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Investigation of Polypharmacy and Rational Prescribing in Elderly Patients in a Health Centre of Nicosia, Cyprus

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This paper is an attempt to study in-depth polypharmacy in the elderly population of a health center in Strovolos, Nicosia, Cyprus, and its association with various factors influencing it. Motivation for the preparation of this research was the knowledge of the severity of polypharmacy observed in several countries worldwide, including Cyprus, both in terms of health and the economy. In this sense, the main purpose was to investigate and assess the prevalence of polypharmacy in elderly patients, over 65 years of age, visiting Strovolos Health Centre, Nicosia. Specific objective aims were to attempt to find ways to address and reduce polypharmacy, by controlling the issuing of prescriptions, as well as the reason for visits by the elderly patients to the Health Centre. For the completion of this study, polypharmacy was established as the concomitant intake of five or more medications from the patient simultaneously. The sample included 350 elderly patients, over 65 years of age, who came for examination at the Strovolos' Health Centre during the period July to September 2011. A simple random sampling was selected among many patients that visited the author's and her other three colleagues offices', who worked in the same health centre. An appropriate questionnaire was designed to record the basic data, which included questions aiming to determine the rate of polypharmacy. According to the statistical results, 54.6% consumes more than five different drugs which can be regarded as polypharmacy and the majority (58.6%) of patients requests drugs that are not prescribed for their chronic condition. There is a serious problem of polypharmacy in elderly

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patients which is associated with age (P = 0.043), educational level (P = 0.003), number of chronic conditions and mainly the demand for drug prescription (P < 0.001). All patients were given medication during their visit to the health centre and the main reason for their visit was the prescription of drugs. Consequently, general practitioners should apply more strict rational drug prescribing and inform the patients about the dangers of polypharmacy.

Keywords: polypharmacy, rational prescribing, primary health care, elderly patients

Introduction

Polypharmacy is a phenomenon that occurs mainly in the elderly population. It is defined as the concomitant intake of five or more medications from the patient simultaneously (Brager & Sloand, 2005; Viktil, Blix, Moger, & Reikvam, 2007; Hilmer, 2008; Gibson, 2010), or the use of clinically inappropriate medications (Zarowitz et al., 2005). In recent years, many studies observed the trend of increased drug consumption mainly due to increased life expectancy, changing demographics and the emergence of new diseases. This has led countries affected in an effort to find and implement measures to control and reduce the growing demand for drugs, aiming primarily to change the behavior of users and consumers and secondarily to change the prescribing behavior of health professionals. Polypharmacy is recognized as a serious problem worldwide affecting various countries of Europe and the United States, both in terms of health and the economy (Masoodi, 2008) and refers to problems that can arise when a patient consumes many medications. Elderly population lists in the U.S. as 13% of the population and alone they consume 30% of all prescription medications each year (Williams, 2002; Bushardt et al., 2008). In Europe, the elderly consume two to three times more medications on average than other people (Masoodi, 2008). According to Bushardt et al. (2008), patients who are 65 years and older are the largest consumers of prescription and non-prescription medications in the US. It is estimated that this number has almost doubled since 1990. In addition, polypharmacy has a significant effect on increasing health expenditures, because of overpricing on the part of pharmaceutical companies, and non-rational prescribing on the part of the doctors. According to Bodenheimer (2001), the tendency of doctors to replace cheap medications by prescribing other new and expensive medications is one of the factors that increased health expenditures in the health care systems in most developed countries. This also happens in Cyprus, perhaps to a greater extent than other European countries, as the main source of Cypriot doctors in the pharmaceutical sector are funded by the pharmaceutical companies, who are legitimately interested in increasing their sales (Theodorou, Pavlakis, & Peter, 2008). The phenomenon of polypharmacy is extremely complex because the possible risks related to the drug/drug interaction, adverse effects, drug/disease interactions, and inappropriate dosing regimens are real (Zarowitz et al., 2005). On the other hand, the benefits of medications become apparent only in the event that the allocated amount of medications given to treat, alleviating the symptoms or slowing the progression of the disease. According to Brager and Sloand (2005), polypharmacy can be both positive and negative. Thus, finding the balance between benefits and risks of multiple medication use is a challenge to health professionals, and with proper training they are able to be successful in providing multiple treatment medications (Prescom, 2005).

