# ERASMUS UNIVERSITY ROTTERDAM
# ERASMUS SCHOOL OF ECONOMICS

# MASTER THESIS HEALTH ECONOMICS

**Subject:**" Internet Use and its impact on frequency of visit to doctors"

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I would like to dedicate this master thesis to my parents who support me psychologically as well as financially all this period.

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# Abstract

The traditional relationship between doctors and patient has experienced structural changes and a new type of relationship emerged. Patients have been transformed into an active consumer of health information and claim their participation in the decision-making process. Internet use has a main impact on the significant change of the structure in the medical world. The main purpose of this study is to investigate whether internet use can affect positively or negatively the frequency of visit to doctors. The factors used in our analysis were internet use for health information, opportunity cost, quality of relationship and health state. The method used in our study was a questionnaire survey which tested the hypothesized relationship between internet use and frequency of visit to doctors. It was indicated that internet use affect negatively the frequency of visit to doctors. Furthermore quality of relationship and health state are significant factors that influence positively the frequency of visit to doctors in contrast with opportunity cost that has no significant impact. A potential relationship between internet use opportunity cost, quality of relationship and health state could be investigated in a greater extend.

**Key words:** health information, internet use, frequency of visit to doctors, substitution and complementarity effect, quality of relationship, opportunity costs and health state.

# Contents

# 1. Introduction

In the Internet Age, the relationship between doctors and patients has been induced a rapid change. Traditionally, this relationship has been characterized as paternalistic where the attention was on obligations of patients. The development of technology, the diffusion of internet in health care services, the emergence of consumerism( focus on patient rights) in the patient-physician relationship and the creation of managed care organizations has changed completely the heath care services and the structure of this relationship. Based on this steep change it is expected that the general public will attempt to participate more actively in the medical decision-making process. (Brashers, Haas, Klingle and Neidig, 2000)

Internet as an important factor should facilitate these changes since it permits free access in health information to the public, reducing the imbalance of power between doctors and patients which comes from the problem of the asymmetry of information and characterizes this relationship. Internet constitutes a wide resource of health information enabling people to be informed about medical issues.

Regarding the increased use of internet, many specialists have raised their concerns about the potential shortcomings of health information on internet focused more on quality issues. On the other hand an emerging topic that is related with Internet is whether internet use affects the frequency of health professional visit. In fact this issue has not been fully investigated yet. (Chul-Joo Lee, 2008)

However some scholars have tried to shed some light on the effects of internet use for health information over the frequency of visit to health professionals. According to their rationale, they argued that if people use internet for finding information related with health issues then it is expected that the total time patients discuss with their physicians is possible to increase. Furthermore if they use internet for finding information before the visit then it is supposed that the visit will become more productive. A potential improvement of the quality of relationship between doctors and patients may lead patients to increase their visit to doctors. On the other hand not only the cost of visit but opportunity cost (like the loss of time for a visit to a doctor) as well can motivate patients to substitute their visit to health professionals with internet.

## 1.1 Research Question

Specialist has paid considerably attention to the consequences from the sharp change in the environment of information in the health care sector. Mass media like television, magazines and newspapers focus on health issues making people's interest to grow more and more about health. Nevertheless, it is a fact the significant contribution of Internet in the modulation of a new structure of health care services and a new environment of health information. Individuals have the possibility to seek health information from a wide resource of health information enforcing their knowledge to complex health issues where in the past was extremely difficult for them to be informed. This changed brought a significant shift in the role of patient from passive to active in the decision-making process.

As already mentioned above, some scholars have already developed some thoughts about the impact of internet on the frequency of health professional contact. Going furthering in this issue someone can put some basic questions as: 1) Whether Internet provide patients with incentives to reduce time and money required for contact with the physicians without reducing the number of contacts (for instance communication through mails.) Also another question is whether internet decreases the number of physician-patient contact by functioning as a substitution to the doctor visits. (Chul-Joo Lee, 2008)

At this point it should be very important to mention the definition of substitute and complementary goods since their terms has influenced the modulation of our research question and our hypothesis. Substitute goods are two or more goods when one could be used instead of the other (others) in order to satisfy the same need. ( Miltiades Chacholiades, Microeconomics 1, 1990)  The demand for a good is changed into the same directions with the price change of the substitute good. A. In our study we take as an example for substitute goods the internet and the visit to doctors. For instance if the price of a visit to doctors is increased, people can substitute, if it is possible, this visit with internet.

On the other side, Complementary goods are two or more goods where the consumption of one good requires the consumption of the other (others) in order to satisfy a need. The demand of a good is changed into the opposite directions with the price change of the complementary good .In our study we can regard as

complementary goods internet and visit to doctors but quite more differentially with the previous definition. In this case we can suppose that the frequent internet users will also visit often their general doctors.

The above consideration brings us the following research question:

**"Does internet use for health information actually affect positively or negatively the frequency of visit to doctors?"**

## 1.2 Hypothesis development

Since the correlation between internet use and professional contact remains an important issue some scholars have expressed the opinion that internet use contributes in the realization of a more interactive and deliberative type of doctors-patient relationship (Chul-Joo Lee, 2008). This statement arises opportunities for a more productive relationship between them which can lead to an increase of professional contact.

Nevertheless, the medical community raises concerns about the technological advancement in the medical world and the negative consequences on their relationship with their patient. In this point is considered important to refer to a basic characteristic of health professionals which is their dominance on the field of knowledge. Given this health professional power comes from the ignorance of patient against doctor's expertise. (Child, Fulk, 1982).

Focusing on the development of technology in the medical word, some scholars had underlined the emergence of a new trend in the society. Deprofessionalization is defined as "the loss of physician's monopoly over knowledge, public belief in their service ethos and expectations of work autonomy and authority over client" (Haug, M.R. 1973). According to Haug, a significant improvement of technology in the field of medicine is the weak control of physicians over their profession.

Companying Haug's hypothesis with the potential impact of Internet use on physician visits, one can suggest that the new health information environment can enforce people to be less dependent on health professional contact. This trend can lead to a loss of health professional's monopoly power.

However, people usually face difficulties to understand in depth all the health information which come from internet due to a lack of advanced knowledge. So the increasing dependency on internet may raise the number of contact with doctors The rationale behind this behavior predicts that individuals will feel the necessity to discuss with their doctors about the information from internet so that giving the answer in questions that may have concerning the meaning of medical information.

On the other side, people may use internet as a substitute to visit to doctors as a way to avoid the cost of the visit. Moreover opportunity costs are concerned another reason which motivate people to use internet as a substitute against health professional contacts. (M. K Bundorf. L. Baker, S.Singer T.Wagner)

On the basis of the above considerations, the following two hypotheses are modulated:

**Hypotheses 1a:** Internet Use for health information affects negatively the frequency of visit to doctors. (Substitution Effect)

**Hypotheses 1b:** Internet Use for health information affects positively the frequency of visit to doctors. ( Complementarity Effect).

## 1.3 Thesis Structure

Thesis structure is divided into 6 chapters, therefore a brief outline is provided below.

*Chapter 1*. ***Introduction:*** The first chapter comprises a short introduction of the topic, the development of the research question and hypotheses and the structure of the thesis.

*Chapter 2*. ***Theoretical Review***: In this chapter theoretical review and empirical findings from the existing literature is presented and discussed.

*Chapter 3*. ***Research Methodology:*** This chapter consists of a presentation about the survey design, questionnaire design.

*Chapter 4*. ***Results and Analysis:*** All the information about demographics, the analysis procedure and the report of results is included.

*Chapter 5. **Conclusions:*** In the last chapter is included a general conclusions and general discussion as well as limitations and further research.

## 2. Theoretical Review

In this chapter theoretical analyses and empirical results from previous empirical studies are discussed. There is a limited empirical research, however, in the field of the impact of Internet as a source of health information on the patient-physician relationship. There is even limited literature for our research question for this reason we will present a general background about internet as an alternative way of seeking health information and its impact on doctor and patient behavior. We analyze as well one of the major failures of the heath care market and how this issue can be connected with our topic.

### 2.1 Internet and its impact on the doctor-patient relationship

The unlimited use of internet leads to its embodiment into the daily life of people. The intensive use of internet has already a profound effect on the medical world. The role of both patient and doctor has shifted and the traditional relationship has ended. According to the new reality, patients can access an unlimited volume of health information being more responsible for their care. On the other side doctors should be ready to handle with the new patient role. The last decade many scholars focus their research interest not only on whether internet affects the relationship between doctors and patients but on many other related issues.

The emergence of the necessity for this structural change in the health care comes from the desire for a better quality of care, for better knowledge, for more privacy and security of personal health information, for finding a solution in the problem of malpractice and finally comes from worries about doctor's reimbursement. (J.P.Kassier, 2000)Patients are dissatisfied with the fact that their doctors are not paying mush attention to them and not dedicate the appropriate time to for listening their complaint.

