

**An-Najah National University  
Faculty of Graduate Studies**

**Prevalence and Risk Factors affecting polypharmacy  
among elderly patients in the North of West Bank**

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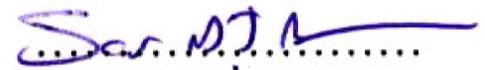
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## إقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

### **Prevalence and Risk Factors affecting polypharmacy Among elderly patients in the North of West Bank**

معدل حصول ظاهرة تعدد الأدوية و العوامل المرتبطة  
بها بين مرضى كبار السن في محافظات (نابلس، جنين، طولكرم)

أقر بأن ما اشتملت عليه هذه الرسالة إنما هي نتاج جهدي الخاص، باستثناء من تمت  
الإشارة إليه حيثما ورد، وأن هذه الرسالة ككل، أو أي جزء منها لم يقدم من قبل لنيل أية درجة  
أو لقب علمي أو بحثي لدى أية مؤسسة تعليمية أو بحثية أخرى.

### **Declaration**

The work provided in this thesis, unless otherwise referenced, is the  
researcher's own work, and has not been submitted elsewhere for any other  
degree or qualification.

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IX  
**Prevalence and Risk Factors affecting polypharmacy  
among elderly patients in the North of West Bank**

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**Abstract**

Chronic diseases are common among the older population, the rate of drug related problems and inappropriate medication use in the elderly is disturbing. The heavy use of medications in this population has increased. The rate of drug interactions decreased the quality of life, and the financial consequences of the problem are enormous. Information about polypharmacy and pattern of drug use by community dwelling elderly is scant.

This study aimed to investigate the prevalence of polypharmacy and factors affecting it among home-dwelling elderly Palestinians in the Northern West Bank districts, aged 65 years or over by using a cross-sectional study (n=317). Elderly were defined for the purpose of this study as those who are aged  $\geq 65$ , Polypharmacy was defined as the concomitant use of 5 or more medications.

Results found that the percent prevalence of polypharmacy among the study population of the three districts (Nablus, Tulkarm, and Jenin) is 41%. Mean number of medications used by each elder of the study population was 4.48 (SD 2.249). The commonest disease affecting elderly is hypertension, followed by joint diseases, diabetes mellitus, and cardiovascular disease. The study's findings showed that polypharmacy is affected significantly by gender ( $p = 0.015$ ), no statistically significant relationship between polypharmacy and other factors (Age, place of

residence, marital status, level of education, and income). The study also showed that elderly patients are unaware of consequences of polypharmacy; (non-adherence, medication errors, adverse drug reactions, drug-drug interactions, increased risk of hospitalization, and increased cost of treatment).

The study results showed that medication counseling is mainly done by physicians, with minimal role for pharmacists or nurses. Prescribers need to be aware of increasing polypharmacy. Regular assessment of indications is needed to avoid overuse of drugs. Geriatric knowledge is needed to support health centers and specialized units in this demanding task. Community pharmacists' role in reducing this phenomenon needs to be enhanced. Physicians, nurses, pharmacists, and all health providers who have a direct contact with the elders should be aware of polypharmacy, they should work as a team to educate community elderly about consequences of polypharmacy. Polypharmacy is a complex and worrying phenomenon that merits more research.

**Key words:** Elderly, Polypharmacy, Aging, Palestine, prevalence, drug interactions.

**CHAPTER ONE**  
**General Introduction**

## 1. Introduction:

There is alarming increase in the number of the people who suffer from disabling non-curable diseases, which create exponentially increasing medical, economic, and social age related problems<sup>1</sup>. Many studies show that elderly people are the largest per capita consumers of medications<sup>2</sup>. Most of them (up to 80%) suffer from chronic diseases<sup>2</sup>. Many elderly patients have at least one reasonably detectable chronic illness, e.g. cardiac condition, diabetes, respiratory problems and so forth, that is the focal point of treatment. Unfortunately, other chronic, potentially serious conditions often go undetected. Such undetected conditions may include depression, cognitive impairment, vision and/or hearing problems, malnutrition, gait instability, urinary incontinence, sexual dysfunction and elder abuse<sup>3</sup>. Thus, the presenting symptoms, indicating that the elderly patient is ill, may be totally misleading as to the nature and location of the primary disease process. The diagnostic process for the elderly necessarily needs to be different in that the patient medications' regimens should be reviewed.

With increasing age, multi-morbidity becomes more frequent, leading to higher occurrence of medication use and higher risk of adverse drug reactions due to polypharmacy, chronic diseases, and age-related changes in pharmacokinetics (absorption, distribution, and elimination of a drug in the body) and pharmacodynamics (the pharmacologic effect and clinical response to the drug)<sup>4</sup>.

Conditions of Palestinian elderly are not very much different from those around the world; elderly in Palestine represent 3% of population in Palestinian territory<sup>5</sup>; Life expectancy at birth in the Palestinian territory is

71 years for males, and 74 years for females<sup>5</sup>. Statistics show that 65.5% of elderly in Palestine are suffering from at least one chronic disease<sup>6</sup>. The most common chronic diseases among elderly people are hypertension at 35.3%, diabetes at 24.9%, joints diseases at 16.5%, and heart diseases at 12.2%<sup>6</sup>.

New drugs are continuously developed leading to more and more possibilities of medication use, in indications previously thought to be resistant to pharmacotherapy, adding to the problems faced by elderly because of drug-disease, drug–drug interactions. Many diseases of the elderly, such as hypertension, are now treated more actively than before, and the threshold of starting medication has become lower. With advancing age, a greater share of individuals becomes susceptible to chronic morbidity which requires long-term medical treatment and leads to the use of several medications<sup>7</sup>.

There are many cross-sectional or longitudinal studies about drug use by the elderly in different countries<sup>8</sup>. However, there is not much information available on the drug use, and polypharmacy, by the home-dwelling elderly in Palestine. This study concentrated on investigating these aspects of drug use by the elderly.

## **1.2 Objectives of this study**

- To measure the prevalence of polypharmacy in a group of elderly patients in Northern West Bank.
- To identify risk factors that predispose patients to polypharmacy

- To determine the commonest diseases affecting elderly in the study locations and most frequently prescribed pharmacological classes.
- To study drug use behaviors of elderly population.

**CHAPTER TWO**  
**Literature Review**

## 2. Literature Review

### 2.1 Aging

#### 2.1.1 Definition of aging

The simplest definition of age is the chronological count of calendar years<sup>9</sup>. Many elderly persons do not feel themselves old even when retired or at the advanced age of 75<sup>10</sup>. Devroey et al (2002) divided the elderly population into the young elderly aged 60–74 years and the very elderly over 74 years old<sup>10</sup>.

In the literature, aging is defined most simply as a biological, psychological, and social phenomenon. Biological aging is associated with changes in the human organism and biological aging processes. Biological age is an attribute of body tissue relevant to pathogenesis<sup>11</sup>. Pharmacokinetic and pharmacodynamic changes of drug efficacy are associated with the biological aging of the elderly<sup>12</sup>. The major organs affected by aging are the kidneys, the liver, and the cardiovascular and central nervous systems<sup>12</sup>. Aging may cause changes in the neurotransmission systems and these changes may increase sensitivity to sedation by drugs<sup>13</sup>. Psychological aging takes place in the person's psychic activities. Social aging is connected with the person as a member of society, and the term "the elderly" generally refers to people who have reached the socio-political age of 65 years. Social aging is more complicated to define than either biological or psychological aging, and the definitions partly overlap. Social aging is associated with changes that take place in the individual's or social group's relationship with their

environment and these changes may manifest at both individual and societal levels<sup>-12</sup>.

## **2.2 Polypharmacy:**

Multiple definitions are used in the literature for polypharmacy such as two or more drugs for 240 days or more<sup>13</sup>, concurrent use of two or more drugs, use of four or more medications<sup>14</sup>, use of five or more different prescription medications<sup>15</sup>. Additional definitions include regular daily consumption of multiple medications as well as the use of high-risk medications and questionable dosing<sup>16</sup>. Finally, Fillit et al (1999) defined polypharmacy as the “untoward iatrogenic sequela of the use of multiple, interacting medications”<sup>17</sup>. European studies defined polypharmacy according to the number of medications taken, whereas the studies conducted in the United States defined polypharmacy according to whether a medication was clinically indicated<sup>17</sup>. World Health Organization defined Polypharmacy as “Use of more medications than clinically necessary”<sup>18</sup>.

### **2.2.1 Reasons of taking many medications by elderly**

Several factors contribute to polypharmacy among patients over age 65. Clinicians may be prescribing more drugs for their elderly patients than they have in the past, simply because there are more drugs available for treating these patients. The discovery of a broad range of pharmaceuticals for a wide variety of conditions has helped many patients. Unfortunately, this new development has also led to both overuse and inappropriate use of prescription medications<sup>19</sup>.

Many drugs that were once obtainable only with a prescription, such as omeprazole (a drug used to treat symptoms of gastroesophageal reflux

disease (GERD) and other conditions caused by excess stomach acid, and loratidine (is an antihistamine that provides relief of seasonal allergy symptoms such as watery eyes, runny nose (rhinitis), itching eyes, and sneezing), are now readily available over the counter, and their use is on the rise in the United States. In addition, complementary and alternative medicines, such as herbal therapies, are becoming increasingly popular among all patients, including the elderly<sup>20</sup>.

Compared to the general population, a patient over 65 is more likely to have several chronic disorders, each requiring at least one medication<sup>21,22</sup>. Elderly patients with more than one health condition are likely to receive care from several healthcare providers, each of whom may prescribe a different medication to treat the same symptoms<sup>23</sup>.

Additionally, patients may purchase medications from more than one pharmacy, and each pharmacy checks for potential problems only on those medications that its pharmacist knows the patient is, or is supposed to be, taking<sup>21</sup>. Drug-related problems are less likely to occur when one physician or nurse practitioner oversees the patient's medication regimen.

Another factor in the equation is what's called the prescribing cascade: An elderly patient develops side effects from a medication he's taking; however, his healthcare provider interprets the symptoms not as side effects of the drug but as symptoms of a disease. The healthcare provider then prescribes yet another drug, creating the potential for even more side effects<sup>23, 24</sup>.

### 2.2.2 Aging and drug sensitivity

An elderly patient is at risk for adverse drug events (ADE), because the physiologic changes that occur with aging make the body more sensitive to the effects of medications<sup>21</sup>. These changes affect both pharmacokinetics—what the body does to a drug -and pharmacodynamics-what a drug does to the body<sup>21</sup>.

The three components of pharmacokinetics are absorption, distribution, and clearance, and each is affected by aging. Absorption, particularly after oral administration, is least affected<sup>21</sup>. In elderly patients, absorption is generally slower but complete<sup>24</sup>. (Absorption through the skin after topical administration may actually increase in the elderly as the aging skin becomes thin and frail)<sup>21</sup>. The more medications a patient takes, however, the greater the chance that one drug will interfere with the absorption of another.

Distribution of drugs throughout the body also changes with age. A medication gets distributed into either fat or water, depending on its chemical characteristics. As patient ages, his percentage of body fat increases, so a drug that's lipid-soluble, such as diazepam (Valium)<sup>®</sup>, may stay in the body longer because there are more fat stores into which it can be distributed<sup>25</sup>. And, because older patients have proportionally less body water than younger ones, blood levels of a drug that is water-soluble may be higher than expected<sup>21</sup>. It's difficult, though, to anticipate the effect that changes in fat stores or body water will have on drug distribution because other body functions, such as protein binding, can also complicate drug distribution.

Aging significantly affects clearance because it produces changes in the liver, where drugs are metabolized, and in the kidneys, through which drugs are excreted<sup>21</sup>. As the body ages; blood flow through the liver decreases, which can reduce the clearance of certain drugs by 30% – 40%. Also, the cytochrome P450 enzyme system -the major enzyme system by which the liver metabolizes drugs- becomes easily overwhelmed in older patients, so certain medications are metabolized more slowly and not as well<sup>21,20</sup>.

In addition, the size of the kidneys and renal blood flow both decrease with age<sup>21</sup>. Renal clearance of medications can be reduced by up to 50% as a patient reaches age 75<sup>21</sup>.

Aging also affects pharmacodynamics. Changes to drug receptors can make a patient more or less sensitive to certain medications<sup>20</sup>. Drugs that act on the CNS may have far greater impact in an elderly patient than in a younger one as a result of changes in the blood-brain barrier<sup>21</sup>.

