Many respondents would consider antibiotic prescription for routine dental extraction, and for non-clinical reasons such as uncertainty of diagnosis, convenience, expectation of the patient and lack of time to treat immediately. Amoxicillin was the most frequently prescribed antibiotic. Higher knowledge regarding adequate indications for antibiotic use was associated with longer professional experience. This study concluded that there is lack of uniformity in the rationale for antibiotic use among dental practitioners in Kuwait. There is an urgent need for the formulation of evidence-based guidelines, which should take into account the peculiar behavioral characteristics of the community (Salako , Rotimi , Adib and Al- Mutawa, 2004) .

In Palestine unfortunately a very few pharmacy related studies were founded , in Gaza strip a study was conducted to evaluate the public or community pharmacies services the results showed that 87.6 % of the community pharmacies are indebted which an indication of bad economical situation , 28.9 % of the Gaza pharmacists who can afford establish a new community pharmacies due to the lack of suitable employment opportunities which will increase competition , 44.3 % did not regard the formal price , 91.8 % dispense drugs without prescription and 37.1 % dealt with informal drugs , this study concluded that to have a higher quality pharmaceutical services , the pharmacy laws must be complied , committing with formal prices , effective intervention against the informal drugs , o t c drugs policy must be adopted , evaluation of the governmental regulations procedures must be performed and finally continuous education to increase the professional skills of both community pharmacists and the pharmacists inspectors must be implemented to insure the best quality of community pharmacies services (Abu Sirreya , 2005 ) .

In Gaza Strip also another study was conducted to describe the pattern of antibiotics prescription for treatment of the commonest pediatric acute respiratory tract infections , to determine the factors that associated with antibiotics prescriptions and to appraise and determine the level of accompanied parents awareness and satisfaction regarding antibiotics use during their visits to the primary health care physicians , the findings of this study was as follows , 77.8 % of the study children were prescribed antibiotics , 77.7 % of these antibiotics were unnecessary , Amoxicillin trihydrate is the antibiotic of choice for treating acute upper and lower respiratory infections , antibiotics were prescribed more to older children , high – income families , children with fever and those who had diffuse redness of tonsils and children with wheezes , both parental expectation for obtaining antibiotics and low knowledge scores for increase antibiotic prescriptions and finally this study showed that the main factors that increase parent satisfaction were 94.2 % complete examination of the child and 72.4 % the good communication between the parents and the physicians ( El Khoudary, 2002 ) .

Another study was conducted aimed to evaluate the compliance of the Gaza Strip physicians with the Palestinian EDL in the governmental PHC clinics , this study showed that 67.4 % of physicians are using EDL and 51.2 % of them are facing many problems in using it . also the study showed that the average number of drugs prescribed per each prescription was 1.92 , the percentage of drugs prescribed by generic names was 5.47 % , the percentage of drugs prescribed from EDL was 97.85 % and some other results were shown , this study concluded that there are a number of problems regarding the physicians compliance with EDL , and recommending more training , monitoring , evaluation and follow up (Fattouh , 2005 ) .

In Gaza Strip a study was conducted and revealed many health service users , and private providers reporting an inadequate supply of drugs resulting in the purchasing of drugs in private pharmacies , as a result a survey of the patterns of utilization of three private community pharmacies in three contrasting areas within G. S was undertaken , the main results show that variations in the patterns of health seeking behavior were associated with socio – economic status , the adult males were the most frequent customers of all three pharmacies , they were buying medicines for other family members, pain and influenza were the most commonly treated conditions , women mostly were buying reproductive health problems medicines and customers of the pharmacy located in the relatively rich area commonly buying their drugs by private doctor prescriptions ( Beckerleg , Lewando- Hundt , Abed , Eddama , El Alem , Shawaa , 1999 ) .

Other studies were founded in the Occupied Palestine like the following study .

In northern Israel, a study to estimate self-medication with antibiotics by the population . A questionnaire sent by post on antibiotic usage to 2,615 adults, both Jewish and Arab, living in northern Israel. The results were as the following, the overall response rate was low (17.9%), particularly among the Arab population (9.4% of respondents). Among the 467 respondents, 169 (36.2%) reported 215 antibiotic courses within the last year. Amoxicillin was the antibiotic most commonly used (32.7% of courses); 89.4% of antibiotics were obtained via a physician's prescription; 114 respondents (24.4%) stored leftover antibiotics at home, and 81 (18.7%) would consider self-medication with antibiotics without a medical consultation. The study concluded that Over-the-counter acquisition of antibiotics is rare in Israel. However, the storage of leftover antibiotics in the home constitutes an alternative potential source of self-medication that can have untoward consequences, not only for the individual patient but also for the general population since inappropriate antibiotic usage contributes to the increasing rates of antimicrobial resistance. (Raz R, Edelstein H, etal , 2005 ) .

## **2.14 When and how to take antibiotics:**

It is almost well known that , antibiotics are prescribed for illnesses caused by bacteria, not by viruses. Flu and The common cold are caused by viruses, not by bacteria. Antibiotics do not work against viruses. When used prudently, antibiotics are a powerful medical tool to cure bacterial diseases. The concept of Prudent use includes taking antibiotics only for diagnosed bacterial infections and following the precise directions on the prescription (APUA ,2006).

## **2.15 The proper dosage of antibiotics**

Prescriptions are written to cover the time needed to help the patient body fight all the harmful bacteria which cause the disease . If the patient stop his antibiotic early, the bacteria that have not yet been killed can restart an infection. Leftover antibiotics are not a complete dose, and they will not work to kill all the patient disease causing bacteria. Taking partial doses can select for the bacteria that are resistant. A patient must Always talk to his doctor because his symptoms may not be caused by bacteria. If the patient do has another bacterial infection, a complete dose of the appropriate antibiotic is needed to ensure the killing of all the harmful bacteria (APUA,2006).

## **2.16 Safety of antibiotics**

Antibiotics are generally safe and should always be taken as prescribed by a doctor; however, antibiotics can kill most of the bacteria in the patient body that are sensitive to them, including good bacteria . By destroying the bacterial balance, it may cause stomach upsets, diarrhea, vaginal infections, or other problems.

Also Antibiotics may alter the effectiveness of other medications and cause side effects or allergic reactions and if taken unnecessarily antibiotics may contribute to the development of antibiotic resistance. If the patient become sick and his bacteria are resistant to his prescribed antibiotic, his illness lasts longer and he may has to make return office and pharmacy visits to find the right drug to kill the germ. For more serious infections it is possible that the patient would need to be hospitalized or could even die if the infection could not be stopped. Also, while the resistant bacteria are still alive, the infected patient act as a carrier of these germs, and he could pass them to friends or family members (APUA ,2006 ) .

## **2.17 Factors influence a physician decision in which antibiotic to prescribe**

Physicians normally examine patients and consider their symptoms in order to decide if they should prescribe an antibiotic and, if so, which one. Physicians can also take a culture to see if bacteria are causing a particular illness, such as a throat culture to determine the presence of strep throat. For hospital infections and some community-acquired infections, the doctor will obtain an antimicrobial susceptibility report that indicates which families of antibiotic drugs are useful for the particular bacteria recovered from the infection. If the cause of the infection is unclear, but suspected to be due to bacteria, the doctor may prescribe a broad-spectrum antibiotic that is useful for controlling a wide variety of bacterial types. The physician may choose either a (non-generic) antibiotic depending on the individual circumstances (APUA,2006).

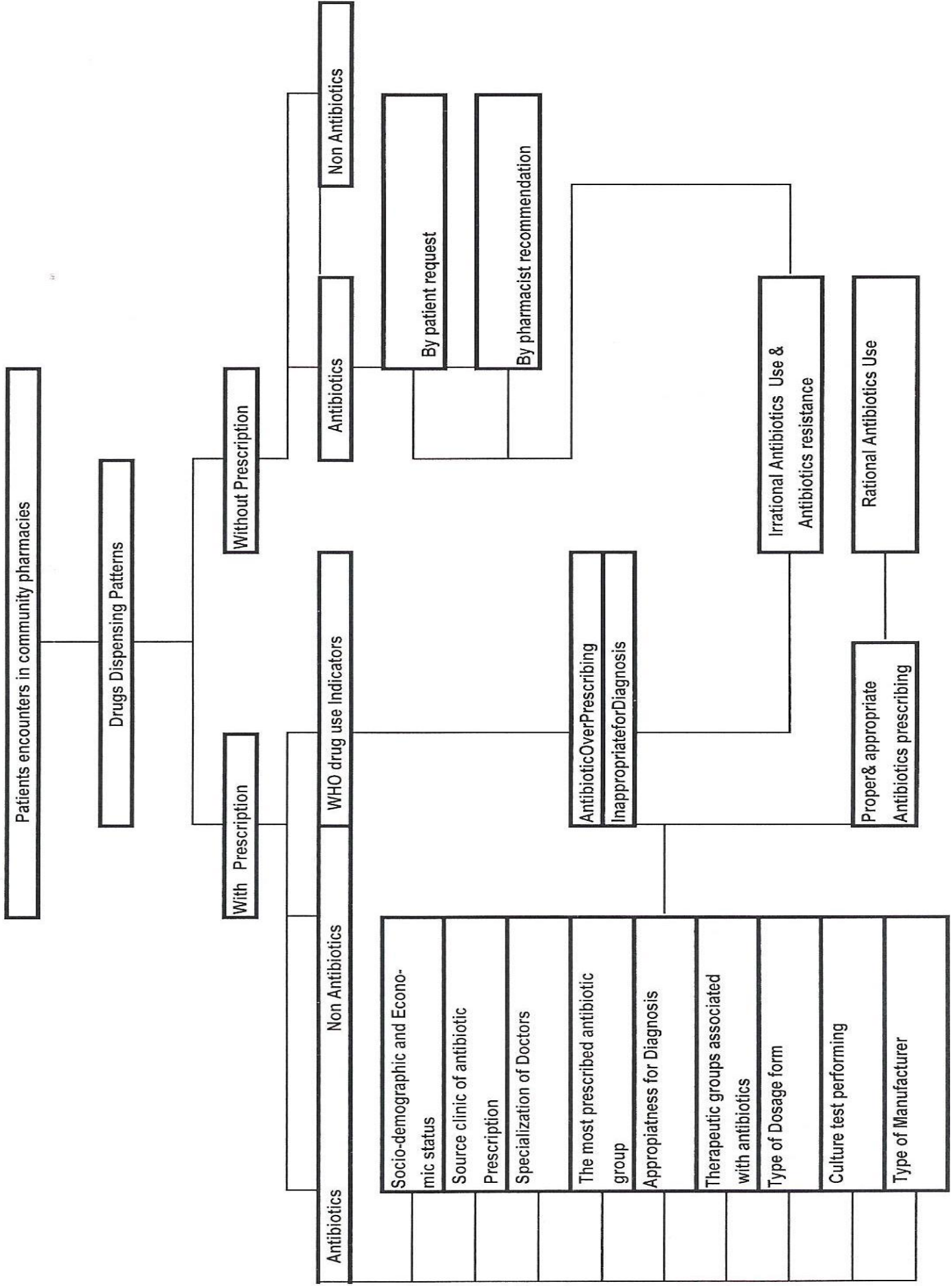
## **2.18 Questions a patient must ask for a doctor before prescribing antibiotics**

If a doctor prescribes antibiotics, the patient should ask his doctor the following questions , Why do I need an antibiotic?, What is this particular antibiotic supposed to do? ,Is this drug likely to cause any side effects?, Is there anything I can do to prevent these side effects?, Should I take the drug at a specific time? With or without food?, Does this drug interfere with the effectiveness of other medication? (i.e., birth control pills) ,How much does it cost ? and finally Do I need to avoid alcohol or other foods?, in addition to that the patient must tell his doctor about any of the following conditions , previous adverse drug reactions , special diet , allergies , chance of pregnancy and any other health problems (APUA,2006) .

## **2.19 information should women know before taking antibiotics**

Before women can take antibiotics they must know that , Antibiotics may reduce the efficacy of birth control pills , also taking Antibiotics often lead to a vaginal yeast infection. Because antibiotics kill the normal bacteria in the vagina, yeast no longer have competition for food and grow rapidly. Yeast cells begin attacking tissues in the vagina, usually causing one or all of the following symptoms: burning , itching, , pain during sex and vaginal discharge. If woman think she has a yeast infection, she must consult a physician , finally as with other medications, some antibiotics may be transmitted to a fetus, and some may cause harm. Therefore, woman should never take antibiotics without her doctor's knowledge if she is pregnant or nursing (APUA,2006).

# Conceptual Framework for Antibiotics Dispensing Patterns in Community Pharmacies in Gaza Governorate



## **Conceptual Frame work**

This chapter will describe , a trial to represent the ideas extracted from the actual observed dispensing patterns of antibiotics with other study objectives , which have been incorporating in this study conceptual framework in a way which can be suitable to our Palestinian situation which reflects a typical developing country situation .

A conceptual framework is defined as a formal way of thinking, conceptualizing about a process or a system under study. There are various ways to conceptualize a system for analysis . For example , an undirected graph is a simple formal representation for Interstate Highway System (Web., 2006).

Conceptual models attempt at organizing and donating a symbolic representation of conceptualization of phenomena with the minimal use of words . A framework is conceptual underpinning of a study and used to guide and direct the research process and to make research findings more meaningful and generalized; in addition, frameworks are efficient mechanisms for drawing together and summarizing accumulating facts as shown in the graph ( Burns and Grove, 1997).

after conducting a lot of literature review , and from the researcher professional field experience and observations as a community pharmacist , also bearing in mind the main objectives of this study which was conducted in Gaza governorate as an example of one city in a developing country , in this developed conceptual framework firstly all the study patients encounters observed in the study sample of community pharmacies were analyzed for all the socio demographic status like age , sex and educational level and economic status of patients, this will help to have a clear view of all the possible factors characterize those patients , then the observed patients encounters as in all the developing countries divided according to the dispensing patterns of drugs weather dispensed with prescription or without prescription , then each of the main pattern of drugs dispensing is further divided for deeper analysis , the with prescription pattern of dispensing is divided in to antibiotics with prescription , non antibiotics with prescription and WHO study selected prescribing and patient care indicators were used to deeply analyze this pattern of dispensing , furthermore the antibiotics with prescription were analyzed for socio –demographic , educational and economic status of patient and deferentially analyzed for possible statistical significance for those of antibiotics without prescription .

In addition to that this pattern of dispensing of antibiotics with prescription is deeply analyzed according to the objectives of the study , studying the source clinic of antibiotic prescriptions, to find out the specialization of doctors who are the most prescribers of antibiotics , to identify the most prescribed antibiotics groups , to analyze the appropriateness of the prescribed antibiotics for the observed diagnosis , then for more clarification those antibiotics dispensed with prescriptions were more analyzed fore what kinds of therapeutic groups associated with them , if a culture tests were performed before prescribing , their type of dosage forms and type of manufacturer .

Now for the without prescription dispensing pattern of the study , it is divided to antibiotics without prescription and non antibiotics , and that of antibiotics is further divided in to dispensing of antibiotics by patient request and by pharmacist recommendation .

In the conclusion of this study conceptual framework whether , antibiotics dispensed by over prescribed not appropriate for diagnosis prescriptions or dispensed without prescription by patient request or pharmacist recommendation , this will lead to irrational antibiotic use , which may lead to future antibiotic resistance , while only antibiotics dispensed with a proper and appropriate prescriptions will lead to the desired rational use of antibiotics .

## **CHAPTER 4**

### **METHODOLOGY**

This chapter presents study methodology, study design, study population, sample size, sampling process, setting of the study, period of the study and the ethical considerations .

This chapter also shows the research tool , its validity, reliability, the pilot study and how data were collected and managed.

Finally it presents some limitations encountered by the researcher in conducting this study.

#### **4.1 Study design**

The study design is a descriptive cross sectional using triangulation of both structured observations and exit interviews for pharmacy clients, and this will be used to describe the real and actual patterns of antibiotics dispensing in the community pharmacies and can measure the required drug use indicators, and the correlation between the study variables, cross sectional design was chosen because it involves the collection of data at one period of time, the phenomena under investigation are captured as they manifest themselves during one period of data collection, so it is practical, economical and easy to manage and can enable the researcher to meet the study objectives in a short time (Polit and Hungler ,1993 ) .

#### **4.2 Study population**

The study population were all the patients encounters or patients visits all the registered licensed private sector community pharmacies in Gaza governorate to dispense drugs and antibiotics whether with or without a prescription. The number of the registered licensed community pharmacies in Gaza Governorate is 190 pharmacies as listed by the MOH general administration of pharmacy in December 2006 and this list was obtained officially by the researcher ( MOH, GAOP,2006 ) .

#### **4.3 Sampling process**

The proportional multistage clustered random method was used in selection of the study sample, because it was considered more economical and practical than other probability sampling, particularly when the population is large and widely dispersed. In the first stage Gaza governorate was divided into nine geographical areas and the total number of private sector community pharmacies for each area was determined from the MOH list of licensed pharmacies ,then a sample of 30% of the pharmacies was randomly drawn from each area , then in the second stage each pharmacy of the clustered random sample of pharmacies was visited at random schedule for one period of three hours visit, mainly between 3 to 8 p.m., the expected peaking hours of pharmacies business in normal business days. Then all the patients encounters or clients visits during the three hours visits to the pharmacies resulting in dispensing

and purchasing drugs, whether with prescription or without prescription, were recorded in structured checklist by both observations and exit interviews with the patients just immediately after purchasing their required medications, and all the recorded patients encounters are considered the required study sample .

#### **4.4 Sample size**

Multistage cluster random sample and data triangulation was used to ensure credibility of research results . In the first stage the cluster random sample of community pharmacies from each of the nine areas of Gaza governorate was randomly drawn and the total resulting random sample was 57 pharmacies , then in the second stage , all the patients encounters or patients visits to the 57 randomly selected clustered sample of pharmacies were recorded during the randomly scheduled three hours visit for each pharmacy , this recording was done by a team of pharmacists using both observations and exit interviews with patients and resulted in a random sample of 471 patients encounters .

#### **4.5 Eligibility criteria**

##### **4.5.1 Inclusion criteria for community pharmacies:**

In the first stage in the sampling process of this study , the sample includes only the community pharmacies which are licensed registered pharmacies by MOH General Administration of pharmacy and located in Gaza governorate . while in the second stage of sampling it includes all the patients encounters or patients visits to the sampled pharmacies at the time of the randomly scheduled three hours visits , whether with prescription or without and resulted in dispensing and purchasing at least one kind of medicines or antibiotics only , and the patient agree to have an exit interview with the data collectors .

##### **4.5.2 Exclusion criteria for community pharmacies:**

Any non licensed and not registered community pharmacy by MOH General Administration of pharmacy in Gaza governorate was excluded from both the population and the sample of community pharmacies .

while in the second stage of sampling all patients encounters or patients visits during the time of data collection to the sampled pharmacies which resulting in purchasing a non medicines like for example medical disposables or cosmetics etc . are excluded , also all patients encounters resulted in purchasing medicines or antibiotics with our without prescription but the patient refused to have an exit interview were excluded .

#### **4.6 Setting of study**

The study was conducted in Gaza governorate public community pharmacies in the following setting , Al Darag area seven pharmacies , Al Tofah area two pharmacies , Al Zaytoon area five pharmacies , Al Shjhaia area nine pharmacies , Al Sabra area three pharmacies , Al Remal area eighteen pharmacies , Al Shateei camp six

pharmacies , Al Shikh Radwan area five pharmacies and Tal Al Hawa and Shiekh Ajleen area two pharmacies , totaling of 57 pharmacies .

#### **4.7 Period of study**

Data collection starts on 31/01/2007 and completed on 30/04/2007 .

#### **4.8 Ethical consideration**

A strict adherence to the ethical considerations of Helsinki declaration were strongly maintained through the study . So firstly an ethical approval to conduct the study was obtained from both the School of Public Health in Al Quds University and Helsinki Committee as shown in Annex ( 3 ) , then secondly an approval letter was sent to Director General of the General Administration of pharmacy in MOH as shown in Annex ( 4 ) , thirdly a recommendation letter was issued by the Director General of GAOPH to the pharmacists to cooperate and help the researcher in conducting this study Annex (5 ) , then finally an informed consent letter for both the managing pharmacists and the participant patients explaining the study was attached to every checklist in order to maintain the rights of all participants Annexes (6) & (7) .

#### **4.9 Construction of research tool**

In this study one research tool which is structured checklist with specific categorization and some close ended questions which was developed and designed to cover all the study objectives Annex (8) , the researcher develop the research tool based on the literature review , field observations and consultation with more than ten experts pharmacists , doctors and public health specialist , the checklist designed in English language and data were planed to be collected by a team of professional trained pharmacists using a triangulation of both observation of patient encounters to record the type of encounter , the dispensing time in minutes from time of arrival of patient until he finish purchasing his medication and an exit interview with the patient directly after he finish purchasing his medications , in this tool the first part was designed collect the type of encounter then all the social , demographic , educational and economical characteristics of the patients purchasing the medications from the pharmacies , the second part was designed to collect data from prescriptions only about doctor specialization and diagnosis .

The third part was designed to collect data about the types of therapeutic groups dispensed in each patient encounter with the pharmacists and the number of drugs for each group dispensed which ended in recording the number of drugs in the prescription , the number of drugs in prescription written by generic name and finally the number of dispensed drugs in prescription , the fourth part designed to collect data whether the patient encounter include antibiotics or not , and if it includes , it collects data about the type of antibiotic groups , the dosage form the manufacturer and whether a culture test was done or not before taken it .