It is true that a new role for physicians has appeared. Doctors would be able to treat through mail a no serious illness as respiratory infection, as they used to do in the past through telephone. Furthermore doctors will be in case to prescribe, scheduling, sending laboratory test, and do all the regular activities not only from their office but using email. It is clear that doctors have to understand that patient is not passive

recipient of information but they have changed to active consumers of health information. The paternalistic relationship between patient and doctor defines that patients follow blindly the order of doctors and they avoid asking for questions. Doctors have the exclusive expertise and knowledge to make decisions for their patients. In the age of consumerism, the increasing growth of new technologies and especially internet changed the paternalistic model. After this change scholars suggested that personal preferences of patient should be taken into account The ideal model seems to be a model where patient and doctors will have an equal role in the decision making process Patients will bring to the relationship their life-style preferences and doctors will contribute to the relationship bringing their advanced knowledge and experience about the technical aspects of diagnosis and treatment. (Raisa B. Deber, 1994)

To sum up, with the easy access and availability of information about health issues on internet, patient ask from their doctors to be fully- informed about their health status and their illness. They want to participate actively in the treatment decision making process. The shift of the role for patient is obvious and the impact of this change on the relationship with doctors depends on whether doctors are ready to accept it or not. Doctors with inadequate communication skills are possible to perceive the new role of patient as a challenge for their dominance of their professional authority. In this case this group of doctors will have a negative attitude towards their patient and behave negatively in the consultation.

On the other side doctors with adequate communication skills could reinforce their patient to look for information on internet and discuss afterwards with them. This category of doctors indicates a greater acceptance of more informed and educated patients since it may result to an improved relatiosnhip. (Ben.S. Gerber, Arnold R.Eiser, 2001.

## 2.1.1 The effect of internet on the patient empowerment and disease experience

Consistent with recent empirical studies internet affects patient empowerment and control over their diseases in a positive way. More specific patients with life-threatening diseases report that internet assists them to gain the control over their disease improving their quality of life. (Alex Broom, 2005)

The wide use of internet for health-related issues and the increased desire for information lead patient into the greater participation in treatment decision making enhancing their autonomy and improving the outcome. Although the relation between participation and satisfaction of patient is not clear yet, researchers support that a patient with an active role in his care could increase the success of the treatment since he can increase his control over the illness and gain more self-confidence. The psychological status of patient plays a vital role for the outcome.

More analytical, the definition of patient empowerment has been used different by many authors. According to K. Roberts (1999) this term has been used to indicate a new role of patients who gain more power and control of their health and the imbalance of power between doctors and patient has been changed significantly. According to Gibson (1991) the definition of empowerment refers to the emergence and increase of the sense of control over a disease, the sense of a healthier status, independency, power, and the absence of helplessness, hopelessness and paternalism. Finally consistent with Sharf (1997) empowerment defines how patients can make better decision for their health improving their quality of life based on the online information that they found.

Empirical studies have shown that empowerment is connected with better outcomes regarding the patient treatment and higher satisfaction of patient. Greenfield and his colleagues (1985) extracted the conclusion that patient with an active role would acquire a greater sense of control over their illness, thus a better outcome for them. The results of this study are in compliance with other studies which demonstrated similar results, positive relationship between sense of control and active role of patient (Alex Broom 2005). The question that came in light after these studies is whether internet has an impact on patient- doctor relationship. Research studies show that is a strong relation between internet and patient empowerment and both affect the doctor-patient relationship.

Some patients in the study of Alex Broom (2005) reported the use of Internet had an impact on their decision-making ability. Finding useful information on internet they felt that they had some control over their disease. Internet gave them a sense of a goal and control. According with their experience their quality of life improved significantly.

On the contrary, the article of Alex Broom report some reasons why patients do not turn into internet for deciding about treatments. For some patients internet has no impact on their disease experience because of its unclear and contradictory nature of the effect it has on it. For counteracting this problem it would be essential to develop internet as an alternative source of information and support.

**2.1.2 Shortcomings of health information on internet**

Internet as a new alternative source of information on medical world can transfer knowledge concerning medical issues from health professionals to the general population and help people to improve their health. There are many websites for medical and health information that provide individuals with information about health problems, prevention and other issues relating with health. The gap between professionals and patient has been reduced remarkably by this transfer of knowledge. According with recent studies there is a considerable large percentage of the population in Canada and United States that seek health information on Internet. (Benigeri, Pluye, 2003)

Nevertheless, this new source of technology hides several weak points and it is worth mentioning some of that in our text. Some shortcoming could be:1)low quality of health information available on internet 2)difficulties in finding, understanding and using this information,3) lack of access for a percentage  of the population 4) the harmful effects of the expansive use of internet. (Benigeri, Pluye, 2003).

Concerning with the quality of information there were developed some criteria in order to evaluate the volume of the information which is available on internet. These criteria take into account the content of the website, the form (design and use of media for instance), accessibility and credibility of sources. (Kim, 1999 and Winker, 2000). About the lack of access, even though Internet gives the possibility to everyone to have equal access to health information, still, there are many people who do not have access to it. Moreover the age, but also the income is essential factors which increased the inequalities in access to Internet. As a general conclusion someone can argue that if knowledge becomes a benefit exclusively for the rich people, then increasing social inequalities will be a serious threat.

Turning to the problem for finding, understanding and using health information there are some important findings. Although there are many sources of medical information

available on internet (in 2000 there were more than 70.000 health related sites Benigeri, Pluye, 2003), individuals have a limited number of tools to seek the information which are relevant for them. There is empirical evidence that patients who use sites for finding information about breast cancer or obesity find only one link will give them the information that they want. (Berland, 2001). Incomplete information is always a problem and even if someone finds a site which is complete furthermore he has to understand it and to transfer theory to practice. The problem is that a majority of the sites include medical terms where only health professionals have the ability to understand. Advanced reading skills are required for understanding the medical sites.

Finally the harmful effects of the overuse of internet are extremely important due to existence of inaccurate and manipulative sources of medical information. For people who interpret in a wrong way the information that they\find or try improper treatments, there is a serious probability of health problem. More generally, Internet could lead to an over consumption of drugs and use of health services without resulting in a positive effect on quality of care and prevention of diseases.

## 2.2 Asymmetric Information and Internet as a source of health information

Having a more economic perspective we can investigate the impact of internet as a source of information on the market of health care. It is crucial to mention and to analyze a specific feature of health care market so that we could correlate internet as an alternative source of information with this market.

Health care market is characterized not only by imperfect information but also by asymmetry of information between health professionals and patients. Asymmetric information is a term used to describe a situation where patient and physicians have different level of information about the health status of patient, treatment available expected outcomes and prices charged from others providers. (Folland, Stano, Goodman, 2007). Markets of other goods also characterized by asymmetry of information but perhaps in health sector are more serious. Asymmetric information is a source of market failure (W.G Scott, H.M.Scott, T.Auld, 2005) and for this reason many economists have turned their attention on this issue.

In a market of health care which is characterized by asymmetric information, it is supposed that physicians are better informed than their patient and are able to present health services or medical product to be of high quality and to be necessary more than actually is influencing consumers of health services to consume much more quantities of health care and pay more as well than in case that would be fully informed. From the above case it seems that an unregulated free market of health care may fail to maximize the social welfare due to inefficiency of market. Government intervention is considered the main tool for correction of market failures. Nevertheless, trying to correct market failure by government intervention the cost of such policy is expected to overweight the potential benefits. (W.G Scott, H.M.Scott, T.Auld, 2005)

The information asymmetry lead into another particular feature of health care market where physicians induce demand on the part of their patient by taking advantage of their information surplus to provide more or even more expensive services resulting in overprovision of health .It is supported the relationship between the level of information or knowledge and the information asymmetry since the more informed a patient is, the less experience of demand inducement would have. (Kenkel, 1990).

 If we try to find out the correlation between internet and the phenomenon of asymmetric information we can support that if the quality of health information on internet could be evaluated and controlled then internet could be used as complementary solution of the problem of asymmetric information since it would provide consumers of health care the opportunity to be fully informed and to value in a more efficient way the medical services. For instance patients who are informed from internet about a specific illness may use a different treatment that better match them instead of the doctors proposed treatment. In this way patients can effectively correct the problem of the asymmetry of information.

## 2.2.1 Consumer Demand for health information on Internet

Consumer demand for health information comes from the demand for health and people could maximize their utility from being healthy and increase their productivity in the labor and leisure because of their good health status. The main factors which affect the demand of health information are associated with the effectiveness that consumers will gain from the acquisition of health information and the expected costs

and benefits that individuals have from the use of health information. (Bundorf, Baker, Singer, Wanger, 2004)

Concerning the first factor, consumers need more health information in order to minimize their uncertainty about the result of any specific treatment. The lack of advanced knowledge on the part of patient about medical issues leads them into the increase of demand for health information. Increasing the volume of received information, consumers will improve theirs knowledge about health.

The expected cost and benefits consumers have from the gaining of health information affect the demand of health information both in a negative or positive way. People in a poor health condition are expected to benefit more from more information and knowledge about health issues than people in a better health ( Bundorf, Baker, Singer, Wanger, 2004).Therefore people in poor health would increase their demand for health information. Moreover, highly educated individuals are likely to have increased demand for health information comparing with low educated people. In addition highly educated people can reduce the expected cost of gain health information since they possess the appropriate knowledge to indentify and acquire this kind of information.

Although physicians were for years the ultimate source of health information, the diffusion of technology has managed to shift consumers to other alternative sources of medical information. The appearance of Internet as a new alternative source of information offered to scholars the opportunity to study the impact of internet on the demand of health information from non physician sources. The demand for health information on internet is affected positively and negatively by some factors. It is important to mention that the characteristics of individuals have a significant impact on the demand for medical information.

