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Patient adherence to pharmaceutical care amid the economic crisis in Greece: Underlying priority areas for policy makers

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ABSTRACT

The *purpose* of the study was to investigate the degree to which chronic patients adhered to medication regimens during the economic crisis in Greece. It is a *quantitative cross-sectional study*, with a convenience sample of 1,009 residents of Western and Northern Greece, aged ≥ 18 years, with chronic health problems. The survey was conducted between February and June 2016. Data were collected via a structured questionnaire with closed-ended questions, filled out during face to face interviews with all participants. The vast majority of respondents (94.5 %) said that they were able to buy prescribed drugs but had to economise in other ways (for example, by cutting back on clothing and travel) to cope with essential household expenses, including medication. Only 71 % of participants said they remembered to take their prescribed medications every day, following all of their physicians' recommendations. Almost 70 % of participants said that using generic medications made it easier to adhere to their treatment regimens. The results of a correlation analysis showed that patients experiencing financial hardships as a result of health problems were less likely to adhere to pharmaceutical care regiments than those who were not experiencing financial difficulties (p = 0.026). Men had a higher level of adherence than women (p = 0.001).

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1. Introduction

The increase in health expenditure in Greece (2005–2009) had its own share of responsibility for the country's 21 % economic deficit. That is why the first fiscal adjustment measures were directed toward the health sector, which was absorbing 10 % of GDP and generating 20 % of the national deficit [1]. The policies and measures implemented during the economic crisis focused on achieving quick and easy fiscal adjustments. However, the need for fundamental reforms and the right of citizens to access healthcare, irrespective of their ability to pay, were partly overshadowed by the government's emphasis on the public provision of health services [1].

The sharp increase in health expenditure was partly due to the rapidly rising pharmaceutical expenditure in Greece, compared to other EU countries [2]. Expenditure rose from $ 419 PPPs per capita in 2003 to $772 PPPs per capita in 2010 (84.2 % increase), of which more than 77 % was publicly funded. The EU-15 average increase during this period was significantly lower (32 %), rising from $420 PPPs to $554 PPPs [3].

During the years of financial crisis, public expenditure on pharmaceutical products decreased by approximately 50 % from 2010 ($597 PPPs per capita) to 2015 ($296 PPPs per capita) (OECD, 2017). At the same time, out-of-pocket pharmaceutical spending increased from approximately $175 PPPs per capita in 2010 to $276 PPPs per capita in 2015 [3].

To save on pharmaceutical expenditures, measures were taken to reduce prices (from €17.8/box in 2012 to €12.8/box in 2013). In addition, the measures introduced a positive list of medicines and increased the use of generic medicines and cost-sharing levels.

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Despite reduced pharmaceutical prices, monthly household spending increased from 2012 to 2013, due to increased levels of cost sharing. In 2013, in particular, only 8% of prescribed drug boxes were provided under a 0% cost sharing arrangement, in contrast to 13 % in 2012. A 25 % cost-sharing level was imposed on 77 % of prescribed medicines in 2013, in comparison to 53 % in 2012. The estimated mean cost-sharing burden for pharmaceuticals in 2013 was 18 %, in comparison to approximately 14 % in 2012 [2].

Increased cost-sharing levels imposed on pharmaceuticals, in combination with decreased incomes (30 % lower during the years of crisis), [4] have a negative direct impact on patient compliance. For lower-income patients in particular those below the poverty line, increased cost sharing on medicines often results in unmet pharmaceutical needs.

Many chronic patients, whose therapies are particularly expensive, are unable to cover the excess costs. For instance, patients with diabetes find it very difficult to cope with the cost of anti-diabetic drugs, on top of the added costs associated with following the recommended diet program. This burden is exacerbated by the need to defray the cost of the antihypertensive and dyslipidemia treatment that diabetes patients usually receive, alongside anti-diabetic therapy.

Although the imposed cost-sharing levels for oral anti-diabetic treatment dropped from 25 % to 10 % (in total value) and the cost of expensive anti-diabetic medications was significantly reduced, patients' participation in the treatment of dyslipidemia, which usually coexists with diabetes, increased from 10 % in 2010 to 25 % in 2011. For this reason, many patients object to using a precise anti-diabetic treatment or wish to reduce the frequency of prescribed drug dosages [5].