Altered pharmacokinetics and pharmacodynamics increase an elderly patient's risk for both drug-drug and drug-disease interactions<sup>20</sup>. Drug-drug interactions typically occur when an elderly patient takes two medications that have different indications but additive pharmacologic effects. For example, an elderly patient might experience problems if he's prescribed a narcotic analgesic and an antidiarrheal agent; each is used for a different reason, but each can cause constipation.

Drug-disease interactions, in which a medication exacerbates a disease process, are also common among elderly patients, because of the prevalence of disease in this population<sup>21</sup>. Anticholinergic drugs, for

example, can exacerbate glaucoma, Alzheimer's disease, and benign prostatic hyperplasia <sup>21</sup>.

### **2.2.3 Polypharmacy Appropriate / Inappropriate:**

Polypharmacy can stem from different phenomena and can therefore be divided into several distinct subgroups. One must recognize:

- Appropriate polypharmacy, when a patient takes several concomitant drugs, all of which are for recognized indication. In this case an estimation of appropriateness of the treatment is often more suitable than simply attempting to reduce the number of medications.
- Inappropriate polypharmacy, when a patient really takes more drugs than is necessary.
- Redundant pseudo-polypharmacy, when patients are recorded as taking more drugs than they actually take. Even though failure to record a medication is more common <sup>25</sup>.

### **2.2.4 Causes of Polypharmacy:**

Inappropriate polypharmacy stems from two distinct sources – healthcare providers and patients themselves <sup>27, 28</sup>.

- Polypharmacy due to healthcare providers:  
It has been demonstrated that the number of drugs prescribed increases with the number of physicians seen and the number of pharmacies used, minimizing the number of physicians seen and

pharmacies visited by patient could decrease the incidence of polypharmacy<sup>29,30,31</sup>.

- Polypharmacy due to patients:

Inappropriate polypharmacy in the elderly is related to patient demographics. Female sex, increasing age, rural residence, and low education increase the risk of polypharmacy<sup>28,32</sup>; the use of a greater number of drugs is also associated with insurance coverage for prescription medication<sup>32</sup>.

Two other factors frequently encountered in the elderly population are self medication with over the counter drugs, and borrowing medications from friends and family members<sup>33</sup>.

### **2.2.5 Consequences of polypharmacy**

The consequences of polypharmacy fall into six major categories. The first five of these namely, non-adherence, adverse drug reactions, drug-drug interactions, increased risk of hospitalization, and medication errors, are closely linked. One follows from another and vice versa and all lead to deterioration of the quality of life of the elderly patient. The sixth consequence is increased cost, due directly to the medication and indirectly to the cost of treating adverse effects<sup>20</sup>.

1. Non-adherence

Several studies suggest that non-adherence increases with complexity of drug regimen. In a study, patients with diabetes or congestive heart failure, drug errors (defined as proportion of drugs that the patient fails to take plus the proportion of drugs taken by the patient of which the physician is unaware) were 15% when the

patient took one medication, 25% with two or three medications and reached 35% when the treatment included four or more medications<sup>34</sup>.

## 2. Adverse Drug Reactions

Polypharmacy is clearly related to adverse drug reactions<sup>32,33</sup>. The incidence of adverse reactions increase exponentially with the number of medications taken<sup>36,37</sup> and a study showed that the intake of more than four medications was correlated with a higher risk of adverse drug reactions<sup>38</sup>.

## 3. Drug- Drug interactions

Drug- drug interactions increase with the number of medications taken. It has been suggested that when the number of drugs prescribed to patient reaches eight, the risk of drug- drug interaction approaches 100%.<sup>39</sup>.

Interactions resulting in reduced efficacy of medication may be overlooked more often than those resulting in synergistic effect, because other reasons may be used to explain the lack of efficacy (e.g poor adherence, resistant disease). These hasty conclusions can lead to an increase of in dosage or the introduction of a complementary drug to enhance efficacy, putting the patient at even greater risk of drug-drug interaction and polypharmacy.

## 4. Increased risk of hospitalization

The link between polypharmacy and hospitalization seems quite clear when considering that polypharmacy increases non-adherence, adverse drug reactions and drug-drug interactions.

A study showed that 11.4% of hospitalizations in elderly patients in acute care hospital were due to non-adherence and 16.8% to adverse drug reactions (37). Hospital admissions due to drug-drug interactions have been estimated to reach 2.8%<sup>41</sup>.

The link between the number of drugs taken and the incidence of hospitalizations due to adverse drug interaction was illustrated in a study where 11.7% of elderly patients were admitted with an adverse reaction to medical therapy. On average, they took 6.3 medications compared with 3.8 medications in elderly patients admitted for other reasons not related to adverse drug reactions<sup>42</sup>.

#### 5. Medication Errors

Medication error means “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in control of the healthcare provider, patient or consumer. This definition does not include adverse drug events<sup>43</sup>”.

The elderly are at increased risk of medication errors because of their exposure to a greater number of drugs and complexity of drug regimen. In a report on mortality associated with medication errors, 48.6% of the deaths occurred in patients aged over 60 years, and 55% of these patients were taking more than one drug<sup>44</sup>.

#### 6. Increased Costs

Polypharmacy increases costs directly via prescription costs and indirectly via the five consequences quoted above.

Sullivan et al estimated the direct cost of hospitalization due to non-adherence to be \$US8.5 billion. They also suggested that \$US17-25 billion could be attributed to the indirect costs of polypharmacy (values from seven studies conducted from 1976-1988)<sup>45</sup>.

## **2.3 Appropriate Polypharmacy**

Polypharmacy has also become useful in other areas, such as diabetes mellitus<sup>46</sup>. A striking recent example of proposed beneficial polypharmacy is the Polypill, which contains six ingredients – aspirin, a statin, and folic acid, plus three antihypertensive drugs<sup>46</sup>. The antihypertensive drugs are recommended in half the usual doses, to reduce the risks of adverse effects, which are distinct for the different types of drugs, while multiplying the therapeutic benefit, since all lower the blood pressure. In some patients this strategy will be ineffective, since the doses may be too low to produce any beneficial action at all; some patients failed to respond to low doses of three or more antihypertensive drugs but responded well to a large dose of just one. But for many patients the strategy will work well. And if everybody over the age of 55 years took the Polypill, it would, according to predictions based on a large amount of published evidence, reduce the burden of heart attacks and strokes in the population by over 80%<sup>47</sup>.

### **2.3.1 Physicians and appropriate prescribing**

The physician who cares for aging patients with numerous chronic medical conditions must make daily decisions about appropriate drug therapy. More than 60 percent of all physician visits include a prescription

for medication<sup>48</sup>. The multiple medications and complex drug schedules may be justified for older persons with complex medical problems.

However, the use of too many medications can pose problems of serious adverse drug events and drug-drug interactions, and often can contribute to non-adherence (Table 1)<sup>49</sup>.

**Table (1): Factors Associated with Medication-Related Problems**

- Wrong or unnecessary drugs being prescribed
- Unmet need for new or additional medications
- Wrong medication (contraindications, inappropriate for condition being treated)
- Dosage too low or too high
- Adverse drug reaction or event
- Non-adherence or noncompliance (failure to take drugs properly, cost, prescribing errors)

## 2.4 Adherence and Adverse Drug Events

Many factors influence the efficacy, safety, and success of drug therapy with older patients. These factors include not only the effects of aging on the pharmacokinetics and pharmacodynamics of medications but also patient characteristics (Table 2)<sup>50</sup>, and other issues, including atypical presentation of illness, the use of multiple health care professionals, and adherence to drug regimens (Table 3)<sup>51,52</sup>.

**Table (2): Common Characteristics of Older Adults with Medication-Related Problems**

- 85 years and older
- More than six active chronic medical diagnoses
- Decreased kidney function (estimated creatinine clearance < 50 mL per minute [0.83 mL per second])
- Low body weight or body-mass index
- Nine or more medications

**Table (3): Factors That Interfere with Safe and Successful Drug Therapy.**

- Impediments to the recognition of the need to obtain care (cultural, economic, physical, psychologic)
- Atypical presentation of illness
- Multiple illnesses
- Dementia
- Diminished vision or hearing
- Impairments to adherence (cultural, economic, physical, psychologic)
- Polypharmacy
- Increased susceptibility to adverse drug events
- Age-related changes in pharmacology (absorption, distribution, metabolism, excretion)

Adherence or compliance with drug therapy is essential to successful medical management. Noncompliance or non-adherence with drug therapy in older patient populations ranges from 21 to 55 percent<sup>53, 54</sup>. The reasons for non-adherence include more medication use (total number of pills taken per day), forgetting or confusion about dosage schedule, intentional non-adherence because of medication side effects, and increased sensitivity to drugs leading to toxicity and adverse events<sup>53</sup>. Older patients may intentionally take too much of a medication, thinking it will help speed their recovery, while others, who cannot afford the medications, may under-medicate or simply not take any of the medication. Simple interventions by the health care team, such as reinforcing the importance of taking the prescribed dose and encouraging use of pill calendar boxes, can improve adherence and overall compliance with drug therapy.

## 2.5 Physicians and reducing polypharmacy

To prevent an iatrogenic illness caused by over-prescribing, it is important to consider any new signs and symptoms in an older patient to be a possible consequence of current drug therapy 52. A 10-step approach to help reduce polypharmacy has been described (Table 4) 53. Another way to avoid adverse drug events is to use lower dosages for older patients. Many popular drugs do not have effective lower-dosage recommendations from the manufacturers. Physicians should remember to start low and go slow. Starting with one third to one half of the recommended dosage may help eliminate potential harmful effects 53.

**Table (4): Ten steps to Reducing Polypharmacy.**

1. Have patients "brown bag" all medications at each office visit, and keep an accurate record of all medications, including over-the-counter medications and herbs.
2. Get into the habit of identifying all drugs by generic name and drug class.
3. Make certain the drug being prescribed has a clinical indication.
4. Know the side-effect profile of the drugs being prescribed.
5. Understand how pharmacokinetics and pharmacodynamics of aging increase the risk of adverse drug events.
6. Stop any drug without known benefit.
7. Stop any drug without a clinical indication.
8. Attempt to substitute a less toxic drug.
9. Be aware of the prescribing cascade (treating an adverse drug reaction as an illness with another drug).
10. As much as possible, use the motto, "one disease, one drug, once-a-day."

## 2.6 Significance of study:

The Palestinian elderly constitute 4.4% of the study population according to the very latest survey by the Palestinian Central Bureau of Statistics, and expected to increase in the coming decades<sup>5</sup>. This rings the bell towards increased healthcare services.

Prevalence of polypharmacy and factors affecting it has not been investigated thoroughly in Middle East region, several studies has touched base on the topic of polypharmacy, but did not investigate factors affecting it, consequences of polypharmacy and its impact on elderly patients, health system, and local economy.

A very similar study to our study was carried out in Finland, where changes in medicine use and polypharmacy were assessed over a period of time, the study came out with interesting finding which we used to compare with ours<sup>57</sup>.

Our study is the one of its kind to be carried out in Palestine; several other studies have investigated attitudes towards medications in Palestine, compliance among patients with chronic diseases in Nablus district<sup>61</sup>. All these studies have pointed out the topic of polypharmacy, but not in a separate context.

A study was conducted in Israel that aimed at minimizing drug intake in nursing departments in 2004 and introduced a geriatric palliative approach to combat the problem of polypharmacy. The study showed that an average of 2.8 drugs per patient was discontinued and was not associated with adverse drug events<sup>1</sup>. An evaluation of drug use by applying WHO prescribing indicators was conducted in Jordan through a

retrospective study, and concluded that the prescribing and use of drugs in Jordan needs rationalization<sup>66</sup>.

In the Middle East region a study conducted in Turkey to investigate drug utilization, and to estimate the prevalence of potentially inappropriate drug use in a Turkish population aged 70 years or older, this resulted in only age and total number of medications were associated with potentially inappropriate drugs in the multivariate analysis<sup>67</sup>.

Lack of information about polypharmacy and factors affecting it in Palestine, show the importance of doing this study.

### **2.7 Hypothesis of the study:**

1. There is high prevalence of polypharmacy in elderly population in the North of West Bank
2. There is a statistically significant relationship between elderly age, gender, place of residence, income, level of education, social status, and polypharmacy.
3. There is a statistically significant relationship between polypharmacy and frequency of hospitalization, and elderly chronic diseases.

## **CHAPTER THREE**

### **Methodology**

### **3. Methodology:**

This chapter of the thesis describes the population & the subjects of the study, data collection, the measuring instrument, tool, & the analysis method.