According to Bundorf, Baker Singer Wanger,(2004) individuals in poor health or with chronic diseases is more likely to increase their demand for health information on internet Health status and expected benefits appear as important factors of demand for health information on internet. Furthermore the insurance status of individuals influences the demand of health information from internet. Uninsured people will turn on to the internet as sources of information since because of financial barriers are not able to access health care from the traditional environment

In addition people facing high price to get the information from physicians are more possible to substitute physicians with internet as a source of information. Opportunity costs of time in visiting physicians are counted as a reason for increasing the demand for health information on the internet. (Wagner et al, 2001). On the other side the difficulty of evaluating the quality of information on internet as well as the huge amount of information on internet that someone can find online may discourage consumers to seek health information online affecting in a negative way the demand for medical information on internet.

## 2.3 Internet Use for health information in Greece

In our study the sample we used in order to extract our results was 101 respondents from Greece. For this reason we consider that is important to refer whether the use of internet for health information is in a significant degree or not in Greece. We briefly present the results of research study of Chronaki, Kouroubali, Stathopoulou, Roumeliotaki, Orphanoudaki, Esterle, Tsinakis which was carried out in 2007. The main objective of this study is to find out the perception and the behavior of people in Greece concerning the use of internet for Health.

According to their study, generally Greece has the lowest levels of Internet use in Europe while the main reason of internet use in Greece is the seeking of information. Nevertheless, it is noticed that there is an increasing use of internet for health and other related issues. The main explanation for the limited use of internet for health issues is apparently the perception of general population that personal contact with doctors cannot be substituted by internet.

More specifically those who use intensively internet for Health issues are just 13% of the general population. Their characteristics are mostly men highly educated people between 25-44 years old and they are living mainly in cities. They use internet to improve their knowledge about health-related issues, to decide whether a visit to doctor is necessary or not, to be more informed either before or after a visit to physician. In addition people who tend to use very often the internet are the younger and because of the intensive use of internet it is noticed that the percentage of people who use it for Health in Greece would grow.

Finally they recognized the existence of a digital divide in Greece that can be caused from the lack of adequate infrastructure in the remote and rural areas. Age, gender and level of education enhance the digital divide in Greece.

The main conclusion of the study confirmed the existence of the digital divide in Greece because of the different perception of Internet among the Greek population. Nevertheless currently the use of Internet for e-Health is increasing and the general thought for internet as a source of health information is more positive  in Greece comparing with the past.

# 3. Research Methodology

In this chapter all issues related with the method used to collect the data of the survey has been discussed. All the important details about the survey and questionnaire design are illustrated.

## 3.1 Sample and Survey Design

In order to collect the data for the present study a questionnaire of 26 items has been conducted. Approximately 150 questionnaires were put in the waiting rooms of the offices of 15 doctors of various specializations in order to study the relationship of health information on internet with the behavior of patient. The exact amount of the questionnaires that was received was 103 and the rest 47 questionnaires were not filled in at all. The survey took place in Thessaloniki, Greece. The duration of the survey was from 1/08/2010-31/08/2010. The applicants filled in the questionnaires during their waiting time in their doctor's office. Participants who attended in the survey were kindly requested to read the introduction paragraph of questionnaire in order to avoid filling in wrongly the questionnaire. Considerable attention was given in the anonymity of the survey as to receive precise answers.

In conclusion the introduction paragraph is given below: "This questionnaire is meant to investigate the influence of health information on Internet on the patient's behavior. The questions are divided into six parts. Always you underline the statement that fits your explanation. It takes no more than 10 minutes to fill out this form. Please don't have any worry about your anonymity, this questionnaire is strictly personal. No one else is possible to read your answers. Thanks in advance."

## 3.2 Questionnaire Design

In this part it is described the structure of the questionnaire which was assessed the two hypothesis of this study. The questionnaire is divided into six parts which with each one counting a different number of variables.

### 3.2.1 Measurement

As it was mentioned above the questionnaire is divided into 6 parts. Part 1 measures the demographic characteristics of respondents. Part 2 measures the use of internet from the respondents. Part 3 measures the cost variable. Part 4 measure the communication between doctors and patient. Part 5 measure how patients take care of their prevention and lastly Part 5 measures the health status of patient. The questionnaire includes 26 items as it is mentioned above.( Appendix 1,2)The number of items used in each part was between 4 to 5. In essence a combination of scores is used to the present study. A Likert 5-scale ranging from strongly disagree (1) to strongly agree (5) are used to measure the variables for cost, communication and prevention. A 5 statements scale proposed by Chul-Joo Lee (2008) is used in the present study for measuring the frequency of use of internet. A 5 statements scale and a 2 statement scale proposed by Ronald Rice (2006) are used in here for measuring health status of patient and the frequency of visit to doctors the last two months respectively. Lastly an ordinal scale ranging from 0 to 1 is used as well. This questionnaire was generated based on previous academic literature in the area of internet health information seeking. Based on the articles of Ronald Rice (2006), Chul-Joo Lee (2008), and Kate Bundorf, L.Baker Sara.Singer Todd Wagner (2004) we extracted the items of our questionnaire.

In the first part there was 4 items. Questions like "how old are you", "what is your gender", "what is your educational level" and "what is your occupational status" are measured the demographics characteristics of respondents.( Appendix 1,2)

In the second part there was 5 items. Questions like "I go on the internet", "I consult health websites", "I ask my family members or friends to find for me health information", "I trust health websites" and "Before this visit to the doctor I gathered information on a website" are measured the use of internet. .( Appendix 1,2)

In the third part there were 4 items. Questions like: "A visit to the doctor is very expensive" "A visit to the doctor takes a lot time" "Travelling to visit the doctor it takes a lot of time" "Travelling to visit the doctor is expensive" are used to measure the factor of cost. .( Appendix 1,2)

In the fourth part were 4 items. Questions like: "it is difficult to explain what I have to the doctor" "The doctor is very clear" "The doctor takes enough time to explain what

I have" "I don't feel comfortable to discuss with my doctor about my problem" are used to measured the quality of communication between doctor and patient .( Appendix 1,2)

In the fifth part were 4 items. Questions like: "I go to the doctor for a checkup" "People should visit the doctor only when they are very ill" "I consult websites to gather information to avoid getting ill" "I find necessary to discuss with my doctor the information I find on health websites" are used to measure the degree of prevention that patient take care. (Appendix 1,2)

In the last part were 5 items. Questions like: "Do you have a chronic disease" "How many times did you visit your doctor in the last 12 months" "Do you have any disease which is relating with heritable reason" "Do you receive any particular pharmaceutical therapy" "Would you say your current health is very good, good, fair, poor or very poor" are used to measure the health status of patient. (Appendix 1,2)

# 4. Results and Analysis

In this chapter, the results of the present study are analyzed by means of factor analysis and binary logistic regression analysis. In the first section some demographic characteristics of respondents are discussed. The following three sections are associated with the statistical analysis of the survey: Clustered bar charts were used to indicate some information about the relationship between two or more variables. Factor analysis was used to identify the latent factors of the constructed model and lastly binary logistic regression was conducted to investigate the potential linear relationship between the depended and independed variables of the model.

## 4.1 Demographics

Out of the total number of respondents 51,5% were females and 48,5% male. The age group with the higher frequency was the group 18-28 and its percentage is 21,4% out of the total respondents. 58,3% of total respondents have received university education. The predominant occupation status of respondents is employed with a percentage 57,3% out of the total respondents. In the following table are presented the demographic characteristics of the respondents and then it follows pies diagrams for visualizing our results.

**Table 4.1: Demographic Characteristics of Respondents.**

| Age | Number | Percent (%) |
|---|---|---|
| <18 | 7 | 6,8 |
| 18-28 | 22 | 21,4 |
| 29-39 | 20 | 19,4 |
| 40-50 | 20 | 19,4 |
| 51-61 | 20 | 19,4 |
| > 62 | 14 | 13,6 |
| **Gender** | | |
| Male | 50 | 48,5 |
| Female | 53 | 51,5 |
| **Educational Level** | | |
| Less than High School | 11 | 10,7 |
| High School | 32 | 31,1 |
| University | 60 | 58,3 |
| **Occupational Status** | | |
| Employed | 59 | 57,3 |
| Unemployed | 5 | 4,9 |
| Retired | 18 | 17,5 |
| Household | 3 | 2,9 |
| Student of University | 11 | 10,7 |
| High school student | 7 | 6,8 |