#### **4.10 Validity of the research tool**

#### **4.10.1 Content validity:**

In order to validate the content of research tool ,the researcher sent a copy of both the structured checklist and the list of objectives of the study to eleven different experts including specialist physicians , pharmacists from different sectors , researchers , public health specialists, and statisticians . All the suggestions and the comments of the experts were taken in to the researcher best consideration an as a result of that some of the modifications for some of the items were introduced which enhance the content validity of the research instrument .

#### **4.10.2 Reliability of the research tool:**

In order to enhance and ensure the reliability of the tool used in this study a special training two hours work shop was held by the researcher , to train the team of data collectors to collect the data and fill the tool by both observation and exit interview in the same manner . Also a standardization in implementing the structured checklist was organized and guaranteed , to ensure the best possible reliability of the research instrument .

#### **4.11 Pilot study**

Before the start of the process of actual data collection , a pilot study was conducted as pretest for both the appropriateness of the data collection instrument and the response rate , which helped to detect if there is a need to modify any part of the instrument .

In a convenient sample of two community pharmacies , a convenient a twenty patients encounters sample were observed and an exit interviews were conducted with them , after filling the 20 structured checklists a slight modifications and improvements were introduced and the response rate was encouraging which is 100% .

#### **4.12 Data collection**

A data collection team consists of the researcher and other six professional pharmacists started to visit the study cluster random sample of community pharmacies who agree to participate in this study, each data collector was assigned a share of pharmacies to visit , each pharmacy was visited at random Schedule , a one time three hours visit between 3 to 8 P.M the expected peaking hours of pharmacies business during normal business days , in each pharmacy all the patients who visited the pharmacy at the time of data collection to purchase a medication whether with prescription or without prescription is observed and included in the second stage of the study sample of patients encounters , this inclusion only happened after agreeing to have a five minutes face to face exit interview , in this interview all required data about the patient , the doctor , the diagnosis and all the medicines dispensed and purchased is properly and correctly recorded according to the structured checklist by both observation and by asking the patient close ended questions to ensure the correctness of his socio demographic , economical , educational and health status , a

total of 503 encounters were observed and only 471 patients agree to have an exit interview and included in the second stage sample of patients encounters .

#### **4.13 Response rate**

In the first stage from the sample population of 57 public community pharmacy 49 pharmacies agree to participate and 8 pharmacies refuse with 85.96 % response rate , while in the second stage out of 503 encounters 471 who agree to have an exit interview were included with response rate of 93 .63 % , while the other 32 patients refused to participate due to the lack of time and they were in a hurry , that is why they were not included .

#### **4.14 Data management**

##### **4.14 . 1 Data entry:**

The checklists were overviewed for possible errors in filling , 471 structured checklists were filled properly and included , then data entry model was designed using the computerized soft ware program Statistical Package for Social Sciences ( SPSS ) version 11 , and data were categorized and properly coded and entered in to the program by the researcher with the help of a statistician , finally the process of data cleaning was performed to ensure the proper entry of all data , this process was done by two steps , in the first step a random number of checklists were checked for possible errors in data filling and entry then in the second step a descriptive statistics and frequencies for all study variables was performed .

##### **4.14 .2 Data analysis :**

The process of data analysis was done by the researcher with the help of both the supervisor and a statistician using the computerized software program the Statistical Package for Social Sciences( SPSS ) version 11 , it was started by descriptive analysis and frequency tables for the study different variables , then for some of the study continuous numeric variables both means and standard deviations were computed , after that the study WHO selected prescribing and patient care indicators were computed using the mathematical formulas approved by WHO , in addition to that a recoding and cross tabulation for specific study variables were performed , finally Chi square test was performed to explore possible relationships between the study categorical variables , the relationship was considered statistically significant if P value is below 0.05 .

#### **4.15 Limitations of the study**

The researcher encountered so many limitations in conducting this study , namely as a working student he had a very limited time available to conduct the study , very limited scientific references like books and journals especially it is the first study from this kind in Palestine and a very few related studies across the world , finally the current continuous security and political unrest characterizing our life in Gaza strip , especially the Israeli bombardment of our main power station have its negative effects in delaying the researcher for a considerable period of time .

## **Chapter 5**

### **Results**

In this chapter the results of this study will be presented , including the study population of patients encounters with community pharmacists, distribution by antibiotic dispensing patterns , by socio –demographic , educational level and economical status .

Then a calculation of the study resulted WHO prescribing and patient care indicators will be presented and discussed , after that the sample population of patients encounters who received with prescriptions antibiotics , further distributed according to the socio-demographic , educational and economical status of patients, also the distribution of antibiotics prescriptions by source clinic will be presented , the most common prescribed antibiotics group per patient will be indicated , the distribution of prescribed antibiotics groups by diagnosis also will be tabulated and discussed for possible appropriateness , all dispensed drugs will be presented according to its therapeutic classification and the most common dispensed therapeutic groups will be indicated. Then all dispensed therapeutic groups of drugs that were associated with each dispensing patterns of antibiotics will be presented , furthermore a distribution of the study population who received antibiotics by dosage forms , culture test and type of manufacturer of antibiotics well be presented and discussed .

Finally chi square test was performed for the study population who took antibiotics with or without prescription , to examine the level of significance and possible relationships between the study different variables.

#### **5.1 Characteristics of the study population**

The study population was 503 patients encounters with community pharmacists in Gaza governorate , 471 patients participated and included with a high response rate of 93.64 % , the study showed a clear variation in the different variables .

##### **5.1.1 Distribution of the study population by drugs dispensing patterns :**

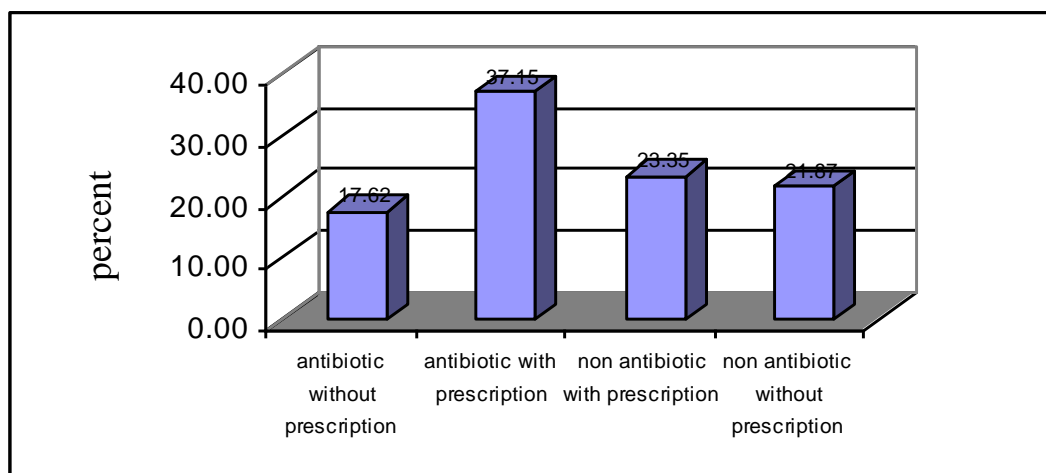
The study population was chosen to be representative of the entire population of patients encounters with pharmacists in Gaza governorate community pharmacies , table (5.1) shows that 17.62 % of the study patients purchased their antibiotics without prescription , 37.15 % purchased their antibiotics with prescription , 23.35 % purchased their non antibiotic drugs with prescription and 21.87 purchased their non antibiotic drugs without prescription . these results which illustrated more by Figure (5.1) achieved one of the main objectives of conducting of this study , and indicates that the patterns of irrational dispensing and over prescribing of antibiotics in Gaza governorate is a real and common problem , other important results can be manually.

Calculated and derived from table (5.1) , like 54.77 % of total patients encounters involved antibiotics which is very high percentage , only 60.50 % of total encounters dispensed with prescription while 39.50 % dispensed without prescription , 44.62 % of total encounters dispensed without prescription involved antibiotics and antibiotics prescription constitute 61.4 % of total encounters dispensed with prescription which

an indication of irrational over prescribing of antibiotics , from total antibiotics encounters dispensed 67.8 % with prescription , 17.8 % by pharmacist recommendation and 14.4 % by patient request these results more or less resembles that of the other developing countries and better than Alexandria 35% of antibiotics dispensed by prescription , 13,8 % by pharmacist recommendation and very high 50.4 % by client request (Benjamin , Smith and. Motawi , 1996). and better little bed than Jordan 54% of antibacterial dispensed with prescription , 23.1% by pharmacist recommendation and 23.2 % by self medication or patient request(Al-Bakri , Bustanji and Yousef , 2005). In rural Bangladesh 50% of antibiotics dispensed and sold by retail drug stores without any prescription (Mamun , Tabassum , Shears and Hart , 2006) , in Brazilian urban slum city of Fortaleza 54 % of antibiotics dispensed for a cohort of children were by physician prescription , 39 % by mothers of children and 7 % by pharmacy workers (Schorling , De Souza and Guerrant , 1991 ) .

**Table 5.1 : Distribution of study population by antibiotics dispensing patterns**

Antibiotics Dispensing Pattern	Frequency	Percent
Antibiotic without prescription	83	17.62
Antibiotic with prescription	175	37.15
Non antibiotic with prescription	110	23.35
Non antibiotic without prescription	103	21.87
Total	471	100



**Figure 5.1: Distribution of study population by antibiotics dispensing patterns**

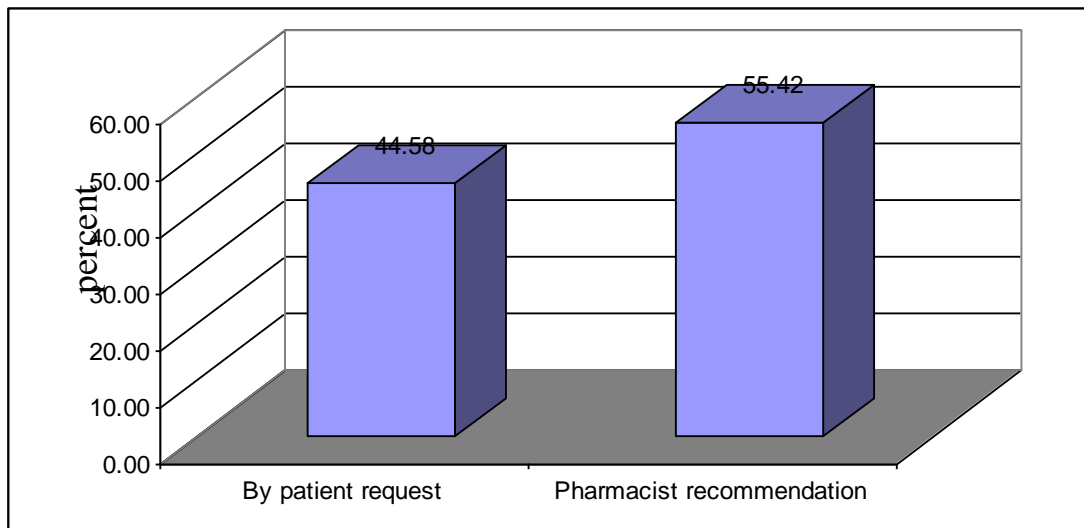
### 5.1.2 Distribution of study population of antibiotics without prescription by patterns of dispensing:

As shown in table (5.2) 44.58 % of the antibiotics dispensed without prescription were dispensed by patient request which considered as self medication and 55.42 % by pharmacist recommendation , these results which are more illustrated in figure (5.2) indicate the irrational dispensing and using of antibiotics, violate the basic pharmacy practice law of dispensing prescription only antibiotics without prescription

which will endanger the population public health through the emergence of antibiotics resistance , but unfortunately this situation resembles the situations in most of the developing countries .

**Table 5.2: Distribution of study population of antibiotics without prescription by patterns of dispensing**

Antibiotics Without Prescription Dispensing Pattern	Frequency	Percent
By patient request	37	44.58
Pharmacist recommendation	46	55.42
Total	83	100



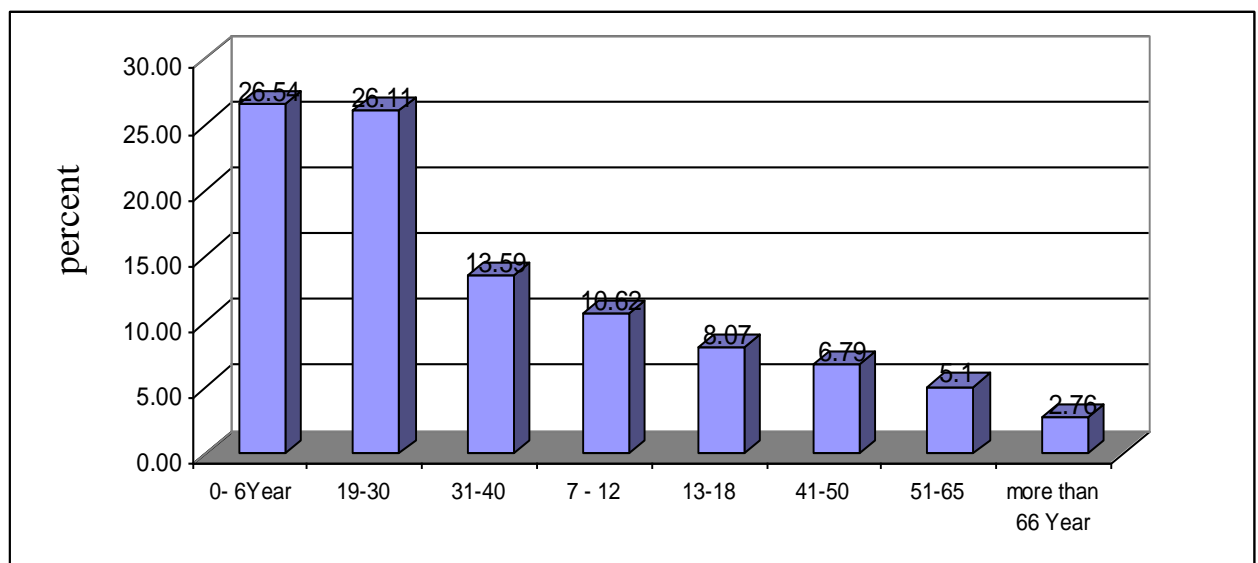
**Figure 5.2.: Distribution of study population of antibiotics without prescription by patterns of dispensing**

### 5.1.3 Distribution of study population by age group:

The results in table (5.3) show that the highest percentage 26.54 % of study population are in the age group 0-6 year , while the lowest 2.72 % are in the age group more than 66 year, these results are more illustrated by figure (5.3) and by manual calculation 45.23 % of the study population are eighteen and below years old , which is reflecting the structure of the Palestinian population pyramid of Gaza governorate and the other governorate in general.

**Table 5.3: Distribution of study population by age group**

Age of patient	Frequency	Percent
0- 6Year	125	26.54
19-30	123	26.11
31-40	64	13.59
7-12	50	10.62
13-18	38	8.07
41-50	32	6.79
51-65	24	5.10
more than 66 Year	13	2.76
Total	471	100



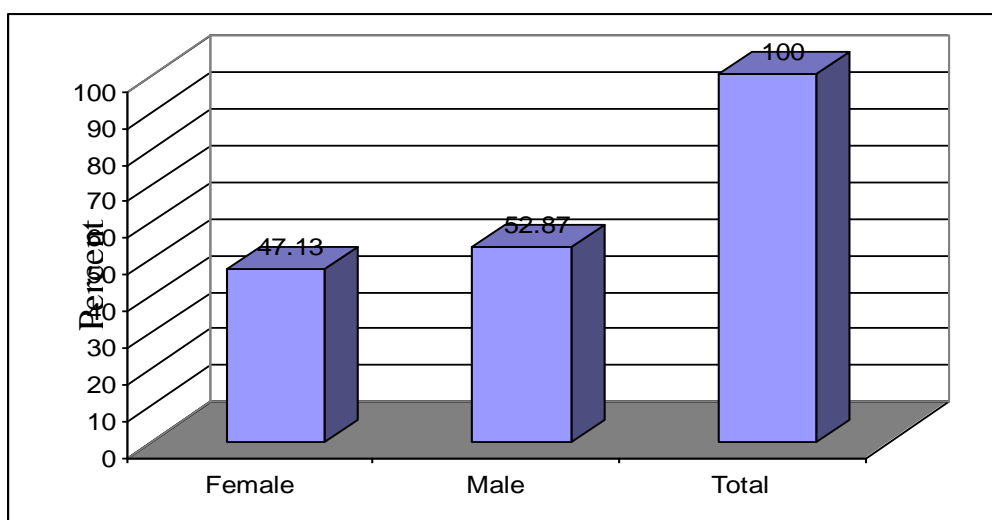
**Figure 5.3: Distribution of study population by age group**

#### 5.1.4 Distribution of study population by sex:

Results in table (5.4 ) show that more male patients 52.87 % purchased drugs than females 47.13 % , this is more illustrated by figure (5.4 ) .

**Table 5.4 : Distribution of study population by sex**

Sex of patient	Frequency	Percent
Male	249	52.87
Female	222	47.13
Total	471	100



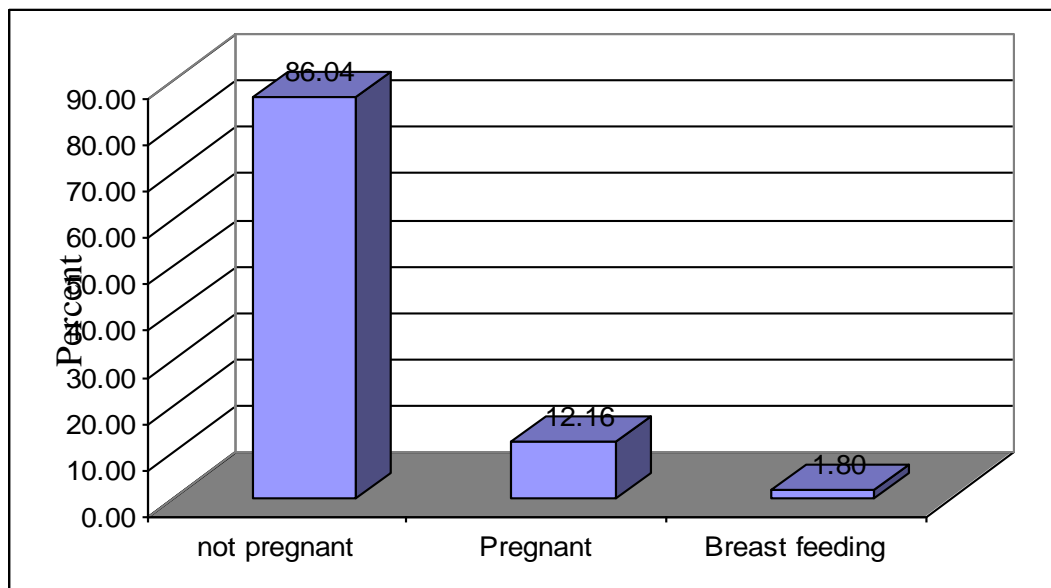
**Figure 5.4 : Distribution of study population by sex**

### 5.1.5 Distribution of females in the study population by pregnancy:

The results in table (5. 5) show that among the study females population , the majority 86.04 % are not pregnant , 12 .16 % are pregnant and only 1.8 % are breast feeding , these results are more illustrated by figure ( 5. 5 ) .

**Table 5.5 : Distribution of females in the study population by pregnancy**

If Female	Frequency	Percent
not pregnant	191	86.04
Pregnant	27	12.16
Breast feeding	4	1.80
Total	222	100.00



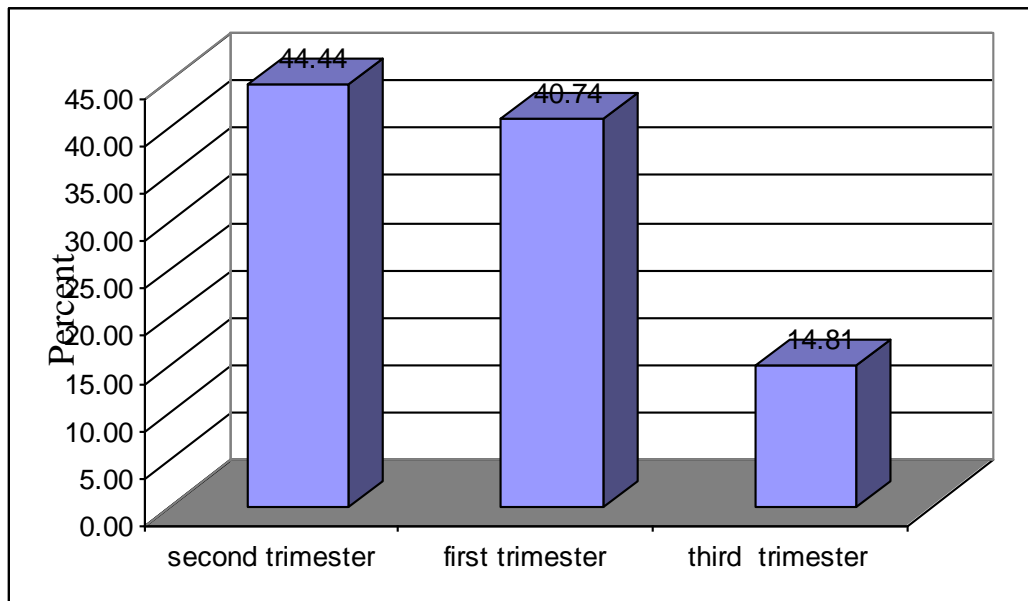
**Figure 5.5 : Distribution of females in the study population by pregnancy**

### 5.1.6 Distribution of study population by type of pregnancy trimester:

The results in table (5.6 ) show that 44.44 % of the study population of pregnant women are in their second pregnancy trimester , 40.74 % in their first trimester and 14.81 are in their third trimester , these results show high percentage 40.74 % of pregnant women in their first trimester which need very careful clinical attention from both doctors and pharmacists , these results are more illustrated in figure (5.6) .

