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**PERCEIVED INFORMATION NEEDS AND NON-ADHERENCE:
EVIDENCE FROM GREEK PATIENTS WITH HYPERTENSION.**

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Abstract

Background: The role of information on patients' decision to non-adhere is important, yet not well explored. **Objective:** To identify differences between perceived information needs for hypertension and medication to treat it, to explore the information channels used by patients and to test what type of information is more important to adhere to medication. **Design, setting and participants:** A questionnaire study was designed and conducted by telephone in the Centre for the Treatment of Hypertension in Athens, Greece among seven hundred and forty-three individuals. **Main variables studied:** The main variables included perceived information needs, information channels, non-adherence to medication and socio-demographic characteristics. **Main outcome measures:** Non-adherence to medication was measured using the Morisky scale. **Results:** Patients reported feeling better informed about hypertension (90%) than medication to treat it (80%). The doctor remains the dominant information source, while the Media, and magazines on health issues were reported more frequently than the family and the pharmacist. Feeling well informed about medication for hypertension was a predictor of better adherence. Other determinants of adherence were the use of the Internet and the Media. **Discussion:** The results confirm the importance of patients leaving the consultation feeling well informed about their medication as this improves adherence. They also show that the use of the Internet and the Media can be beneficial for adherence. **Conclusions:** Given the restricted time the doctor can usually spend with the patient, it is important to know that more emphasis on the information regarding medication is important.

Keywords: perceived information needs, patients, doctor, hypertension, information channels, non-adherence.

Introduction

Non-adherence to medication is of particular importance in antihypertensive treatment, leading to serious complications and increasing the risk of cardiovascular diseases and stroke. Recent evidence from the USA, based on reviews of clinical trials, warns of the risk untreated hypertension has on increasing heart attacks and other cardiovascular conditions [1]. Adherence to medication also affects the efficiency of hypertension treatment. A study examining the cost-effectiveness of arterial hypertension treatment by age, sex, arterial hypertension stage, type of drug used and level of treatment adherence concluded that improvement of treatment adherence yields the greatest gain among these factors both in the effectiveness and efficiency of the treatment [2].

A number of factors have been identified as determinants of non-adherence in anti-hypertension treatment. Of particular importance is the asymptomatic nature of the condition. Hypertension has no obvious symptoms and non-adhering to the treatment has no immediate consequences [3]. As a result, when patients experience adverse effects they may be tempted to modify their doses to avoid them [4]. The impact of socio-demographic factors in adherence with anti-hypertensive treatment differs among studies. With respect to gender, findings vary and results are inconclusive [5, 6]. Age has also been a puzzle although younger patients have been reported to have lower levels of adherence in the study by Ren et al [7].

Another important factor is the number and frequency of dosages. A meta-analysis by Iskedjian et al [8] concluded that patients were more likely to non-adhere if they had to take their medications twice a day than if they had to take them only once. Similar

results were confirmed in the review by Wetzels et al [9]. Taylor and Shoheiber [10] showed that the number of dosages is also important in anti-hypertensive treatment. They found that adherence was greater among patients who were on one medication per day than those receiving two or more.

The role of information about hypertension and the medication prescribed to treat it requires particular attention, as little is known about how well informed patients feel and the impact this has on their decision to take their medication. Evidence has shown that patients' information needs differ from health providers' perception of those needs and when they are left unresolved this may lead to lower adherence rates [11]. In chronic heart failure nurses underestimated patients' needs for information and that led to poor concordance between them [12]. Understanding patients' needs regarding both hypertension and the medication to treat it is crucial to help health care providers pass on the right information to them.

The aim of this study is threefold. First, it differentiates between information needs for medication and the condition itself to identify possible differences. Second, it explores different information channels used by patients to collect information for hypertension and the medication to treat it. Thirdly, it explores whether it is information about the condition or the medication that is more important in determining non-adherence to the prescribed medication.