## 4.1.2 Pies Diagrams

**1) Gender**

**Diagram 4.1: Gender**
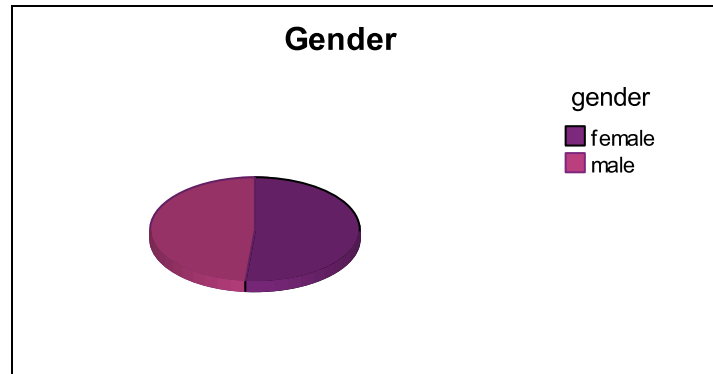


**2) Age**

**Diagram 4.2: Age**
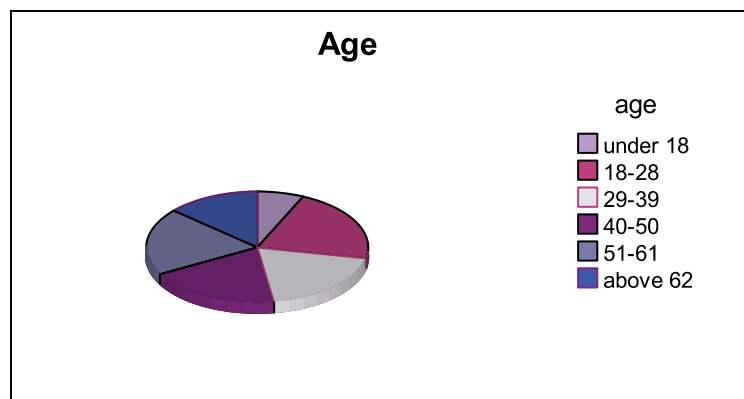


**3) Education Level**

**Diagram 4.3: Education Level**
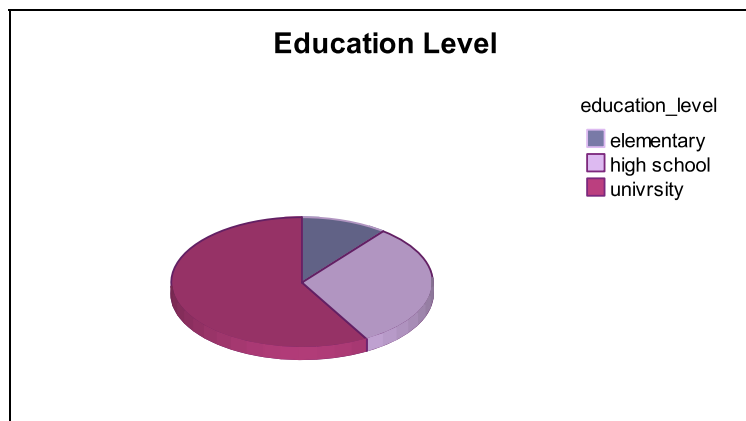
**4) Occupation Status**

**Diagram 4.4: Occupation Status**



Occupation Status

occupation_level
- employment
- unemployment
- retired
- household
- student univ
- student school
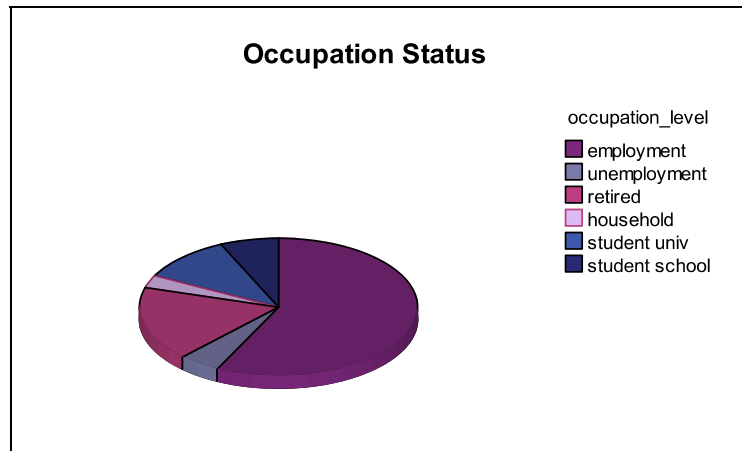
## 4.2 Clustered Bar Graphs

In this section the use of clustered bar graphs could offer more information about the relationship between two or more variables. In our model we used clustered bar graphs to indicate the relationship of the frequency of seeking health information on internet with the demographic characteristics of respondents. Furthermore we seek whether there is a correlation between the trust of health information on internet with the demographics characteristics of respondents and whether there is a correlation between the independent variable of our model (visit to doctors the last 12 months) with two other variables. (trust on health information online and sense of embarrassment discussing with the doctor). The use of graphs is expected to demonstrate in a more interestingly and interactive way some information.

## 4.2.1 Frequency of seeking health information and age of Respondents

**Diagram 4.5: Frequency of seeking health information and age of Respondents**
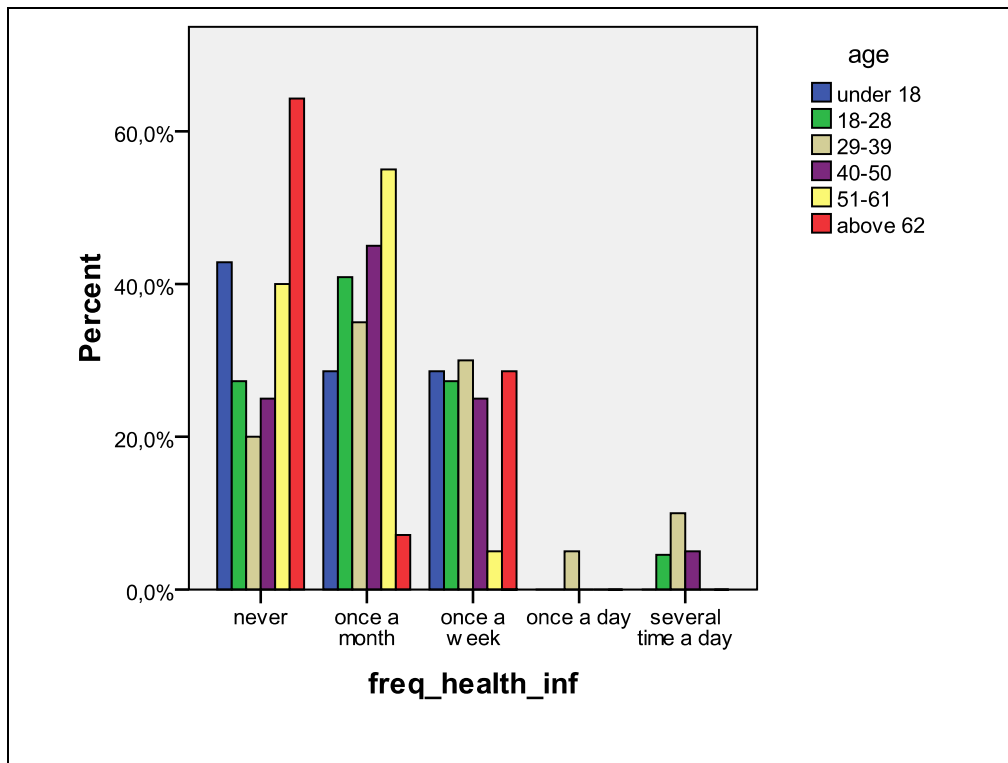


In the first graph we can say as a general comment that the predominant age group which never use internet for health information is the group of age above 62 with percentage above 60%. This high percentage seems quite rationale since this age group in Greece have the less experience with internet and mainly for seeking health information. Furthermore even the low percentage the age group of 29-39 it seems the predominant group which use internet in a more intensive frequency. Around 35% of respondents age of 29-39 use the internet for finding health information once a week Even a lower percentage of the same age group use the internet for health information once a day and several times a day.

## 4.2.2 Frequency of seeking health information and gender of Respondents

**Diagram 4.6: Frequency of seeking health information and gender of Respondents**
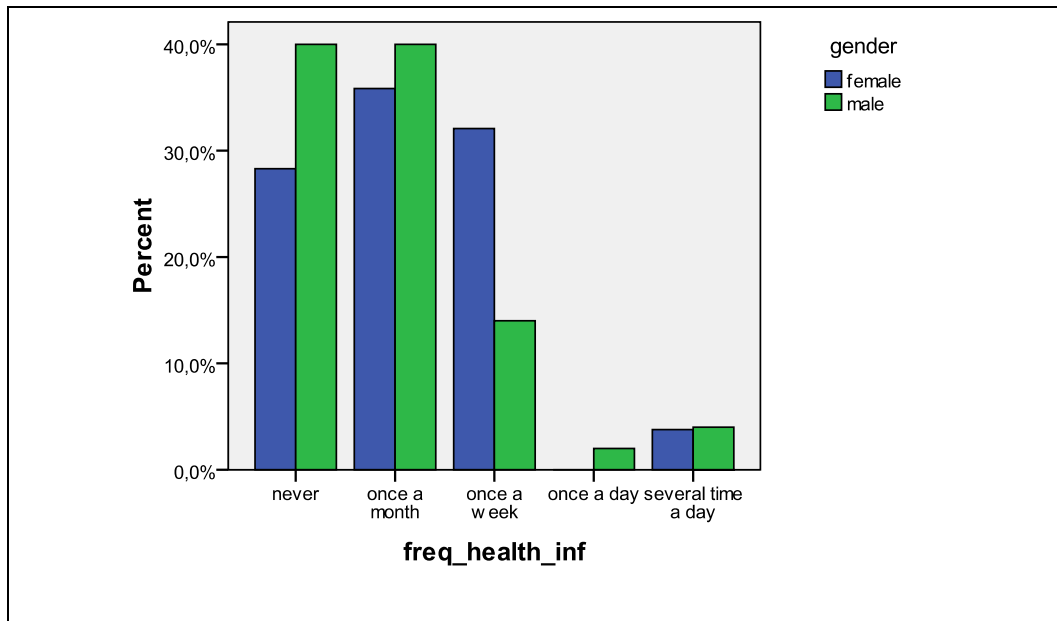


The second graph depicts the frequency of seeking health information on line based on gender. It seems that the percentage of male who use internet for health information is lower that this of female. More specific the percentage of male who never use internet and those who use once a month for health information is both 40% comparing with this of female which is lower: about 28% and 35% respectively. There is a considerably difference between the percentage of male and female who use internet once a week. About 33% of female use internet for health information once a week comparing with 15% of male. The percentage of male and female who use internet for health information several times a day is significantly low and is quite the same.