**Table 5. 6 : Distribution of study population by type of pregnancy trimester**

Type of trimester	Frequency	Percent
second trimester	12	44.44
first trimester	11	40.74
third trimester	4	14.81
Total	27	100



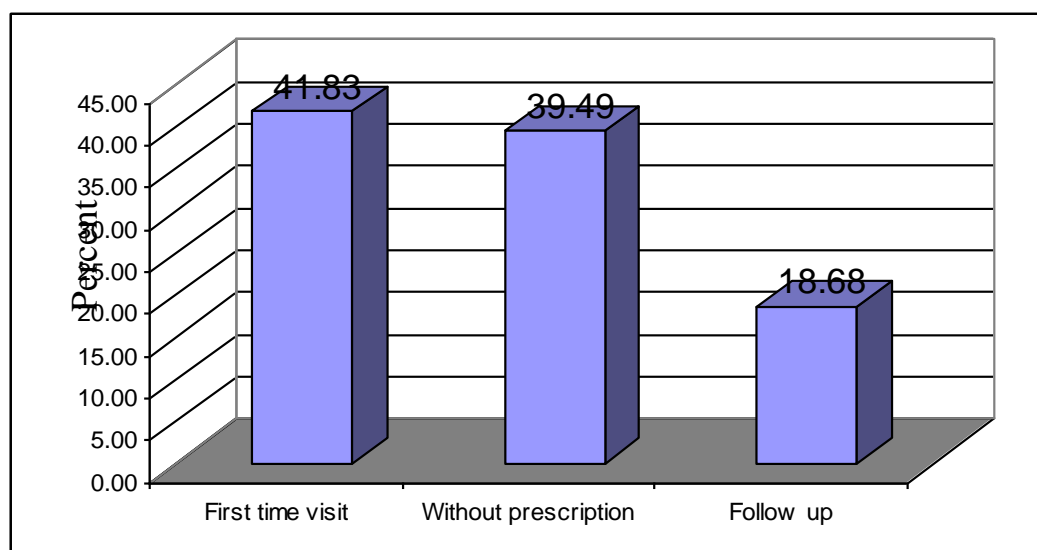
**Figure 5. 6 : Distribution of study population by type of pregnancy trimester**

### 5.1.7 Distribution of study population by type of visit to the doctor:

Results in table (5.7) show that 41.83 % of study population of patients purchased their medicines by prescriptions after visiting their doctor for the first time , 39.49 % purchased their medicines without prescriptions which is a high percentage , 18.68 % by their follow up prescriptions , these results are more illustrated in figure ( 5.7) .

**Table 5.7 : Distribution of study population by type of visit to the doctor**

Visit Type to the Doctor	Frequency	Percent
First time visit	197	41.83
Without prescription	186	39.49
Follow up	88	18.68
Total	471	100



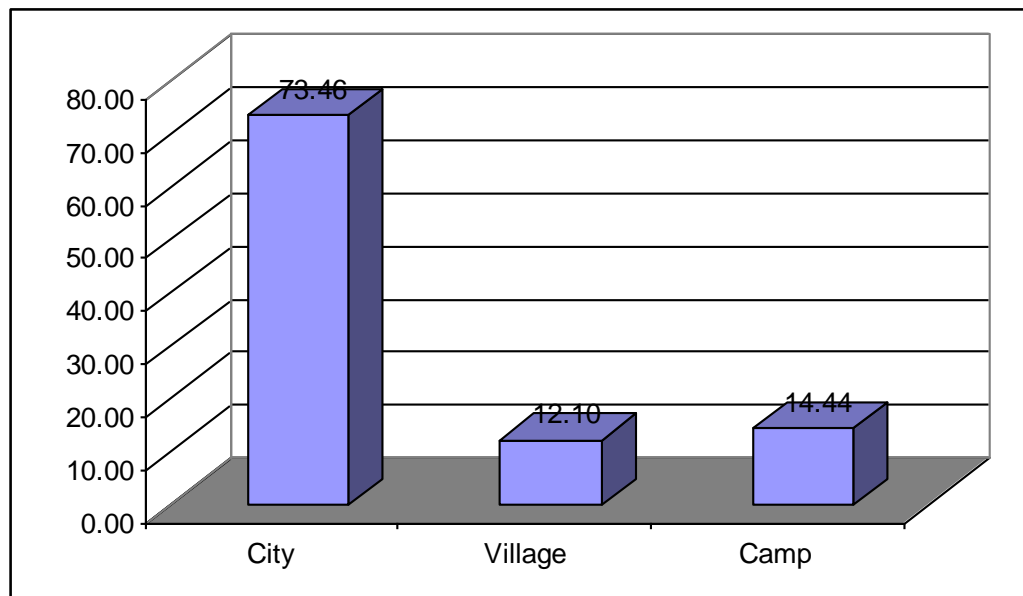
**Figure 5.7 : Distribution of study population by type of visit to the doctor**

### 5.1.8 Distribution of study population by place of resident:

Results in table (5 . 8) show that the majority of the study population patients 73.46 % reside in a city , 14.44 % in a camp and 12.10 in a village , these results are logical and reflect the actual fact that most of the population of Gaza governorate are living in Gaza city , the above mentioned results are more illustrated in figure ( 5.8 ) .

**Table 5.8: Distribution of study population by place of resident**

Place of resident of patient	Frequency	Percent
City	346	73.46
Village	57	12.10
Camp	68	14.44
Total	471	100



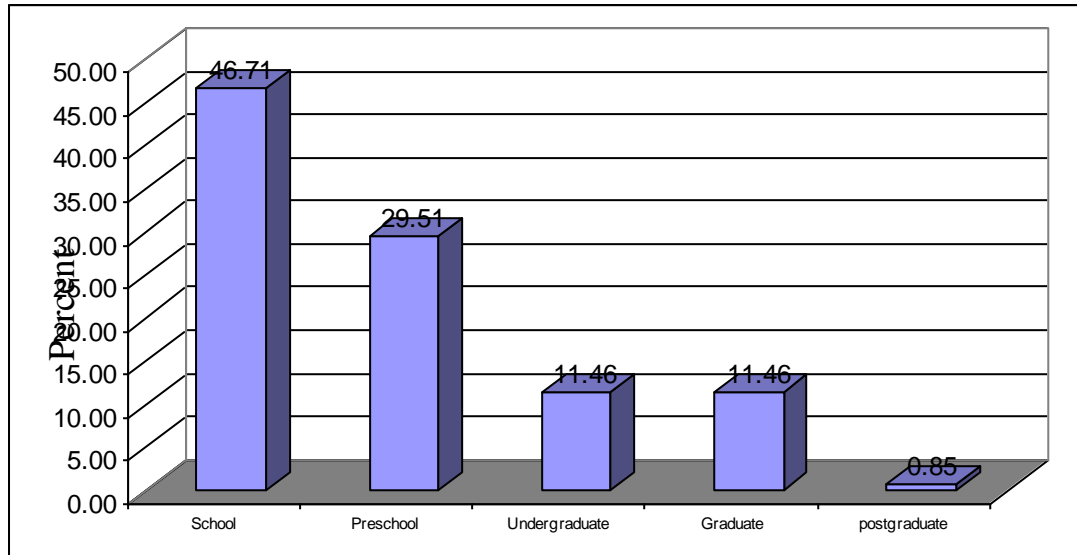
**Figure 5.8: Distribution of study population by place of resident**

### 5.1.9 Distribution of study population by level of education:

Results in table ( 5.9) show that the 46.71% of the study population have school level of education , 29.51 % have preschool level , 11.46 % have undergraduate level , equal to that 11.46 % have graduate level and only 0.85 % have postgraduate level of education , these results are more illustrated in figure (5.9) , and it indicate that the higher the level of education of patients after school level , the lower their visits to the community pharmacies to purchase medicines , which may indicate the higher their health awareness and the lower the chance they get sick .

**Table 5.9: Distribution of study population by level of education**

Level of Education of patient	Frequency	Percent
School	220	46.71
Preschool	139	29.51
Undergraduate	54	11.46
Graduate	54	11.46
Postgraduate	4	0.85
Total	471	100



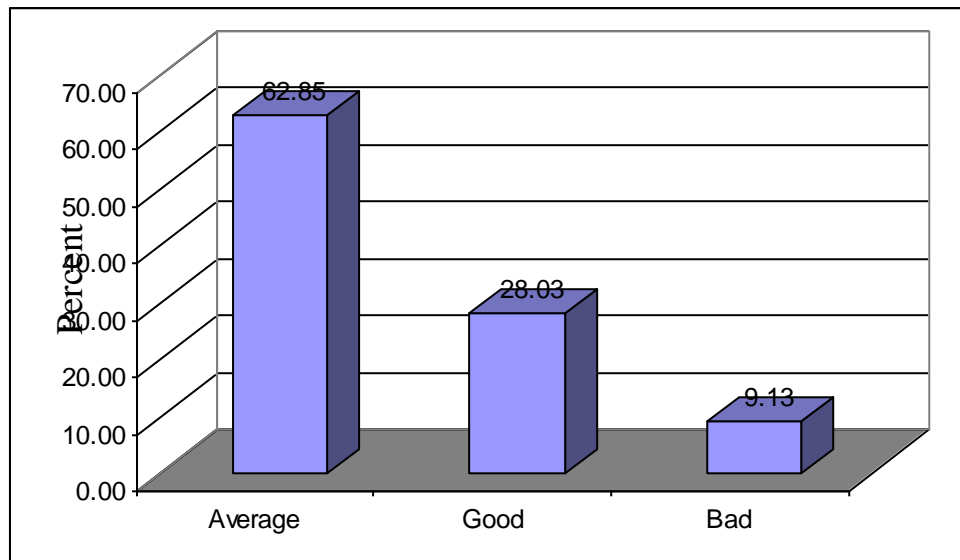
**Figure 5.9: Distribution of study population by level of education**

### 5.1.10: Distribution of study population by economic situation:

Results in table (5.10) show that 62.85 % of the study population patients have an average economic situation , 28.03 % have good economic situation and 9.13 % have bad economic situation , these results are illustrated in figure (5.10) , so the results show that almost 90 % of study population patients has an average and good economic conditions and only 9.13 % have bad economic conditions ,which is fair and true in spite of the current hard economic situation and the high level of poverty and unemployment reaching more than 50% in Gaza strip governorates due to the embargo and unstable political situation , this is true and fair because only people who have money and enjoy financial capability will go to private sector clinics and community pharmacies , while most of poor patients will go to receive their medications from free or cheap health providers like MOH clinics , UNRWA clinics and NGOs clinics .

**Table 5.10: Distribution of study population by economic situation**

Economic situation of patient	Frequency	Percent
Average	296	62.85
Good	132	28.03
Bad	43	9.13
Total	471	100



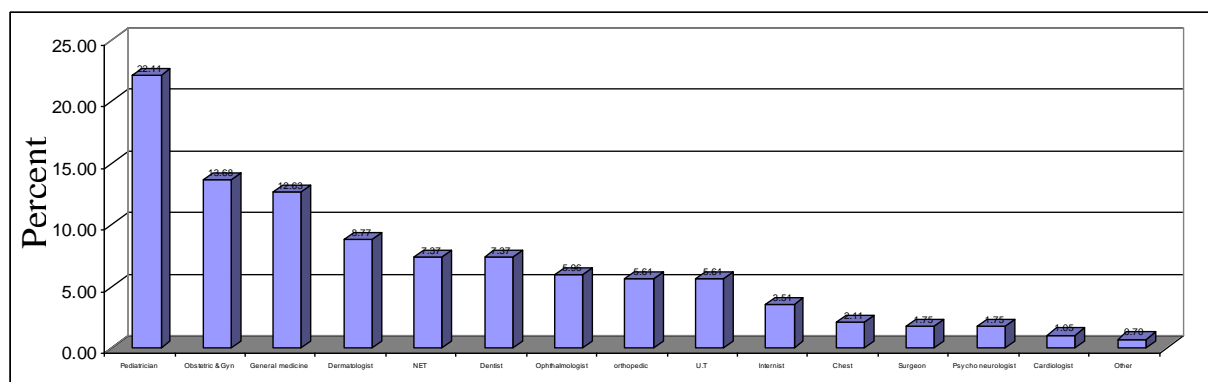
**Figure 5.10: Distribution of study population by economic situation**

### 5.1.11 Distribution of study population prescriptions by specialization of Doctors:

Results in table ( 5.11 ) show that the highest percentage 22.11 % of the study population prescriptions came from pediatricians , and 12.63 % from general medicine doctors and the lowest 1.05 % from cardiologists , these results are illustrated in figure ( 5. 11) .

**Table 5.11 : Distribution of study population prescriptions by specialization of Doctors**

Specialization of doctor who wrote the prescription	Frequency	Percent
Pediatrician	63	22.11
Obstetric & Gyn	39	13.68
General medicine	36	12.63
Dermatologist	25	8.77
NET	21	7.37
Dentist	21	7.37
Ophthalmologist	17	5.96
Orthopedic	16	5.61
U.T	16	5.61
Internist	10	3.51
Chest	6	2.11
Surgeon	5	1.75
Psycho neurologist	5	1.75
Cardiologist	3	1.05
Other	2	0.70
Total	285	100



**Figure 5.11: Distribution of study population prescriptions by specialization of Doctors**

## 5.2 WHO prescribing and patient care indicators

In this part the study resulted selected WHO prescribing indicators which they are the average number of drugs per prescription , the percentage of medicines prescribed by generic name and the percentage of encounters with an antibiotics prescribed will be presented and compared to other local and foreign studies , in addition to that the same will be done to the study resulted selected WHO patient care indicators, which

they are the average dispensing time and the percentage of medicines actually dispensed (WHO, 2002).

### 5.2.1 The average number of drugs per prescription:

Results in table (5.12) show that WHO prescribing indicator which is the average number of drugs per prescription is 2.154 with minimum 1 and maximum 6 drugs per prescription indicate high rate of poly pharmacy and could result in adverse drug – drug interactions , this result is higher than WHO standard values for drugs use which is ranging from 1.6 to 1.8 and higher the valid international recommended standard by WHO to be below 2 (Dumoulin ,1998) .

By Comparing the result obtained in this study and the results of other studies , the average number is higher than average number drugs obtained in 1997 in different Palestinian cities of Tulkarm hospital 1.8 , Tulkarm clinic 2 while lower than Shifa hospital 2.9 , Rimal clinic 3.1 , Nablus hospital 2.6 and Hebron hospital 2.9 (Obeidallah , Mahariq, Barzeq, Zemli, Piva and Valasquez , 2000).

The average number drugs per prescription in this study is higher than the average number for Gaza strip primary health care clinics which was 1.92 in a study conducted in the year 2004 ( Fattouh , 2005 ) .

**Table 5.12 : WHO Prescribing Indicators**

Descriptive Statistics	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Average Number of drugs per prescription	285	1	6	614	2.154	0.959

This result better and lower than Babol city in Iran which is 4.4 (Moghadamnia , Mirbolook and Aghili , 2002 ) , lower and better than Jordan 2.3 (Otoom , Batieha , Hadidi , Hasan and Al –Saudi , 2002 ) ( 61) , the result also lower and better than west Bengal in India which has average 3.2 drugs per encounter (Hazra , Tripathi and Alam , 2000) , in addition to that the average number of drugs per prescription in this study is lower than and better the following countries , Attock district in Pakistan 4.1 for private sector and 2.7 for public sector (Siddiqi , et al ,2002 ) , Mali 3.2 in public and 2.8 in private sector (Maiga , Diawara and Maiga , 2006) , North west Ethiopia 2.5 (Desta , Abula , Beyene , Fantahun ,Yohannes , Ayalew, 1997 ) , India 2.9 (Karande, Sankhe and Kulkarni , 2005 ) , Uzbekistan 2.9 (Pavin , Nurgozhin , Hafner , Yusufy and Laing , 2003 ) , Karachi in Pakistan 4.51(Das , 2001) and finally the result of this study is lower and better than Indonesia 3.3 and Nigeria 3.8 ( Hogerzeil , et a l , 1993 ) . ., while this study result still higher and worse than the city of Kragujevac in Serbia which is averaging 1.9 per prescription ( Jankovic , Vasic , Maksimovic , Cupurdija , Kostic and Kovacevic , 1999) .

### 5.2.2 The percentage of drugs prescribed by generic name :

An other study drug prescribing indicator is the percentage of drugs prescribed by generic name , which is calculated by the following formula : (number of drugs prescribed by generic name/total number of drugs prescribed ) \* 100 (WHO ,1995 ) .

The result as shown in table (5.13) is 6.19 % which is very low , and indicate the following trends , high tendency of physicians in Gaza governorate to prescribe drugs in different brand names rather than in generic names , the lack of training courses for physicians about the value of generic drugs in the rational drug use .

This study is consistent with a study conducted in Gaza strip in 2004 which was 5.47% (Fattouh , 2005) , and better little bed than average percentage for Gaza strip and west bank 2,7 % obtained in a study in the year 1997 (Obeidallah , Mahariq, Barzeq, Zemli, Piva and Valasquez , 2000) , and almost equal to Jordan 5.1 % (Otoom , Batieha , Hadidi , Hasan and Al –Saudi , 2002 ) , the result of this study lower and much worse than otter countries like , India 73.4 % (Karande, Sankhe and Kulkarni , 2005 ) , west Ethiopia is encouraging 75%(Desta , Abula , Beyene , Fantahun ,Yohannes , Ayalew, 1997 ) , Uzbekistan 38% (Pavin , Nurgozhin , Hafner , Yusufy and Laing , 2003 ) , Mali 88.2 % in public sector and 30.9 % in private sector (Maiga , Diawara and Maiga , 2006) , in India non governmental organization 46.2 % (Hazra , Tripathi and Alam , 2000) and too much lower than Iran 98 % (Moghadamnia , Mirbolook and Aghili , 2002 ) .

**Table5. 13 : WHO prescribing and patient care indicators**

WHO Indicator	Percent
Percentage of encounters with an Antibiotic prescribed	61.4
Percentage of drugs prescribed by Generic name	6.19
Percent of drugs actually dispensed	90.06

### 5.2.3 The percentage of encounters with an antibiotic prescribed:

This is an other important WHO study selected prescribing indicator , it was calculated by the following formula: (number of patient encounters during which an antibiotic was prescribed / total number of encounters surveyed ) \* 100(WHO ,1995) .

Table (5.13) shows the result is 61.4 % which is very high and indicating the irrational over prescribing of antibiotics by the physicians in Gaza governorate and a lot of the antibiotics were prescribed for common cold and other viral upper respiratory tract infections , this catastrophic result which is badly may contributing in the increase of antibiotic resistance problem and may endanger our people general public health .

This result is higher than Tulkarem hospital 54 % , Nablus primary health clinic 46 % , Hebron hospital 52 % , Shifa hospital 35 % and Remal clinic 48 % (Obeidallah , Mahariq, Barzeq, Zemli, Piva and Valasquez , 2000) , The result higher than Uganda

56 % , and the median of 12 developing countries 41% while lower than Sudan 63 % ( Hogerzeil , et al , 1993 ) .

Also the result is higher than Uzbekistan 57 % (Pavin , Nurgozhin , Hafner , Yusufy and Laing , 2003 ) , Sharjah 45 % ( Hasan , Das and Mourad , 1997 ) , India 39.6 % (Karande, Sankhe and Kulkarni , 2005 ) , Mali 50 % in private sector(Maiga , Diawara and Maiga , 2006) , Jordan 60.9 %(Otoom , Batieha , Hadidi , Hasan and Al –Saudi , 2002 ) and Erbid city in Jordan 50 % ( Mohammed , Hashim , Hashim and Mahdi , 1991) , while this study result is lower than Damanhour general hospital in Egypt 80.6 % ( Ibrahim, Sarkis and N. , 2003 ) . and Ethiopia 62.5 % (Desta , Abula , Beyene , Fantahun ,Yohannes , Ayalew, 1997 ) .

#### **5.2.4 The percentage of drugs actually dispensed:**

This is the last important study selected WHO patient care indicator , it was calculated by the following formula : ( number of drugs actually dispensed / total number of drugs prescribed ) \* 100 ; (WHO,1995)

Results in table (5.13) show that it is 90.06 % , while this result considered high and indicating good supply of drugs in Gaza governorate community pharmacies , but those 9.94 % of non dispensed drugs can be attributed either to the shortage of some kinds of drugs in the drug stores due to the interruption in opening Al Muntar border gate for good crossing , or due to the disability of patients to buy some of the prescribed drugs, also it can be attributed to other unknown reasons .

The result in this study is higher and much better than Kragujevac city in Serbia which ranging from 39 % to 68 % ( Jankovic , Vasic , Maksimovic , Cupurdija , Kostic and Kovacevic , 1999) .

#### **5.2.5 The average dispensing time:**

This is the last important study selected WHO patient care indicator , it was calculated by the following formula : ( total time for dispensing drugs to series of patients / number of patient encounters ) (WHO,1995) .

Results in table (5.14) show that the average dispensing time is 4.28 minutes with minimum 2 and maximum 16 minutes , which is very good and high comparing with other studies , it indicates that Gaza governorate community pharmacists are caring for their clients and dedicated enough time while they are dispensing their patients prescriptions which enable a reasonable chance for considerable interaction between the pharmacist and the patient , may be because community pharmacies are less crowded than government and UNRWA pharmacies .