To address the above aims a questionnaire survey among patients in Greece was designed, supervised and analysed. This is, to our knowledge, one of the first attempts to examine the problem of non-adherence and information preferences within a

specific group of patients in Greece, a country where no previous systematic empirical evidence exists. The survey took place in the Centre for the Treatment of Hypertension in the Hippocraton General Hospital of Athens.

The rest of this paper is organised in the following way. First, the methodology of the survey is described in detail, explaining the sampling procedures, interview techniques, the design of the questionnaire as well as its evaluation. The results of the analysis are then presented. A general discussion of the findings follows and the last section concludes.

Methodology

Sampling Procedures

The survey took place in the Centre for the Treatment of Hypertension in Hippocraton General Hospital of Athens. The Centre remains one of the country's biggest and most well known centres for the prevention and treatment of hypertension. It provides diagnosis as well as treatment of hypertension by prescribing medication, suggesting dietary plans and following patients up for as long as this is needed. The interviews were conducted by phone. For that purpose the survey company RASS, based in Piraeus, was recruited to conduct the telephone interviews. They contacted all members in the list of individuals enrolled in the Centre. There were up to four attempts to contact each patient, while an appointment was arranged with those who were willing to participate but for whom the time of the first contact was not convenient.

In the context of the specific study, the telephone survey solves an important methodological issue regarding the estimation of adherence rates. The desire to please the health care provider or researcher may encourage patients to exaggerate reports of medication adherence. The setting where assessment occurs as well as the relationship to the interviewer may also influence the extent that this social desirability effect occurs [13]. In the case of the telephone interviews patients are less likely to associate the survey with their treatment and their doctor and therefore it is less probable that they report biased adherence rates in order to please their physician.

Evidence also shows that patients tend to adhere better the closer they are to visiting their doctors and therefore surveys conducted in a clinic setting just before or after a consultation report higher adherence rates [14]. This obstacle can also be overcome with the telephone interview when patients are interviewed at a random moment of their everyday life.

Finally, in the busy context of a hospital setting patients are probably willing to dedicate less time to completing a questionnaire. A contact by telephone gives the patient the chance to choose a different and more convenient time or day for the interview to take place and this reduces the non-response rate.

Sample size

Seven hundred and forty-three individuals finally completed the interview. The sample size is sufficiently high for our investigation, a 95% confidence level and with a 3.5% confidence interval.

Questionnaire Design

This stage includes the process of translating the broad objectives of the survey into questions that can obtain the required information.

Measurement of non-adherence

The Morisky scale [15] was chosen as the most appropriate way of measuring non-adherence in our study for being simple and comprehensive.¹ The scale is composed of 4 yes/no questions regarding use of medication and it is therefore a simple and quick adherence screening tool. The questions ask individuals a) whether they ever forget to take their medicine, b) if they are careless at times about taking medicine, c) whether, when they feel better they sometimes forget to take their medicine and d) if sometimes, when they feel worse when they take medicine, they stop taking it. The Morisky score is calculated by assigning one point for each positive answer, thus it ranges between 0 and 4. The scale has been widely used in previous empirical studies to measure medication adherence both in hypertension and other chronic illnesses [17-21]. The scale is usually dichotomised but the cutting point depends on the responses of the question [22] therefore will be discussed later.

The Morisky scale has been developed in the English language and has been tested for psychometric properties and concurrent and predictive validity [15]. However, the

¹ It is worth mentioning that the new 8-item version of the Morisky scale [16] was published after the present study was conducted.

scale also needs to be psychometrically validated in the Greek survey by testing its reliability and validity. This is discussed in the results section of the paper.

Information

The study explores patients' perceptions regarding information needs by asking them how well informed they feel they are regarding, first hypertension and then medication to treat it. In particular patients were asked to answer with a yes or a no whether the following statements apply to them: "I am well informed about blood pressure" and "I am well informed about the medication I take for blood pressure".

The questionnaire then focuses on the sources patients use to get information regarding their condition and their medication. Eight different options are given: Family/friends, doctor, pharmacist, nurse, other patient with hypertension, the Media (TV, Radio, and Newspaper), Internet and Magazines on health issues and nutrition. These options were chosen from the literature and through discussions with the doctors in the Centre. The question was open-ended and patient could add other sources if they used any.