This study is a prospective multi-center cross-sectional study, was approved by the medical research ethics committee by Anajah National University, and was composed of 317 elderly people in the North of West Bank conducted between the first of September 2007 and the end of February 2008.

#### **3.1 Inclusion criteria:**

- Elderly aged above 65 years.
- Community dwelling elderly.
- Residing with their families or living alone.

#### **3.2 Exclusion criteria:**

- Elderly aged less than 65 years.
- Elderly suffering from dementia or other mental disorders.
- Institutionalized elderly.

#### **3.3 Population of the study /sample**

- The study sample was chosen from different categories of elderly people in the North of Palestine, Nablus, Jenin, Tulkarem. These

categories are the community dwelling elderly; residing with their families, or living alone.

### 3.3.1 Sample Size

We applied the following formula to calculate the sample size.

$$n = \frac{1}{e^2}$$

Where:

$n$  = sample size

$e$  = error term which we can expect in this study (error due to error in sample, error in field, interviewer or from researcher<sup>64</sup>).

Assumption: accepted error term 5.7 %

Elderly in Palestine has in general the similar features; they live in similar conditions and face the same problems. Since there is no difference in living situations, we can accept small sample to represent them.

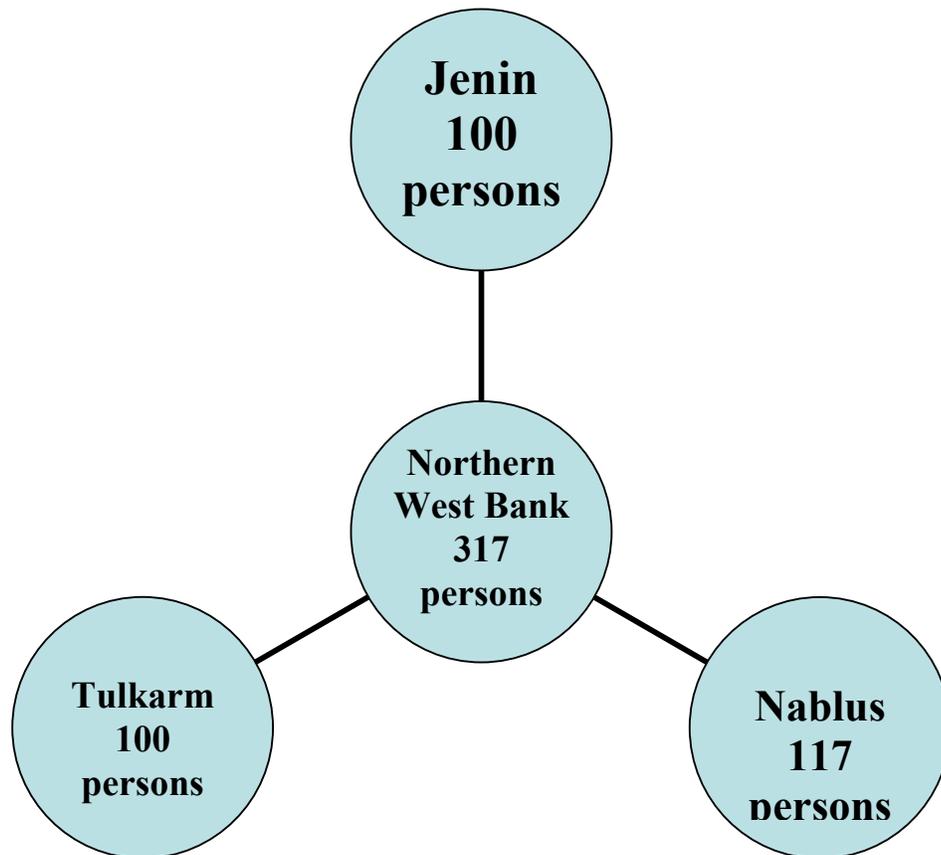
The population of study is the elderly in North of West Bank, and the population is more than 28000 so we can use the mentioned equation to determine the sample size

Then,

$$n = \frac{1}{0.00325} = 308$$

Where 0.00325 is the accepted error (5.7%)<sup>2</sup>.

Individuals in the sample were randomly selected; our sample was simple random sampling); in which the researcher visited the three districts (Nablus, Jenin, Tulkarm) with different living situations in villages, camps, and cities. The researcher visited the local councils in camps and villages, requested a list of elderly people over 65 of age, and interviewed those who are listed.



### 3.4 Data collection

Home visits were conducted by the researcher to elderly in the study locations, personal interviews were made by the researcher, the subjects

had been asked to bring their medications along to show what they were taking 7 days prior the interview (the brown bag). The researcher had confirmed the respondents' medications use with a close relative or a caregiver, if the person was unable to answer questions, had dementia, or was not in a good condition. The brand names of all prescription drugs taken by the interviewee during seven days prior to the interview were recorded.

### **3.5 Tools**

The study was the first to be conducted in Palestine, there was no chance to adopt a ready made questionnaire, so the researcher developed a new one which was evaluated and reviewed carefully by the research committee at Anajah National University, and an external physician and pharmacist. It consisted of questions on four parts, which contain multiple choice questions:

1. The first domain is about social demographic data, including gender, age, and marital status, place of residents, education level, and monthly income.
2. The second domain discusses the health status of the patient, whether he has chronic diseases or not, frequency of hospitalization, currently used medications by patients. The patient is asked to bring all the medications he keeps to be reviewed by the researcher. Name of drug, where is it obtained from, dosing, compliance by patient, and reported side effects, are all recorded by the interviewer.
3. The third domain discusses behaviors of drug use.

4. The fourth domain discusses possible complications of polypharmacy, falls, memory disturbances, gastrointestinal disturbances, and general weaknesses, are all recorded by the data collector.

### **3.6 Definitions**

- Age was distributed into intervals; 65-70, 71-80, 80+.
- Marital status was divided as follows: married, widowed, divorced, and single.
- Basic education was defined as illiterate, basic education, secondary education, high education, and postgraduate education.
- Drug use and polypharmacy. Both regular and irregular prescription drug use during seven days prior to the interview were defined as use of medication. Medication was defined as regular if it was taken daily or at regular intervals, e.g., once a week or month, as is the case with, for instance, vitamin B12 or long-acting anti-psychotics injected intramuscularly once a month or at other regular intervals. If the person used a drug once a month or at other regular intervals, but had not had an intramuscular injection, for example, during the previous week, his/her drug use was recorded as regular use. Irregular medication was taken when needed. Polypharmacy was defined as concomitant use of more than five prescription medications<sup>57</sup>. We adopted the World Health Organization definition of polypharmacy; which was the concomitant use of five or more drugs (WHO 1985).

- Brown Bag method: The term ‘brown bag’ review for medications is a practice that initially started in 1982 when the pharmacist provided a regular brown grocery sack for each individual to place medications in and bring to a designated location at the pharmacy or a community site for review<sup>63</sup>.

### **3.7 Ethics**

The study was conducted according to the guidelines of the Declaration of Helsinki; and the researcher’s ethics committee at Anajah National University, all subjects gave verbal informed consent.

### **3.8 Questionnaire reliability & validity**

#### **3.8.1 Reliability**

The reliability is major criterion for assessing its quality and adequacy. It is the consistency or accuracy with which an instrument measures an attribute, there are three types of reliability:

- 1- Stability.
- 2- Internal consistency.
- 3- Equivalence.

- 1- Stability aspect of reliability, which concerns the extent to which an instrument yields the same results on repeated administrations, is evaluated by test-retest procedures.

The reliability of the scale in this study was estimated by using test-retest due to independent variable.

Thirteen elderly people were given the questionnaire and filled it, after 2 weeks, they were given the same questionnaire test-retest done.

- 2- Internal consistency aspect of reliability, which refers to the extent to which the entire instrument items are measuring the same attribute, and Cronbach's Alpha is the most common test used in these researchs.

The reliability of scale in this study was estimated using Cronbach's Alpha formula to determine mean interim correlation. The questionnaire reliability was at  $\alpha = 0.68$ .

### **3.8.2 Validity**

The validity is the degree to which an instrument measures what it is supposed to be measuring.

## **3.9 Procedure:**

### **3.9.1 Pilot Study**

Pilot testing was conducted on actual data collection, the questionnaire was tested with 30 elderly persons in different locations, through that we changed some of the questions; for example, the question about the elderly reading the pamphlet, after the pilot testing, we changed that into the elderly reading the pamphlet, or asking a caregiver, family member, or neighbor reading it, as the majority of elderly are illiterate. The layout was changed as well, for the easy use of researcher.

Such verification process was made through the advisor who had research background.

### **3.9.2 Analysis Tool**

After completion of the data; they were entered into the SPSS, statistics package for social science (version 16).

### **3.9.3 Used Statistical Analysis**

The various statistical analysis tools in this research were as follow:

- 1- Frequencies and percentages.
- 2- Chi-square test to examine significant statistical differences in polypharmacy with factors affecting it. Significance of the relationship is determined when P value is less than 0.05
- 3- Correlation coefficient procedure to determine the strength of the relationship among variables, in the hypothesis.

## **CHAPTER FOUR**

### **Results**

## 4. RESULTS

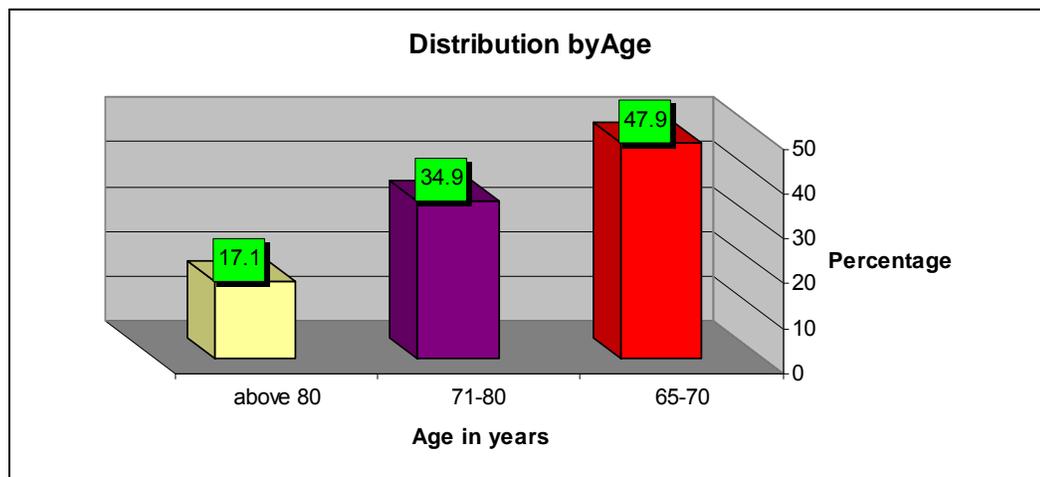
The profile of the study population include: social and demographic, health and co-morbidity, and drug use behaviors profile relationships.

### 4.1 Profile of the study population:

#### 4.1.1 Social and demographic profile:

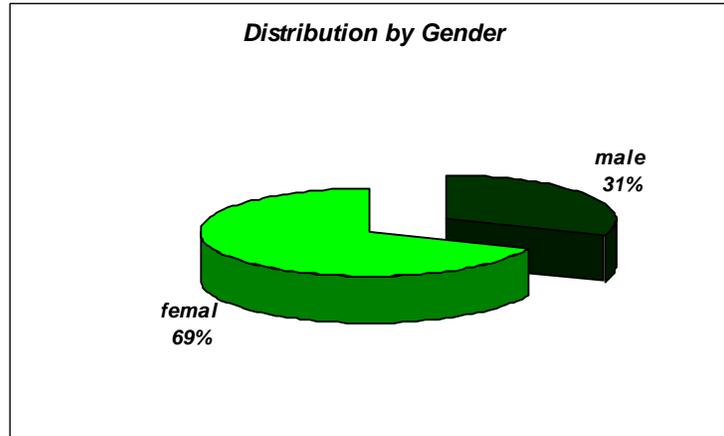
The following figures describe the demographic characteristics of the study population (Age, gender, place of residence, level of education and marital status profile).