**Table 5.14 : WHO patient care indicators**

Descriptive Statistics	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Average dispensing time in minutes	285	2.00	16.00		4.2877	2.3470

This study resulted average dispensing time , is higher and much better than the dispensing time in Tulkarem hospital 30.0 seconds , Nablus PHC 29.5 seconds , Hebron hospital 30.8 second , Shifa hospital 30.0 second and Remal PHC 28.0 second (Obeidallah , Mahariq, Barzeq, Zemli, Piva and Valasquez , 2000) , also it is higher and better than Ethiopia 1.9 minutes (Desta , Abula , Beyene , Fantahun ,Yohannes , Ayalew, 1997 ) , India in NGO clinic 3.1 minutes (Hazra , Tripathi and Alam , 2000) , Jordan 26.25 second (Otoom , Batieha , Hadidi , Hasan and Al –Saudi , 2002 ) , Sharjah 89 seconds (Hasan , Das and Mourad , 1997 ) and Kragujevac city in Serbia 24 seconds ( Jankovic , Vasic , Maksimovic , Cupurdija , Kostic and Kovacevic , 1999) .

In this part of this chapter the study population , of patients encounters with antibiotics prescriptions will be deeply analyzed and distributed according to some of the following independent variables source of clinic , the most common antibiotic groups prescribed , age group , sex , female pregnancy situation , type of pregnancy trimester , type of visit to the doctor , place of resident , level of education , economic situation of patient and finally the specialization of doctor who wrote the antibiotic prescription .

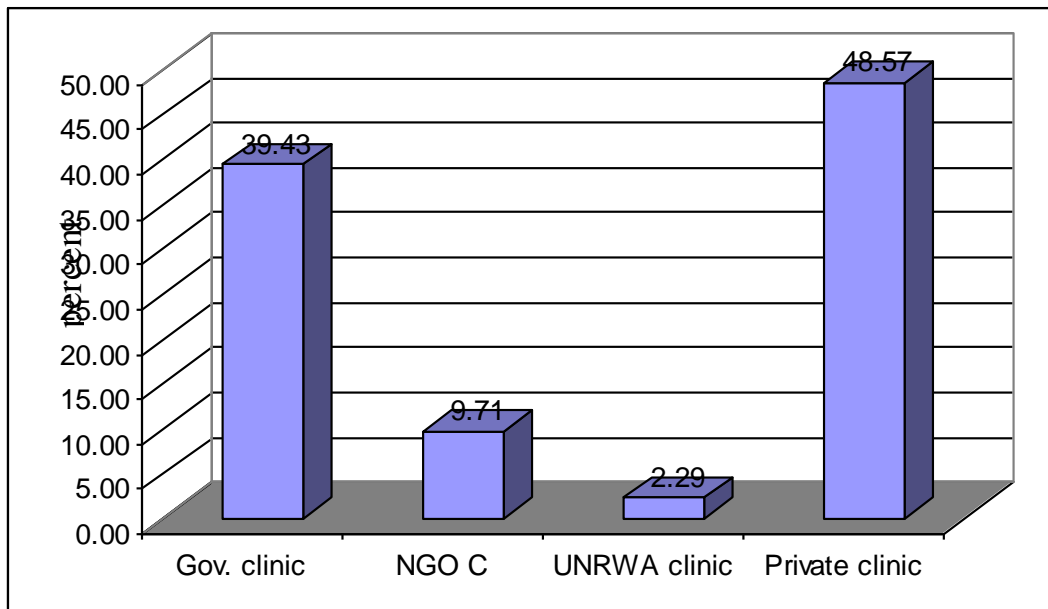
### **5.3.1 Distribution of study population antibiotics prescriptions by source clinic:**

The results in table (5. 15 ) , showed that 48 .57 % of the study antibiotics prescriptions came from private clinics source , 39 .43 % from government clinics , 9.72 % from NGOs clinics and only 2.29 % from UNRWA clinics, the highest percentage of antibiotics prescriptions came from private clinics which is normal and logical result because the setting of the study is the private sector community pharmacies and it even suppose to be higher, while 39. 43 % came from government clinics which considered very high and clearly indicates that there is a great shortage of drugs in governmental clinics pharmacies , may be due to the current embargo a against our government and the lack of fund to buy the necessary drugs , this shortage may pushed the patients to buy medications which they can not find in government clinics from the private sector community pharmacies , the low percentage 9.71 % came from NGOs clinics indicates that the majority of their patients buy their medications from their private NGOs pharmacies because of the low prices and the free of charge in some cases they offer , the large quantities of drugs donations they received from multiple local and international donors , so only

when they can not find their prescribed medications their patients will leave the NGO pharmacy and go to buy from outside community pharmacy, finally only 2.29% of the study antibiotics prescriptions came from UNRWA clinics which is a clear indication of the very good availability of drugs in UNRWA pharmacies because UNRWA is not suffering any kind of fund embargo, maybe this can explain why a very few of UNRWA patients who cannot find their medications will go to the community pharmacies to buy their lacking medications, these above mentioned results are more illustrated in figure ( 5. 12) .

**Table 5.15 : Distribution of study population antibiotics prescriptions by source clinic**

Source of antibiotics prescriptions	Frequency	Percent
Gov. clinic	69	39.43
NGO C	17	9.71
UNRWA clinic	4	2.29
Private clinic	85	48.57
Total	175	100



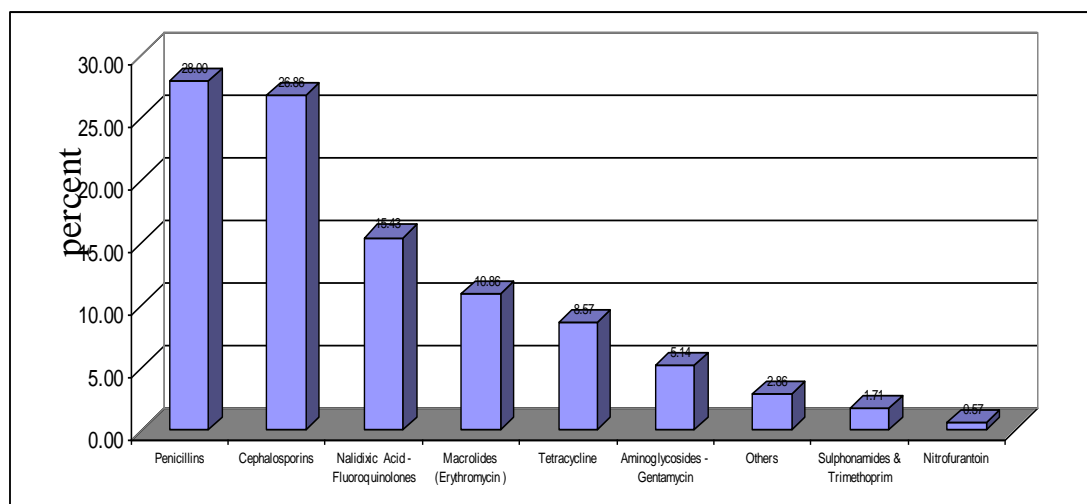
**Figure 5.12 : Distribution of study population antibiotics prescriptions by source clinic**

### 5.3.2 Distribution of study population antibiotics prescriptions by the most common antibiotic groups prescribed per patient:

Results in table ( 5.16 ) showed that the most common antibiotics groups prescribed is penicillin's 28 % then cephalosporin's 26 ,86 % , nalidixic acid – fluoroquinolones 15.43 % , macrolides 10 .86 % , tetracycline 8. 57 % , amino glycosides 5. 14 % , sulphonamides & trimethoprim 1.71 % , nitrofurantoin 0.57 % and from others 2.86 % these results are more illustrated in figure ( 5. 13 ) .

**Table 5.16: Distribution of study population antibiotics prescriptions by the most common antibiotic groups prescribed per patient**

Antibiotic Group	Frequency	Percent
Penicillins	49	28.00
Cephalosporins	47	26.86
Nalidixic Acid – Fluoroquinolones	27	15.43
Macrolides (Erythromycin )	19	10.86
Tetracycline	15	8.57
Aminoglycosides – Gentamycin	9	5.14
Others	5	2.86
Sulphonamides & Trimethoprim	3	1.71
Nitrofurantoin	1	0.57
Total	175	100



**Figure5.13 : Distribution of study population antibiotics prescriptions by the most common antibiotic groups prescribed per patient**

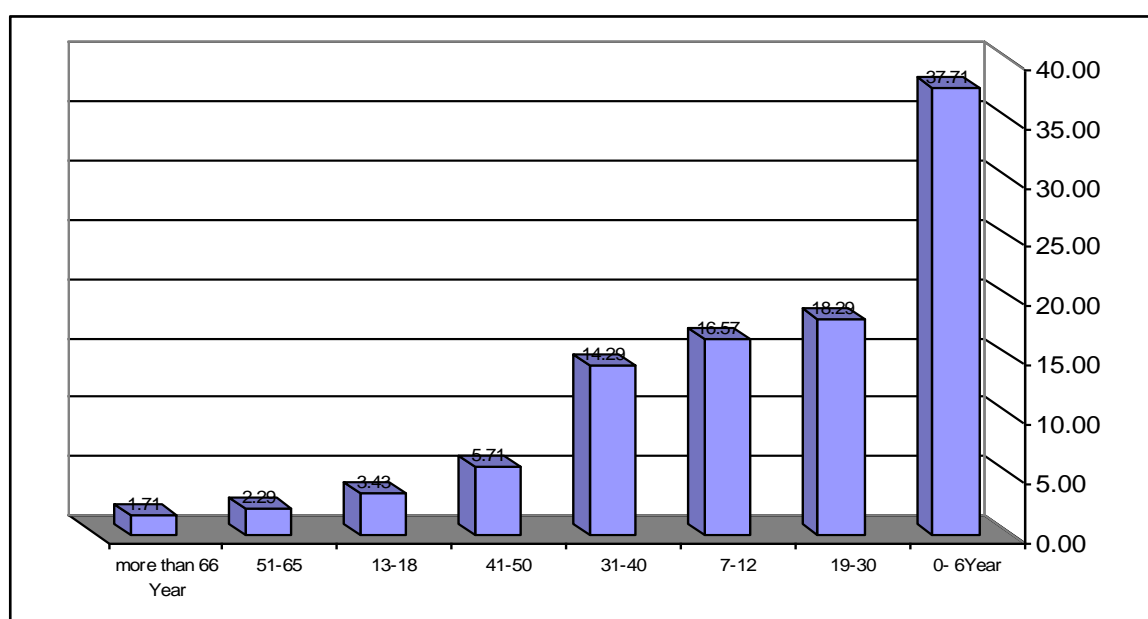
### 5.3.3 Distribution of the study population antibiotics prescriptions by age group:

Results in table ( 5.17 ) showed that 37.71 % of the study population patients who have antibiotics prescriptions are in the age group 0 – 6 years old , 18 .29 % are in the age group 19 – 30 years old , 16.57 % are in the age group 7 -12 years old , 14.29 % are in the age group 31 – 40 years old , 5.71 % are in the age group 41 - 50 years old , 3.43 % are in the age group 13 -18 years old , 2.29 % are in the age group 51- 65 years old and 1. 71 % more than 66 years old .

From the above mentioned results it is clear that more than 57 % of patients are in age of 18 years and below and more than 53 % are in the age of 12 years old and below , which indicate that doctors are over prescribing most of the antibiotics to the children , which may cause future emergence of antibiotic resistance , also great attention must be focused by our MOH public health and rational drug use officials to try educate physicians about the danger of this trend , These results also are more illustrated in figure ( 5 .14 ) .

**Table 5.17 : Distribution of the study population antibiotics prescriptions by age group**

Age of patient	Frequency	Percent
0- 6Year	66	37.71
19-30	32	18.29
7-12	29	16.57
31-40	25	14.29
41-50	10	5.71
13-18	6	3.43
51-65	4	2.29
more than 66 Year	3	1.71
Total	175	100



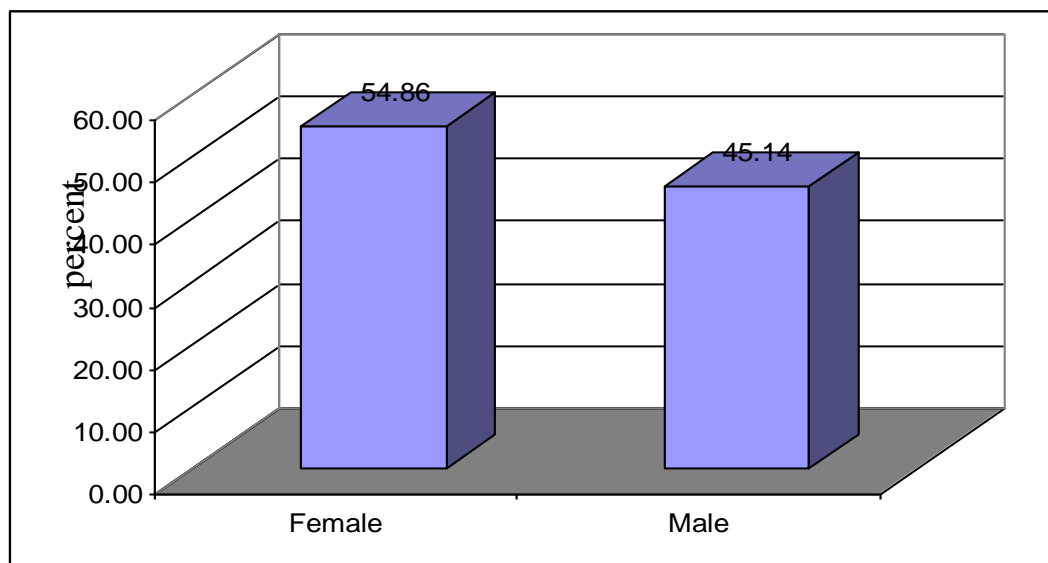
**Figure 5.14 : Distribution of the study population antibiotics prescriptions by age group**

### 5.3.4 Distribution of the study population antibiotics prescriptions by sex:

The results in table ( 5.18 ) show that the majority of the study population who have antibiotics prescriptions 54.86 % are females while 45.14 % are males , this result is more illustrated in figure ( 5 .15 ) .

**Table 5.18 : Distribution of the study population antibiotics prescriptions by sex**

Sex of patient	Frequency	Percent
Female	96	54.86
Male	79	45.14
Total	175	100



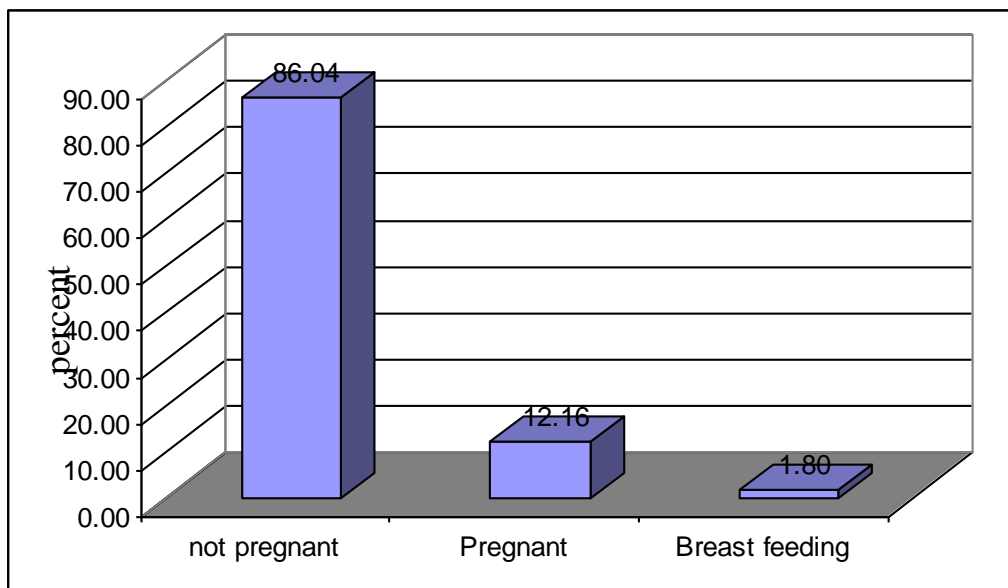
**Figure 5.15 : Distribution of the study population antibiotics prescriptions by sex**

### 5.3.5 Distribution of the study population antibiotics prescriptions by female pregnancy situation:

Results in table ( 5 .19 ) , showed that from the study population female patients who have antibiotics prescriptions the majority 86 . 46 % are not pregnant , 11.46 % are pregnant and 2.0 8 % are Breast feeding mothers these results are shown in figure (5.16) .

**Table 5.19 : Distribution of the study population antibiotics prescriptions by female pregnancy situation**

If Female	Frequency	Percent
not pregnant	83	86.46
Pregnant	11	11.46
Breast feeding	2	2.08
Total	96	100



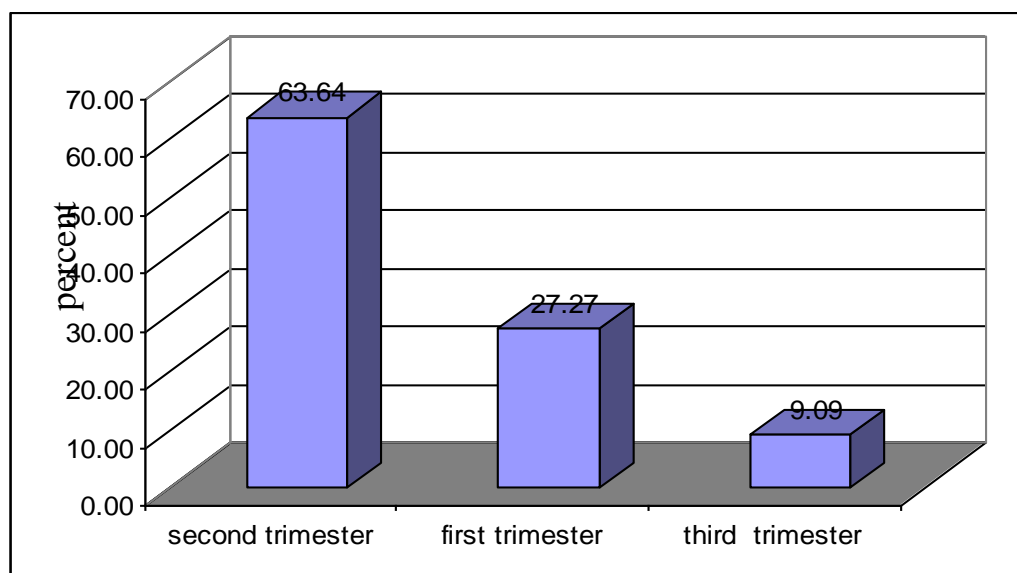
**Figure 5.16 : Distribution of the study population antibiotics prescriptions by female pregnancy situation**

### 5.3.6 Distribution of the study population antibiotics prescriptions by type of pregnancy trimester :

Results in table ( 5.20 ) showed that from the study population of pregnant women who received antibiotics prescriptions 63.64 % were in their second trimester of pregnancy , 27 .27 % in their first trimester and 9.09 % in their third trimester , prescribing antibiotics for pregnant women in their first trimester needs a lot of clinical attention and justification hoping that will not cause any harm to the fetus , also same attention needed during the whole pregnancy period , these results are more illustrated by figure ( 5 .17 ) .

**Table 5.20 :Distribution of the study population antibiotics prescriptions by type of pregnancy trimester**

Type of Pregnancy Trimester	Frequency	Percent
second trimester	7	63.64
first trimester	3	27.27
third trimester	1	9.09
Total	11	100



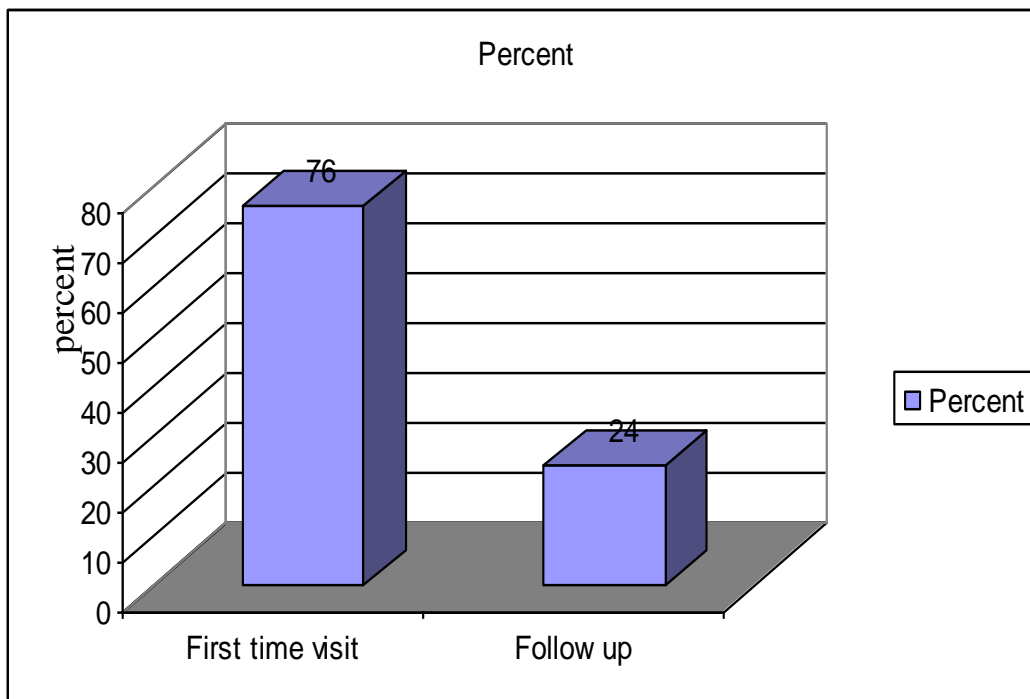
**Figure 5.17 :Distribution of the study population antibiotics prescriptions by type of pregnancy trimester**

### 5.3.7 Distribution of the study population antibiotics prescriptions by type of visit to the doctor:

The results in table (5.21) , showed that 76 % of the study population of patients received their antibiotics prescriptions from their first time visit to their doctors while 24 % in their follow up visit , this may indicate the tendency of physicians to over prescribe antibiotics for their patients , these results are more illustrated in figure ( 5 . 18 ) .