Methodology

Sample and Data Analysis

For the completion of this study, polypharmacy was defined as the concomitant intake of five or more

medications from the patient simultaneously, a definition that has been widely used in previous studies (Chen, Dewey, & Avery, 2001; Junius-Walker, Theile, & Hummers-Pradier, 2007; Grimmsmann & Himmel, 2009). The sample comprised 350 elderly patients, over 65 years of age, who came for examination at the Strovolos' Health Centre during the period July to September 2011. Random sampling was used to select from among the many patients that visited the four offices of choice. There were 145 men and 205 women in the sample which accounted for 41.4% and 58.6% of the sample, respectively. The mean age was 74.8 years. A questionnaire was designed to record the basic data, including questions aiming to determine the rate of polypharmacy. A statistical analysis was performed in the collected data using the programme SPSS version 17.0 software that involved the relationship between polypharmacy and demographic data, descriptive and inferential analyses including some parametric tests like X^2 (Chi square), t-test and Mann-Whitney U test.

Results and Discussions

The results include:

- The description of socio-demographic characteristics of the sample (gender, age, profession, educational level, and marital status), which may affect the appearance of the phenomenon of polypharmacy;
- The relationship of polypharmacy in the socio-demographic characteristics, evaluated for the existence of relations of gender, age, educational level, number of diseases of the patient, and if the patient requests prescribing medications other than for their disease;
- The main requested medications by the patients that are not related to their chronic condition;
- The major chronic diseases of elderly patients;
- Reasons for visiting the Health Center by elderly patients.

Socio-Demographic Characteristics

There were 145 men and 205 women in the sample, corresponding to 41.4% and 58.6% of the sample as shown in Figure 1.

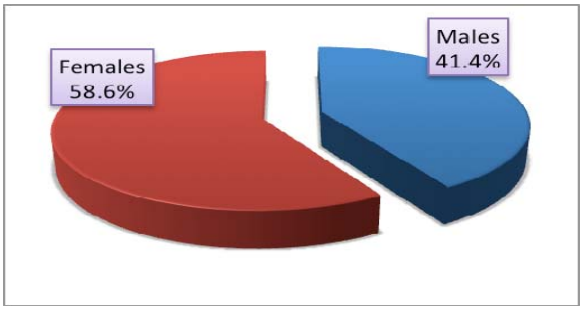

Figure 1. Socio-demographic results of the sample—Gender.

The average age was 74 years 9 months and 18 days (74.8 years old).

For the occupation of the sample studied, 91% said they were retired and the remaining 9% were housekeeping. For the educational level, 62% graduated from elementary school, 15% graduated from high school, 11% from gymnasium, 11% have completed university and 1% were illiterate as identified in Figure 2.

When it comes to marital status, 89% were married, 3% were single, and 8% were other.

The sample consumes on average 4.1 different drugs for their associate chronic disease and an overall average of 5.1 different drugs. According to Figure 3, 54.6% consumes more than five different drugs which can be regarded as polypharmacy.

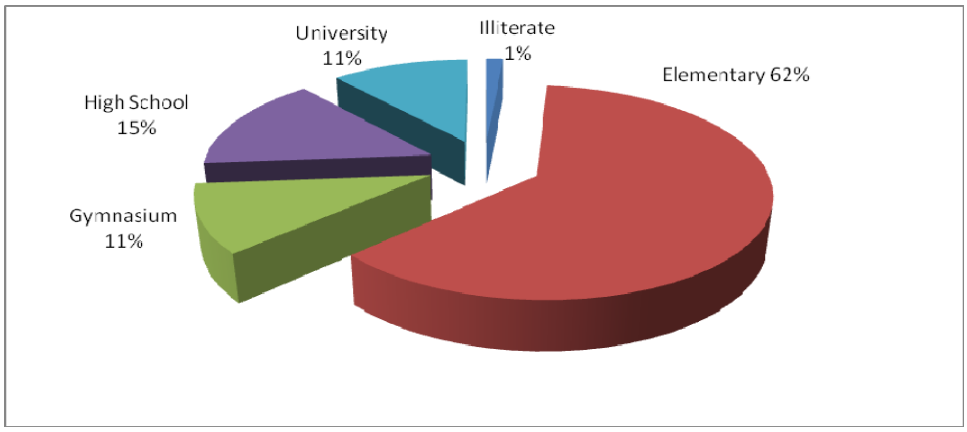

Figure 2. Educational level.