- Distribution by Age:



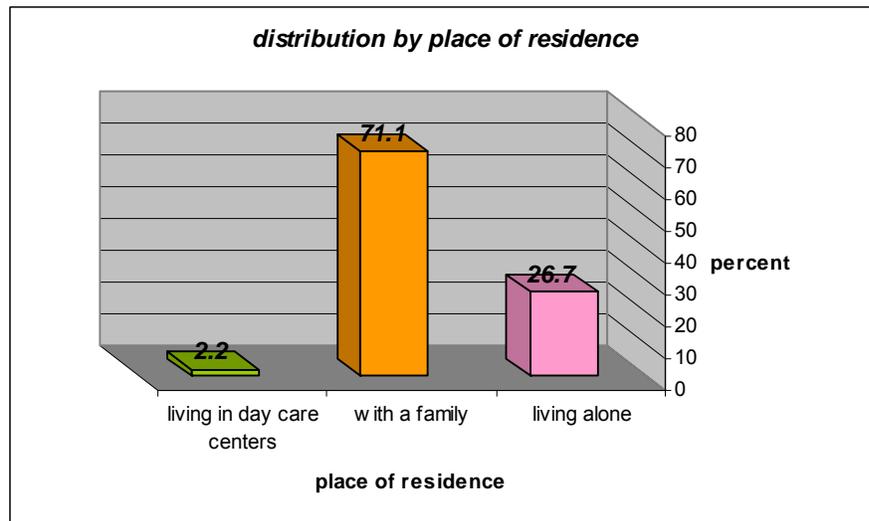
**Figure (1):** Show that 47.9% of the study sample was aged 65-70 years, 34.9% was aged 71-80 years, while 17.1% of the study population was aged above 80 years.

- Distribution by Gender:



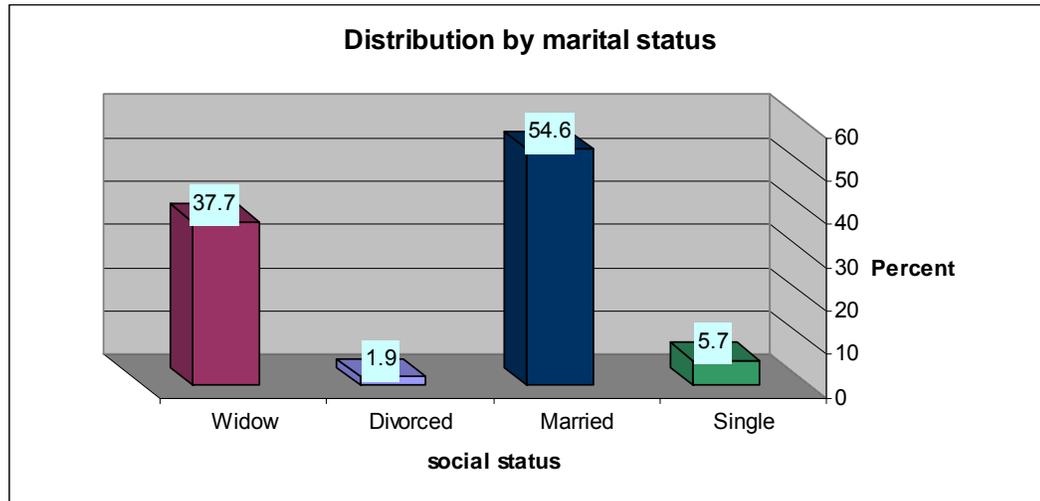
**Figure (2):** Shows that 69.3% of the study sample was females, and 31% was males.

- Distribution by place of residence:



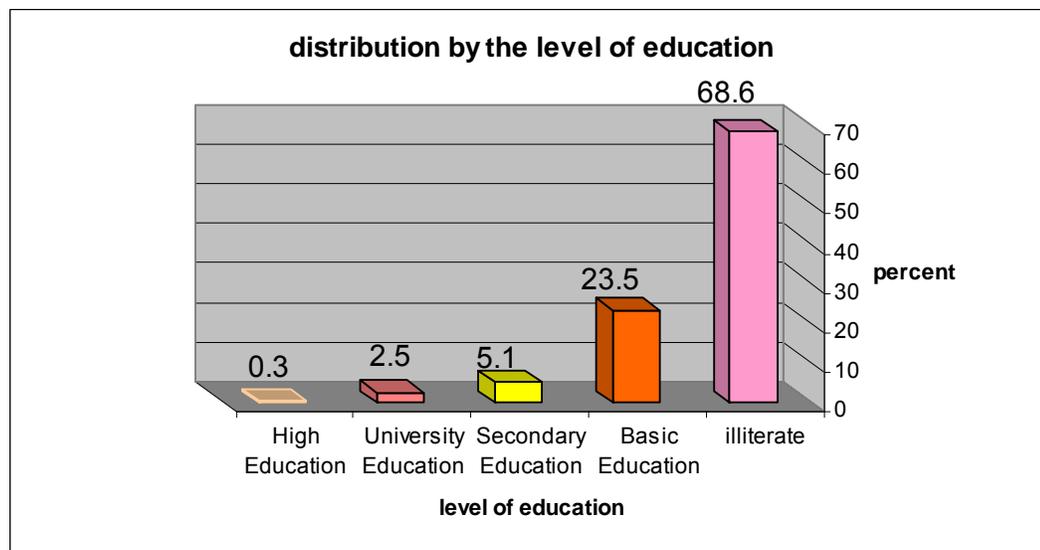
**Figure (3):** Shows that 71.1% of the study sample lived with their families, 26.7% were living alone, and only 2.2% lived in Day Care centers.

- Distribution by marital Status:



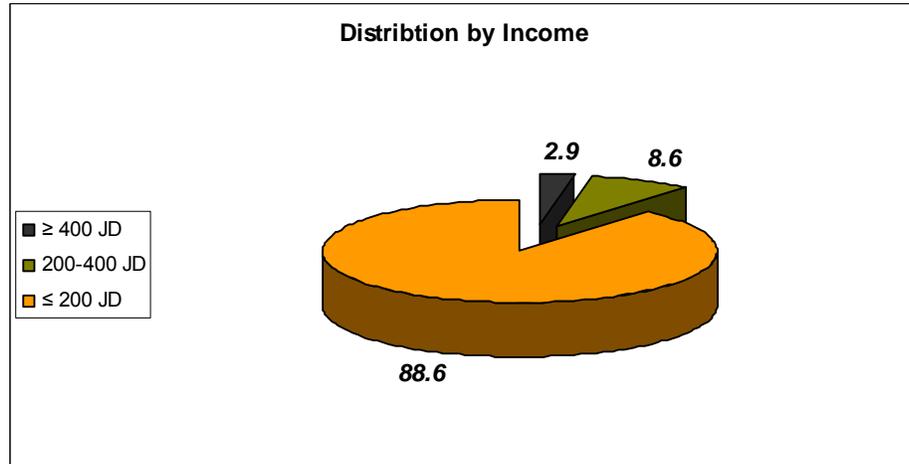
**Figure (4):** Shows that 45.6% of the study sample is married, and 37.7% is widows, 5.7% are single, and 1.9% is divorced.

- Distribution by level of education



**Figure (5):** shows that the majority 68.6% of the study population is illiterate, 23.5% is having basic education, only 5.1% is having secondary education and those who hold university degrees are 2.5%, and high education elderly is 0.3%,

### 4.1.2 Socioeconomic situation



**Figure (6):** Shows that 93.3% of the study sample themselves have no fixed monthly income. And 88.6% of the study population makes less than 200 JD.

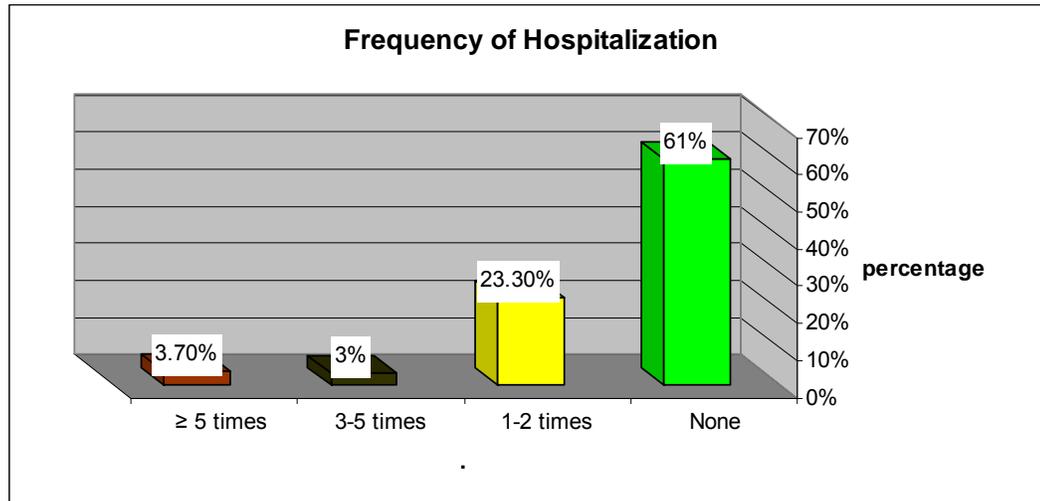
## 4.2 Health profile of the study population.

### 4.2.1 Chronic Morbidity

**Table 5: Chronic morbidity of the study sample.**

Disease	Frequency	Percent
Hypertension	204	64%
Joint diseases	142	44.8%
Diabetes	110	34.7%
Cardiovascular diseases	107	33.8%
Respiratory diseases	29	9.1%
Osteoporosis	27	8.5%
Depression	8	2.5%
Sleep disorders	12	3.8%

#### 4.2.2 Frequency of hospitalization:



**Figure (8):** Shows that 61% of the study sample has been never hospitalized in the last two years, 32.3% were hospitalized 1-2 times, while 3% of the study population were hospitalized 3-5 times in the last two years, and 3.7% were hospitalized more than 5 times.

#### 4.2.3 Affordability of non-free drugs.

**Table (6):** Affordability of non-free medications by the study sample.

Ability to afford non-free prescribed medications	Frequency	Percent
Always	122	36.6
Most of the time	111	35.1
Rarely	42	13.3
Not at all	41	13
Total	<b>316</b>	<b>100</b>
Missing	1	

#### 4.2.4 Reference health personnel for study sample.

**Table (7):** Reference health personnel for the study sample, and counseling

Medications self administered	Frequency	Percent
Always	259	81.7
Most of the time	22	6.9

Rarely	5	1.6
Not at all	31	9.8
<b>Total</b>	<b>317</b>	<b>100%</b>
<b>Who prescribed medications</b>	<b>Frequency</b>	<b>Percent</b>
Governmental centre physician	112	35.6
Private physician	135	42.9
UNRWA	60	19
Other	8	2.5
<b>TOTAL</b>	<b>315</b>	<b>100%</b>
Missing	2	
<b>Medications use counseling</b>	<b>Frequency</b>	<b>Percent</b>
Yes	309	98.4
No	5	1.6
<b>Total</b>	<b>315</b>	<b>100%</b>
Missing	2	
<b>Who did the counseling</b>	<b>Frequency</b>	<b>Percent</b>
Physician	293	92.4
Pharmacist	10	3.1
Nurse	3	0.9
Others	3	0.9
Missing	8	2.7
<b>Total</b>	<b>309</b>	<b>100%</b>

#### 4.2.5 Knowledge of how to use medications among study sample, and the clinical purpose of medications.

**Table (8): Study sample's knowledge of how to use medications and the clinical purpose of their medications.**

<b>Knowledge about how proper medications use</b>	<b>Frequency</b>	<b>Percent</b>
Know very well	247	77.9
Know	38	12
Not always know	14	4.4
Don't know	18	5.7
<b>Total</b>	<b>317</b>	<b>100%</b>
<b>Knowledge about the clinical purpose of medications</b>	<b>Frequency</b>	<b>Percent</b>
Know very well	239	75.6
Know	43	13.6
Not always know	15	4.7

Don't know	19	6
Missing	1	
<b>Total</b>	<b>317</b>	

#### 4.2.6 Believes about necessity of using medications.

**Table (9): Believes about the necessity of using medications, and intolerable conditions in case of discontinuing medications use.**

Belief about necessity of medications use	Frequency	Percent
Yes	304	95.8
No	8	2.5
Missing	5	1.7
<b>Total</b>	<b>317</b>	<b>100</b>
intolerable consequences if medications stopped	Frequency	Percent
Very frequent	161	50.7
Frequent	58	18.2
Medium frequency	38	11.9
Not at all	56	17.6
Missing	4	1.2
<b>Total</b>	<b>317</b>	<b>100</b>

#### 4.2.7 Pattern of medication use

**Table (10): Drug compliance among elderly patients.**

Frequency of questioning elderly by physicians about using medications other than prescribed drugs	Frequency	Percent
Always	211	66.6
Most of the time	24	7.6
Rarely	22	6.9
Not at all	60	18.9
<b>Total</b>	<b>317</b>	<b>100</b>
Using medications without prescription	Frequency	Percent
Always	15	4.7
Most of the time	4	1.3
Rarely	31	9.8
Not at all	267	84.2
<b>Total</b>	<b>317</b>	<b>100</b>