**Table 5.21:Distribution of the study population antibiotics prescriptions by type of visit to the doctor**

Type of Visit to The Doctor	Frequency	Percent
First time visit	133	76
Follow up	42	24
Total	175	100



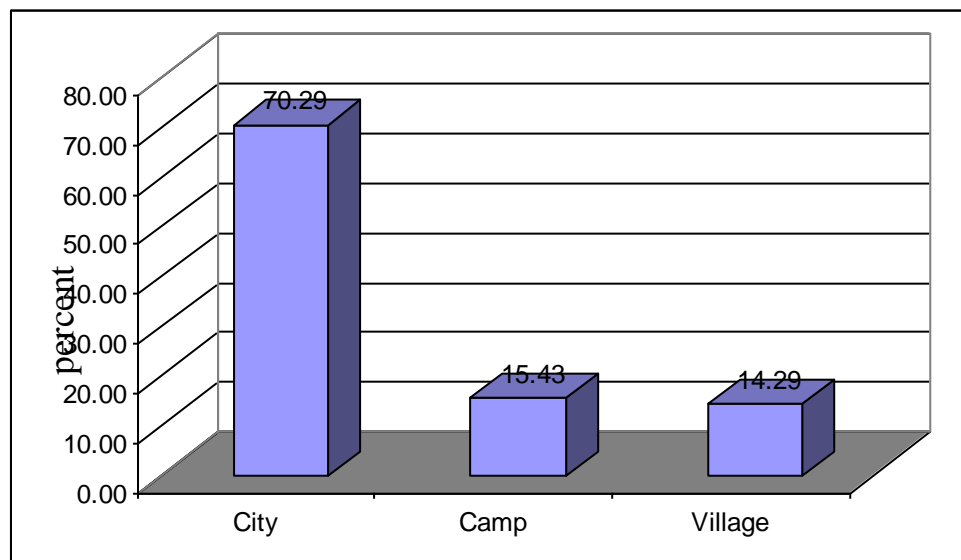
**Figure 5.18: Distribution of the study population antibiotics prescriptions by type of visit to the doctor**

### 5.3.8 Distribution of the study population antibiotics prescriptions by place of resident:

The results in table ( 5.22 ) , showed that the majority 70 .29 % of the study population patients who have antibiotics prescriptions live in a city , 15 .43 % in a camp and 14 .28 % in a village , these are logical because more than 70 % of Gaza governorate residents are living in Gaza city ( PCBS , 2006 ) , these results are more illustrated by figure ( 5 .19 ) .

**Table 5.22: Distribution of the study population antibiotics prescriptions by place of resident**

Place of Resident of Patient	Frequency	Percent
City	123	70.29
Camp	27	15.43
Village	25	14.28
	175	100



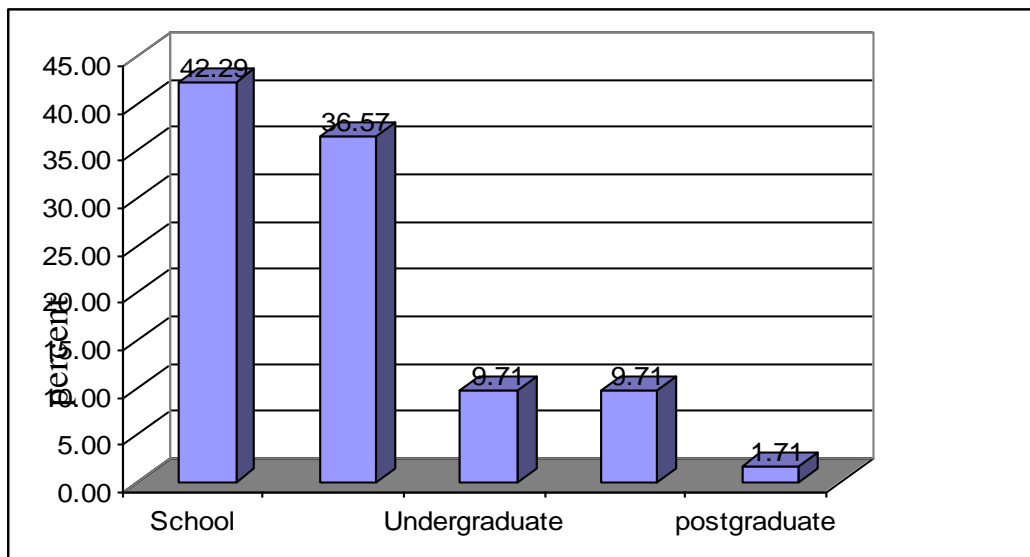
**Figure 5.19: Distribution of the study population antibiotics prescriptions by place of resident**

### 5.3.9 Distribution of the study population antibiotics prescriptions by level of education:

The results in table ( 5 .23 ) showed that 42 .29 % of the study population who have antibiotics prescriptions have school educational level , 36 .57 % have preschool level , 9.71 % have undergraduate level , 9.71 % have graduate level and 1. 71 % have postgraduate level , these results indicate that patients with higher education than school level are less frequently go to doctors to receive antibiotics prescriptions , and patients with the highest level of education have the lowest percentage of antibiotics prescriptions , aside from the fact that they are also may constitute a small percentage of the entire Gaza governorate population , but still these result are clear indication that the higher the education level of the patient the higher his level of health awareness and may be the lower the chance he will get sick and the less frequent the chance he will go to doctors and get antibiotics prescriptions , these results are more illustrated in figure ( 5 . 20 ) .

**Table 5.23 :Distribution of the study population antibiotics prescriptions by level of education**

Level of Education of Patient	Frequency	Percent
School	74	42.29
Preschool	64	36.57
Undergraduate	17	9.71
Graduate	17	9.71
Postgraduate	3	1.71
Total	175	100



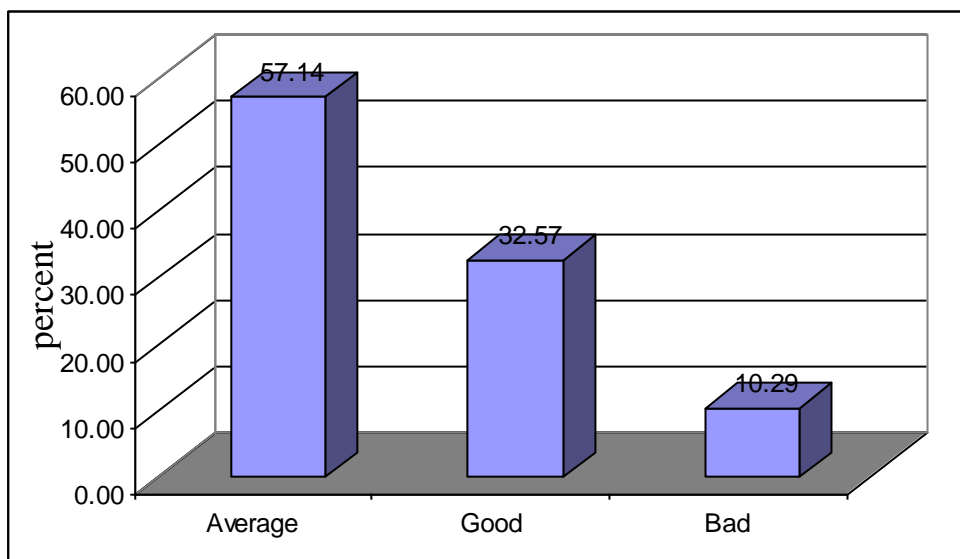
**Figure 5.20 :Distribution of the study population antibiotics prescriptions by level of education**

### 5.3.10 Distribution of the study population antibiotics prescriptions by level of economic situation of patient:

The results in table ( 5 .24 ) , showed that 57.14 % of study population patients who have antibiotics prescriptions have an average economical level , 32.57 % have a good economical level and 10.29 % have a bad economical level , meaning that the majority of patients enjoy average and good economical situation in spite of the current bad general economical situation , this can be attributed to the fact that only people who can afford will utilize the private sector medical services , while poor people or people with bad economical situation will utilize other cheaper or free medical services like government , UNRWA and NGOS medical services , these results are more illustrated in figure ( 5.21 ) .

**Table 5.24: Distribution of the study population antibiotics prescriptions by level of economic situation of patient**

Level of Economic Situation of Patient	Frequency	Percent
Average	100	57.14
Good	57	32.57
Bad	18	10.29
Total	175	100



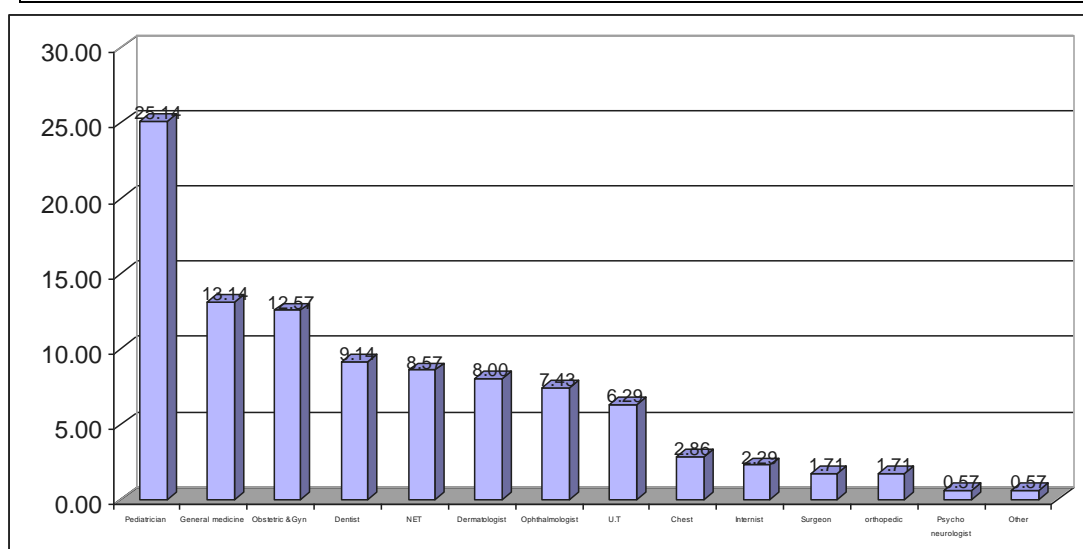
**Figure 5.21: Distribution of the study population antibiotics prescriptions by level of economic situation of patient**

### 5.3.11 Distribution of the study population antibiotics prescriptions by specialization of doctors who wrote the prescription:

The results in table ( 5.25 ), showed that the highest percentage 25 .14 % of the study population of patients encounters with antibiotics prescriptions came from pediatricians , 13 .14 % from General medicine practitioners , 12.57 % from Obstetric & Gynecologists , 9.14 % from dentists , 8.57 % from NET doctors and the lowest percentage 0.57 % is from Psycho neurologists , these results indicate clear over prescribing of antibiotics by pediatricians which may need a proper regulation and educational intervention by the MOH a special committee in rational drugs and antibiotics use , the above mentioned results are more illustrated in figure ( 5 .22 ).

**Table 5.25: Distribution of the study population antibiotics prescriptions by specialization of doctors who wrote the prescription**

Specialization of Doctors	Frequency	Percent
Pediatrician	44	25.14
General medicine	23	13.14
Obstetric & Gyn	22	12.57
Dentist	16	9.14
NET	15	8.57
Dermatologist	14	8.00
Ophthalmologist	13	7.43
U.T	11	6.29
Chest	5	2.86
Internist	4	2.29
Surgeon	3	1.71
orthopedic	3	1.71
Psycho neurologist	1	0.57
Other	1	0.57
	175	100



**Figure 5.22: Distribution of the study population antibiotics prescriptions by specialization of doctors who wrote the prescription**

#### **5.4 Distribution of antibiotics groups prescribed by diagnosis in prescriptions:**

The results in table ( 5.26 ) , show the main finding here which is that most of antibiotics groups of penicillin's cephalosporin's and macrolides are prescribed for the upper and lower respiratory tract diseases like common cold , sore throat , pharyngitis and etc , with antibiotics in spite of the fact that most of upper respiratory tract infections are with viral etiologies and often no need for antibiotics treatments , this irrational in appropriate prescribing of antibiotics violate the main WHO and CDC guide lines for the use of antibiotics in acute upper respiratory tract infections , and the use of broad –spectrum antibiotics when a narrow – spectrum antibiotic would have been just as effective ( Wong , Blumberg and Lowe , 2006 ) , the upper respiratory tract infections ( URIs ) are the most common infections world wide , their frequent inappropriate treatment with antibiotics is likely , to increase antibiotic resistance , contribute to morbidity and mortality , and waste of scarce resources , in a study in Thailand 91 % of the URI patients may have viral infections 60 % of them were prescribed an antibiotic ( Suttajit , Wanger , Tantipidoke , Ross- Degnan , Sitthi –amorn , 2005 ) , in Palestine , Gaza strip in a study 77.8 % of study population of pediatric acute respiratory infection (ARI) children were prescribed antibiotics , 77.7% of these antibiotics were unnecessary ( El Khoudary , 2002 ) , in Saudi Arabia study the most common frequent diagnosis was the upper respiratory tract infections ( URTI ) and was included in 21.6 % of the study prescriptions (Irshaid , AHomrany , Hamdi , Yamoah , Mahfouz , Ahmad , 2004 ) , the results also show an other inappropriate use of nalidixic acid – fluoroquinolones group in eye drops form for eye diseases while it is not the first line choice of treatment and it can only be used when the other first line groups fail , also using this same group in conditions like Gastroenteritis , common cold.

Gynecological diseases , urinary tract infections ( UTI ) and mouth & dental diseases is clearly inappropriate because it is not the first line choice of treatment , while it can be effective in treating UTI and other conditions it must be used only when other first line antibiotics failed , the use of penicillin's to treat food poisoning can be considered an appropriate as this group specially amoxicillin is effective against invasive salmonellosis and typhoid fever (Khatib and Daoud ,2003) , also while it is clinically justified and appropriate to use penicillin's , tetracycline's and macrolides groups to treat skin diseases , gynecological diseases , UTI and mouth & dental diseases , but is not appropriate to use cephalosporin's for the same disease conditions , because they are not considered as the first line of treatment due to the fact that they are broad spectrum , expensive and resistance will develop easily and rapidly for such agents since they are broad spectrum (Khatib and Daoud ,2003) .

**Table 5.26: Distribution of antibiotics groups prescribed by diagnosis In prescriptions**

Antibiotic Group	Penicillins	Cephalosporins	Tetracycline	Macrolides (Erythromycin )	Sulphonamides & Trimethoprim	Nitrofurantoin	Nalidixic Acid - Fluoroquinolons	Aminoglycosides - Gentamycin	Others
food poisoning	3	0	1	1	0	0	0	2	0
Gastritis	2	0	0	1	0	0	0	0	0
Diarrhea	0	0	0	0	0	0	1	0	0
Gastroenteritis	0	2	0	0	0	0	2	0	0
Constipation	1	2	0	1	0	0	0	0	0
abdominal pain	0	0	0	0	0	0	0	0	1
other gastrointestinal disease	0	1	0	0	0	0	1	1	0
Common cold	4	2	1	2	1	0	2	0	0
Sore throat	2	1	0	0	0	0	0	0	0
Pharyngitis	1	1	0	0	0	0	0	0	0
Tonsillitis	4	10	1	2	0	0	0	0	0
Bronchitis	8	5	0	3	0	0	1	0	0
Pneumonia	2	1	0	1	0	0	0	1	0
Asthma	0	1	0	0	0	0	0	0	0
others respiratory diseases	1	1	0	0	0	0	0	0	0
Hypertensive	0	0	0	0	0	0	1	0	0
C.V.A	0	0	0	0	0	0	1	0	0
heat stroke	1	0	0	0	0	0	0	0	0
Fractures	1	1	0	0	0	0	1	0	0
car accident	0	1	0	0	0	0	0	0	0
Dislocation	0	1	0	0	0	0	1	0	0
others injuries	0	1	0	0	0	0	0	0	0
Eye diseases	1	0	3	1	0	0	6	1	1
Ear diseases	0	4	1	1	0	0	0	2	0
Skin Conditions	4	1	4	1	1	0	1	1	0
Gynecology	4	4	1	2	0	1	3	1	1
UTI	1	5	2	2	1	0	5	0	1
Mouth & Dental Diseases	9	1	1	1	0	0	1	0	1
Psycho Neurological Disease	0	1	0	0	0	0	0	0	0
Total	49	47	15	19	3	1	27	9	5

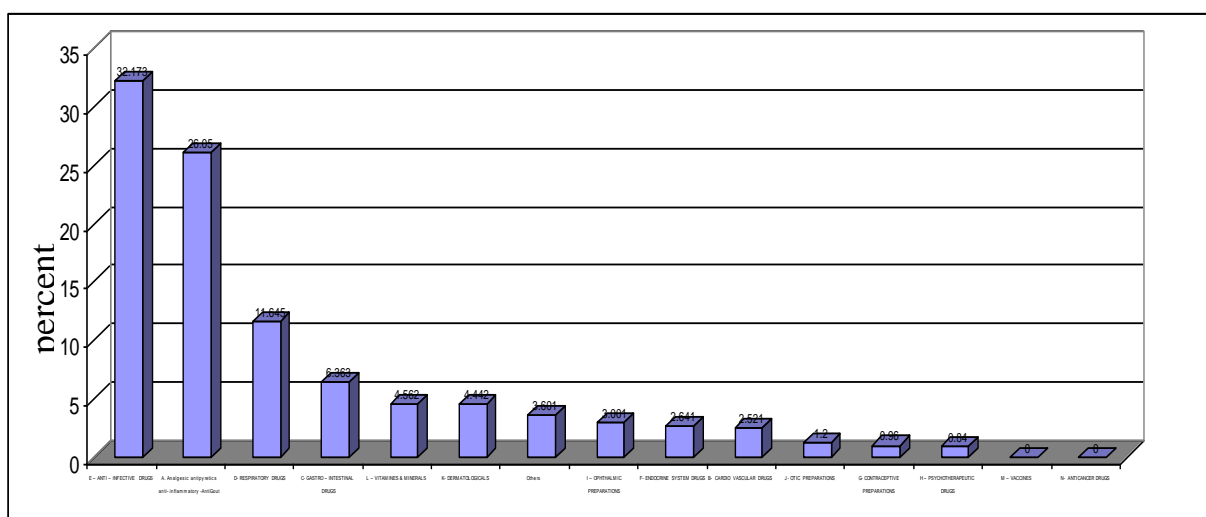
### 5.5 Distribution of study population by type of total therapeutic group dispensed

Results in table ( 5.27 ) showed that the highest percentage of purchases dispensed 32.17 % by the study population patient encounters is anti –infectives , 26.05 % analgesics antipyretics anti-inflammatory , 11.64 % respiratory drugs , 6.36 % gastro – intestinal drugs , 4.56 % vitamins & minerals and the lowest was 0.84 % psychotherapeutic drugs , these results are more illustrated in figure ( 5.23 ) , the results are higher than results obtained in a study in Alexandria community pharmacies in Egypt anti- infectives dispensed accounted for 19.8% , 16.2 %

analgesics antipyretics and non-steroidal drugs , 11.8 % respiratory drugs , 9.6 % gastro – intestinal drugs (Benjamin , Smith and Motawi , 1996) , the results of this study also show that , non of the vaccines and anticancer drugs were dispensed it is clearly because they are very expensive and insured patients usually get them from MOH free of charge .