Low adherence leads to poor health outcomes, resulting in increased medical visits, admissions, and hospitalisation days [6,7]. Pharmaceutical care adherence is therefore a focal point for a range of issues, involving clinician interests, healthcare systems, and stakeholders. The rate of non-adherence is likely to grow as the rate of chronic patients increases. Consequently, it is necessary to acknowledge that improvements in medication adherence do not depend on patients alone, but are also affected by healthcare professionals and the healthcare system [8].

1.1. Aim

The present study aims to investigate the extent to which chronic patients adhere to medication regimens, given their profiles during the economic crisis. The specific objectives of this study were as follows:

1) To investigate the extent to which the economic crisis affected patients' adherence to pharmaceutical regimens;
2) To identify individual patient groups that could be prone to medication non-adherence; and
3) To suggest targeted interventions to improve the medication adherence of chronic patients.

1.2. Compliance vs adherence

'Compliance' is defined as 'the extent to which one's behaviour coincides with medical advice' [9]; According to WHO [10], the term 'adherence' describes 'to what extent a person's behaviour in relation to taking medication or adopting eating habits and lifestyle changes matches the instructions given to that patient by a health professional.'

The meaning of 'compliance' has been questioned by Donovan and Blake, [11] as it reflects a more general policy attitude, suggesting the control and domination of an authoritarian health system,

where the health professional, as an 'expert', delivers the diagnosis, and the patient, as a passive prescription recipient, has no option other than to comply and obey [12]. By contrast, the concept of 'adherence' suggests active, voluntary participation or cooperation on the part of the patient; this is likely to promote mutually acceptable behaviour, designed to achieve a therapeutic outcome [13–15].

WHO [10] emphasises five dimensions that affect patient adherence, which it defines as a multi-factor phenomenon, influenced by factors other than the personal characteristics of an individual patient. Although practitioners tend to attribute non-adherence to patient forgetfulness, a number of other factors also influence the phenomenon. These relate to: i) the type and severity of the disease, ii) demographic factors, iii) the relationship and communication between physicians and patients, iv) health units where the patients are treated, and v) types of medication and social and psychological factors [10]

2. Materials and methods

In this quantitative cross-sectional study, the surveyed population was a convenience sample (N = 1,009) of residents of Western and Northern Greece, aged $\geq$ 18 years with chronic health problems (approximately 80 % mentioned cardiovascular diseases). The survey included men and women from every socio-economic group and educational level. Data were collected via a structured questionnaire with closed-ended questions. To develop the questionnaire, researchers drew on similar studies carried out in Greece and the international arena, [16–23] and collaborated with specialists in the fields of health management and health economics. Of the 1,120 questionnaires used for face to face interviews 1,009 were completed and included in the survey (90.08 % response rate). A pilot study (N = 52 patients) was conducted between December 2015 and January 2016; a test-retest was carried out within 20 days (correlation coefficient >0.7 for the majority of questions). The Cronbach's alpha reliability coefficient was estimated at 0.765 initially and at 0.816 after 20 days. The final survey was conducted between February and June 2016. Individuals were informed verbally and in writing of the purposes of the survey and assured that their data would be anonymous. Individuals who agreed to take part gave their informed consent and filled out the questionnaire during personal interviews with researchers. This data collection method aimed to ensure greater participant responsiveness, questionnaire completion, and response accuracy.

The data analysis was conducted using the SPSS v 21.0 statistical package. The significance level was set to 0.05. The categorical variables were presented as absolute (n) and relative (%) frequencies, while the quantitative variables were presented as a mean, standard deviation. A Pearson's correlation coefficient was used to investigate the relationship between two quantitative variables following a normal distribution. A linear regression was applied with pharmaceutical adhesion as the dependent variable in cases where more than two independent variables showed statistically significant differences at the level of 0.2 (p < 0.2) in the bivariate analysis.