Figure 3. Polypharmacy.

Correlation Studies

Polypharmacy & gender and educational level. The results do not prove the existence of statistically significant relationship between gender and polypharmacy (p = 0.182, X^2 = 1,784, df = 1), although there is a tendency for women to consume more medications. A statistically significant relationship was found between educational level of the patient and polypharmacy (p < 0.05, *Mann-Whitney U* = 12,735, z = -2,983). Educational level appears to be inversely related to the consumption of drugs. Elderly people with lower educational level, consume more drugs than elderly patients with higher educational level which is shown in Figure 4.

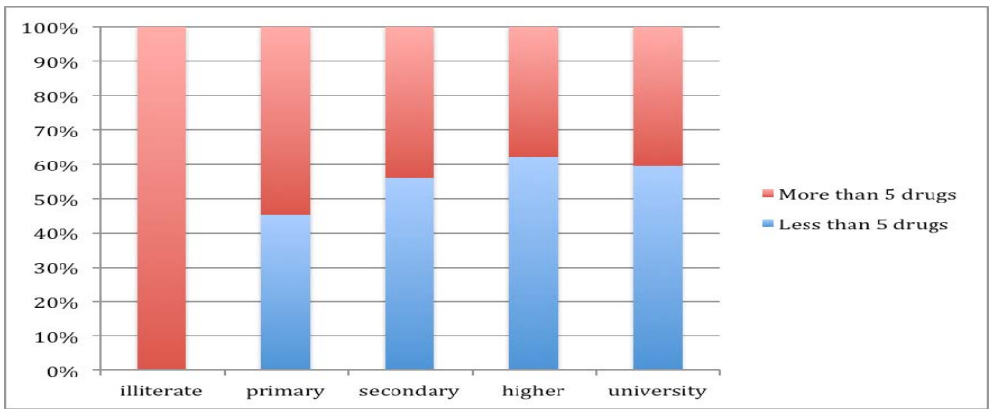

Figure 4. Correlation between education level and polypharmacy.

Polypharmacy & age and demand for drugs by patient. This study also observed the association of polypharmacy with age ($P = 0.043$) and the demand for drugs by the patient ($P < 0.001$). The majority (58.6%) of patients request drugs that are not prescribed for their chronic condition. Consequently, patients demand drugs other than their chronic condition. Regarding the patient requested drugs that are not related to their condition, the highest product demand was the analgesic paracetamol. Next were dermatological creams, followed by medications for insomnia, anti-inflammatory, and vitamins. It is obvious from Figure 5 that the demand and ultimately the prescribing of antibiotics at the health center compared with other drugs were at the lowest level of demand.

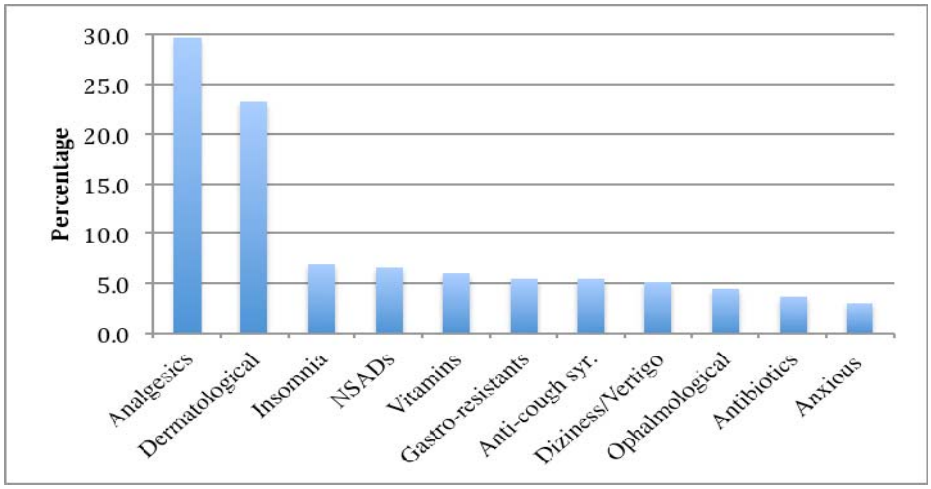

Figure 5. Requested drugs.