**Table.5.27: Distribution of study population by type of total therapeutic group dispensed**

Descriptive Statistics	Minimum	Maximum	Sum	Mean	Std. Deviation	%	
E – Anti- Infective drugs	0	3	268	0.569	0.655	32.173	1
A-Analgesic antipyretics anti-inflammatory -AntiGout	0	3	217	0.461	0.634	26.050	2
D- Respiratory drugs	0	3	97	0.206	0.482	11.645	3
C- Gastro- Intestinal drugs	0	3	53	0.113	0.383	6.363	4
L – Vitamins & Minerals	0	2	38	0.081	0.280	4.562	5
K- Dermatologicals	0	3	37	0.079	0.320	4.442	6
Others	0	2	30	0.064	0.277	3.601	7
I – Ophthalmic preparations	0	3	25	0.053	0.283	3.001	8
F- Endocrine system drugs	0	2	22	0.047	0.240	2.641	9
B- Cardio Vascular drugs	0	3	21	0.045	0.285	2.521	10
J- Otic preparations	0	3	10	0.021	0.183	1.200	11
G- Contraceptive preparations	0	2	8	0.017	0.172	0.960	12
H– Psychotherapeutic drugs	0	2	7	0.015	0.138	0.840	13
M – Vaccines	0	0	0	0.000	0.000	0.000	14
N- Anticancer drugs	0	0	0	0.000	0.000	0.000	15



**Figure5.23: Distribution of study population by type of total therapeutic group dispensed**



## 5.7 Distribution of study population who received antibiotics therapy by making culture test

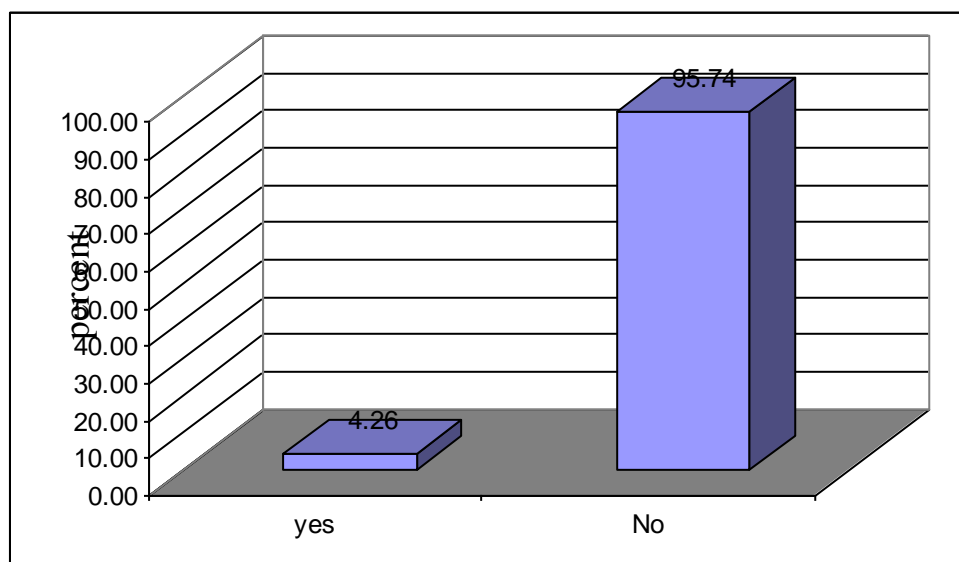
In this part of this chapter , the study population of patients will be distributed according their performance of Microbial sensitivity test or culture test as a valued indicator of the appropriateness and rational prescribing of antibiotics .

### 5.7.1 Distribution of study population who received antibiotics therapy by making culture test:

Results in table ( 5 .29 ) showed that only 4.26 % of the total patients encounters , who received antibiotics weather with or without prescription made a culture test or microbial sensitivity test ( MCST) before receiving their antibiotics , while 96.74 % received their antibiotics without performing any ( MCST ) , these results indicate the very high percentage of irrational and inappropriate prescribing and dispensing of antibiotics in Gaza governorate . these results are more illustrated in figure ( 5 .24 ) .

**Table.5.29 : Distribution of study population who received antibiotics therapy by making culture test**

Classification according to culture test performing	Frequency	Percent
Yes	11	4.26
No	247	95.74
Total	258	100



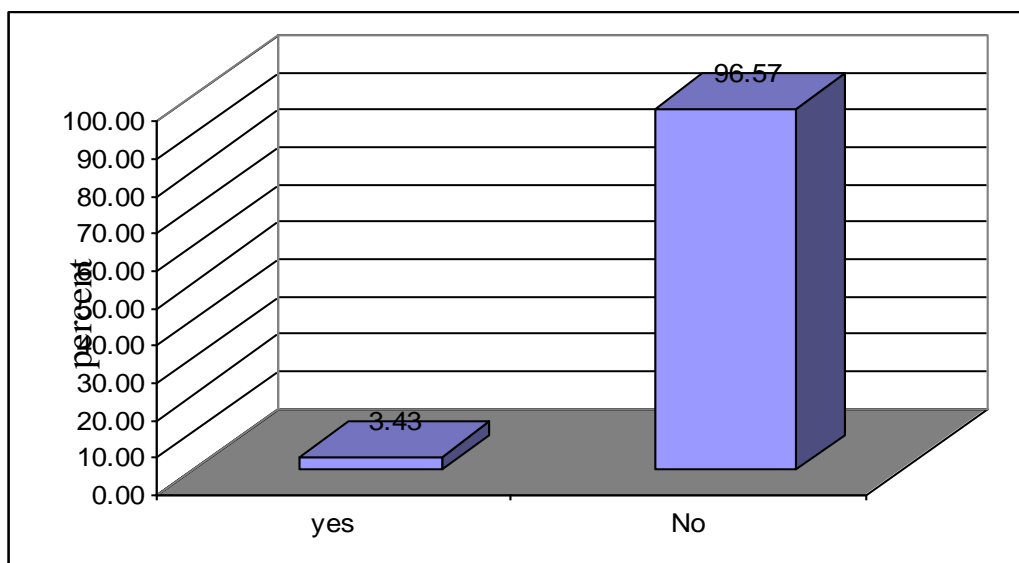
**Figure.5.24: Distribution of study population who received antibiotics therapy by making culture test**

### 5.7.2 Distribution of study population who received with prescription only antibiotics therapy by making culture test:

Results in table ( 5 .30 ) showed that only 3.43 % of antibiotics prescriptions patients received their antibiotics based on ( MCST ) results , while the vast majority of them 96.57 % received their medications without performing such test , which also indicates the irrational inappropriate prescribing patterns of antibiotics by Gaza governorate physicians , these results almost equal the results in Nigeria hospital only 4.2 % of antibiotic prescriptions were based on ( MCST ) , (Chukuani , Onifade , Sumonu , 2002 ) , the results of this study are more illustrated in figure ( 5.25 ) .

**Table5.30:Distribution of study population who received with prescription only antibiotics therapy by making culture test**

Classification according to culture test performing	Frequency	Percent
Yes	6	3.43
No	169	96.57
Total	175	100



**Figure5.25: Distribution of study population who received with prescription only antibiotics therapy by making culture test**

### 5.7.3 Distribution of study population who received with prescription Antibiotics therapy who made culture test by type of antibiotic group:

Results in table ( 5.31) showed that only one patient out of 49 who received with prescription penicillin made a culture test or MCST , 3 patients out of 47 who received cephalosporin's with prescription made a culture test and 2 patients out of 9 who received with prescription amino glycosides made a culture test , while none of the patients who received the other prescribed antibiotics made any MCST which clear indication of irrational prescribing , especially with the prescribing of Nalidixic Acid - Fluoroquinolones group , which not considered as first line therapy drugs , but are of real value as reserve agents when other agents have failed ( Khatib and Daoud ,2003 ) .

**Table 5.31 : Distribution of study population who received with prescription Antibiotics therapy who made culture test by type of antibiotic group**

Culture test by antibiotic Group	Yes	No
Penicillins	1	48
Cephalosporins	3	44
Tetracycline	0	15
Macrolides (Erythromycin )	0	19
Sulphonamides & Trimethoprim	0	3
Nitrofurantoin	0	1
Nalidixic Acid – Fluoroquinolones	0	27
Aminoglycosides – Gentamycin	2	7
Others	0	5
Total	6	169

## 5.8 Distribution of study population who received antibiotics therapy by type of dosage form

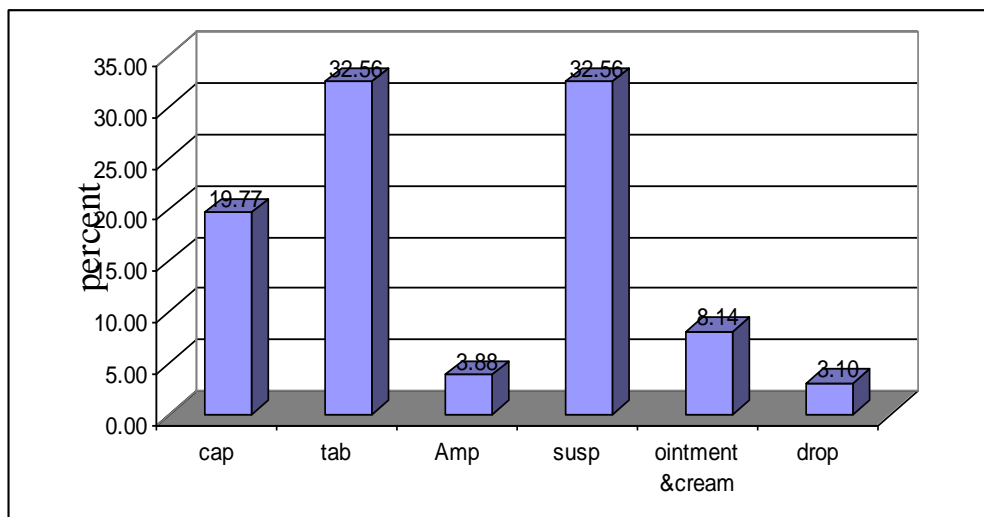
In this part of this chapter , the study population who received antibiotics therapy will be distributed by the type of dosage to indicate the most common usable of dosage form of antibiotics in Gaza governorate .

### 5.8.1 Distribution of study population who received antibiotics therapy By type of dosage form:

Results in table ( 5 .32 ) showed that 32.56 % the antibiotics received by the study patients in the tablets dosage form , 32,56 % in suspension dosage form ,19.77 % in capsules dosage form , 8.14 % in ointment & cream form , 3.88 % in ampoule form and 3.10 % in drop dosage form , these results are more illustrated in figure ( 5 .26 ) .

**Table 5.32: Distribution of study population who received antibiotics therapy By type of dosage form**

Type of dosage form of this antibiotic	Frequency	Percent
Cap	51	19.77
Tab	84	32.56
Amp	10	3.88
Susp	84	32.56
ointment & cream	21	8.14
Drop	8	3.10
Total	258	100



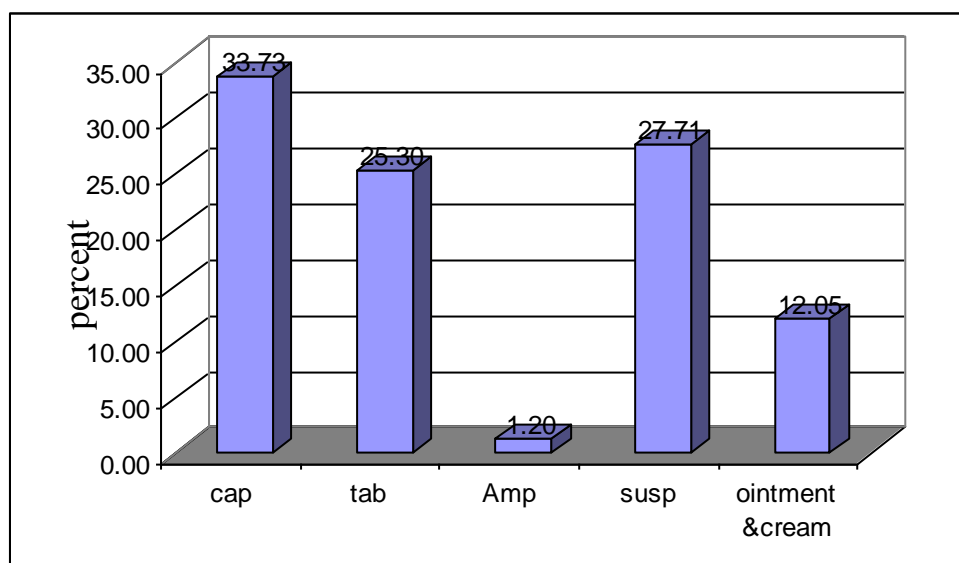
**Figure 5.26.: Distribution of study population who received antibiotics therapy by type of dosage form**

### 5.8.2 Distribution of study population who received without prescription antibiotics therapy by type of dosage form:

Results in table ( 5. 33 ) show that 33.73 % of the antibiotics received without prescription by the study patients were in the capsules dosage form , 27.71 % in the suspension form , 25.30 % in the tablets form , 12 . 05 % in ointment & cream form and 1.2 % in ampoule dosage form ,these results are more illustrated in figure ( 5.27 )

**Table 5.33 :Distribution of study population who received without prescription antibiotics therapy by type of dosage form**

Kind of dosage form of this antibiotic	Frequency	Percent
Cap	28	33.73
Tab	21	25.30
Amp	1	1.20
Susp	23	27.71
ointment & cream	10	12.05
Total	83	100



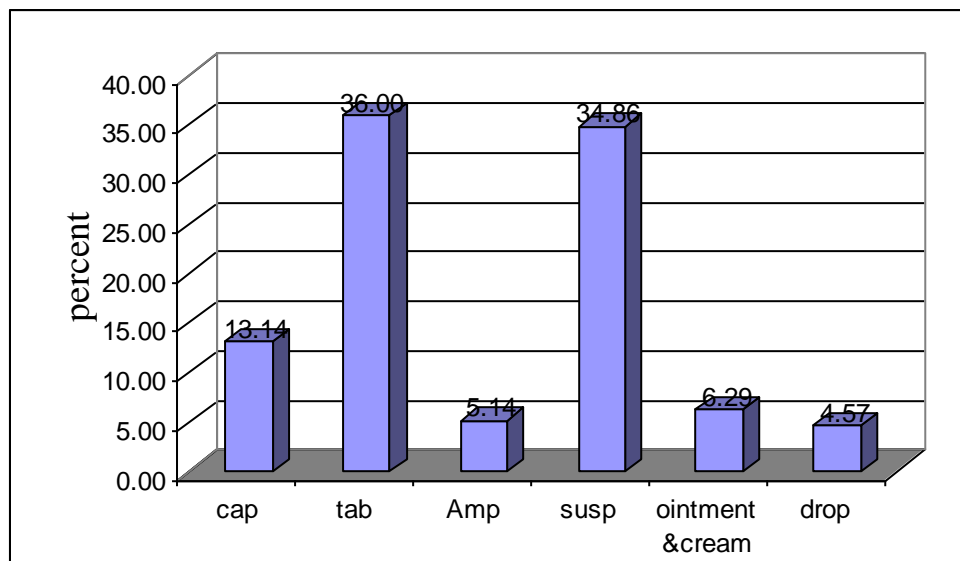
**Figure 5.27: Distribution of study population who received without prescription only antibiotics therapy by type of dosage form**

### 5.8.3 Distribution of study population who received with prescription antibiotics therapy by type of dosage form:

Results in table ( 5.34 ) showed that 36 % of the antibiotics received with prescription by the study patients were in the tablets dosage form , 34.86 % in the suspension form , 13.14 % in the capsules form , 6.29 % in ointment & cream form , 5.14 % in ampoule form and 4.57 % in the drop dosage form , these results are more illustrated in figure ( 5.28 ) .

**Table 5.34 :Distribution of study population who received with prescription only antibiotics therapy by type of dosage form**

Kind of dosage form of antibiotic	Frequency	Percent
Cap	23	13.14
Tab	63	36.00
Amp	9	5.14
Susp	61	34.86
ointment & cream	11	6.29
Drop	8	4.57
Total	175	100



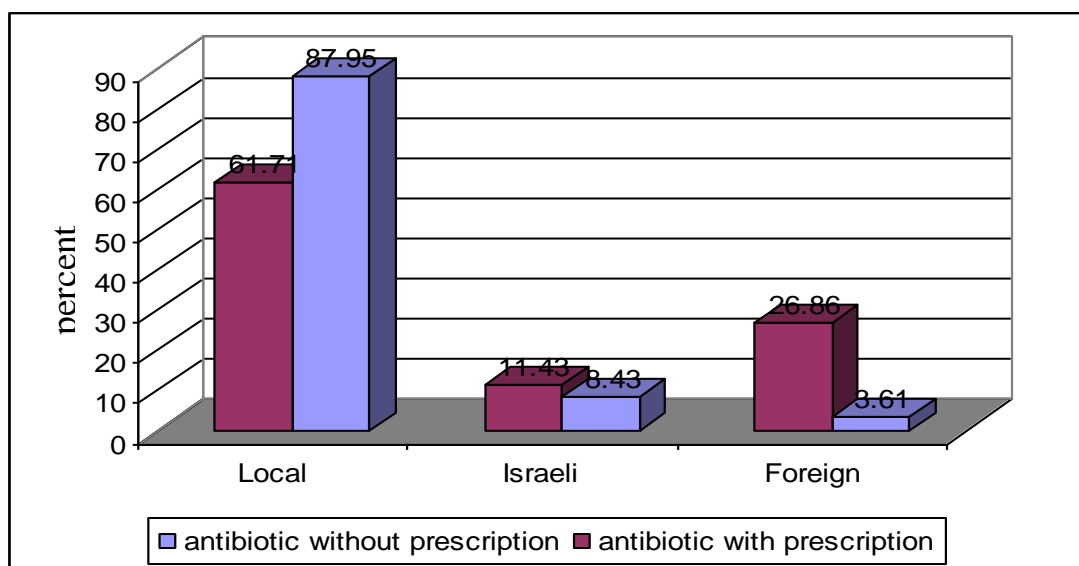
**Figure 5.28 :Distribution of study population who received with prescription antibiotics therapy by type of dosage form**

### 5.9 Distribution of study population who received antibiotics therapy by type of manufacturer of antibiotics

The results in table ( 5.35 ) show that , the majority 87.95 % of the antibiotics dispensed without prescription are locally manufactured brands , 8.43 % are Israeli brands and 3.61 % foreign brand names , these results indicate that the trend for pharmacists and costumers in Gaza governorate is to dispense and consume locally manufactured antibiotics , may be because it is less expensive than other Israeli and foreign brand names , also local antibiotics brand names can be easier and more available than the imported brands , in addition to that the table show that the majority of the study population prescribed antibiotics by Gaza governorate physicians 61.71 % are locally manufactured brands , 26.86 % are foreign brands and 11.43 % from Israeli manufactured antibiotics , these results indicate the trend of Gaza governorate to prescribe mostly local antibiotics in spite of well known social stigma of the preference of Israeli and foreign brand names due to the high standard of good manufacturing processes , this trend can be clearly attributed to the current economic hard ship of our people , so local doctors tend to prescribe cheaper local antibiotics than the imported Israeli and foreign ones , these results also indicate the active advertising and incentives efforts exerted by medical representatives of our local pharmaceutical manufacturing companies these results are more illustrated in figure (5.29).

**Table 5.35 :Distribution of study population who received antibiotics therapy by type of manufacture of antibiotics**

Group	antibiotic without prescription	%	antibiotic with prescription	%
Local	73	87.95	108	61.71
Israeli	7	8.43	20	11.43
Foreign	3	3.61	47	26.86
Total	83	100.00	175	100.00



**Figure 5.29 : Distribution of study population who received antibiotics therapy by type of manufacture of antibiotics**

## 5.10 Inferential Analysis

Chi –square test was done to explore the possible relationships between the study selected independent variables and dependent variable which is the antibiotics dispensing patterns , and to find the level of statistical significance differences at level ( $P \leq 0.05$ ) .

The results in table (5. 36) show that patient in the age group 19 -30 taking antibiotics without prescription more than other age groups 25 out of 83 , while patients in the age group 0-6 taking antibiotics with prescription more than the other age groups 66 out of 175, and the variation between groups reach a statistical significant level (  $P$  value = 0.019 ) . which mean that age of patient has important role in the dispensing pattern of antibiotics to him .

**Table 5.36 : Distribution of study population by patterns of dispensing antibiotics and age group**

Age of patient	antibiotic without prescription	antibiotic with prescription	Total	X <sup>2</sup>	P value	Sig. level
0- 6Year	18	66	84	16.779	0.019	Sig. at 0.05
7-12	8	29	37			
13-18	9	6	15			
19-30	25	32	57			
31-40	11	25	36			
41-50	6	10	16			
51-65	4	4	8			
more than 66 Year	2	3	5			
Total	83	175	258			

The results in Table (5. 37) show that male patients take antibiotics without prescription more than female 52 out of 83 , while female patients take antibiotics with prescription more than male 96 out of 175 , and the variation between groups reached statistically significant level ( $P = 0.01$ ) , which mean that sex of patient has important role in the dispensing pattern to the patient .

**Table 5.37 : Distribution of study population by patterns of dispensing antibiotics and sex group**

Sex of patient	antibiotic without prescription	antibiotic with prescription	Total	X <sup>2</sup>	Sig.	Sig. level
Male	52	79	131	6.904	0.009	Sig. at 0.01
Female	31	96	127			
Total	83	175	258			

The results in table ( 5.38) show that most of the pregnant women , the non pregnant women and all the breast feeding women from the study population received antibiotics with prescription , but the variation between groups did not reach statistically significant level with (  $P = 0.508$  ) , which means that pregnancy situation of women may not play significant role in taking antibiotics whether by prescription or without prescription .

**Table 5.38 Distribution of study population by patterns of dispensing of antibiotics and pregnancy situation**

	antibiotic without prescription	antibiotic with prescription	Total	X <sup>2</sup>	Sig.	Sig. level
Pregnant	2	11	13	1.353	0.508	Not sig.
not pregnant	29	83	112			
Breast feeding	0	2	2			
Total	31	96	127			

The results in table ( 5 .39 ) show that , all the study population pregnant women who received antibiotics while they are in their first trimester , received them with prescription , most of the pregnant women in their second trimester 7 out of 8 received their antibiotics with prescription and only 1 received it without prescription , while one pregnant woman in her third trimester received antibiotics with prescription and another one received it without prescription , and the variation between groups did not reach statistically significant level (  $P = 0.296$  ) , which may mean that the type of pregnancy trimester do not have significant role in taking the antibiotics by pregnant women whether with or without prescription .

**Table 5.39 Distribution of study population by pattern of dispensing of antibiotics and type of pregnancy trimester**

	antibiotic without prescription	antibiotic with prescription	Total	X <sup>2</sup>	Sig.	Sig. level
first trimester	0	3	3	2.4375	0.296	Not sig.
second trimester	1	7	8			
third trimester	1	1	2			
Total	2	11	13			

The results in Table (5.40 ) show that more patients live in city take antibiotics weather and 123 out of 175 respectively , this can be attributed because most of the population of Gaza governorate where the study took place are living in Gaza city , and the variation between the groups is not statistically significant with (  $P$  value 0.678 ) , which means that the place of resident of patients has no role in making the patient s to take antibiotics weather with or without prescription .