Using all prescribed medications by elderly	Frequency	Percent
Always	287	90.5
Most of the time	15	4.7
Rarely	8	2.5
Not at all	7	2.2
<b>Total</b>	<b>317</b>	<b>100</b>
Improper use of prescribed medications by elderly	Frequency	Percent
Always	29	9.1
Most of the time	20	6.3
Rarely	56	17.7
Not at all	212	66.9
<b>Total</b>	<b>317</b>	<b>100</b>
Reading medication pamphlet by the elderly himself or by relative	Frequency	Percent
Always	161	50.8
Most of the time	54	17
Rarely	26	8.2
Not at all	76	24
<b>Total</b>	<b>317</b>	<b>100</b>
Frequency of questioning elderly by physicians about using medications other than prescribed drugs	Frequency	Percent
Continuous use of stock medications	Frequency	Percent
Always	22	6.9
Most of the time	9	2.8
Rarely	33	10.4
Not at all	250	78.8
Missing	3	.9
<b>Total</b>	<b>317</b>	<b>100</b>
Elderly reference in case of encountering problem with use of medications	Frequency	Percent
Physician	304	95.9
Pharmacist	6	1.9
Family member	4	1.26
Missing	3	0.94
<b>Total</b>	<b>317</b>	<b>100</b>

**Table (11): Possible complications profile for polypharmacy perceived by elderly**

Falls among elderly	Frequency	Percent
Always	25	7.9
Most of the time	69	21.8
Rarely	64	20
Not at all	158	50
Missing	1	0.31
<b>Total</b>	<b>317</b>	<b>100</b>
Falls due to medications use	Frequency	Percent
Yes	38	25.5
No	111	74.5
<b>Total</b>	<b>149</b>	<b>100</b>
Memory loss among elderly	Frequency	Percent
Always	52	16.4
Most of the time	69	21.7
Rarely	60	18.9
Not at all	135	42.5
Missing	1	0.31
<b>Total</b>	<b>317</b>	<b>100</b>
Memory loss due to medications use	Frequency	Percent
Yes	15	9
No	151	91
<b>Total</b>	<b>166</b>	<b>100</b>
Symptoms experienced by elderly	Frequency	Percent
Headache	76	34.9
Constipation	106	48.6
General weakness	21	9.6
Other symptoms	15	6.9
<b>Total</b>	<b>218</b>	<b>100</b>
Origin of symptoms is perceived to be medication use.	Frequency	Percent
Yes	3	37.5
No	5	62.5
<b>Total</b>	<b>8</b>	<b>100</b>
Physician informs elderly of possible side effects of medications	Frequency	Percent
Yes	21	6.6
No	292	92.1
Missing	4	1.26

<b>Total</b>	<b>317</b>	<b>100</b>
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#### 4.2.8 Prevalence of polypharmacy:

**Table (12): Prevalence of polypharmacy**

<b>Table (12): Prevalence of polypharmacy</b>					
Taking $\geq 5$ medications					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	130	60.2	60.2	60.2
	No	86	39.8	39.8	100.0
	Total	216	100.0	100.0	

Results show that Percentage of elderly taking medications among our sample was 69%, and those who take more 5 medications among medication takers are 60.1%. We calculated the prevalence of polypharmacy among the study population,

#### **Calculation of prevalence:**

*Prevalence = all new & pre – existing cases during a time period  $\times 10^n$*

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*population during the same time period <sup>65</sup>.*

*elderly taking  $\geq 5$  medications*

---

*Study population (Nablus, Jenin, Tulkarem)*

*Percent Prevalence =  $130 \div 317 = 41.1\%$  people*

#### **4.3 Factors affecting polypharmacy:**

We analyzed factors affecting polypharmacy among the study sample (age, sex, place of living, income, level of education, and marital status) found the following relationships:

- Age

Data presented in table (13) shows No statistically significant relationship between age, and polypharmacy.

**Table 13: Relationship between polypharmacy and age.**

Age *Polypharmacy Cross-tabulation					
			Taking $\geq 5$ medications		Total
			Yes	No	
Age	65-70	Count	68	45	113
		% of those taking $\geq 5$ medications within this age group	52.3%	52.3%	52.3%
	70-80	Count	45	29	74
		% of those taking $\geq 5$ medications within this age group	34.6%	33.7%	34.3%
	>80	Count	17	12	29
		% of those taking $\geq 5$ medications within this age group	13.1%	14.0%	13.4%
Total	Count	130	86	216	
	% of those taking $\geq 5$ medications	100.0%	100.0%	100.0%	

P = 0.303

R= 6%

- Gender

Data presented in table (14) shows the relationship between elderly gender and polypharmacy. The data shows that there is a significant statistical association between polypharmacy and female gender of study sample.

**Table (14): Relationship between polypharmacy and gender**

<b>Gender * <math>\geq 5</math> Cross-tabulation</b>					
		Taking $\geq 5$ medications			Total
		Yes	No		
Gender	male	Count	30	33	63
		% % of those taking $\geq 5$ within	23.1%	38.4%	29.2%
	female	Count	100	53	153
		% % of those taking $\geq 5$ within	76.9%	61.6%	70.8%
Total		Count	130	86	216
		% of those taking $\geq 5$ within	100.0%	100.0%	100.0%

P = 0.015

R= 17%

Significance is less than 0.05.

- Place of residence

Data presented in table (15) shows the relationship between elderly place of residence and polypharmacy, data shows that there is No statistically significant association between polypharmacy and place of residence of study sample.

**Table (15): Relationship between polypharmacy and place of residence.**

<b>Place of residence *<math>\geq 5</math> medications Cross-tabulation</b>						
				Taking $\geq 5$ medications		Total
				Yes	No	
Place of residence	With the family	Count	94	68	162	
		% of those taking $\geq 5$ within	72.3%	79.1%	75.0%	
	Living alone	Count	36	18	54	
		% of those taking $\geq 5$ within	27.7%	20.9%	25.0%	
Total		Count	130	86	216	
		% of those taking $\geq 5$ within	100.0%	100.0%	100.0%	

P = 0.261

R= 8%

- Elderly Income.

Data presented in table (16) shows the relationship between elderly Income and polypharmacy. Data shows No statistically significant association between elderly income and polypharmacy.

**Table (16): Relationship between polypharmacy and elderly income.**

<b>Elderly Income *<math>\geq 5</math> medications Cross-tabulation</b>						
				Taking $\geq 5$ medications		Total
				Yes	No	
Elderly Income	$\geq 400$ JD	Count	1	2	3	
		% of those taking $\geq 5$ within	.8%	2.3%	1.4%	
	200-400 JD	Count	7	7	14	
		% of those taking $\geq 5$ within	5.4%	8.1%	6.5%	
	$\leq 200$ JD		Count	121	77	198
			% of those taking $\geq 5$ within			

		% of those taking $\geq 5$ within	93.8%	89.5%	92.1%
Total	Count		129	86	215
	% of those taking $\geq 5$ within		100.0%	100.0%	100.0%

P value = 0.455

R= 7.5%

- Marital Status:

Data presented in table (17) shows the relationship between elderly marital status and polypharmacy. Data shows No statistically significant association between elderly marital status and polypharmacy.

**Table 17: Relationship between polypharmacy and marital status.**

Marital Status * $\geq 5$ medications Cross-tabulation					
			Taking $\geq 5$ medications		Total
			Yes	No	
Marital Status	Single	Count	9	4	13
		% of those taking $\geq 5$ within	6.9%	4.7%	6.0%
	Married	Count	60	51	111
		% of those taking $\geq 5$ within	46.2%	59.3%	51.4%
	Divorced	Count	2	2	4
		% of those taking $\geq 5$ within	1.5%	2.3%	1.9%
	Widow	Count	59	29	88
		% of those taking $\geq 5$ within	45.4%	33.7%	40.7%
Total		Count	130	86	216
		% of those taking $\geq 5$ within	100.0%	100.0%	100.0%

P value = 0.252

R= 10%

- Level of Education:

Data presented in table (18) shows the relationship between elderly marital status and polypharmacy. Data shows No statistically significant association between elderly level of education and polypharmacy.

**Table 18: Relationship between polypharmacy and level of education.**

Level of Education * $\geq 5$ medications Cross-tabulation						
				Taking $\geq 5$ medications		
				Yes	No	Total
Level of Education	No Education	Count		93	55	148
		% of those taking $\geq 5$ within		72.1%	64.0%	68.8%
	Basic Education	Count		32	21	53
		% of those taking $\geq 5$ within		24.8%	24.4%	24.7%
	Secondary Education	Count		4	8	12
		% of those taking $\geq 5$ within		3.1%	9.3%	5.6%
	University Education	Count		0	2	2
		% of those taking $\geq 5$ within		.0%	2.3%	.9%
Total		Count		129	86	215
		% of those taking $\geq 5$ within		100.0%	100.0%	100.0%

P value = .070

R= 15%

#### **4.4 Mean number of medications used by elderly patients:**

Mean number of medications used per elderly patient was calculated and found to be 4.48 (SD 2.249).

#### **4.5 Summary of results**

This chapter presented the findings of the statistical analysis. The results found that the percent prevalence of polypharmacy among the study sample of the three districts (Nablus, Tulkarm, and Jenin) is 41%. Mean number of medications used by elderly of the study sample was 4.48 (SD 2.249). The first most common chronic disease affecting elderly is hypertension, followed by joint diseases, diabetes mellitus, and cardiovascular diseases. Study findings showed that polypharmacy is affected significantly by female gender of population. No statistically significant relationship between polypharmacy and other factors (Age, place of residence, marital status, level of education, and income). The study also showed that elderly patients are unaware of consequences of polypharmacy; (non-adherence, medication errors, adverse drug reactions, drug-drug interactions, increased risk of hospitalization, and increased cost of treatment). The determinant role of deciding the nature of medications taken is played almost entirely by physicians, pharmacists play a minor role.

**CHAPTER FIVE**  
**DISCUSSION**

## 5.1 Discussions of the Results

### 5.1.1 Demographic profile:

The Palestinian elderly constitute 4.4 % of population <sup>6</sup>. Our results showed that the percent prevalence of polypharmacy among Palestinians elderly in (Tulkarm, Jenin, and Nablus districts) is 41%. There is no published data yet regarding polypharmacy in Palestine in order to compare these results. In other countries, they used the measurement mean number of medications used. For example, in Finland a study assessed changes in medicine use and polypharmacy, two cross-sectional surveys were carried out among community dwelling persons aged 65 years or over in 1990-91 (n = 1,131) and 1998-1999 (n = 1,197), the study found that the mean number of medications used per elderly person grew from 3.1 (SD 2.8) in 1990-1991 to 3.8 (SD 3.1) in 1998-1999<sup>57</sup>. Our study showed that mean number of medications used was 4.48 (SD 2.249). The Percentage of elderly taking medications among our sample was 69%, while those in Finland using prescription medications were 88% in the year 1998-1999<sup>57</sup>. In our study the mean number of medications is higher than that of Finland, this might be due to pattern of prescribing medication by physicians. Another study showed that patients with diabetes or congestive heart failure, drug errors were 15% when the patient took one medication, 25% with two or three medications and reached 35% when the treatment included four or more medications<sup>34</sup>.

Our study showed that 52.3% of elderly aged 65-70 years used more than 5 medications, while 13.3% of oldest elderly (over 80 years) used more than 5 medications. Our study showed No statistically significant relationship (P value 0.303) between polypharmacy and Age, this does not

go along with the study conducted in Finland, in that the Finnish study showed that polypharmacy increases with advancing age, 97% of elderly over 84 years use more than 5 medications<sup>57</sup>. This might be due to the quality of health care provided to the older elderly, in Palestinian culture, the younger elderly receive better quality of care by their families, as they continue to live with their families, and play a role in family decision making process, so they are provided with their needs of medications, the older elderly are not receiving the same quality of care like the younger ones, so they might be under provided with their medications by their families.

Our findings showed No statistically significant relationship between education factor and polypharmacy ( $P = 0.070$ ), the percentage of elderly with no education and using more than 5 medications was 72.1% knowing that the percentage of elderly with No education is 68% from our study population.; our study's findings matches the Finnish study that shows no difference among drug users with or without education regarding the number of medications they use<sup>57</sup>. This finding that goes along with the Finnish study, is pointing that prescribing pattern & health system seem to be much more important than the level of education. However level of education was found to be of significance for compliance in a study conducted in Nablus<sup>58</sup>.