3. Results

3.1. Demographic and socio-economic characteristics

About 48 % of the participants were men. The mean age of participants was 70 years old (SD: 10) and the overwhelming majority were Greek citizens. About 60 % of participants had reached the obligatory educational level; approximately 25 % were secondary school graduates. Almost 30 % of the participants had at least one

Table 1
Study sample diseases.

Diseases*	Percent	Cost Sharing	ICD 10
Diseases of the Circulatory System	80 %	25 %	I00-I99
Asthma	3.70 %	25 %	J45
Chronic Obstructive Pulmonary Disease	8.10 %	25 %	J44
Renal Failure/Hemodialysis	2%	0%	N17-N19
Diseases of the musculoskeletal system and connective tissue /Chronic Pains	27.10 %	25 %	M00-M99/R52.1-R52.2
Neoplasms/Cancer	6%	0%	C00-D09
Other Diseases [Diabetes, Gastro-oesophageal Reflux Disease, Hypertrophy (Benign) of Prostate, Dyslipidemia, Osteoporosis]	23.29 %	0%, 10 %, 25 %	(E10-E14, K21, N40, E78.1 &E78.6, M80-M82)

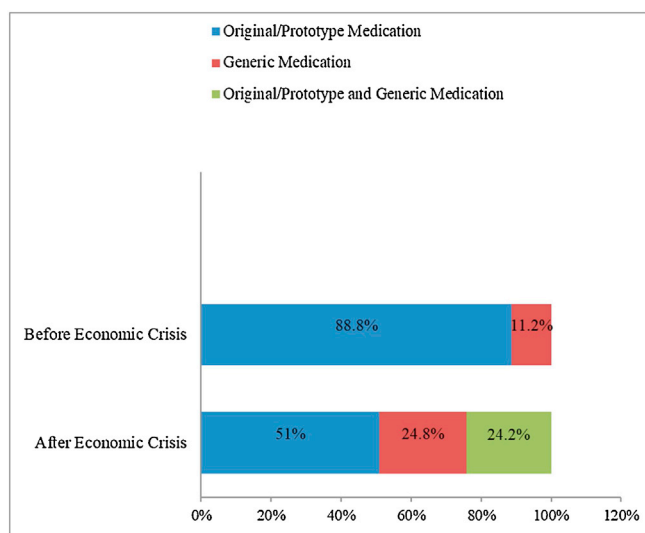*Percentages do not add up to 100 % as patients have the choice of multiple answers.

Fig. 1. Types of medication used by chronic patients.

Table 2
Study sample demographic and socio-economic characteristics (N = 1,009).

Gender	Percent
Male	48.20 %
Female	51.80 %
Age	
Average	70
SD	10
Region	*N*
Northern Greece (mainly Thessaloniki-urban area)	*500*
Western Greece (urban and semi urban areas and villages)	*509*
Unemployed members in the family	*Percent*
None	67.50 %
One	19.60 %
Two	8.80 %
Three	1.90 %
More than three members	1.30 %
Income reduction since the onset of the economic crisis	*Percent*
<10 %	27.30 %
11−22%	36.40 %
21−30%	19.30 %
31−40%	7.10 %
>40 %	8%

family member who was unemployed. A large number of participants provided financial support to their children, despite facing a reduced income due to the economic crisis.

Almost all of the participants (98 %) were insured by one of the four major social security funds: a) IKA – for those in regular, salaried employment, b) OPAD – for civil servants, c) OAEE – for self-employed people, and d) OGA – for farmers, stockbreeders, and fishermen.

Few, more than half (53 %) of the respondents coped easily with their monthly household expenses. Almost 61 % of the participants said that they were financially able to pay for healthcare; at the same time, almost 65 % had reduced the frequency of medical tests needed to effectively manage their diseases (Table 2). The overwhelming majority of respondents had had to cut back on lifestyle expenditures, such as amusement (88 %), clothing (83 %) and travel (88 %) to manage their essential monthly household expenses (e.g. medications).

3.2. Pharmaceutical care

3.2.1. Use of prototypes vs generics

When asked about types of medication, 51 % of the respondents said that they used original/prototype medications after the onset of the economic crisis; prior to the crisis, the rate was approximately 89 % (Fig. 1).