**Table 5.40 : Distribution of study population by dispensing patterns of antibiotics and place of resident of patient**

Place of resident of patient	antibiotic without prescription	Antibiotic with prescription	X <sup>2</sup>	Sig.	Sig. level	Sig. level
City	60	123	183	0.778	0.678	Not sig.
Village	13	24	37			
Camp	10	28	38			
	83	175	258			

The results in Table (5.41) show that more patients with school level of education take antibiotics without and with prescription than other levels 44 out of 83 and 74 out of 175 respectively , while the results show that the higher the level of education of patient than school level the lower the number of patients taking antibiotics without or with prescription and non of the patients with postgraduate level of education take antibiotics without prescription , this late result may indicate higher awareness of dangers of non prescribed antibiotics by the patients with the highest education , but these variations between variables group do not reach statistical significance with the resulted Chi-square test ( P value = 0.124 ) , which indicates that patients of all levels of education take antibiotics without and with prescription and a lot of a awareness campaigns about the danger of irrational use of antibiotics must be done to the public .

**Table 5.41 : Distribution of study population by dispensing patterns of antibiotics and level of education of patient**

Level of Education of patient	antibiotic without prescription	antibiotic with prescription	Total	X <sup>2</sup>	Sig.	Sig. level
Preschool	19	64	83	7.241	0.124	Not sig.
School	44	74	118			
Undergraduate	12	17	29			
Graduate	8	17	25			
postgraduate	0	3	3			
total	83	175	258			

The results in Table ( 5. 42 ) show that more patients with average economic situation take antibiotics weather without prescription 57 out of 83 , or with prescription 100 out of 175 , than other patients who have good and bad economic situation , the variations between groups were not statistically significant with (P value = 0.200 ) , which means that patients take antibiotics without or with prescription regardless of their economic situation .

**Table 5. 42 : Distribution of study population by dispensing patterns of antibiotics and economic situation of patient**

Economic situation of patient	antibiotic without prescription	antibiotic with prescription	Total	X <sup>2</sup>	Sig.	Sig. level
Good	19	57	76	3.220	0.200	Not sig.
Average	57	100	157			
Bad	7	18	25			
total	83	175	258			

## Chapter 6

### Conclusions and recommendations

#### Conclusions

The findings of this study show that the prescribing doctors, the dispensing community pharmacists and the consuming patients are all in different ratio sharing the responsibility of irrational use of antibiotics in Gaza governorate, with the highest responsibility fall on the prescribers first, the dispensers and finally the patients, these findings will be stated as the following.

\* The response rate was high for both the community pharmacies and the study patients encounters.

\* There are four patterns of antibiotics and non antibiotics dispensing as follows, antibiotics with prescription were dispensed for 37.15 % of patients encounters, antibiotics without prescription were dispensed for 17.62 % of patients encounters, non antibiotics with prescription were dispensed for 23.35 % of patients encounters and non antibiotics without prescription for 21.87 % of patients encounters, from the above results another results were derived and indicated the irrational over prescribing, dispensing and consuming of antibiotics, 60.50% of total patients encounters dispensed with prescription and 39.50 % without prescription, high percent 54.77 % of total patients encounters involved antibiotics, 44.62 % of total patients encounters dispensed without prescription involved antibiotics, a very high 61.4 % of prescription patients encounters contain antibiotics and from the total antibiotics patients encounters dispensed 67.8 % were with prescription, 17.8 % by pharmacist recommendation and 14.4 % by patient request.

\* The highest percentage 26.54 % of the study population of patients are in the age group 0 – 6 year, the lowest percentage 2.72 % are over 66 years old and the majority 45.23 % are eighteen years old and below, which almost is reflecting the structure of the Palestinian population pyramid, in addition to that the highest percentage 37.71 % of patients who received antibiotics dispensed with prescription are in the age group 0 -6 year old and more than 57 % are in the age 18 years old and below, which is clear indication that physicians are over prescribing of antibiotics for children, and consequently this will cause future emergence of antibiotics resistance.

\* More male from total study population of patients than female purchased drugs, while more females than males received antibiotics dispensed with prescription

\* Majority of pregnant women who received with prescription antibiotics 63.64 % were in their second trimester, 27.27 % in first trimester and 9.09 % in their third trimester these results may need better attention from our physicians about safety of women.

\* 76 % of study patients who received with prescription antibiotics had been prescribed their antibiotics from their first time visit to the doctor and 24 % in their follow up visit, which indicate over prescribing and violation of WHO, CDC

antibiotic prescribing guide lines especially in Respiratory upper and lower tract infections .

\*Almost three quarter of the study population patients and the patients who received with prescription antibiotics live in a city and the fourth quarter live in a camp and in a village , these results are logical because it agree with the latest PCBS demographic distribution of population in Gaza governorate .

\* The highest percentage 42.29 % of the study population who received with prescription antibiotics have school educational level and the lowest percentage 1.71 % have postgraduate level , which may indicate that the higher the education level of patients after school level the higher their health awareness and the lower the chance the will get sick and receive prescribed antibiotics .

\* Most of the study population of patients 57 .14 % who received with prescription antibiotics have an average economic situation , 32.57 % have a good and only 10.29 % have a bad economic situation , these results are justified because only people who can afford and have money utilize the private medical sectors services , while most of the people with bad economic situation will utilize other cheaper or even free of charge medical services like MOH , UNRWA and NGOs .

\* Most of study antibiotics prescriptions 48. 57 % came from private clinics source , 39.43 % from government clinics , 9.72 % from NGOs clinics and only 2.29 % from UNRWA clinics , while it is normal that most of study antibiotics prescriptions came from private clinics because the setting of the study , the high percent of prescriptions from governmental clinics source is clear indication of shortage of antibiotics and other drugs due to the current situation which force people who can afford to buy their lacking medications from the public community pharmacies , also the very low percent of prescriptions came from the NGOs and UNRWA clinics is a clear indication of the good availability of drugs in their pharmacies .

\* The most common antibiotics groups prescribed per patients is penicillin's 28 % , cephalosporin's 26.86 % and nalidixic acid – fluoroquinolones 15 .43 % , while the highest percentage 25 .14 % of the study antibiotics prescription came from pediatricians , 13 .14 % from general practitioners and 12 .57 % from obstetric & gynecologists , these results needs especial attention from our pediatricians of the danger of over prescribing of antibiotics for our children .

\* The resulted WHO prescribing indicator which is the average number of drugs per prescription is 2.154 is higher than the valid international recommended standard which is must be below 2 , this result indicate that our doctors in Gaza governorate are over prescribing drugs , which encouraging poly pharmacy and drug – drug interactions .

\* The resulted percentage of drugs prescribed by generic name , which is another WHO study selected prescribing indicator is only 6.19 % , which is very low and indicates the high tendency of physicians in Gaza governorate to prescribe drugs in different brand names rather than in generic names , the lack of training courses for physicians about the value of generic drugs in the rational drug use , the need to

implement the generic drug law as other countries and it indicate the high promotional effect of pharmaceutical manufacturing companies on doctors prescribing patterns .

\* Another resulted very important WHO study selected prescribing indicator is the percentage of encounters with an antibiotics prescribed is very high 61.4 % , this extremely high result indicating the irrational over prescribing of antibiotics , by physicians in Gaza governorate and requiring intensive national public health authorities intervention in terms of education , regulations and clinical practices national guidelines .

\* A satisfying resulted two study WHO selected patient care indicators , the first one is the average dispensing time of 4.28 minutes , which is a very good and high comparing to other studies , and indicates that Gaza governorate community pharmacists are caring for their clients and dedicating enough time while they are dispensing their patients prescriptions, which allow a reasonable time for interaction between the pharmacist and the patients , the second study selected WHO patient indicator is the percentage of drugs actually dispensed , with resulted value of 90.06 % which is a very good and indicates the good supply of drugs in Gaza governorate community pharmacies .

\* Also another important study results were revealed like most of the antibiotics of the penicillin's , cephalosporin's and macrolides groups were in appropriately prescribed for mostly viral upper and lower respiratory tract infections in violation of both the WHO and CDC clinical guidelines .

\* Most of the study dispensed drugs 32.17 % are anti-infectives and 26.05 % analgesics antipyretics drugs which is clear indication of over prescribing , dispensing and consuming of these drugs .

\* Only 3.43 % of the study population patients , who received with prescription antibiotics based on a culture test results , while 96.57 % of them did not perform that test , this indicates the irrational inappropriate prescribing patterns of antibiotics by Gaza governorate physicians .

\* Finally Chi square test results revealed that only the age and sex of patients when inferentially analyzed with the study dependent variables of dispensing antibiotics with prescription and without prescription are statistically significant , while the study of other independent variables are not .

## **Recommendations**

A great efforts have to be done according to the following recommendations to try to rationalize the process of prescribing , dispensing and consuming of antibiotics in our community to enhance and protect our people general public health it is a common responsibility of health policy makers , health professional providers and the community .

\*The results indicate that the urgent need for proper professional educational awareness campaigns by MOH about the danger of over prescribing of antibiotics by our local physicians , and the irrational and illegal dispensing of antibiotics by our

local community pharmacists , in addition to inform our local population about the danger of over using antibiotics without the proper clinical advice by a doctor .

\* There is a great need for our health policy makers to implement and enforce all the WHO intervention steps to promote more rational use of medicines in general and to exert more efforts in implementing and enforcing the WHO global strategy for promoting rational use of antibiotics and containment of antibacterial resistance which was mentioned in details in this study literature .

\* There is a priority need to a carefully designed public awareness program about the danger of antibiotics over use which is opened for public, and consists of a mix of activities by all health providers MOH , UNRWA , NGOs local and international and

the private sector with participation of the medical and pharmaceutical colleges , associations and companies , using all means of media publications TV , News papers, internet and magazines with very active involvement of both the pharmacists and physicians associations to ensure the participation of its members in these programs and to pass this knowledge to all their patients regardless of their level of education , economic situation , place of residents , age or sex .

\* WHO study selected prescribing indicators results were negative such as poly pharmacy (2.154 ) , using of generic names only 6.19 % and over prescribing of antibiotics 61.4 % of total prescriptions , a great educational and regulation efforts have to be implemented by both MOH and the physicians association with doctors to improve these results and to adhere to the proper clinical guidelines in diagnosis and treatment of their patients .

\* Another studies need to be done in the other governorates in Gaza strip and West Bank to have a national overview of this serious problem .

\* A comparative studies need to be done in the other health providing sectors MOH , UNRWA , NGOs with regard of WHO drug use indicators .

\* If interventions into antibiotics over use are to be effective , future research have to be done to explore in more depth the socio- cultural rationality of antibiotics use , a combine quantitative and qualitative different methods have to used like case simulations , focus group discussions and in – depth interviews .

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











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# Annex 1

## Gaza Strip Map

### GAZA STRIP

March 1999

- |  |   |
|--|---|
|  Built-up area   |  Yellow area (Israeli security control, Palestinian civil control) |
|  Actual Israeli-developed area (civilian) beyond the 1950 Armistice Line |  Oslo-defined Israeli settlement area                              |
|  Oslo-defined military installation area                                 |  UNRWA refugee camp  |
|  Major road  |  Israeli-developed refugee housing area                            |
|  Regional road   |  International boundary  |
|  Local, access, or main urban road                                       |  1950 Armistice Line   |
|  |  Israeli security perimeter  |

Elevations are in meters

Brown grid indicates the 10,000 meter Universal Transverse Mercator Grid, Zone 36, WGS84 Spheroid

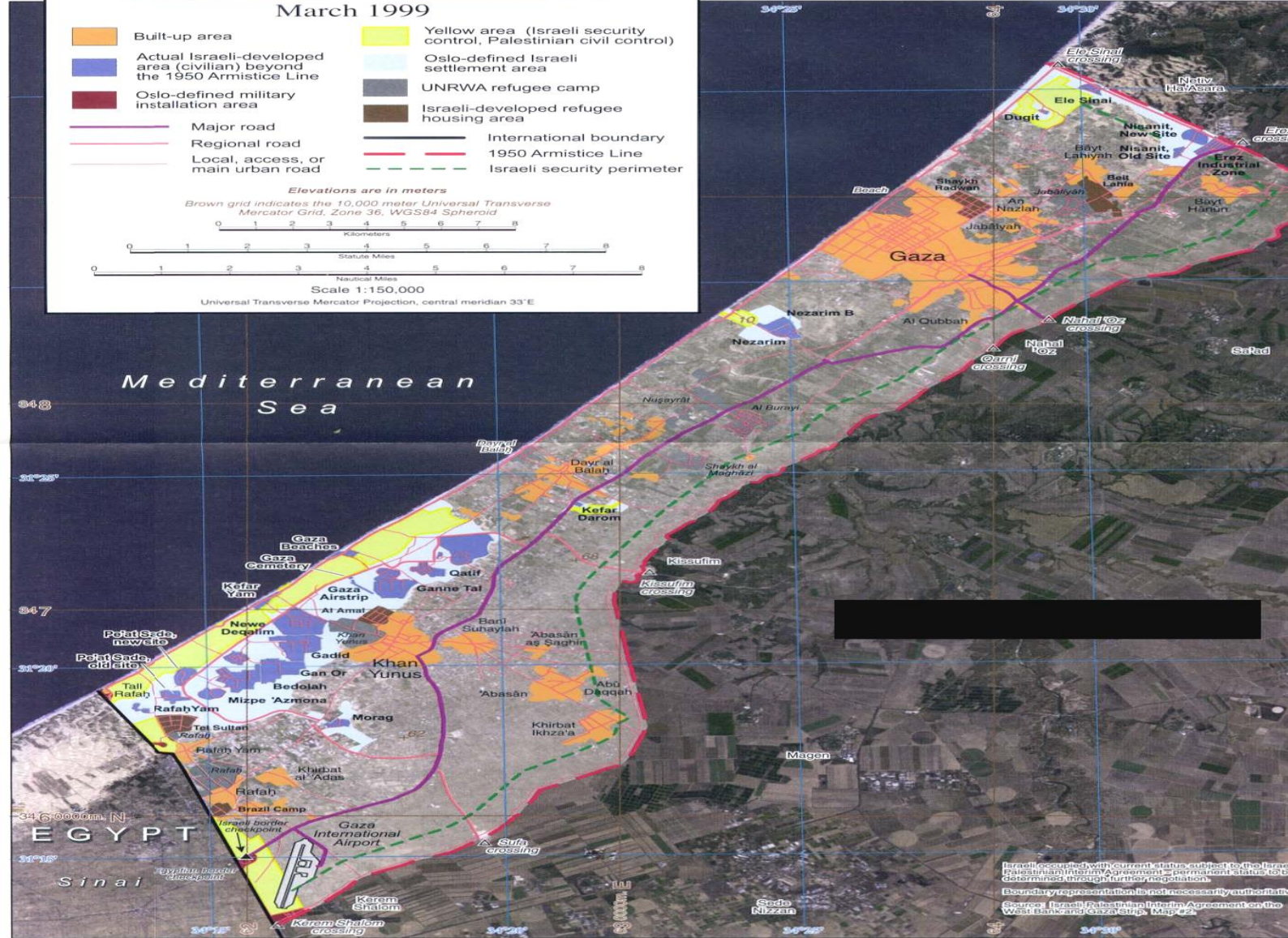
0 1 2 3 4 5 6 7 8

0 1 2 3 4 5 6 7 8

0 1 2 3 4 5 6 7 8

Scale 1:150,000

Universal Transverse Mercator Projection, central meridian 33°E



Ref/ [www.googleearth.com-map](http://www.googleearth.com-map)

## Annex 2

### Antibiotics in Palestinian Essential Drug list

Name of Antibiotics	Dosage Form
Amoxicillin 250 mg	CAP.
Amoxicillin 500 mg	CAP.
Amoxicillin 250mg / 5ml , 100 ml	SUSP.
Ampicillin 500 mg I.V	VIAL
Ampicillin 1 g I. V	VIAL
Benzathine benzylpenicillin 1.2 Mill.IU	VIAL
Benzylpenicillin 10 Mill IU	VIAL
Cefazolin Sodium 1g	VIAL
Ceftazidime 1 g	VIAL
Ceftriaxone 1 g	VIAL
Cefuroxime 500mg	TAB.
Cefuroxime 750 mg	VIAL
Cephalexin 250mg / 5 ml . 100ml	SUSP.
Cephalexin 500mg	CAP.
Cloxacillin Sodium 500 mg	VIAL
Cloxacillin Sodium 250 mg	CAP.
Procaine BenzylPenicillin 2 Mill. IU	VIAL
phenoxymethylpenicillin 250 mg	TAB.
Chloramphenicol 1 g	VIAL
Ciprofloxacin 200 mg	VIAL
Ciprofloxacin 500 mg	TAB
Doxycycline 100 mg	CAP.
Erythromycin 250mg	TAB
Erythromycin 200mg / 5 ml . 100ml	SUSP.
Gentamycin 80 mg	AMP
Trimethoprim 40mg + Sulphamethoxazole 200mg / 5 ml , 100ml	SUSP.
Trimethoprim 80mg + Sulphamethoxazole 400mg	TAB
Vancomycin 500 mg	VIAL

## Annex 3

Palestinian National Authority  
Ministry of Health  
Helsinki Committee

بسم الله الرحمن الرحيم



السلطة الوطنية الفلسطينية  
وزارة الصحة  
لجنة هلسنكي

Date: 3/5/2005

التاريخ: 2005/5/3

Mr./ Mostafa El-ghosain

السيد: مصطفى الغصين

I would like to inform you that the committee  
has discussed your application about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم  
حول:-

Antibiotics Dispensing Patterns in the  
Community Pharmacies in Gaza  
Governorate.

أنماط صرف المضادات الحيوية في الصيدليات الخاصة في  
محافظة غزة.

In its meeting on May 2005  
and decided the Following:-

و ذلك في جلستها المنعقدة لشهر مايو 2005  
و قد قررت ما يلي:-

To approve the above mention research study.

الموافقة على البحث المذكور عالياه.

Signature

توقيع



Member

Member

Chairperson

عضو

عضو

Conditions:-

- ❖ Valid for 2 years from the date of approval to start.
- ❖ It is necessary to notify the committee in any change in the admitted study protocol.
- ❖ The committee appreciate receiving one copy of your final research when it is completed.

**Annex 4**  
**Approval letter send to MOH**

جامعة القدس



2006/12/10

كلية الصحة العامة

School of Public Health

القدس - فلسطين

وزارة الصحة



الأخ/ د. زياد شعث المحترم  
مدير عام الإدارة العامة للصيدلة  
تحية طيبة وبعد،،،

الموضوع: مساعدة الطالب مصطفى النصين

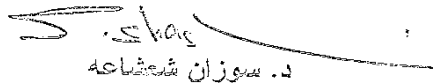
يقوم الطالب المذكور أعلاه بإجراء بحث بعنوان:

"Antibiotics dispensing pattern in the community pharmacies in the Gaza governorate "

كمطلب للحصول على درجة الماجستير في الصحة العامة علماً بأن الطالب قد حصل على موافقة لجنة هلسنكي لأخلاقيات البحوث و ستكون المعلومات متوفرة لدى الباحث فقط. و عليه نرجو التكرم للإيعاز لمن ترونه مناسب لتسهيل مهمة الطالب في جمع البيانات الخاصة.

موافقتكم دعماً للمسيرة الأكاديمية

و تفضلوا بقبول فائق الاحترام ،،،

  
د. سوزان ششاعة

عميد كلية الصحة العامة المساعد

كلية الصحة العامة / غزة  
رقم الملف: 143  
تاريخ الملف: 2006/12/10

نسخة: الملف

## Annex 5

### Recommendation letter from MOH Director of GAOPh to the community pharmacists

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Palestinian National Authority  
Ministry of Health  
General Administration of Pharmacy



السلطة الوطنية الفلسطينية  
وزارة الصحة  
الإدارة العامة للصيدلة

الرقم: ٢٠١٧/٧٥٧٧١  
التاريخ: ٢٠١٧/١١/١٦  
الأقسام: .....

حفظهم الله ...

الأخوة الزملاء المبيدات

أصحاب ومديري الصيدليات الخاصة

تحية الوطن ،،،

تهديكم الإدارة العامة للصيدلة كل التحية والتقدير متمنين لكم التوفيق في أعمالكم .  
ونتمنى على سيادتكم مساعدة زميلنا وزميلكم الأخ الصيدلي د./ مصطفى الغصين في البحث المطلوب منه  
كمطلب للحصول على درجة الماجستير في الصحة العامة .  
أملنا فيكم كبير في مساعدته وتسهيل مهمته علماً بأن ما سوف يحصل عليه من معلومات هي فقط لأغراض  
البحث وستبقى سرية إلى درجة كبيرة .  
مرة أخرى أملنا كبير في مساعدة زميلنا د./ مصطفى الغصين .