Socio-economic and demographic characteristics

Age is used as a continuous variable (i.e. measured in years) for the analysis. Education was merged into three categories (0= primary, 1= secondary, 3= tertiary) and marital status in two (0= not married, 1=married). Income reflected individuals' self-reported assessment of their financial situation (0=living comfortably with present income, 1=coping on present income, 2=finding it difficult to cope, 3=finding it very difficult to cope).

Cross-cultural adaptation

In order to be used in a Greek survey, the questionnaire needs to undergo cross-cultural adaptation procedures and linguistic validation. The methodology used in order to obtain semantic, idiomatic, experiential and conceptual equivalence in translation of the questionnaire was mainly based on the recommendations and guidelines of Acquardo and colleagues [23] and Guillemin and colleagues [24]. The procedure included clarification of concepts in consultation with the doctors of the hospital, forward translation from English to Greek by an independent translator, backward translation and finally pilot testing and proofreading of the final version.

Fieldwork period and ethical approval

The interviews were conducted between the 11th and 12th of April 2006. The study was approved by Hippocratio's Hospital Research Ethics Board on the 30th of March 2006 (protocol number 7173).

Statistical specifications

The nature of the dependent variable determined the type of the statistical analysis used. Given that the Morisky scale measuring non-adherence to medication was merged into a dichotomous variable a probit model was used to identify determinants of patients' decision.

The age and sex composition of the sample was different from the composition of the population, i.e. the sample had more women than men and age was above the average. Thus, at the beginning of the analysis we weighted the sample using post-stratification weights for age and sex, on the basis of the overall list of the Centre.

Stata edition 9.2 was the statistical package used for the analysis.

Results

Response Rate

Seven hundred and forty-three individuals completed the interview, 318 refused to participate, 337 were not eligible and the rest did not pick up the phone after the fourth effort to contact them. We report here the Response Rate RR5 defined by the American Association for Public Opinion Research (AAPOR) as the number of completed interviews divided by the number of completed and refused ones [25]. The response rate is 70% and is considered sufficiently high for our investigation.

Reliability

The reliability of the Morisky scale is measured in the present study both in terms of internal consistency and test-retest reliability. Internal reliability is tested here through the Cronbach's Alpha and inter-item correlation coefficient for the different scale items and results are shown in Table 1. The reliability of the scale is lower than the

original Morisky study, where Cronbach's Alpha was 0.61 [15], yet not much lower. Also, the "careless" item has a lower alpha than the previous "forget" item.

<Insert Table 1 here>

Test-retest reliability measures the degree of agreement between two measurements taken at two different points in time and it is measured using the kappa coefficient. The retest interview was conducted 3 weeks after the original interview. A random sample of one hundred and fifty (20%) of the participants were contacted and asked if they would like to answer a few more questions related to the initial interview. The retest interview repeated only the questions on adherence and lasted for less than 5 minutes. The kappa coefficient was 0.71, indicating a good strength of agreement [26].

Descriptive analysis

The average age of the sample was 61 years, 294 respondents (40%) were men and 601 (81%) were married. Almost half of the respondents felt they could cope with the present household income. One hundred and eighty four individuals (25%) stated they live comfortably while the rest (25%) felt it was difficult or very difficult for them to cope on present household income.

One hundred and sixty three respondents (22%) had received primary education, three hundred and twelve (42%) had finished secondary education (including those having finished Junior High School, High School or Technical School), while two hundred and eight (28%) held a University degree.

Information

Six hundred and sixty six individuals (90%) responded they feel well informed regarding hypertension, while five hundred and eighty six (80%) felt the same about information regarding medication for its treatment. It can be said that patients felt well informed in general, however proceeding with a t-test analysis we found that they seemed to feel significantly better informed about their condition rather than the medication used to treat it ($t=6.43$, $p<0.001$).