Gender has been found to be a main factor affecting polypharmacy; around two thirds of our study population was females, while one third of the study population was males. It was found that 76.9% of the female elderly in our study population used more than 5 medications, while only 23.1% of the male elderly used more than 5 medications. Our findings of

the relationship of gender and number of medications used was statistically significant ( $p = 0.015$ ), (However this result should be taken with some conservatism, as the sample showed some bias in the male female ratio, so it might be misleading result). This result goes along with the Finnish study that showed 81% of women used more than 5 medications. In contrast to that a cross-sectional, nationally representative Finnish home-dwelling survey, polypharmacy was associated with age and chronic morbidity, but not with gender<sup>59</sup>.

The gender relationship and drug use has been emphasized repeatedly by other studies worldwide; a Swedish study investigated the differences between men and women living in the community of Tierp and the number of prescription medications utilized. It was a retrospective cohort study which reported that women used more medications than men, with women using an average of 4.8 prescription medications and men using an average of 3.8<sup>68</sup>.

In our study, marital status effect on polypharmacy was also investigated, the married elderly represent 51.4% of the study population, and those with polypharmacy represent 46.2% of the married people, widowed elderly represent 40.7% of the study population, those with polypharmacy represent 45.4%, however the relationship is not statistically significant ( $P = 0.252$ ). These results contrast the Finnish study which indicates that polypharmacy is more prevalent in widowed elderly persons<sup>57</sup>. Marital status did not influence the probability of polypharmacy in our study this is explained by the fact that people in Palestinian culture highly value and respect widowed women, they find less social difficulties than other women European communities, this also has its implications on the

kind of behavior they show. as they are treated like married women, they don't show polypharmacy.

Studying the relationship between the place of residence and polypharmacy, our study showed 71.1% of the study population live with their families, while 26.7% of the study population live alone, 72.3% of those living with their families use more than 5 medications, while 27.7% of those living alone used more than 5 medications, however these results are statistically non significant (P value 0.336). The Finnish study found that polypharmacy is more prevalent in elderly who are living alone; people percentage that are living alone in our study is very small, because of religion and culture reasons, possibly leading to no statistically significant relationship<sup>57</sup>.

The effect on Palestinian elderly income on polypharmacy was studied as well; results showed that 92.1% of the study population receives less than 200 JD/ month. 93.8% of them take more than 5 medications, however this relationship is not statistically significant (P = 0.455). No similar studies investigated the effect of elderly income on polypharmacy. In our case the effect is not that much visible because almost all elderly at our study population are covered with the health insurance, either UNRWA, or MOH. So elderly find No problem with basic drug affordability, our study also shows that more than two thirds of the study population reported that they do afford non-free prescribed medications, if prescribed by their physician in addition to those covered by their insurance.

### **5.1.2 Chronic Morbidity**

Our study showed that 64% of the study population chronically has hypertension, 44.8% of elderly suffer from joint diseases, while 34.7% have diabetes mellitus, and 33.8% have cardiovascular diseases. This is much different than the Finnish community whose most common diseases are first cardiovascular diseases, second CNS disorders, and third most common disease is musculoskeletal disorders<sup>57</sup>. Our study's findings are in accordance with the findings of the Palestinian Central Bureau of Statistics that found the most common disease affecting elderly is Hypertension, follows diabetes mellitus, joint diseases, and finally heart diseases<sup>5</sup>. This goes along with a case-control study carried out in Israel where a geriatric palliative approach and methodology to combat the problem of polypharmacy was introduced, assessment of the case group showed 46% of the patients have hypertension, while 30% of the patients have diabetes mellitus<sup>1</sup>. This is quite logical as Palestinians and Israelis have a common environment that justifies the similarities in co-morbidities findings.

### **5.1.3 Polypharmacy & Hospitalization**

Our study shows that 61% of the study population reported that they have never been hospitalized, while only 3.7% has been hospitalized more than 5 times, this contrasts a study was carried out in Pittsburgh, Pennsylvania that linked between the number of drugs taken and the incidence of hospitalization due to adverse drug reactions. Results showed that 11.7% of elderly patients were admitted with adverse reactions to medical therapy. On average, they took 6.3 medications compared with 3.8 medications in elderly patients admitted for other reasons not related to adverse drug reactions<sup>42</sup>. For these reasons, the paper by Hippisley-Cox

and Coupland, examining the individual and combined effects of three of the polypill ingredients -statins, aspirin, and blood pressure lowering drugs<sup>74</sup>. Their analysis provides support for the synergic action of the polypill in the context of secondary prevention of coronary heart disease. Their analysis of 11 330 patients with coronary heart disease shows that all cause mortality is lower in those patients taking drug combinations- two or three drugs when compared with those taking single agents. These findings are consistent with a previous study that showed that a combination of two drugs, aspirin and pravastatin, is superior to either drug alone in the secondary prevention of cardiovascular disease<sup>47</sup>. A further study of dispensed prescribing in the secondary prevention of coronary heart disease in 4892 patients in Tayside, Scotland, also shows that patients taking an additional cardiovascular drug experience fewer cardiovascular events than patients taking statins alone, but that this synergistic effect was not sustained when two additional drugs were taken: hazard ratios for combinations of two and three drugs were the same<sup>48</sup>.

This difference is explained by that; based on the researcher observation, elderly don't prefer being hospitalized unless they are at serious risk, in Palestinian culture, and there is a trend of home health care, arranged individually by families on ambulatory basis.

## **5.2 Patterns of medications use among Palestinian community in the three districts (Nablus, Tulkarm, Jenin).**

### **5.2.1 Affordability of non-free medications:**

Our study showed that around 70% of study population do affords non-free prescribed medication. This is due to their belief about the

necessity of medications, as our study revealed that 97.4% of the study population believes about the necessity of drug use, while only 2.6% don't, and 51.4% of the study population reported that they witnessed intolerable consequences once they stopped having their medications, while only 17.7% reported that they faced no problems at all once they stopped having their medications. According to researcher interviews, unofficial comments of elderly revealed that affording their medications is a top priority for them; they reported that they are ready to sacrifice their food or other interests for affording their medications, keeping in mind that our study showed 88.6% of the study population receives less than 200 JD / month. Other important factor that plays a role here is that they suffer from discontinuity of their chronic diseases medications in MOH clinics or UNRWA, so they tend to stock their medications for future discontinuity especially in our volatile political situation.

### **5.2.2 Drug compliance among elderly patients**

Results show that 84.2% of the study population reported that they never use non-prescription medications, while only 1.3% of the study population reported that they use non-prescription medication all the time. That is not necessarily true, our question in the questionnaire was a direct one, where elderly people strongly replied that they don't use non-prescription medications, but that didn't go along with the brown bag investigation, which shows much of vitamins, herbal supplies, and pain killers are there. It was concluded that elderly don't perceive these products as non-prescription medication.

Bedell et al (2000) reported that with polypharmacy, “one third of discrepancies involved over-the-counter drugs or herbal therapies”<sup>69</sup>.

Herbal therapies and over-the-counter medications are frequently self-prescribed and not reported to primary care providers in the United States<sup>69</sup>. Kaufman et al (2002) reported that the most common over-the-counter medications contributing to polypharmacy are acetaminophen, ibuprofen, and aspirin<sup>70</sup>. These findings have implications for practice because over the- counter medications can interact with or duplicate the action of many of the medications prescribed for cardiovascular conditions, the most frequently mentioned predictor for the development of polypharmacy<sup>70</sup>.

Our study showed that 90.5% of the study population always uses all their prescribed medications; this again is related to their belief about the necessity of medications, and fear from intolerable consequences once they stop their medications. 66.95% of our study population reported that they never use medications improperly because they feel insecure if they miss one or two doses. However these results don't go along with the study of compliance along patients in Nablus, as it showed that 60% of elderly over 60 reported poor compliance<sup>58</sup>. This contrast relates to the perception of compliance among elderly patients, to them, compliance means not missing even a single dose

Our findings showed that 24% of the study population doesn't read the medication pamphlet by themselves or don't ask a relative to do, they explained that they chronically use those medications, and know all about them, so they don't need to read the pamphlet, and the fact that 68.6% of the study population is illiterate makes them less interested to get to know what's inside it.

In our culture, people only trust physicians, they don't seek counseling from pharmacist or nurse, this is reflected by only 1.9% of our study population refers to pharmacists when experience difficulties with certain medications, and 96.8% of the study population refer to physicians in such a case.

### **5.3 Consequences of polypharmacy**

Literature review showed that consequences of polypharmacy fall into six major categories. The first five of these namely, non-adherence, adverse drug reactions, drug-drug interactions, increased risk of hospitalization and medication errors, are closely linked. One follows from the other and vice versa and all lead to the deterioration of the quality of life of the elderly patient. The sixth consequence is increased cost, due directly to the medication, and indirectly to the cost of treating adverse drug event<sup>20</sup>.

In our study, results showed that 66.95% of the study population never uses medications improperly while the mean number of medications per elderly patient is 4.48 (SD 2.24). this contrasts a study where patient with diabetes or congestive heart failure were investigated, drug errors (defined as proportion of drugs that the patient fails to take plus the proportion of drugs taken by the patient of which the physician is unaware) were 15% when the patient took one medication, 25% with two or three medications and reached 35% when the treatment included four or more medications<sup>69</sup>.

It was difficult to track other consequences of polypharmacy like adverse drug reactions; increased cost of treatment, and medication errors,

part of the reasons was because elderly patients reported that they are unaware of these consequences.

#### **5.4 Falls and polypharmacy**

Our results showed only 7.9% of the study population reported incidences of falling, while 50% reported that they had never experienced falling, and 25.5% of the ones reported falling related that to polypharmacy. A British study of the relationship between falling and polypharmacy was carried out, and found out that the prevalence of falling increased with increasing numbers of simultaneously occurring chronic diseases<sup>73</sup>. Only two classes of drugs (hypnotics and anxiolytics, and antidepressants) were independently associated with increased odds of falling<sup>73</sup>.

Other symptoms; headache, constipation, general weakness were common among elderly as showed in our results. 34.9% of the study population reported headache, 48.6% reported constipation, while 9.6% reported general weakness, but only 37.5% of them related that to polypharmacy. It is very clear that elderly patients don't perceive polypharmacy as a cause of problems they encounter in their life. In a study conducted in Palestine about people's attitudes towards medications, 79.9% of the study population considered drugs as positive, 15.4% viewed medications as necessary, and only 4.7% considered medications as negative danger<sup>61</sup>.

#### **5.5 Limitation of the Study:**

1. The study investigated community dwelling elderly; almost all of them are covered with the Palestinian Authority insurance, or

UNRWA, so it was difficult to track the correlation between polypharmacy and treatment costs.

2. It was difficult to track certain relationships with polypharmacy for example; adverse drug reactions, drug-drug interactions, non-adherence, hospitalization, and medication errors due to the lack of needed records.
3. Sample selection: Snowball sampling in which there was an opportunity of showing a certain level of bias.
4. Results Generalization: the sample took the three largest districts in the North of West Bank, but can't generalize the results statistically to cover the whole six Northern districts.

**CHAPTER SIX**  
**CONCLUSIONS & RECOMMENDATIONS**

## **6. Conclusions and Recommendations:**

In Palestine and other Arab countries, there are not many studies concerning drug use and polypharmacy, among the home-dwelling elderly. Worldwide, such studies have been carried out, but most of them also include institutionalized persons. This study aimed to illustrate the prevalence of polypharmacy and pattern of drug use of community dwelling elderly in the North of Palestine.

### **6.1 Conclusions:**

According to the findings and in view of the literature, the following conclusions and clinical implications can be made:

1. The use of prescription drugs and polypharmacy among home-dwelling elderly people in the North of Palestine became more prevalent. Percent polypharmacy prevalence rate was found to be 41%.
2. The mean number of drugs per elder 4.48 (SD 2.249) is high compared to other countries, most markedly in women.
3. In this study hypertension was the most common disease affecting elderly, antihypertensive drugs were used most commonly by the general elderly population and also by the persons with polypharmacy. The persons with polypharmacy were typically those who had many diseases and refer to clinics of MOH or UNRWA.
4. Misperceptions about drug use was found to be a phenomenon among the elderly population, this triggers increased efforts in awareness program.

5. Physicians were found to be taking the lead in counseling and treating elderly patients, with minimal role of the other health personnel.