Almost 46 % of the participants who used prototype medication (branded drugs) said that they would be willing to use a generic

drug in the near future to reduce costs. In addition, 48 % continued to use generics while 39 % said they had used generics more often during the economic crisis than before. Approximately 70 % of respondents who used generic medications said that these lower-cost drugs made it easier to for them to adhere to medication regimens. In general, the majority of respondents had a favourable view towards replacing specific branded drugs with generic drugs.

3.3. Ability to buy drugs – adherence to treatment

More than 70 % of the respondents reported that cost sharing rates for medications increased during the economic crisis; approximately 23 % said that cost sharing rates remained the same.

The vast majority of participants (approximately 95 %) could afford medication; approximately 12 % bought the drugs they needed but sometimes saved up doses (Table 3).

3.4. Adherence to medical recommendations

Of the respondents, 71 % had no problems remembering to take their medication on a daily basis, in accordance with a fixed schedule. A mere 39 % also remembered to follow the doctor's advice about changing lifestyle habits. The results of a correlation analysis showed that patients who received generic and prototype medication or generic medication only had lower adherence, compared to patients who received only prototype medication (p-value = 0.000). In addition, pharmaceutical adherence was significantly higher in

Table 3
Adherence to pharmaceutical care regimens.

	Variables	YES* % (N)	NO % (N)
1.	You almost always buy the pharmaceutical products prescribed by a physician.	94.5 % (948)	5.5 % (55)
2.	You almost always buy prescribed pharmaceutical products but don't think it's necessary to use them all the time.	9.2 % (90)	90.8 % (886)
3.	You buy pharmaceutical products but sometimes reduce the dosage.	11.8 % (116)	88.2 % (866)
4.	You don't always buy pharmaceutical products because you don't think they are necessary.	4.4 % (43)	95.6 % (936)
5.	Sometimes you don't buy pharmaceutical products because you can't afford them.	8.4 % (82)	91.6 % (898)
6.	You have stopped buying pharmaceutical products because you can't afford them.	2.8 % (27)	97.2 % (952)

* Participants had the option to choose more than one statement.

Table 4
Bivariate analysis showing pharmaceutical adherence and various independent variables.

Variable	Medication Adherence Mean/Std. Deviation	Value p
Change in pharmaceutical cost-sharing levels		0.134
Increased	3.7599 (0.70258)	
Decreased	3.7624 (0.80534)	
The same	3.8668 (0.69009)	
Type of pharmaceutical products		0.000
Original/prototype medication	3.8819 (0.70626)	
Generic medication	3.6477 (0.70857)	
Original/prototype & generic medication	3.7146 (0.67670)	
Rate of using generic medications during the current period		0.005
Often	3.9367 (0.73672)	
More Often	3.6225 (0.68625)	
Constantly	3.6765 (0.68049)	
Initial use of generic medications in relation to the financial crisis		0.101
Before	3.8090 (0.83760)	
After	3.6642 (0.66643)	
Using generic medications makes it easier to adhere to a medication regimen.		0.045
Yes	3.7290 (0.69493)	
No	3.5938 (0.69056)	
I use generic medications because they cost less.		0.003
Yes	3.7706 (0.74365)	
No	3.9529 (0.65414)	
I have fewer laboratory tests than the recommended number needed to monitor chronic disease		0.000
Yes	3.5533 (0.71430)	
No	3.9113 (0.67089)	

patients who hadn't reduced the number of laboratory tests needed to monitor their diseases than in patients who had (p-value = 0.000). By contrast, changes in cost sharing levels and the start-up time for using generic medications did not affect the patients' adherence to medication regimens or to their physicians' recommendations (p-value = 0.134 and p-value = 0.101, respectively) (Table 4).

A linear regression analysis was carried out on statistically significant independent variables at the level of 0.2 (p < 0.2), which affects pharmaceutical adherence. The results of the regression analysis revealed four factors that ultimately affected adherence: coping with financial difficulties and reducing the frequency of laboratory tests were negatively related to adherence, while the use of prototype medication (versus generic or generic and prototype) and gender (men) were positively correlated with treatment adherence (Table 5).