Participants were asked to indicate the sources they use to get information on hypertension and medication for its treatment (Table 2). The doctor was the dominant source of information for both, while all other sources were mentioned very rarely. An interesting finding is that the Media and magazines on health issues and nutrition were the second most commonly reported source of information for hypertension, more than the family and the pharmacist. Finally, the Internet was stated as an information channel only by 20 participants (2.8%) regarding hypertension and by only twelve (1.5%) regarding medication. Overall, sources of information regarding medication were very limited in relation to the ones for hypertension.

<Insert Table 2 here>

Non-adherence to medication

Table 3 shows the frequency of the responses to the combined items of the Morisky scale. The answers are very close to the responses of the original Morisky study [15], where the proportions were 43%, 24%, 17%, 7%, and 9% respectively.

<Insert Table 3 here>

Non-adherence rates were very low. As discussed earlier, Shalansky and colleagues [22] argue that the threshold score for the Morisky scale may differ depending on the rate of non-adherence and suggests that in cases where they are low a cutting off point of ≥ 2 may be used. This suggestion was followed and therefore as ‘non-adherent’ we denoted those respondents who had answered ‘yes’ to at least two of the questions of the scale. All other respondents were defined as ‘adherent’.

Determinants of non-adherence

Information regarding medication was a significant determinant of non-adherence. Those who reported that they felt well informed regarding the medication for hypertension were less likely to non-adhere ($b=-0.373$, $p<0.05$). On the other hand, information regarding their condition was not a significant predictor of non-adherence (Table 4). This is an interesting result, especially when compared with some findings presented earlier, showing that people feel better informed about their condition than they do about their medication.

<Insert Table 4 here>

The sources of information that predicted non-adherence were the Media and Internet. Respondents who reported they had used these sources to get information regarding their prescribed medication for hypertension were less likely to non-adhere to it ($b=-1.269$, $p<0.05$ and $b=-1.21$, $p<0.1$ respectively).

From the socio-demographic factors only age and education were significant predictors of non-adherence with older patients ($b=-0.0163$, $p<0.01$) and those with higher education ($b=-0.2952$, $p<0.1$) being less likely to non-adhere.

Discussion

Non-adherence rates among the hypertensive patients under study were close to the original study by Morisky and reveal that the sample studied here was mostly adherent to the medication. A possible explanation may be hidden in the fact that the sample was taken from a specialised centre. The Centre for the treatment of Hypertension in the Hippocraton General Hospital in Athens is one of the most well known centres for the treatment of hypertension in Greece. The hospital specialises in the treatment of all cardiovascular conditions. Therefore, patients visiting the centre may be more determined in treating hypertension and this may partly explain the high adherence rates.

Analysis showed interesting results regarding the role of perceived information on adherence. In general, patients seem to feel better informed about their condition and less informed about the medication to treat it. What is more, lack of information

regarding medication was a strong predictor of non-adherence. Of course, the study explored patients' perceptions regarding information, i.e. how well informed they feel. This may not always correspond to how well informed they actually are. However, the analysis confirms the importance of these perceptions on patients' decision to adhere. The practical implication is that the physician need to ensure the patient leaves the clinic confident about the information they have received both regarding hypertension and the medication to treat it.

On the information channels, it is clear that the doctor was the dominant source for patients both regarding their medication and their condition. All other sources were reported much less by the participants, indicating that the doctor has a very strong influence on patient's decision.

Another source of information that was shown to be important was the Media as well as magazines on health issues and nutrition. In fact, this information source was reported more often than the other sources, such as family and the pharmacist. Information from the Media was also shown to have a significant positive impact on patients' decision to adhere. A possible explanation, given that the use of Internet was also a significant predictor of adherence, may be that patients who search for more information are more engaged in their treatment and therefore willing to adhere to their medication.