## **6.2 Recommendations**

1. Overall assessments of medication should be made regularly, and the main target in the reduction of polypharmacy should be elderly women. Physicians should have a possibility to consult a geriatrician when necessary.
2. The importance of a critical and conservative approach toward drug therapy in elderly patients cannot be overemphasized.
3. Elimination of some elderly drugs is an option for physicians, but it should be always remembered that it is more difficult to simply reduce the absolute number of drugs prescribed than to optimize drug regimens of ill elderly persons, as this group of patients has multiple and chronic diseases. However any superfluous drug can be potentially dangerous, and given the possibility of optimization of drug regimen, then it is worth the effort.
4. Since our study pointed that polypharmacy is a growing problem, but did not propose and measure ways to reduce polypharmacy. Further studies are needed to find the most effective way to not only reduce this phenomenon, but also to minimize the adverse clinical consequences induced by polypharmacy
5. Elderly people need to have their awareness raised of the seriousness of their disease; simple basic information may be very useful in this

situation. Information about their medications, and possible side effects and adverse drug reactions should be given to patients. Elderly needs to be educated about the danger of using over the counter medications (OTC) irrationally, and the importance of informing their physicians in case they do.

6. Quality of life should be improved among persons with polypharmacy, training of nurses to clear medication use and to identify the adverse effect of drugs should be available for all patients in home care nursing.
7. Role of the other health personnel especially pharmacists and nurses need to be emphasized to reduce polypjarmacy and its consequences.

## References

1. Garfinkel D, Zur-Gil S, Ben-Israel J. The war against Polypharmacy: A New Cost-Effective Geriatric-Palliative Approach for improving drug therapy in disabled elderly people. **IMAJ** 2007;9:430-434.
2. Lammy pp. the health status of the elderly. In: Lammy pp, **editors. Prescribing for the elderly.** Littleton: PSG publishing Co: 1980: 113-7.
3. Beers M, Jones T, Berkwitz M, Kaplan J, Porter R. **The Merck Manual of Geriatrics**, 2nd Edition. eds. Merck Research Laboratories, Whitehouse Station, NJ,1995: 1516 pp.
4. Mangoni AA, Jackson SH. Age-related changes in pharmacokinetics and pharmacodynamics: basic principles and practical applications. **Br J Clin Pharmacol**, 2003: 57:6-14
5. Population Reference Bureau .**World population data sheet.** Demographic data and estimates for the countries and regions of the world 2007.
6. Palestinian Central Bureau of Statistics, **Palestinian Family Health Survey**, Final Report (2006).
7. Joint National Committee the sixth report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure. **Arch Intern Med** 157: 1997: 2413-2446.

8. Chrischilles EA, Foley DJ, Wallace RB, Lemke JH, Semla TP, Hanlon JT, Glynn RJ, Ostfeld AM & Guralnik JM. Use of medications by persons 65 and over: data from the established populations for epidemiologic studies of the elderly. **J Gerontol**, 1992;47: 137-144.
9. Jyrkämä J "Steadily downward to evening rest" A study of the social aspects of ageing in four Finnish local communities. **Doctoral thesis**. Acta Univ Tamperensis A 449: 1995 Tampere. (In Finnish with an English summary)
10. Devroey D, Casteren VV & Walckiers D. The added value of the registration of home accidents in general practice. **Scand J Prim Health Care**, 2002: 20:113-117.
11. Last JM In: Last JM, Abramson JH, Friedman GD, Porta M, Spasoff RA & Thuriaux M (eds) **A Dictionary of Epidemiology**. Third Edition. International Epidemiological Association, New York, 1995: 17.
12. Pollock BG. Psychotropic drugs and the aging patient. **Geriatrics** 53 (suppl 1) 1998: 20-24.
13. Veehof L, Stewart R, Haaijer-Ruskamp F, & Meyboom-de Jong B. The development of polypharmacy: A longitudinal study. **Family Practice**, 2000;17(3): 261–267.
14. Bjerrum L. Pharmacoepidemiological studies of polypharmacy: Methodological issues, population estimates, and influence of practice patterns. Doctoral dissertation, Odense University

[Electronic version]. Retrieved August 28, 2003, from <http://www.sdu.dk/health/IPH/genpract/staff/lbjerrum/PHD/PHD.html>

15. Bikowski R, Ripsin C, & Lorraine V. Physician-patient congruence regarding medication regimens. **Journal of the American Geriatric Society**, 2001: 49(10): 1353–1357.
16. Golden A, Preston R, Barnett S, Llorente M, Hamdan K, & Silverman M. Inappropriate medication prescribing in homebound older adults. **Journal of the American Geriatric Society**, 1999: 47(8): 948–953
17. Fillit H, Futterman R, Orland B, Chim T, Susnow L, Picariello G. et al Polypharmacy management in Medicare managed care: Changes in prescribing by primary care physicians resulting from a program promoting medication reviews. **The American Journal of Managed Care**, 1999: 5(5): 587–594.
18. Rational use of medicines by prescribers and patients. **Report by the secretariat**. 16. December. 2004. World Health Organization.
19. Wooten J, Galavis J. polypharmacy: keeping the elderly safe. **RN the professional Journal with the Personal Touch**. Aug 2005.
20. Fulton MM, Allen ER. Polypharmacy in the elderly: a literature Review. **Journal of the American Academy of Nurse Practitioners**. 2005:17 (4).

21. Beers M. H. "Aging as a risk factor for medication-related problems." **1999**.[www.ascp.com/public/pubs/tcp/1999/dec/aging.shtml](http://www.ascp.com/public/pubs/tcp/1999/dec/aging.shtml) (16 May 2005).
22. Zahn C, Sangl J. et al. Potentially inappropriate medication use in the community-dwelling elderly. **JAMA**, 2001; 286(22): 2823.
23. Conry M. "Polypharmacy: **Pandora's medicine chest**" 2000. [www.geriatrictimes.com/g001028.html](http://www.geriatrictimes.com/g001028.html) (16 May 2005).
24. Williams C. M. Using medications appropriately in older adults. **American Family Physician**, 2002; 66(10).
25. Lim W.K, & Woodward M.C. Improving medication outcomes in older people. **Aust J Hosp Pharm**, 1999; 29(2), 103.
26. Rollason V, Vogt N. Reduction of polypharmacy in elderly. **Drugs Aging**, 2003; 20 (1).
27. Bliss MR. Prescribing for the elderly. **BMJ** 1981;283:203-6
28. Fourrier A, Dequae L, Chaslerie A, et al. sociodemographic characteristics and polypharmacy in the elderly people: **data from the paquid study**. **Post mark survey** ,1993; (7)291-8:
29. Meyer TJ, Van Kooten D, Marsh S et al. Reduction of polypharmacy by feedback to clinicians, **J Gen Intern Med**, 1991;6: 133-6.
30. Gupta S, Rappaport HM, Bennelt LT. polyharmacy among nursing home geriatric Medicaid recipients. **Ann Pharma-cother**, 1996: 30:946-50.

31. Tambylyn R, Medication use in seniors: challenges and solutions, **Therapie**,1996:51: 269-82.
32. Lassila HC, Stohr GP, Ganguli M, et al. use of prescription medication in an elderly rural population: the movies project. **Ann pharmacother**, 1996: 30:589-95.
33. Whitaker P, Wilson R, Bargh J Chapman M. et al. Use and Misuse of purchased analysis with age. **Pharm J**,1995: 254: 553-6.
34. Hulka BS, Kupper LL, Cassel JC, et al. Medication use and misuse: physician – Patient discrepancies. **J chronic Dis** 5,1997: 28 (1): 7-21.
35. Montamat SC, Cusack B. overcoming problems of polypharmacy and drug misuse in the elderly. **Clin Geriatr Med**.8 (1): 1992:143-58.
36. Stewart RB, Cooper JW. Polypharmacy in aged: practical solutions. **Drug & Aging**, 1994: 4(6): 449-61:
37. Nolan L, O Malley K. prescribing for the elderly: Pt I,sensitivity of the elderly to adverse drug reactions.**J Ann Geriatr Soc**, 1998: 36: 142-9.
38. Carbonin P, Pabor M, Bernabei R, et al. Is age independent risk factor for adverse drug reactions in hospitalized medical patients?**J Am Geriatr Soc**, 1991: 39: 1093-9.
39. Sloan RW. Drug interactions. **AM Fam Physician** 1983: 27: 229-38

40. Eraker SA, Kirscht JP, Becker MH. Understanding and improving patient compliance. **Ann Intern Med**, 1984;100: 258-68:
41. Stewart RB, Cooper JW. Polypharmacy in the aged: practical solutions. **Drugs & Aging**, 1994; 4(6): 449-6.
42. Colt HG, Shapiro AP. Drug induced illness as a cause for admission to a community hospital. **J Am Geriatr Soc**, 1989; 37: 323-6.
43. American Society of Health System Pharmacist, Suggested definitions and relationship among medication misadventures, medication errors, adverse drug events and adverse drug reactions. **Am J Health Syst Pharm**, 1998;55: 165-6.
44. Philips J, Beam S, Brinker A, et al. Retrospective analysis of mortalities associated with medication errors. **Am J Health Syst Pharm**, 2001;58:1835-41.
45. Sullivan SD, Kreling DH, Hazlet TK. Noncompliance with medication regimens and subsequent hospitalization: a literature analysis and costs of hospitalization estimate. **J Res Pharm Econ**, 1992; 2: 19-33.
46. Standl E, Fuchtenbusch M. The role of oral antidiabetic agents: why and when to use an early-phase insulin secretion agent in Type II diabetes mellitus. **Diabetologia**, 2003;46 (Suppl 1):M30–6.]
47. Wald NJ, Law MR. A strategy to reduce cardiovascular disease by more than 80%. **British Medical Journal**. 2003; 326:1419–23.

48. Beers MH, Ouslander JG. Risk factors in geriatric drug prescribing. A practical guide to avoiding problems, 1989: 37:105-12.
49. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. **Am J Hosp Pharm**, 1990:47:533-43.
50. Fouts M, Hanlon J, Pieper C, Perfetto E, Feinberg J. Identification of elderly nursing facility residents at high risk for drug-related problems. **Consult Pharm**, 1997: 12:1103-11.
51. Kane RL, Ouslander JG, Abrass I. Drug therapy. In: Kane RL, Ouslander JG, Abrass I, eds. **Essentials of clinical geriatrics**. 4th ed. New York: McGraw-Hill, 1999: 379-411.
52. Salzman C. Medication compliance in the elderly. **J Clin Psychiatry**. 1995: 56(suppl 1): 18-22.
53. Coons SJ, Sheahan SL, Martin SS, Hendricks J, Robbins CA, Johnson JA. Predictors of medication noncompliance in a sample of older adults. **Clin Ther**, 1994: 16:110-7.
54. Botelho RJ, Dudrak R 2d. Home assessment of adherence to long-term medication in the elderly, **J Fam Pract**, 1992;35:61-5.
55. Colley CA, Lucas LM. Polypharmacy: the cure becomes the disease. **J Gen Intern Med**, 1993: 8:278-83.
56. Carlson JE. **Perils of polypharmacy**: 10 steps to prudent prescribing. **Geriatrics**, 1996: 51:26-30, 35.

57. Linjakumpu. T, Hartikainen. S, kalukka.T, Veijola.J, Kivela.S, Isoaho.r. Use of medication and polypharmacy are increasing among the elderly. **Journal of clinical epidemiology**, 2002: 55: 809-817.
58. Aker O. compliance among patients with chronic diseases (Hypertension & Diabetes Mellitus) in Nablus district. Thesis Anajah National University. 2003.
59. Klaukka T, Mäkelä M, Sipilä J & Martikainen J Multiuse of medicines in Finland. **Med Care** 1993: 31: 445-450.
60. Linjakumpu T, Hartikainen S, Isoaho R & Kivelä S-L Polypharmacy and the use of psychotropics and analgesic drugs among the community-dwelling elderly. **Gerontologia** 2001: 15: 117-124. (In Finnish with an English summary)
61. Sweileh W, Arafat T. Attitudes towards medications. **The Islamic University Journal** (Series of National Studies and Engineering). 2006:14(22): 1-30.
62. Population projection by municipalities 1998-2030. **Helsinki: statistics** Finland.
63. Alan Nathan et al. Brown bag medication review as a means of optimizing patients use of medication and of identifying potential clinical problems. **Family Practice**, 1999:278-282.
64. Hopkins WG. Estimating Sample Size for Magnitude Based Inferences. **Sportscience** 10,63-70.2006(sportsci.org/2006/wghss.htm).