## 4.2.3 Frequency of seeking health information and education status of Respondents

**Diagram 4.7: Frequency of seeking health information and education status of Respondents**
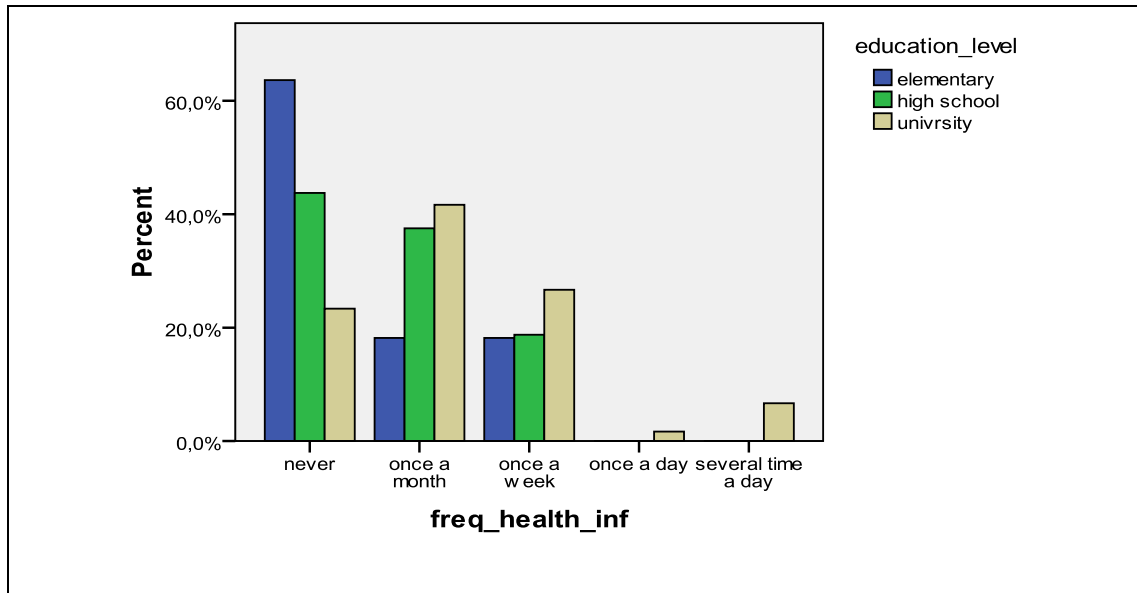


In the above graph it is depicted the frequency of seeking health information on internet according to the level of education. Based on this graph it is obvious that the predominant group that use internet for health information more intensively is the group of respondents who received university education. 41% of respondents of this group use internet for health information once a week. In contrast a high percentage of respondents who never use internet for health reasons (61%) have received elementary education.

## 4.2.4 Trust of health information on internet and gender of Respondents

**Diagram 4.8: Trust of health information on internet and gender of Respondents**
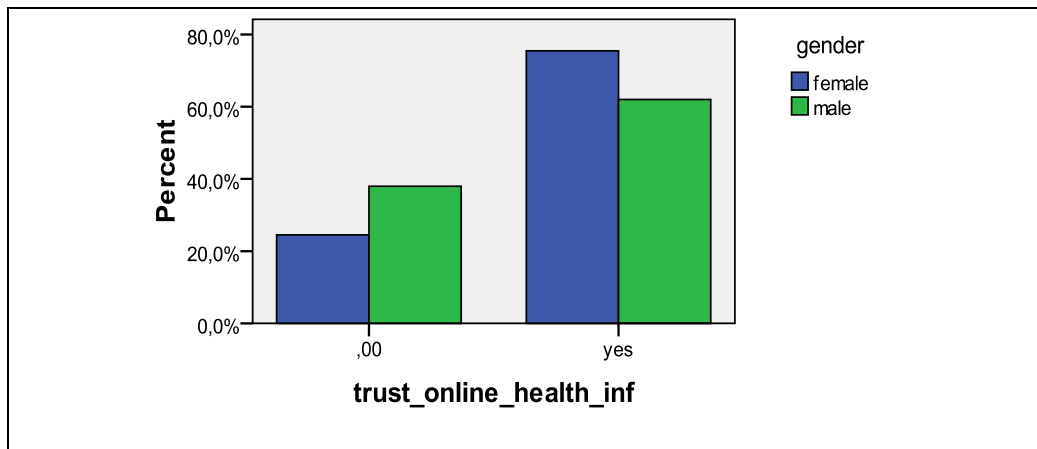


In this graph we can see that female tend to trust more health information on internet that male. About 80% of female respondents trust this information comparing with 60% of male respondents. If we compare this diagram with the above of frequency of seeking health information on internet based on gender it seems the general trend of female to use more and to trust more information for health related issues.

## 4.2.5 Trust of health information on Internet and education status of Respondents

**Diagram 4.9: Trust of health information on internet and education status of Respondents**
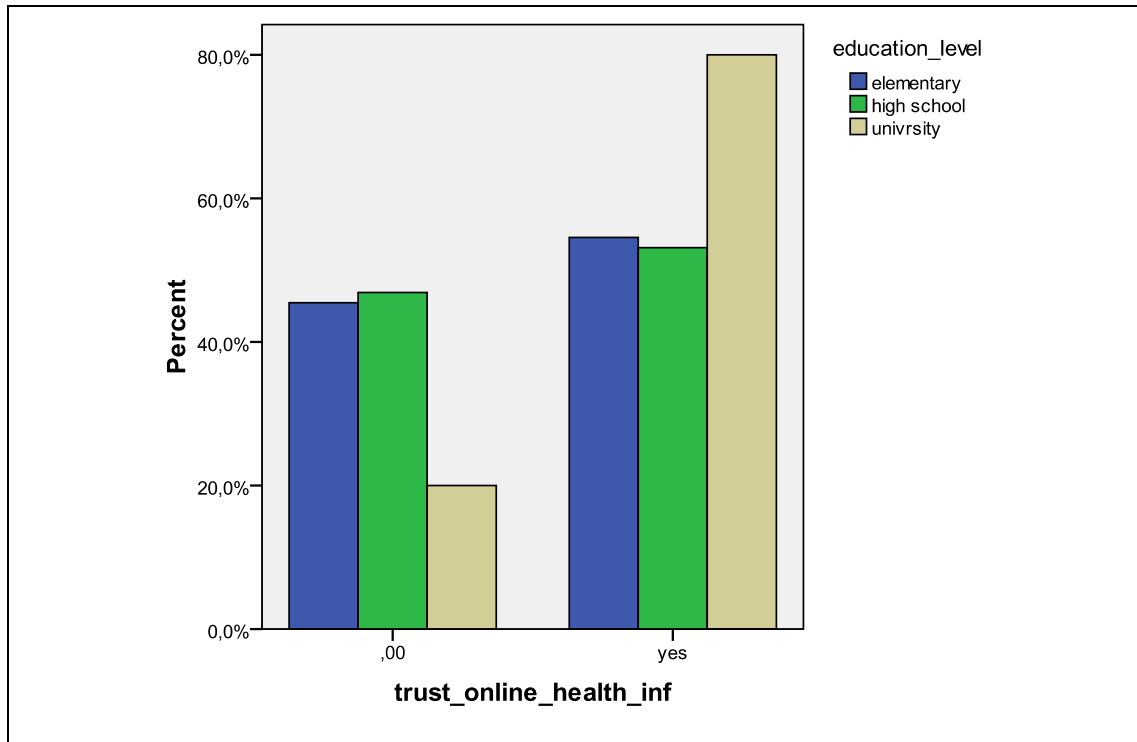


According to the above graph it is a considerably high percentage of respondents (about 80%) who trust online health information with university education. Similar with the above case education level plays an important role in the extent where respondents trust and use internet for finding health information. The higher the education level the greater the trust and use of internet for health information.

## 4.2.6 Trust online health information and visit to doctor the last 12 months

**Diagram 4.10: Trust online health information and visit to doctor the last 12 months**
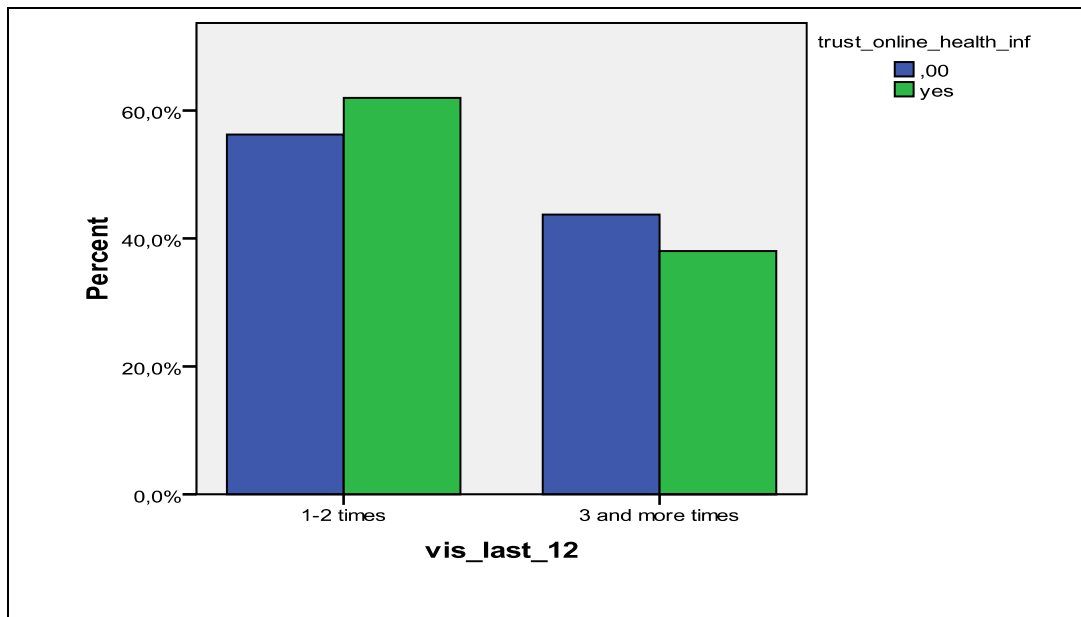


In this graph we are trying to investigate whether there is a relationship between the trust of respondents on health information from internet and the frequency of visit to doctors. It seems that the percentage of respondents who trust online health information and visit their doctor 1-2 times is higher than those who do not trust online health information. On the other side respondents who do not trust online health information have higher frequency of visit to doctors comparing with those who trust online health information.