Finally, the Internet was not a popular source of information. This is contrary to what it has been widely reported in other empirical studies, where the Internet is widely used as a source of information for the management of long-term conditions [27]. Yet, it is

not a surprising finding given that Greece lags behind in the use of Internet among the OECD countries [28]. However, according to the same source, the use of Internet in Greece is increasing rapidly suggesting that it is possible for it to become a more popular source of information for Greek patients with significant implications for decisions made by them. This is particularly interesting in the view of the significant impact that the Internet was shown from our analysis to have on patients' decision to adhere.

Before concluding it is also important commenting on Morisky scale, which was used in our study to measure non-adherence. In general, the use of the scale has been criticised for low internal consistency as this is measured by Cronbach's alpha [22]. However, Cronbach's alpha is a coefficient which depends on the number of items on the scale [29]. This means that the more questions used to measure a behaviour the higher the coefficient. However, increasing the number of questions makes the questionnaire more complicated to answer and requires more time to be completed. Given that hypertensive patients are usually older people and that interviews should be as short as possible it was suggested that keeping the scale simple should be the main criterion for selection. It is also worth noting that the new version of the Morisky scale [16], which includes 8 items instead of 4, had a much higher internal consistency (Cronbach's alpha= 0.83).

Conclusions

To conclude, given the restricted time physicians usually can spend with patients it is important to know what type of information matters to them. Our analysis showed

that patients' perceptions about how well informed they are, particularly regarding medication, is crucial when it comes to adherence to the doctor's prescription. Feeling well informed about the type of medication was a significant predictor of adherence to the doctor's recommendation.

Information sources for hypertension and the medication for its treatment included the Media and magazines on health issues and nutrition and to a less extent the pharmacist and the Internet. All sources were dominated by the doctor who was the main person the vast majority of patients consults when it comes to information concerning their condition and the medication to treat it. This highlights the important role that the doctor still has in enhancing people to adhere to recommendations.

Adherence to medical recommendations is part of a wider patient-focused agenda [30] which includes patient safety, quality of care and satisfaction with health services. A study by de Figueiredo and colleagues [31] in Brazil showed that patients who were more likely to non-adhere to antiretroviral treatment were also more likely to make mistakes with their treatment, underlining issues of patient safety. A number of interventions have tried to inform patients about their medication with the aim not only to improve adherence but also prevent adverse drug events and improve patient satisfaction [32]. Vincent and Coulter [33] described the roles patients can play in order to improve safety and discovered that well informed patients are more likely to adhere to treatment and showed better health outcomes. The present study confirms that information issues are important

and suggests that information interventions should focus on better information regarding medication, as this seems to have a crucial impact on adherence.

Yet, as it has been argued by Haynes and colleagues [34] in one of the most updated reviews in the area, the literature on adherence interventions ‘remains surprisingly weak’. Almost all of the interventions that were effective for the treatment of long-term conditions, such as hypertension, were complex and required more than one element in order to be effective. Relevant to our study here, these interventions included more information and also the attention of the health care provider. Our findings point towards this direction. However, the need to understand better the factors that lead to non-adherence remains vital despite a great deal of work in the area.

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Table 1: Internal reliability – Cronbach’s alpha

Item	Sign	Item-test correlation	Item-rest correlation	Average inter-item covariance	Alpha
Forget	+	0.7024	0.3687	0.0352	0.4559
Careless	+	0.757	0.469	0.0259	0.3586
stop when better	+	0.5808	0.3061	0.0491	0.5096
stop when worse	+	0.5629	0.2252	0.0540	0.5697
Test scale				0.0411	0.5539

Table 2: Use of the following sources to get information regarding...

	...hypertension	...medication
Family/friends	4.3%	0.5%
Doctor	97.3%	97.9%
Pharmacist	6.3%	5.4%
Nurse	1.1%	0.3%
Other patients with hypertension	2.4%	0.3%
Media (TV, Newspaper, Radio)	10.8%	1.7%
Internet	2.8%	1.5%
Magazine on health issues and nutrition	13.9%	2.5%
Other sources	1.8%	0.4%

Table 3: Patient Responses to Morisky Scale

Patient Answered "yes" to:	% of valid
0 items	48
1 item	25
2 items	15
3 items	9
4 items	2
Total	100