4. Discussion

In general, the vast majority of chronic patients (mean age = 70 years) *did not reduce or discontinue their prescribed medication* (Table 1). Overall, the studied population *reported a higher rate of adherence*, compared to the results of previous surveys (Tables 4 and 5).

Notably, a 2009 survey conducted by the National Pharmacists' Association [24] provided another perspective on the problem, revealing that 49 % of respondents had forgotten to take a prescribed medicine; 31 % of respondents had not fulfilled a pre-

scription; 29 % of respondents had stopped taking a medication before the supply ran out; and 24 % of respondents had taken less than the recommended dosage [25]. A later survey (N = 1,842), conducted by the Hellenic Cardiology Foundation in 2015 [37], found that approximately 17 % of respondents discontinued medication due to cost, while 12 % considered the cost of medication to be high or unbearable. Similar results have been found in other studies conducted abroad. In a New York study of hypertensive patients, 63 % of respondents reported medium-to-high medication adherence [27]. Bosworth [29] reported that 30 % of British patients did not comply with a treatment because they forgot to buy the medication and 11 % decided to omit a dose; 27 % of patients failed to adhere to the treatment regimen without any clear reason.

Remarkably, 94.5 % of the current study participants stated that *they almost always bought medication prescribed by a physician,* even though the majority had reduced income and struggled to meet monthly family expenses. This 'paradoxical' finding reflects the fact that elderly patients view pharmaceuticals as an important tool for maintaining their health and managing their illnesses; this finding coincides with the results of similar studies [26–29,33] that have focused on *elderly chronic patients.*

To cope with medication expenses, participants *had economised on other family expenses,* such as entertainment (88 %), travel (88 %), and clothing (83 %). Similarly, a previous survey published by ESDY in 2013 [29] found that the overwhelming majority of respondents had reduced spending on entertainment, travel, and other areas to cope with health expenses; 20 % had reduced their health expenditure. However, when it came to medication, the rate of

Table 5
Linear Regression analysis of Independent Variables with Pharmaceutical Adherence.

Independent variable	Coefficient b	95 % confidence interval for b		Value p
Facing financial difficulties due to health problems	−0.191	−0.369	−0.014	0.026
(Yes vs No)				
Type of Medication				
Prototypes vs Generics	0.198	0.069	0.326	0.001
Prototypes vs Prototypes & Generics	0.123	0.006	0.253	0.037
Reduce the frequency of laboratory tests needed to monitor chronic disease				
(Yes vs No)	−0.279	−0.379	−0.178	<0.001
Gender				
(Men vs Women)	0.149	0.061	0.236	0.001

reduction was just 6%. The HELLAS HEALTH VI survey [30] showed that one out of four patients who took medication on a regular basis had economised on essential purchases to cope with the cost of medication; one out of five patients delayed using or obtaining a prescription from the doctor it was unaffordable. In addition, data derived from a survey conducted by the National School of Public Health [32] showed that more than four out of ten Greeks reported difficulties in accessing medication and check-ups [4,32]. Surveys show that income reduction (during the years of economic crisis) has deprived people of access to appropriate healthcare, forcing them to reduce spending on primary health services and even to reduce or stop taking medication [31].

Indeed, the regression analysis results in the current study show that coping with financial difficulties (p = 0.026) and reducing the frequency of laboratory tests are negatively related to medication adherence (p = 0.001).

It is also worth mentioned that almost 29 % *of the studied population did not remember to take medication* daily, even though the vast majority recognised the need to adhere to a medication regimen. Based on Muszbek et al. [6] the lack of *'sound'* symptoms on a daily basis (e.g. hypertension) is one of the most common reasons for patients forgetting to take their medication on time. This explanation for medication non-adherence coincides with the findings of other Greek studies on adherence to dyslipidemia medication regimens. Based on literature [4,38,40] dyslipidemia patients achieve their treatment goals at a rate that fluctuates between 52 % to just 26 %, due to low adherence levels. A report published by the Ministry of Health [39] emphasised that dyslipidemia patients' adherence to medication regimens tends to decrease after the first half of the treatment.