Polypharmacy and the reason for visit. All patients were given medication during their visit to the health center and some patients came to visit the center for more than one reason. The main reason for their visit was the prescription of drugs in a rate of 97.4%. Followed by monitoring the elderly with a rate of 15.1% and a rate of 11.4% comes for laboratory examination. According Figure 6, percentage 11.1% presents for clinical examination, 1.4% rate for acute case, and 1.1% comes for other reason.

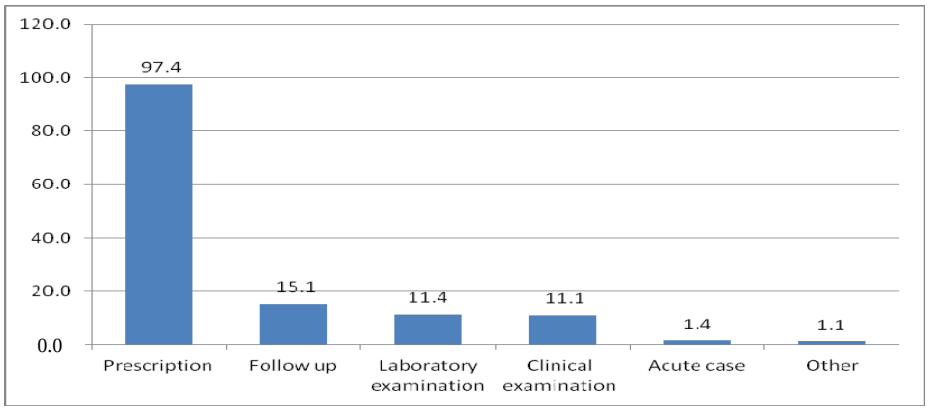

Figure 6. Reason for visiting the Heath Centre by the elderly patients.

Polypharmacy and Chronic Diseases. All elderly patients have at least one chronic disease, with hypertension (82%) the highest, followed by hyperlipidemia (64.6%), diabetes (24%), heart disease (24%), and osteoporosis (19.4%) as shown in Figure 7.

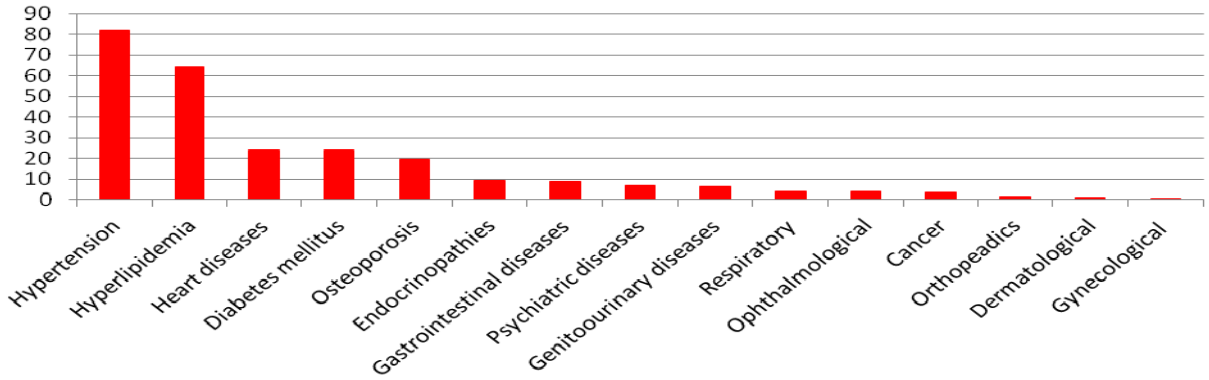

Figure 7. Prevalence of chronic disease.

It must be noted that from Figure 7, each value is a percentage. The values add up to more than 100% as many elderly patients have more than one chronic disease, 31% of elderly patients have two diseases in their medical history, 29% reported three diseases, 16% of elderly people suffering from four and also five diseases and 8% suffer from five and more diseases which is shown in Figure 8.