65. Dicker R, Gathany N. An Introduction to Applied Epidemiology and Biostatistics. Principles of Epidemiology. Second edition. Self study course 3030-G.
66. Ootom S, Batiha A, Haidi H, Hasan M, Al-Saudi K. Evaluation of drug use in Jordan using WHO prescribing indicators. **Eastern Mediterranean Health Journal**. September 2002.Vol 8, No. 4&5.
67. AY P, Akici A, Harmanc H. Drug utilization and potentially inappropriate drug use in elderly residents of a community in Istanbul, Turkey. **International Journal of clinical pharmacology and therapeutics**. 2005;43(4):195-202.
68. Joørgensen, T, Johansson, S, Kennerfalk, A, Wallander, M, & Svaørdsudd K. Prescription drug use, diagnoses, and healthcare utilization among the elderly. **The Annals of Pharmacotherapy**. 2001;35(9), 1004–1009.
69. Bedell S, Jabbour S, Goldberg R, Glaser H, Gobble S, Young-Xu, Y, et al. Discrepancies in the use of medications [Electronic version]. **Archives of Internal Medicine**, 2000;160(14), 2129. Retrieved August 28, from Health and Wellness Resource Center database.
70. Kaufman D, Kelly J, Rosenberg L, Anderson T, & Mitchell A. Recent patterns of medication use in the ambulatory adult population of the United States: The Slone survey. **Journal of the American Medical Association**, 2002;287(3), 337–344.

71. Rollason V, Vogt N. Reduction of Polypharmacy in the Elderly, a systematic review of the role of pharmacist. **Drugs and Aging**, 2003: 20 (11).
72. Sullivan SD, Kreling DH, HazletTK. Non complienc with medication regimens and subsequent hospitalization: a literature analysis and cost hospitalization estimate. **J Res Pharm Econ**. 1992: 2: 19-33.
73. Lawlor D, Patel R, Ebrahim S. Association between falls in elderly women and chronic diseases and drug use: cross sectional study. **British Medical Journal** 2003: 27; 327(7417): 712–717.
74. Hippisley-Cox, Coupland C. Effect of combinations of drugs on all cause mortality in patients with ischaemic heart disease: nested case-control analysis. **British Medical Journal**. 2005;330:1059-1063 .

## **Appendix**

استمارة فحص معدل حصول تعدد الأدوية و العوامل المرتبطة

بها بين كبار السن في شمال الضفة الغربية.

هذا الاستبيان لغرض البحث العلمي, تقوم احدى طالبات الماجستير في برنامج الصحة العامة في جامعة النجاح الوطنية بعمل دراسة حول معدل حصول ظاهرة تعدد الأدوية و العوامل المرتبطة بها في شمال الضفة الغربية.

شاكرين لكم تعاونكم.

الرجاء الإجابة على الأسئلة التالية:

الجزء الأول: معلومات شخصية:

1. العمر:

فوق 80	70-80	65-70
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2. الجنس:

أنثى	ذكر
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3. مكان الإقامة:

وحده في المنزل	مع العائلة	دار الرعاية (بيت المسنين)
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4. الحالة الاقتصادية للشخص المسن:

يوجد دخل ثابت (مثلا راتب تقاعدي ايجارات, الخ):

لا	نعم
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5. دخل عائلة المسن:

أقل من 200 دينار/شهر	بين 200 - 400 /شهر	أكثر من 400 دينار/شهر
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6. المستوى التعليمي للمسن:

	أمي
	تعليم أساسي
	تعليم ثانوي
	تعليم جامعي
	تعليم عالي

7. الحالة الاجتماعية للمسن:

أرمل	مطلق	متزوج	أعزب
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الجزء الثاني: الحالة المرضية

8. هل تعاني من أمراض مزمنة:

لا	نعم
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9. اذا كان الجواب نعم فهل تعاني أحد الأمراض التالية:

1	ضغط دم	نعم	لا
2	سكري	نعم	لا
3	أمراض القلب	نعم	لا
4	أمراض الجهاز الهضمي	نعم	لا
5	أمراض الجهاز التنفسي	نعم	لا
6	هشاشة عظام	نعم	لا
7	التهاب المفاصل	نعم	لا
8	الاكتئاب	نعم	لا
9	اضطرابات النوم	نعم	لا
10	غيره حدد		

10. كم مرة دخلت المستشفى في العامين السابقين:

أكثر من 5	5-3	2-1	ولا مرة
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## 11. ما هي الأدوية التي تتناولها حالياً:

الدواء	اسم الدواء	الاسم العلمي	مكان الحصول عليه	عدد الجرعات/ يوم	تناوله بانتظام	الشعور بأعراض جانبية	فعاليتها من وجهة نظر المريض
أدوية القلب							
أدوية ضغط							
أدوية سكري							
أدوية لالتهاب المفاصل							
أدوية الجهاز التنفسي							

							أدوية
							المعدة
							كورتزونات
							أدوية
							للامساك
							أدوية
							لاضطرا
							بات النوم
							مسكنات
							أدوية
							لهشاشة
							العظام
							فيتامينات
							قطرات
							مراهم
							غيره :
							حدد

## الرموز لسؤال 11

- مكان الحصول على الدواء: 1 الصيدلية 2 عيادة وزارة الصحة 3 عيادات المنظمات غير الحكومية 4 غيره حدد

## الجزء الثالث: ممارسات متعلقة باستعمال الأدوية:

12. هل بمقدورك توفير الأدوية غير المجانية التي توصف لك:

أبدا	نادرا	أغلب الأحيان	دائما
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13. هل تتناول الأدوية بمفردك:

أبدا	نادرا	أغلب الأحيان	دائما
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14. من وصف لك الدواء:

طبيب وزارة الصحة	طبيب خاص	طبيب عيادة غير حومية	غيره: حدد
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15. هل حصلت على ارشاد عن كيفية استعمال الدواء

لا	نعم
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16. اذا كان الجواب نعم فمن قام بهذا الارشاد:

الطبيب	الصيدلي	الممرض	غيره: حدد
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17. هل تعرف كيفية استعمال الدواء:

أعرف جيدا	أعرف	ليس دائما	لا أعرف
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18. هل تعرف الدواعي الطبية لاستعمال هذه الأدوية:

أعرف جيدا	أعرف	ليس دائما	لا أعرف
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19. هل لديك كمية من هذه الأدوية في المنزل تكفي لمدة

أكثر من شهر	بين شهر الى أسبوعين	أقل من أسبوعين	لا يوجد
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20. هل يحدث لك أعراض لا يمكن تحملها في حال عدم تناولك الدواء:

كثير جدا	كثير	متوسط	أبدا
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21. هل تعتقد أن هذه الأدوية ضرورية لك و لصحتك:

نعم	لا
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22. هل تراجع طبيب آخر غير طبيب عيادة وزارة الصحة:

نعم	لا	أحيانا
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23. هل يسألك الطبيب عن تناولك أدوية أخرى غير التي وصفها لك في نفس الزيارة:

دائما	غالبا	أحيانا	أبدا
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24. هل تستعمل أدوية دون استشارة الطبيب:

دائما	أغلب الأحيان	نادرا	أبدا
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25. هل تتناول جميع الأدوية الموصوفة لك:

دائما	أغلب الأحيان	نادرا	أبدا
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26. هل تخطئ في كمية الجرعة الموصوفة لك:

دائما	أغلب الأحيان	نادرا	أبدا
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27. هل تقرأ أو تطلب من أحد أن يقرأ النشرة المرفقة في علبة الدواء عند استعمالك دواء جديد:

دائما	أغلب الأحيان	نادرا	أبدا
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28. هل تواصل استعمال الأدوية التي انتهيت من استعمالها في فترات مرضية سابقة:

دائماً	أغلب الأحيان	نادراً	أبداً
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29. الى من تلجأ عندما تواجه مشكلة مع أحد الأدوية:

الطبيب	الصيدلي	أفراد العائلة	أحد الأصدقاء/ الجيران
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**الجزء الرابع: مضاعفات تعدد الأدوية:**

30. هل تعاني من السقوط و عدم التوازن

دائماً	أغلب الأحيان	نادراً	أبداً
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31. اذا كان الجواب نعم فهل تعتقد أن ذلك يحصل بسبب الأدوية التي تتناولها:

نعم	لا
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32. هل تعاني من صعوبة في الذاكرة:

دائماً	أغلب الأحيان	نادراً	أبداً
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33. اذا كان الجواب نعم فهل تعتقد أن ذلك يحصل بسبب الأدوية التي تتناولها:

نعم	لا
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34. هل تناول الأدوية يسبب لك أحد الأعراض التالية:

صداع	امساك	ضعف عام	أعراض أخرى
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35. هل تعتقد أن أحد الأسباب هو الأدوية التي تتناولها:

نعم	لا
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36. هل سبق و أن أخبرك طبيبك أنك تعاني من أعراض جانبية نتيجة أخذك أكثر من دواء:

نعم	لا
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جامعة النجاح الوطنية  
كلية الدراسات العليا

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بها بين مرضى كبار السن في محافظات (نابلس، جنين، طولكرم)

إعداد  
فاتن تحسين فارس عكاوي

إشراف  
د سمر غزال مسمار

قدمت هذه الأطروحة استكمالاً لمتطلبات درجة الماجستير في الصحة العامة بكلية الدراسات  
العليا في جامعة النجاح الوطنية في نابلس، فلسطين.

2008

ب

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## الملخص

يتناول كبار السن عددا من الأدوية أكثر من غيرهم من الأشخاص الأصغر سنا، لذا هدفت هذه الدراسة الى فحص معدل حصول ظاهرة تعدد الأدوية و العوامل المرتبطة بها بين مرضى كبار السن في محافظات (نابلس، جنين، طولكرم)، تمت دراسة عينة عشوائية مؤلفة من 317 مسن، من خلال مقابلة شخصية و تعبئة استبيان. تم تعريف كبار السن لأغراض الدراسة بمن هم يزيدون عن 65 عاما، و كذلك تعدد الأدوية بتناول خمس أدوية فأكثر. معظم الدراسات التي نفذت في هذا المجال استهدفت المسنين من خلال المؤسسات التي تعنى بكبار السن، خاصة أن المعلومات عن نمط استخدام الأدوية و تعددها بين المسنين غير متوفرة.

تظهر نتائج الدراسة ان معدل حصول تعدد الأدوية في محافظات (نابلس، جنين، طولكرم) بلغت %41، و أن متوسط عدد الأدوية المستخدمة بلغ 4.48 / مسن (انحراف معياري 2.249). أظهرت النتائج أيضا أن أكثر الأمراض المزمنة انتشارا بين المسنين هو ارتفاع ضغط الدم، و من ثم أمراض المفاصل، السكري، و أمراض القلب.

فيما يتعلق بظاهرة تعدد الأدوية، أظهرت النتائج أنها مرتبطة احصائيا ارتباطا وثيقا بالنوع الاجتماعي للمسن، و غير مرتبطة احصائيا بالعوامل الديموغرافية الأخرى كالعمر، الحالة الاجتماعية، مكان الإقامة، مستوى التعليم، و مستوى الدخل. أظهرت أيضا أن المسنين غير مدركين لتبعات هذه الظاهرة من حيث (عدم الانضباط الدوائي، الأخطاء في تناول الأدوية، التفاعلات الجانبية للأدوية، التنافر الدوائي، زيادة احتمال تحويل المسن للمستشفى، و زيادة كلفة العلاج).

ان التركيز الأساسي في علاج كبار السن عادة ما يلقى على عاتق الأطباء، مما يزيد الأعباء عليهم و يؤثر سلبا على مستوى متابعة مجموعة الأدوية الموصوفة لهم. هنالك حاجة الى

ت

أن يدرك الأطباء زيادة انتشار ظاهرة تعدد الأدوية. لا بد من الفحص المستمر لدواعي استعمال أدوية المسنين من قبل الأطباء لتجنب تعدد الأدوية, خاصة من قبل الأطباء المختصين بأمراض كبار السن, و لا بد من التنسيق بينهم و بين المراكز العلاجية لهذه الفئة في معالجة هذه الظاهرة. لا بد من تعزيز دور الصيدلة , و التمريض لمعالجة هذه الظاهرة, و أيضا هناك حاجة لتوعية كبار السن بهذه الظاهرة و ما تحمل في طياتها من تبعات تؤثر على الحالة الصحية للمسنين.

أن ظاهرة تعدد الأدوية بين مرضى كبار السن هو موضوع ملح, و يستحق اجراء دراسات أخرى معمقة و متخصصة.