In relation to gender, the regression analysis results showed that *men had greater adherence rates than women* (p-value = 0.001), a finding confirmed by other studies [17,34]. Specifically, Berg et al. [34], have estimated that men adhere to antiretroviral therapy regimens at a rate of 73 %, while women achieve a rate of just 46 %. Both social and behavioural factors cause this difference in gender-based adherence rates. Based on statements made by participants in the current study, men's spouses take responsibility for giving them the correct amount of medication on time. The difference in gender-based adherence levels could also be related to the volume of drugs consumed by each gender; studies [36,17] have shown that polypharmacy negatively affects pharmaceutical adherence. Although the current study did not analyse the number of drugs consumed per patient by gender, a previous study conducted by Siskou et al. [35] has provided implicit evidence that women in Greece take more drugs than men, which may partly explain their lower adherence rates.

Finally, when it comes to the *type of medication* used, it is worth mentioning that approximately 89 % of patients who use generics began to use them after the onset of the economic crisis. Hakonsen et al. [41] have found that the economic benefit of using generic drugs is an important factor influencing the adoption of generic medicines. Thus, 70 % *of current study respondents reported that using generics made it easier to adhere to treatment regimens.* This finding confirms the literature [42,43,44] in indicating that patients with hypertension and dyslipidemia who replaced prototypes/original drugs with generics, reported high adherence rates and did not stop treatment.

One potential limitation of the current study is the possible influence of the data collection method (based on personal interviews) on the finding of relatively high medication adherence rates. Some participants may have wished to appear (to researchers) as people who adhered to treatment regimens.

4.1. Proposals to mitigate non-adherence

Non-adherence to medication is generally overlooked by national policy makers and rarely considered an issue to be examined. Any measurements taken are generally part of a routine procedure, conducted in only a few OECD countries. The phenomenon of non-adherence is therefore underestimated by stakeholders, leading to unnecessarily expensive healthcare systems [45]. According to the OECD, 200,000 premature deaths in Europe per year are estimated to have been caused by medication non-adherence, while European governments have spent €125 billion per year on excess healthcare services [45]. Annual healthcare costs are much higher for patients with chronic diseases and poor adherence. For example, non-adherent diabetic patients had total annual healthcare costs per patient of $16.498, nearly twice that of patients with good adherence ($8.886) [45].

Health professionals play a key role in improving treatment; they must recognise the patients' right *to get involved in any decision-making* that involves their disease. In order to achieve this goal, a *relationship of trust should be developed between the patient and doctor.* Through this relationship, health professionals can provide guidance and advice to patients to improve their adherence [46]. Interventions concerning patient education, simplified treatment regimes, cost-effective treatments, and easy access to medical services can be used to achieve this goal [47].

In addition, *audiovisual material* and valid medical Internet information sources can be used in place of written instructions to address the problem [48]. Mobile health applications may have an important role in improving adherence, as they are easily accepted by patients [49]. The most common m-health intervention is the Short Messaging Service (SMS), used either independently or in combination with other interventions. SMS content may include health education, medication reminders, and interactive automated messages [50]. Medication Organisation Devices (MODs) that reduce the burden of medical complexity are also widespread [51]. MODs contain sensors that detect in real time whether the device has been opened/used (by the patient) and calculate the number of pills remaining. This real-time data analysis makes it easier to monitor non-adherence, as a patient's caregiver is instantly informed, either by a phone call or by an SMS [52].

5. Conclusions

The first step towards improving adherence to medication is to recognise and analyse the problem. According to Jin et al., [27] the reasons for non-adherence can be classified into the following two categories: i) 'hard' – related to financial difficulties and ii) 'soft' – including social factors that obstruct treatment compliance.

Applying effective strategies that improve adherence in daily practice may have a greater impact on patient health than developing specific medical treatments [45]. There are still many challenges, when it comes to understanding non-adherence (apart from financial difficulties or forgetting to take medicines on time).

Implementing effective health policies can be a vehicle for optimising and protecting health in times of political and economic change. Efficient health expenditure management, long-term investment in people's health, universal health coverage beyond health protection, and reducing and eliminating social inequalities are essential measures anticipated to build a secure environment for people's health [53,54].

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