**4.2.7 Sense of embarrassment discussing with the doctors and visit to doctors the last 12 months**

**Diagram 4.11: Sense of embarrassment discussing with the doctors and visit to doctors the last 12 months**
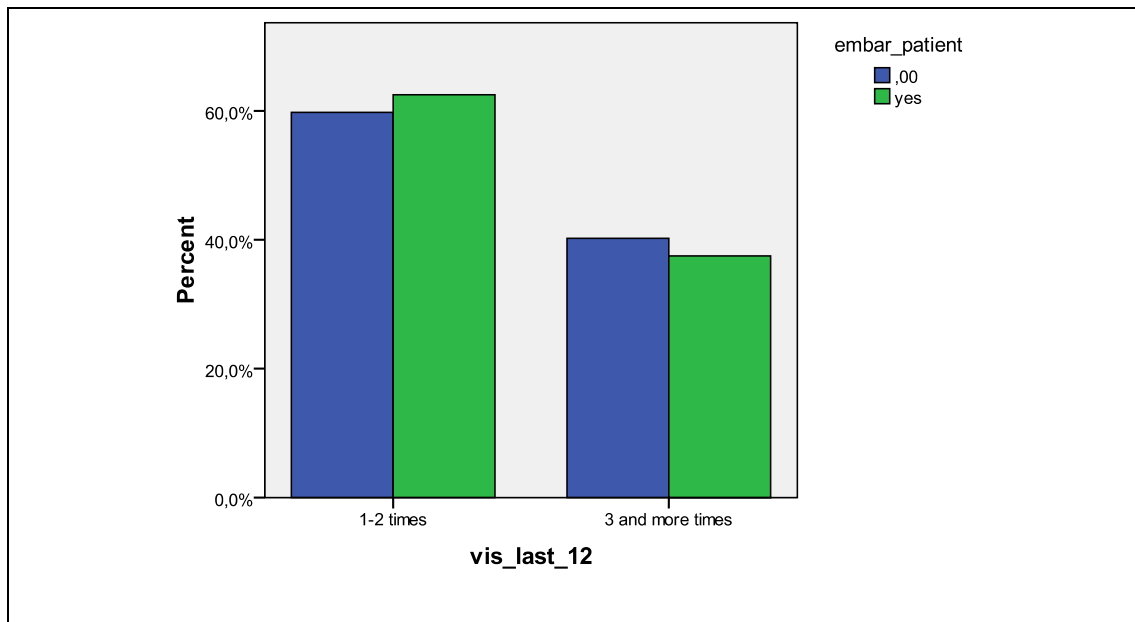


Regarding the last graph respondents who have a sense of embarrassment to discussing with their doctors seems that they are trying to visit less their doctors comparing with those who feel more comfortable.

We should notice nevertheless that due to limited number of data we can not extract exclusively precise results from the graphs.

## 4.3 Factor Analysis

Factor analysis provides to each researcher the possibility to extract a meaning from a complex whole of variables, reducing them in a smaller number of factors. This technique has 3 main uses: 1) to understand the structure of a set of variables.2) to construct a questionnaire to measure an underlying variable.3) to reduce a data set to a more manageable size while retaining as much of the original information as possible.( Field, 2009). In our model the goal was to obtain results that would be easier to be interpreted and subsequently used for further analysis.

Principal factor analysis (PAF) was carried out in this study in order to check whether the used variables identify the latent components of the constructed model. Not all the 21 variables initially included in the factor analysis due to several inconsistencies that came up All the 21 variables were divided into 5 groups and a factor analysis was run separately for each group. We excluded all the items for the group of prevention due to the lack of a specific latent variable. The results of Factor Analysis showed four latent factors. For each factor analysis that was conducted two measures Kaiser-Meyer Olkin and Bertlett's Test were used in order to perform the sampling adequacy.

### 4.3.1 Internet Use for health information on Internet

**Table 4.2: Principal Axis Factoring**

| | Factor |
|---|---|
| **Items** | 1 |
| Frequency of seeking online health information | ,778 |
| Trust online health information | ,766 |
| Seeking for online information for health related- issues for prevention | ,601 |
| Gathering of health information on internet before this visit to doctor. | ,572 |
| Frequency of seeking information on Internet. | ,524 |

A principal axis factoring analysis was conducted on the five items with orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO=0,803 (great according to Field, 2009) and all KMO values for individuals items were >0.5 which is the acceptable limit (Field 2009).Bartlett's test of sphericity $x^2$=132.278, p<0.001, indicated that correlations between items were sufficiently large for PAF. (Appendixes 3)We specified the number of factors that we would like to extract typing the fixed number of actor in the SPPS programme. (Factor 1). We excluded one item from the first group of variables (I ask my family members or friends to find for me health information-Appendixes 1,2) due to problematic impact on our model.(Appendixes 1,2)

Hence, the factor loadings for the internet use are shown in the table 1. (Appendixes 3) The items are clustered on the same factor, as it was expected, suggesting that factor 1 emerges the latent factor of internet use for health information.

### 4.3.2 Opportunity Cost

**Table 4.3: Principal Axis Factoring**

| Items | Factor 2 |
|---|---|
| Time spending during the travel to doctor | ,787 |
| Cost of traveling to doctor | ,643 |
| Time spending on doctor visit | ,468 |
| Cost of visit to doctors | ,443 |

A principal axis factoring analysis was conducted on the 4 four items with orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO=0, 673 (mediocre according to Field, 2009) and all KMO values for individuals items were >0.5 which is the acceptable limit (Field 2009).Bartlett's test of sphericity $x^2$=64.456, p<0.001, indicated that correlations between items were sufficiently large for PAF. (Appendixes 3)We specified the number of factors that we would like to extract typing the fixed number of actor in the SPPS programme. (Factor 1)

Hence, the factor loadings for the opportunity cost are shown in the table 2. ( Appendixes 3)The items are clustered on the same factor, as it was expected. Factor Analysis emerges the latent factor of opportunity cost.

### 4.3.3 Quality of the relationship between patients and doctors

**Table 4.4: Principal Axis factoring**

| Items | Factor |
|---|---|
|  | 3 |
| Time for explanation | ,697 |
| Understanding the doctor | ,606 |
| Difficulty to explain to doctor | -,582 |
| Sense of embarrassment discussing with doctor. | -,381 |

A principal axis factoring analysis was conducted on the 4 four items with orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO=0, 670 (mediocre according to Field, 2009) and all KMO values for individuals items were >0.5 which is the acceptable limit (Field 2009).Bartlett's test of sphericity $x^2$=57.651, p<0.001, indicated that correlations between items were sufficiently large for PAF. (Appendix 3)We specified the number of factors that we would like to extract typing the fixed number of actor in the SPPS programme. (factor 1)

Hence, the factor loadings for the communication effect are shown in the table 3. (Appendix 3)The items are clustered on the same factor, as it was expected. Factor Analysis emerged the latent variable of quality of relationship.

### 4.3.4 Health status

**Table 4.5: Principal Axis Factor**

| Items | Factor 5 |
|---|---|
| Specific pharmaceutical treatment | ,883 |
| Chronically ill patient | ,570 |
| Heritage ill | ,328 |
| Health status | -,314 |

A principal axis factoring analysis was conducted on the 5 four items with orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO=0,582 (barely acceptable according to Field,2009) and all KMO values for individuals items were >0.5 which is the acceptable limit (Field 2009).Bartlett's test of sphericity $x^2$=50,137, p<0.001, indicated that correlations between items were sufficiently large for PAF. (Appendix 3)We specified the number of factors that we would like to extract typing the fixed number of actor in the SPPS programme. (factor 1). (Appendix 3)We excluded one item (visit to doctors the last 12 months) of this group because constitutes the independent variable of our model. (Appendix 1,2)

Hence, the factor loading for the health status is shown in the table 5. (Appendix 3)

The items are clustered on the same factor, as it was expected. Factor analysis emerges the latent factor of patient health state.

## 4.4 Correlations

When a researcher attempts to indicate the relationship between variables statistically he should focus on two measures: covariance and correlation coefficient. A positive sign of coefficient indicates a positive relationship, a negative sign indicate a negative relationship and a coefficient of 0 indicate no linear relationship at all (Field, 2009). There are two main types of correlation: bivariate correlation and partial correlation.

In our analysis we run a bivariate correlation using a Pearson correlation coefficient. At this point it is essential to refer that we should pay considerable attention when we interpreting correlation coefficients since they do not indicate a direct causality.