مع خالص التحية والاحترام ،،،

دكتور/ زياد شعت

مدير عام الصيدلة بوزارة الصحة

الإدارة العامة للصيدلة بوزارة الصحة  
مدير عام الصيدلة بوزارة الصحة  
دكتور/ زياد شعت

## Annex 6

بسم الله الرحمن الرحيم  
Informed consent  
نموذج موافقة لإجراء البحث الصيدلي

حضرة الزميل (ة) مدير صيدلية  
المحترم  
تحية طيبة وبعد ،،،

أنا الطالب مصطفى عمر الغصين أتقدم لكم بكل الاحترام والتقدير على مشاركتكم و مساعدتكم لي في استكمال وعمل بحثي بعنوان أنماط صرف المضادات الحيوية في الصيدليات العامة في محافظة غزة ، وهو جزء من متطلبات التخرج للحصول على درجة الماجستير في كلية الصحة العامة - جامعة القدس . ومن ضمن أهداف البحث هو دراسة أنماط وصف و صرف المضادات الحيوية في صيدليات القطاع الخاص في محافظة غزة ، باستخدام بعض مؤشرات استخدام الأدوية لمنظمة الصحة العالمية ، ولقد تم اختيار صيدليتيكم من ضمن العينة العشوائية للصيدليات المشاركة في البحث ، حيث سيتم زيارة صيدليتيكم بالتنسيق معكم لمدة ثلاث ساعات بعد العصر ولمرة واحدة ، لتسجيل الأدوية و أنماط صرفها وبعض المعلومات الهامة للبحث من المرضى في نموذج خاص بذلك ، مع العلم أن لسيادتكم مطلق الحرية في المشاركة أو عدمها ، ولكن مشاركتكم ومساعدتكم لي سيكون لها أثرا كبيرا في إنجاح هذه الدراسة والارتقاء بمهنة الصيدلة والمحافظة علي الصحة العامة للشعب الفلسطيني . وكما أود أن أعلمكم أن الباحث أو من ينوب عنه سيقوم بتعبئة نموذج الاستبانة ، وأنة من غير الضروري ذكر اسم المشار ك في البحث ، كما أن البيانات المجموعة تتمتع بالسرية المطلقة وهي مخصصة لخدمة البحث العلمي فقط ، ولعلم سيادتكم أن البحث ممول من الباحث فقط .

شاكرين لكم مساعدتكم وحسن تعاونكم

الباحث  
مصطفى عمر الغصين



## Annex 7

بسم الله الرحمن الرحيم  
Informed consent  
نموذج موافقة لإجراء البحث للمريض

----- حضرة المواطن ن الكريم  
المحترم تحية طيبة وبعد ،،،،

أنا الطالب مصطفى عمر الغصين أتقدم لكم بكل الاحترام والتقدير على مشاركتكم و مساعدتكم لي في استكمال وعمل بحثي بعنوان أنماط صرف المضادات الحيوية في الصيدليات العامة في محافظة غزة ، وهو جزء من متطلبات التخرج للحصول على درجة الماجستير في كلية الصحة العامة - جامعة القدس . ومن ضمن أهداف البحث هو دراسة أنماط وصف و صرف المضادات الحيوية في صيدليات القطاع الخاص في محافظة غزة , باستخدام بعض مؤشرات استخدام الأدوية لمنظمة الصحة العالمية , راجيا أن تمنحوني أقل من عشرة دقائق من وقتكم الثمين لمقابلتكم , وذلك لتسجيل الأدوية الموصوفة لكم وبعض المعلومات الهامة للبحث في نموذج خاص بذلك , مع العلم أن لسيادتكم مطلق الحرية في المشاركة أو عدمها , ولكن مشاركتكم ومساعدتكم لي سيكون لها أثرا كبيرا في إنجاح هذه الدراسة والارتقاء بمهنة الصيدلة والمحافظة علي الصحة العامة للشعب الفلسطيني .

وكما أود أن أعلمكم أن الباحث أو من ينوب عنه سيقوم بتعبئة نموذج الاستبانة , وأنة من غير الضروري ذكر اسم المشار ك في البحث , كما أن البيانات المجموعة تتمتع بالسرية المطلقة وهي مخصصة لخدمة البحث العلمي فقط , ولعلم سيادتكم أن البحث ممول من الباحث فقط .

شاكرين لكم مساعدتكم وحسن تعاونكم

الباحث  
مصطفى عمر الغصين

## Annex 8 CHECKLIST IN PHARMACY

Patient name ----- Date ----- Checklist No ----- .

Kind of encounter :	With Prescription	without Prescription
---------------------	-------------------	----------------------

If formal prescription what is the source	Gov. clinic	NGO C	UNRWA clinic	Private clinic
---	-------------	-------	--------------	----------------

If with prescription , how many minutes spent in dispensing the prescription	2	4	6	8	10	14	16	more
--	---	---	---	---	----	----	----	------

If without prescription	By patient request	Pharmacist recommendation
-------------------------	--------------------	---------------------------

Age of patient	0- 6Year	7 – 12	12 -18	18 – 30	31- 40
	41- 50	51- 65	more than 66 Year	Unknown	

Sex of patient	Male	Female
----------------	------	--------

If Female	Pregnant	not pregnant	Breast feeding
-----------	----------	--------------	----------------

If Pregnant	first trimester	second trimester	third trimester
-------------	-----------------	------------------	-----------------

Is the patient	Smoker	Not smoker
----------------	--------	------------

Patient Classification according to visit type to the doctor	First time visit	Follow up
--	------------------	-----------

Place of resident of patient	City	Village	Camp
------------------------------	------	---------	------

Level of Education of patient	Preschool	School	Undergraduate	Graduate	postgraduate
-------------------------------	-----------	--------	---------------	----------	--------------

The patient can consider his economic situation	Good	Average	Bad
---	------	---------	-----

Specialization of doctor who wrote the prescription	General medicine	Internist	Surgeon	orthopedic	Obstetric & Gyn
	Pediatrician	NET	Dentist	U.T	Chest
	Dermatologist	Ophthalmologist	Psycho neurologist	Cardiologist	Other

### Diagnosis in prescription Gastrointestinal Disease

Food poisoning	Gastritis	Diarrhea
Gastroenteritis	constipation	Abdominal pain
Others		

### Respiratory Diseases

Common Cold	Sore Throat	Pharyngitis
Tonsillitis	Bronchitis	Pneumonia
Asthma	Others	

### Circulatory Metabolic Diseases

C.A . D	Hypertensive	Diabetes Mellitus	C. V. A	Others
---------	--------------	-------------------	---------	--------

### Heat Disorders

Heat exhaustion	Heat Stroke	P. U .O	Others
-----------------	-------------	---------	--------

### Injuries

Fractures		Burns		Crush injury		Home accident	
-----------	--	-------	--	--------------	--	---------------	--

car accident		Dislocation		Others	
--------------	--	-------------	--	--------	--

**Other Disease Conditions**

Eye Diseases		Ear Diseases		Rheumatic		Skin conditions		Gynecology	
--------------	--	--------------	--	-----------	--	-----------------	--	------------	--

UTI		Parasitic Disease		Anemia		Mouth & Dental Diseases		Psycho neurological Disease	
-----	--	-------------------	--	--------	--	-------------------------	--	-----------------------------	--

**Treatment By Therapeutic groups per encounter**

Therapeutic Classification	G.N	B.N	D.F	Dispensed
A. Analgesic antipyretics anti- inflammatory -AntiGout				
B- CARDIO VASCULAR DRUGS				
C- GASTRO – INTESTINAL DRUGS				
D- RESPIRATORY DRUGS				
E – ANTI – INFECTIVE DRUGS				
F- ENDOCRINE SYSTEM DRUGS				
G- CONTRACEPTIVE PREPARATIONS				
H – PSYCHOTHERAPEUTIC DRUGS				
I – OPHTHALMIC PREPARATIONS				
J- OTIC PREPARATIONS				
K- DERMATOLOGICALS				
L – VITAMINES & MINERALS				
M – VACCINES				
N- ANTICANCER DRUGS				
Others				

<b>Number of drugs in prescription</b>	1	2	3	4	5	6	7	more
--	---	---	---	---	---	---	---	------

<b>Number of drugs in prescription by Generic Name</b>	1	2	3	4	5	6	NON
--	---	---	---	---	---	---	-----

<b>Number of drugs in prescription are dispensed</b>	1	2	3	4	5	6	NON
--	---	---	---	---	---	---	-----

Is this Encounter contains antibiotic prescribed , yes  ,  what group ?

Antibiotic Group	G.N	B.N	D.F	L	Is	F	Dispensed
1- Penicillins							
2- Cephalosporins							
3- Tetracycline							
4- Macrolides (Erythromycin )							
5- Sulphonamides & Trimethoprim							
6-Nitrofurantoin							
7- Nalidixic Acid - Fluoroquinolones							
8-Aminoglycosides - Gentamycin							
Others							

<b>Did you make a culture test for this antibiotic ?</b>	Yes	No
--	-----	----

<b>Kind of dosage form of this antibiotic</b>	cap	tab	Am p	susp	ointment & cream	Dro p
---	-----	-----	------	------	------------------	-------

<b>Kind of Manufacturer of this antibiotics</b>	Local	Israeli	Foreign	others
---	-------	---------	---------	--------

Note :

G.N = Generic name , B. N = Brand name , D. F= dosage form , L= Local , Is . = Isreali , F= Foreign .

## **Declaration**

I certify that, this thesis submitted for the Degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a any other higher degree to any other university or institution.

Signed :.....

Mostafa Omar El-Ghosain

Date: October 2007

## **Acknowledgements**

I would like to acknowledge and express my greatest thanks to all the people who assisted me in conducting this research , without their valuable efforts , advice and support this work can never be properly performed.

Dr.Salah Al-Sousi, former dean of faculty of pharmacy, Al Azhar University – Gaza, my academic supervisor for his continuous advice , support and tolerance.

Dr. Suzanne Shashaa, the assistant dean of school of public health, for her valuable support and advices .

I wish to extend my thanks to Dr. Mohammad Auda, faculty of pharmacy, AlAzhar University, for his helpful suggestions, Dr. Zeyad shaath, Director General of Pharmacy in MOH for his great help which facilitated the conducting of my research.

My thanks expanded to all those who helped me from the staff of the school of public health, to all those who help me in preparing and modifying my research tool.

Finally I wish to express my gratitude to my colleagues pharmacists both in the data collection team and in the community pharmacies for their cooperation and support.

## Abstract

Irrational use of antibiotics which includes inappropriate over prescribing, over the counter dispensing without prescription and self medication by patient is wide spread international health problem, this problem is more severely exists in the developing countries, this irrational use of antibiotics is very common also particularly in Gaza governorate . The aim of this study was to asses the actual observed antibiotics dispensing patterns in the community pharmacies in Gaza governorate, and to identify and evaluate factors may affecting them in order to provide solid evidence based information for possible proper corrective actions .

A descriptive analytical cross sectional study design was conducted using triangulation of both structured observations and exit interviews of pharmacies clients. To ensure that the study sample is a representative a proportional multistage random cluster sample from community pharmacies in the nine areas of Gaza governorate was selected . Where 30% of the community pharmacies as clusters and the randomly selected patients encounters as the study sample population . In the first stage from the sample population 49 community pharmacies out of 57 agree to participate and in the second stage 471 patient out of 503 patients encounters agree to have an interview with response rate of 85.9 % and 93.6 % respectively.

The finding of this study showed that antibiotics with prescriptions dispensed for 37.1% of patients encounters, antibiotics without prescription for 17.6%, non antibiotics with and without prescriptions dispensed for 23.3% and 21.8% respectively, in addition to that a high percent 54.7% of total patients encounters involved dispensing of antibiotics out of this 67.8 % were with prescription, 17.8% by pharmacist recommendation and 14.4% by patients request, children in the age group 0-6 year old were 37.7 % the highest recipients of antibiotics with prescriptions, which indicate over prescribing, more females 54.8% than males 45.1% received antibiotics with prescriptions, 70.2% of study patients who received with prescription antibiotics live in a city, 15.4 % in a camp 14.2 % in a village, 42.2 % have school level of education, 57.1 % have an average economic situation, 32.5 % have a good and 10.2 % have a bad economic situation. The most common antibiotics groups prescribed were penicillin's 28 %, cephalosporin's 26.8% and fluoroquinolones 15.4% and most of these groups were inappropriately prescribed for mostly viral upper and lower respiratory tract infections, while the highest percentage 25.1% of antibiotics prescriptions came from pediatricians, more importantly the study showed that, the average number of drugs per prescription is 2.1 which is higher the recommended international standard which is 2 , the percentage of drugs prescribed by generic name is only 6.1 %, the percentage of encounters with an antibiotic prescribed is very high 61.4 %, furthermore the study showed a satisfying results for the average dispensing time of 4.2 minutes and 90.0 % of drugs are actually dispensed, also the study showed that most of the dispensed drugs 32.1 % are anti-infective , 26.0 % analgesics antipyretics which indicates a clear over use and only 3.4 % of the study patients were prescribed their antibiotics based on a culture test results. There was a statistically significance only for age and sex of patients when it was inferentially analyzed with the study dependent variables .

There is a great need for to a carefully designed public awareness program about the danger of antibiotics irrational over use involves health policy makers, health

professionals and the community to try to implement all the WHO intervention steps and strategy to promote rational use of antibiotics.

## ملخص الدراسة

### أنماط صرف المضادات الحيوية في الصيدليات العامة في محافظة غزة

إن الاستخدام الغير رشيد للمضادات الحيوية و الذي يشمل الوصف الزائد والغير ملائم، و ا لصرف بدون وصفة والتطبيب الذاتي للمريض، هو مشكلة صحية واسعة الانتشار دوليا، ان كانت تتركز بشكل أكثر سوءا في الدول النامية، و هو شائع بخاصة أيضا في محافظة غزة. الهدف من هذه الدراسة هو معرفة وتقييم الأنماط الفعلية الملاحظة لصرف المضادات الحيوية في الصيدليات العامة في محافظة غزة، ومعرفة وتقييم العوامل التي تؤثر عليها، وذلك حتى نتمكن من توفير معلومات موثقة تساعد في اتخاذ إجراءات صحية الممكنة. إن هذه الدراسة هي دراسة وصفية تحليلية قطعية تم إجراؤها باستخدام أكثر من طريقة لجمع البيانات من زبائن الصيدليات بواسطة قائمة ملاحظات ومقابلات بمجرد الخروج، ولضمان تمثيل العينة لكل زيارات أو لقاءات المرضى مع الصيادلة في كل الصيدليات العامة في محافظة غزة تم اعتماد الطريقة النسبية المتكررة العشوائية العنقودية، حيث تم اختيار ما نسبته 30% الصيدليات من التسعة مناطق في محافظة غزة بحيث أن الصيدليات العامة كعناقيد ولقاءات المرضى كعينة الدراسة، في المرحلة الأولى من عينة الدراسة 49 صيدلية عامة من 57 وافقوا على المشاركة في الدراسة، وفي المرحلة الثانية 471 مريض من 503 وافقوا على إجراء مقابلة، بمعدل استجابة 85,9% و 93,6% على التوالي.

أظهرت الدراسة أن 37,1% من لقاءات المرضى تم صرف المضادات الحيوية بوصفة طبية وفي 17,6% تم صرف المضادات الحيوية بدون وصفة، وتم صرف الأدوية من غير المضادات الحيوية بوصفة و بدون وصفة بنسبة 23,3% و 21,8% على التوالي، بالإضافة إلى ذلك نسبة عالية 54,7% من مجمل لقاءات المرضى اشتملت على صرف المضادات الحيوية حيث كان 67,8% من هذه المضادات تم صرفها بوصفة و 17,8% بتوصية من الصيدلي و 14,4% بطلب من المريض، وشكل الأطفال من الفئة العمرية صفر إلى ستة سنوات 37,71% وهي أعلى نسبة من المرضى الذين صرفت لهم المضادات الحيوية بوصفة طبية وهو يدل على الوصف الزائد، ونسبة الإناث 54,8% وهي أكثر من الذكور 45,1% الذين صرف لهم المضادات الحيوية بوصفة. وأظهرت الدراسة أن 70,2% من المرضى في عينة الدراسة ممن

تلقوا المضادات الحيوية بوصفة يسكنون في مدينة و 15,4% في مخيم و 14,2% في قرية ،والغالبية 42,2% لهم مستوى تعليمي مدرسي ، 57,1% يتمتعون بمستوى اقتصادي معتدل و 32,5% بمستوى جيد و 10,2% بمستوى اقتصادي سيء .

وأظهرت الدراسة أن معظم المضادات الحيوية الموصوفة هي من المجموعات البنسلين 28% و سيفالوسبورين 26,8% و فلوروكوينولون 15,4%، وأن معظم هذه المجموعات تم وصفها بشكل غير مناسب غالبا لالتهابات فيروسية في الجهاز التنفسي، العلوي والسفلي وكما وصف أطباء الأطفال أعلى نسبة 25,1% من وصفات المضادات الحيوية. والأكثر أهمية أظهرت الدراسة أن معدل عدد الأدوية في الوصفة الدوائية الواحدة هو 2,1 وهو أعلى من المعدل المقبول عالميا وهو 2، كما أن نسبة الأدوية الموصوفة بالأسماء العلمية للأدوية هي فقط 6,1%، وكانت نسبة عالية جدا 61,4% من الوصفات الطبية تشتمل على مضادات حيوية، بالإضافة إلى ذلك أظهرت الدراسة نتائج مرضية بالنسبة لمؤشرات العناية بالمرضى حيث كان معدل وقت الصرف للمريض الواحد هو 4,2 دقيقة، وكانت نسبة الأدوية المصروفة فعلا 90,0%، وكان معظم الدواء المصروف 32,1% من الأدوية المضادة للعدوى و 26,05% هي أدوية مسكنة و خافضة للحرارة ويبين ذلك مدى استخدامها الزائد ، كما بينت الدراسة أن 3,4% فقط من المرضى الذين وصف لهم مضادات حيوية تم ذلك بناء على نتيجة اختبار المزرعة. و أظهرت الدراسة عند التحليل الاستدلالي للمتغيرات المختلفة أن عمر و جنس المريض فقط لهم دلالة إحصائية هامة. وبناء على ذلك فإنه يوجد حاجة عظيمة لعمل برنامج توعية عام عن مخاطر الاستخدام الزائد والغير رشيد للمضادات الحيوية، بحيث يشمل هذا البرنامج مشاركة صانعي القرار الصحي و أصحاب المهن الصحية والجمهور العام للعمل على محاولة تطبيق كل خطوات التدخل و الإستراتيجية الموصى بها من قبل منظمة الصحة العالمية لتعزيز وتسهيل الاستخدام الرشيد للمضادات الحيوية.

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### Chapter (1) : Introduction

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## **Definition of Terms**

### **Antibiotics :**

A class of natural and synthetic compounds that inhibit the growth of or kill other microorganisms ( Biology-Text , 2007).

### **Dispensing :**

To prepare medicines for and distribute them to their users (The free medical dictionary, 2007).

### **Patterns :**

The pattern is a form or, template, a set of model, or more abstractly a rules which can be used to make or to generate things or parts of a thing, especially if the things that are created have enough in common for the underlying pattern to be inferred, in which case the things are said to exhibit the pattern (Wikipedia, the free encyclopedia, 2007).

### **Community (Public) Pharmacy :**

Those privately owned pharmaceutical establishments, which is the only place where compounding and dispensing of drugs, infants milk formulas and other complementary food for them can be offered directly to the public with specific prices determined by the MOH (MOH, System of Pharmacy Practice, 2006).

### **Over the counter (OTC) drugs :**

Are the drugs which can be dispensed without prescription and determined by the minister of health by recommendation of a special committee constituted from both the MOH and the pharmacists syndicate (MOH, System of Pharmacy Practice, 2006) .

### **Prescription :**

A physician's order for the preparation and administration of a drug or device for a patient. A prescription has several parts. They include the superscription or heading with the symbol "R" or "Rx", which stands for the word recipe (meaning, in Latin, to take); the inscription, which contains the names and quantities of the ingredients; the subscription or directions for compounding the drug; and the signature which is often preceded by the sign "s" standing for signa (Latin for mark), giving the directions to be marked on the container (Medicine net, 2007).

### **Poly pharmacy :**

The term poly pharmacy generally refers to the use of multiple medications by a patient. The term is used when too many forms of medication are used by a patient, more drugs are prescribed than clinically warranted , or even when all prescribed medications are clinically indicated but there are too many pills to

take ("pill burden"). Furthermore, a portion of the treatments may not be evidence-based. The common result of polypharmacy is increased adverse drug reactions and higher costs ( Wikipedia , the free encyclopedia, 2007 ).

**Self Medication :**

The World Health Organization (WHO) defines self-medication as the selection of medicines by individuals to treat self-recognized illnesses or symptoms (WHO,2000).

**Rational use of drugs :**

As that requires patients receive medications appropriate to their needs, in doses that meet their own individual requirements for an adequate period of time at the lowest cost to them and their community " (WHO,1987).

## **List of Abbreviations**

<b>APUA</b>	Alliance for the Prudent Use of Antibiotics
<b>CDC</b>	Centers for Disease Control and Prevention
<b>EDL</b>	Essential Drug List
<b>GNP</b>	Gross National Product
<b>GS</b>	Gaza Strip
<b>GAOPh</b>	General Administration of Pharmacy
<b>INRUD</b>	International Net for Rationale Use of Drugs
<b>LRI's</b>	Lower Respiratory Infections
<b>MOH</b>	Ministry Of Health
<b>NGO's</b>	Non Governmental Organization
<b>OTC</b>	Over the Counter Drugs
<b>PCBS</b>	Palestinian Central Bureau of Statistics
<b>PHC</b>	Primary Health Care
<b>PNA</b>	Palestinian National Authority
<b>SPSS</b>	Statistical Package of Social Science
<b>UNRWA</b>	United Nations Relief and Work Agency
<b>URI's</b>	Upper Respiratory Infections
<b>WHO</b>	World Health Organization
<b>WB</b>	West Bank