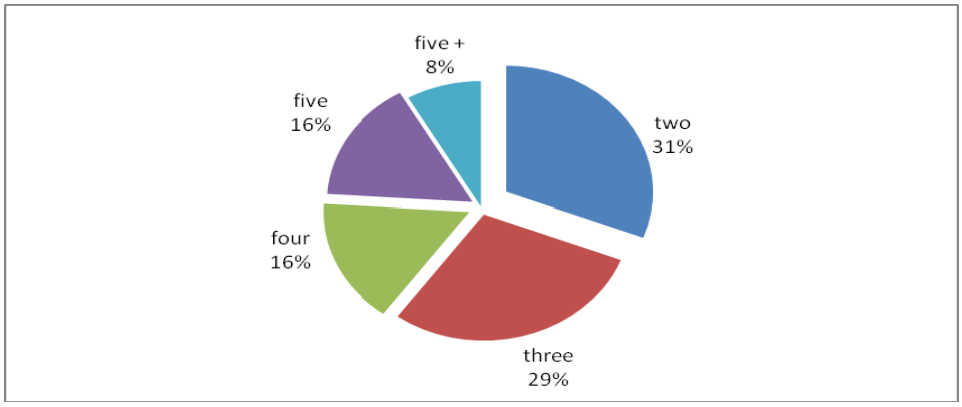

Figure 8. Simultaneous chronic diseases for the elderly patients.

Conclusions and Proposals

During the last decade, several researchers in the health sector have recognized the importance of economic and social dimensions of health policies of countries regarding the rational use and disposal of drugs. The phenomenon of polypharmacy, in conjunction with the increase in drug prices, has contributed to the expansion of wasteful spending on public health (Bushardt et al., 2008). According to the results of this research, there is a serious problem of polypharmacy in the elderly population in the Strovolos Health Center, which correlated with age, educational level, number of diseases and especially with the demand for prescription drugs. The rate of polypharmacy stands at 54.6% of elderly patients with the main reason for visiting the center being to receive prescription of medications for the continuation of chronic drug treatment.

The main factors which contribute to addressing polypharmacy focus on the following areas:

(1) Health policy

The health system in Cyprus has weaknesses and peculiarities at the expense of efficiency and effectiveness. It presents serious problems and malfunctions. The shortcomings relate to all areas, from strategic development to the bureaucratic administration, financial management, production services, and

quality of care. However, the most serious problem that arises is the unequal access and the financial burden on health services. Lack of political will, government problems, and the opposition of vested interests, has delayed the reforms that would lead to the creation of a NHS National Health System with emphasis on primary health care and general practitioner "as a first point contact, as a gatekeeper" of the health system. Today the main feature of the existing primary health care is limited to basic medical care. Ignoring any notion of evidence-based medicine, the current health policy acts without control mechanisms and with unknown practical cost-benefit analysis.

(2) Pharmaceutical policy

The design of drug policy is an especially difficult area of policy. A rational national drug policy, enshrined in the legal framework to control prices and profits, with quality assurance systems, identification of pharmaceutical needs, supplies and drugs delivery and evaluation of pharmaceutical expenditure is of utmost necessity. Good policy costing, both imported and domestic, to promote "Cyprus" drug and cheaper generics, along with the establishment of "List drugs" and the pharmacists who carries out the prescriptions are factors which can help to address polypharmacy.

(3) Doctors

Health professionals and especially general practitioners in primary health care need support in their trying to deal with polypharmacy. They need education continuity, creating medical protocols, and compliance with the guidelines for rational prescribing. The introduction and use of electronic prescribing can reduce medication errors by 20% (Tamblyn et al., 2003). Also the introduction of medical electronic patient records will facilitate the intervention and control of prescriptions. Prescribing should be based on documented medical knowledge, and aims to maximize the effectiveness of treatment and minimize the risks and costs.

(4) Users—consumers

According to researchers, the high consumption of drugs is associated with low participation rates of patients in the cost. Therefore, it is necessary to participate in pharmaceutical costs. Finally, it is important to educate and inform the users-consumers about self-treatment issues.

It is considered necessary to introduce the National Health System (NHS) in Cyprus with the re-organization and proper functioning of primary health care. This should aim at improving the health level of the population through activation of preventive services and health education. Finally, general practitioners should apply more strict rational prescribing and aim to inform about the dangers of polypharmacy.

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