### 4.4.1 Correlations between the indexes from factor analysis

**Table 4.6: Correlations**

|  |  | Internet use | Opportunity cost | Quality of relationship | Health state |
|---|---|---|---|---|---|
| Internet Use | Pearson Correlation | 1 | ,024 | -,050 | -,017 |
|  | Sig. (2-tailed) |  | ,812 | ,613 | ,864 |
|  | N | 103 | 103 | 103 | 103 |
| Opportunity Cost | Pearson Correlation | ,024 | 1 | -,326[**] | ,152 |
|  | Sig. (2-tailed) | ,812 |  | ,001 | ,125 |
|  | N | 103 | 103 | 103 | 103 |
| Quality of Relationship | Pearson Correlation | -,050 | -,326[**] | 1 | ,023 |
|  | Sig. (2-tailed) | ,613 | ,001 |  | ,819 |
|  | N | 103 | 103 | 103 | 103 |
| Health State | Pearson Correlation | -,017 | ,152 | ,023 | 1 |
|  | Sig. (2-tailed) | ,864 | ,125 | ,819 |  |
|  | N | 103 | 103 | 103 | 103 |

From the above table is clear that the only significant relationship is the relationship between the index of opportunity cost and the index of the quality of the relationship between doctors and patients. Moreover there is a negative sigh for this correlation illustrating a negative correlation. Nevertheless it seems unclear the exact relationship between these two indexes and it seems even more difficult to interpret the reason why there is a negative correlation. Based on this information we can conclude that the correlation table does not offer interesting enough information for our survey.

## 4.5 Binary Logistic Regression

In this part the method of binary logistic regression would be used in order to test the hypotheses of our model. The probability of the dependent variable to occur would be predicted through the binary logistic regression.

### 4.5.1 Binary Logistic Regression: Effect of Internet Use on the frequency of visit to doctors

The binary Logistic regression tests the two hypotheses of our model. The dependent variable is visit to doctors the last 12 months and the main predictor is the internet use.

In this model (Appendix 4) the overall statistic (residual chi-square statistic) is 24,129 and it is significant at the 5% level. Moreover, the overall fit of the model is indicated by the -2log-likelihood statistic which is 114,347 and the chi-square statistic which is significant. As the consequence the model is a significant fit if the data.

| Table 4.7: Binary Logistics Regression | | B | S.E. | df | Sig. |
|---|---|---|---|---|---|
| | Internet Use | **-,614** | **,337** | **1** | **,048** |
| | Opportunity cost | -,385 | ,279 | 1 | ,203 |
| | Quality of relationship | **,443** | **,287** | **1** | **,020** |
| | haelth_state | **1,099** | **,266** | **1** | **,000** |
| | Constant | -,453 | ,229 | 1 | ,048 |

Without controlling for socio-demographic variables as gender and age we can observe that the internet use has a negative effect on frequency of visits to doctors with B=-, 614 and it is significant (P=, 048) at the 5% level. Furthermore, due to the fact that the coefficient is negative, it indicates that the probability for patient to reduce their visit to doctors and to increase internet use for health information is significant.

Overall, our results reject **hypothesis 1b** considering complementarity and support **hypothesis 1a** regarding substitution. Hence, there is a significant probability for patients to reduce their visits to doctors after seeking for health information online. This result is not in accordance with Chul-Joo Lee (2008) results that the internet is

positively associated with visits to doctors and consequently there is no substitution. In this point we should mention that in the. study of Lee C.J (2008) socio-demographic variables were controlled.

## 4.5.2: Potential Influence of Opportunity cost, Quality of relationship and Health status factors on the relationship between internet use and frequency of visit to doctors

The effect of internet use on visit to doctors is the main tested relationship. Then we tested whether opportunity cost, quality of relationship and health status could influence the above relationship.

Continuing in our study we tested whether opportunity cost affect either negatively or positively the frequency of visit to doctors. According with the results we can see that the effect of opportunity cost on frequency of visit to doctors is not significant (P=, 271). There is no effect of opportunity cost on the dependent variable (visit to doctors the last 12 months.). This result does not come along with the study of Bundorf, Baker Singer and Wagner who report that opportunity cost in accessing doctors could be lead patient to seek health information on internet for avoiding such a costs.

Moreover, we tested whether quality of relationship between doctors and patients influence the frequency of visit to doctors. Regarding with the results it seems that quality of relationship between doctors and patients has a positive impact on the dependent variable (visit to doctors the last 12 months) with B=,443 and it is significant (P= 0.020) at 5% level. A good relationship between doctors and patients might enforce patients who obtaining health information on internet to visit their doctors more often. People who seek health information on internet still they need an advice from their doctors to make appropriate use of the information. On the other side, it is a great percentage of people who avoid visiting their doctors due to their doctors. A weak relationship between these two parties motivates patients to turn into Internet in order to avoid meeting with their physicians.

Finally current health state was controlled because since this has been shown that affect the relationship between internet use for health information and frequency of visit to doctors ( Chul-Joo Lee 2008). It is clear that health state of patient has a positive effect on the frequency of visit to doctors with B=1,099 and it is significant

(P= ,000) at 5% level. In particular patients in poor health state or those who are expecting a worse health state in the future are more likely to visit their doctors .more frequent that others in a better health state. Patients in a poor health state are expecting to seek health information on internet more intensively in order to be well-informed for their illness. Nevertheless patients in poor health state are not able to substitute their contact to doctors with internet due to their particular health state. On the other side patients in a good health state might substitute their visit to doctors with the health information they find on internet due to their good health state. Consequently, healths state it seems to be an important factor which affects the relationship of internet use for health information and frequency of visit to doctors.

Our results indicated that there is a negative relationship between internet use and frequency of visit to doctors (Support of Hypothesis 1a). Furthermore we indicated that quality of relationship and health state associated positively with the frequency of visit to doctors while opportunity cost has no impact.

# 5. Conclusions

In this final chapter of this study, general conclusions and a general discussion will be demonstrated, as well as limitations and suggestions for further study.

## 5.1.1 General Conclusions

This study had as main goal to investigate whether internet as a source of health information can influence the frequency of visit to doctors. In order to test our hypotheses we used the method of a closed-ended questionnaire.103 respondents took part in this study with different demographical characteristics (gender, age, education level and occupation status) giving interesting outcomes regarding the effect of internet on frequency of visit to doctors. The use of some histograms was very important in order to extract some important information concerning our research question. Furthermore, factor analysis was used in order to extract a meaning from a complex whole of variables, reducing them in a smaller number of factors.

Based on the histograms that we used in the fourth part of our study, some important results can be discussed. To begin with the relationship of the demographic characteristics of respondents with the frequency of seeking of health information we can see that both age, gender, education level and occupation level plays an important role regarding the frequency of seeking health information on internet. More specific the age group of 29-39 tends to use more frequently internet for finding health information on internet as it was expected. Furthermore, female seems to trust more health information on internet and seek more often online information concerning health as well. People who are holder of a university degree tend to use more and to trust more online health information. Other interesting findings that worth mentioning here  is that people who trust health information on internet tend to visit less doctors comparing with people who do not trust online health information. Finally people who do not feel comfortable to discuss with their doctors tend to visit them less comparing with people who feel comfortable.

Taking into consideration some important findings about the use of interne for health information and generally the use of internet in Greece, we have a better understanding about the above results. We had mentioned in the second part of our study that in Greece there is a low percentage of people who use internet comparing

the other European countries and especially a low percentage of individuals who seek health information on internet. Due to this it is expected the fact that younger people ( 18-29 and 29-39) and people who hold of a university degree tend to use more internet for health information since this is the age group that it has more advanced knowledge about internet and is interested in finding information about various topics like health. Furthermore the fact that the percentage of individuals who trust more online health information tend to visit their doctors less it could be regard as an indication for substitution of visit to doctors by internet. The same we can suggest about people who do not feel comfortable to discuss with their doctors.

Continuing with the regression results it seems that there is a trend that internet as a source for health information can affect negatively the frequency of visit to doctors. Internet can be regarded as a substitute for visits to doctors (Hypothesis 1a is supported). An explanation for this trend could be the fact that patient has been shifted permanently from passive to active participant in the making- decision process. Furthermore, the existence of opportunity cost does not affect the frequency of visit to doctors while the quality of relationship and the health status do actually affect it positively. Finally, it should be mention that health status determines in a great extend the frequency of visit to doctors regardless the degree that patients use internet as a source for health information.

## 5.1.2 General Discussion

This study has a main goal to test whether internet affects the frequency of visit to doctors. In order to construct and modulate our research question and research hypotheses were based on the previous literature. We analysed and we critically selected the most essential elements for the modulation of our research question. We analysed the phenomenon of deprofessionalization which brought a considerable change in the perception of patient about their role in the decision making process. We studied about the diffusion of internet in the medical world and in the daily lives of people and we noticed how internet influenced the relationship between doctors and patient. The existence of internet in the lives of people gave them the opportunity to acquire an additional knowledge about medical issues, a knowledge that in the past was an exclusively privilege of doctors. Furthermore Internet increases the empowerment of patient and their disease experience, making them stronger against

various illnesses. All the above demonstrate a considerable and permanent change in the way that patient think and behave and consequently we have seen a essential change in the relationship between doctors and patient. Moreover we analysed the economic perspective of this issue. We tried to investigate how internet can mediate the problem of asymmetric information in the health care sector the imbalance of information between doctors and patient, and we analysed whether patient increase or not their demand for health information on internet. There are various reasons why someone wants to look for health information on internet: for reducing opportunity cost (cost of travelling to the doctor, time spending for seeing the doctor), for finding more information for preventive reasons or for being more informed patients who are in a poor health state.

Take into consideration all the above, we would like to modulate a study which can contribute in the research for the change of the relationship between doctors and patient and at the same time to give a more economic touch in this issue. We would like to test whether internet affect this relationship either reducing or increasing the frequency of visit to doctors.

## 5.1.3 Limitations of the study

Our study comes with some limitations, as it was expected. To begin with the first limitation, the number of our sample (103 respondents) is not big enough in order to extract precise results. Definitely, we could not examine the entire population for extracting our results for this reason we select a smaller sample. Thus we can say that with a bigger number of samples we could have a better view about the perception of the general population and consequently more adequate results.

A second limitation that influences the quality of our result is the fact that we collected our data from only one area of Greece (the city of Thessaloniki) without taking date from other cities or remote areas. Undoubtedly, data from larger cities or remote areas would give a more completed view about our topic enforcing the accuracy of our survey.

A third and major limitation with this study is the probability that unmeasured variables might play an essential role for our observed results. Although our results provide an indication that internet use decreases the frequency of visit to doctors, we are not able to support a causality effect between these two variables. The existence of

some other variables, unmeasured in our study, might affect simultaneously the frequency of visit to doctors and the internet use for health information. Starting with the demographics characteristics of individuals, age it could be considered as a significant parameter which influence both internet use and frequency of visit to doctors. It is expected that young people have the possibility to seek health information on internet and to reduce their visit to doctors since it is assumed that they are in good health state. On the other hand, old people even if are willing to seek health information on internet in order to be well-informed for their health problem, is not feasible for them to substitute physicians contact with internet. Health care needs for old people are more intensive so that they visit their doctors more frequently. Consequently, the parameter age is indentified as the main factor that determine whether individuals can increase or not the frequency of visit to doctors regardless the use of internet as an alternative source for health information.

Furthermore, insurance status of individuals could be considered a determinative factor which influences both internet use and frequency of visit to doctors. Individuals who face higher out-of-pocket payments for using doctor services might increase their demand for health information on internet and reduce their visit to doctors. According with the study of Bundorf, Baker Singer and Wagner the uninsured are more likely to use internet for health information instead of visiting their doctors. Moreover, income variable could be regard as a control variable which explains the relationship between doctors and patients. Patients who face higher opportunity cost of accessing doctors might increase their need to look on internet for health information and reduce the frequency of visiting their doctors.

Finally, it has already mentioned in our study that the relationship between doctors and patients is characterized by information asymmetries. Patients, trying to reduce this uncertainty that exist inevitably their relationship with doctors, seek for valuable information on internet in order to strength their knowledge about their medical problem. In this case they can reduce their visits to doctors.

Another limitation is the fact that we could not collect more data from the age group under 18 and above 62. Although we have an equal number of respondents from the other age groups, a greater number of these two groups could provide us with more precise results.

### 5.1.4 Further Research

In the last section of this chapter we would like to make some suggestions for a further research in this topic. It would be interesting to study whether male of female is more likely to use internet in order to increase or reduce their visit to doctors. Furthermore it would be very interesting and useful at the same time to investigate whether income level and insurance status of patient affect their frequency of visit to doctors.

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# Appendixes

## Appendixes 1: Greek questionnaire

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**Ερωτηματολόγιο**

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Στο παρακάτω ερωτηματολόγιο μελετάται η σχέση των πληροφοριών ιατρικού περιεχομένου που βρίσκονται στο διαδίκτυο με την συμπεριφορά των ασθενών. Ο απαραίτητος χρόνος συμπλήρωσης του ερωτηματολογίου δεν ξεπερνάει τα 10 λεπτά. Οι ερωτήσεις είναι χωρισμένες σε 6 ομάδες. Για κάθε μία ερώτηση συμπληρώνεται στο κουτάκι με την απάντηση που σας αντιπροσωπεύει. Οι απαντήσεις είναι ανώνυμες και ουδείς έχει πρόσβαση στα στοιχεία αυτά.

1. *Δημογραφικά στοιχεία*

Α.      Ηλικία:
☐Κάτω των 18        ☐18-28        ☐29-39        ☐40-50        ☐51-  61
        ☐άνω των 62

Β.      Φύλο:
☐Άνδρας        ☐Γυναίκα

Γ.      Μορφωτικό επίπεδο:
☐ Απόφοιτος πρωτοβάθμιας εκπαίδευσης      ☐ Απόφοιτος δευτεροβάθμιας εκπαίδευσης    ☐ Απόφοιτος τριτοβάθμιας εκπαίδευσης

Δ.      Εργασιακή Κατάσταση:
☐Εργαζόμενος/η        ☐Άνεργος/η    ☐Συνταξιούχος        ☐Οικιακά
        ☐Φοιτητής/τρια

2. *Τεχνολογικές γνώσεις*

Α.      Συχνότητα με την οποία αναζητάτε πληροφορίες στο διαδίκτυο
☐ Ποτέ ☐ Μια φορά το μήνα ☐ Μια φορά τη βδομάδα ☐ Μια φορά την ημέρα ☐ Αρκετές φορές τη μέρα

Β.      Συμβουλεύεστε διαδικτυακές σελίδες σχετικές με την υγεία
☐ Ποτέ        ☐ Μια φορά το μήνα ☐ Μια φορά τη βδομάδα        ☐ Μια φορά την ημέρα ☐ Αρκετές φορές τη μέρα

Γ.      Ζητάτε από μέλη της οικογένειάς σας ή φίλους να αναζητήσουν για εσάς πληροφορίες σχετικές με την υγεία από το διαδίκτυο.
☐Ναι        ☐Όχι oxi!

Δ.      Εμπιστεύεστε τις σχετικές με την υγεία διαδικτυακές σελίδες
☐Ναι        ☐Όχι

Ε.      Πριν από αυτή την επίσκεψή σας στο γιατρό συγκεντρώσατε πληροφορίες από το διαδίκτυο

☐Ναι            ☐Όχι

## 3.  *Παράγοντας κόστους*

Α.      Η επίσκεψη στο γιατρό κοστίζει

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ      ☐Συμφωνώ απόλυτα

Β.      Η επίσκεψη στο γιατρό απαιτεί πολύ χρόνο.

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ      ☐Συμφωνώ απόλυτα

Γ.      Η διαδρομή στο γιατρό απαιτεί χρόνο

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ      ☐Συμφωνώ απόλυτα

Δ.      Η διαδρομή για το γιατρό κοστίζει

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ      ☐Συμφωνώ απόλυτα

## 4.  *Επικοινωνία γιατρού- ασθενή*

Α.      Βρίσκετε δύσκολο να εξηγήσετε τι έχετε στο γιατρό

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ            ☐Συμφωνώ απόλυτα

Β.       Ο γιατρός γίνεται κατανοητός εξηγώντας την πάθηση από την οποία πάσχετε

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ      ☐Συμφωνώ απόλυτα

Γ.      Ο γιατρός αφιερώνει χρόνο να εξηγήσει την πάθηση από την οποία πάσχετε

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ      ☐Συμφωνώ απόλυτα

Δ.      Αισθάνεστε αμήχανα να συζητήσετε με το γιατρό σας το λόγο που τον επισκέπτεστε

☐Ναι   ☐Όχι

## 5.  *Παράγοντας πρόληψης*

Α.      Επισκέπτεστε το γιατρό σας για προληπτικούς λόγους (checkup, γενικές εξετάσεις)

☐Κάθε δύο χρόνια      ☐Κάθε χρόνο  ☐Δυο φορές το χρόνο        ☐Πιο συχνά από δύο φορές το χρόνο

Β.      Επισκέπτεστε το γιατρό μόνο όταν είστε πολύ άρρωστοι

☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ      ☐Ούτε διαφωνώ ούτε συμφωνώ
      ☐Συμφωνώ      ☐Συμφωνώ απόλυτα

Γ.	Συμβουλεύεστε ιστοσελίδες σχετικές με την υγεία για να συγκεντρώσετε πληροφορίες σχετικά με ασθένειες για προληπτικούς λόγους
☐Ναι   ☐Όχι

Δ.	Κρίνετε απαραίτητο να συζητάτε με το γιατρό σας τις πληροφορίες που ανατρέχετε στις ιστοσελίδες υγείας
☐Διαφωνώ έντονα/απόλυτα   ☐Διαφωνώ	☐Ούτε διαφωνώ ούτε συμφωνώ
☐Συμφωνώ	☐Συμφωνώ απόλυτα


### 6.	Κατάσταση υγείας ασθενούς

Α.	 Πάσχετε από κάποια χρόνια ασθένεια
☐Ναι   ☐Όχι

Β.	Πόσες φορές επισκεφτήκατε το γιατρό σας τους τελευταίους 12 μήνες:
☐1-2 φορές    ☐ περισσότερες από 3 φορές

Γ.	Πάσχετε από κάποια κληρονομική ασθένεια
☐Ναι    ☐Όχι

Δ.	Ακολουθείτε κάποια συγκεκριμένη φαρμακευτική αγωγή
☐Ναι   ☐Όχι

Ε.	Πως θα χαρακτηρίζατε την τωρινή κατάσταση της υγείας σας
☐Πολύ καλή  ☐Καλή	☐Μέτρια	☐Άσχημη	☐Πολύ άσχημη


**Σας ευχαριστώ πολύ για τον χρόνο σας.**

## Appendixes 2: English Translation of the Greek questionnaire

# Questionnaire

This questionnaire is meant to investigate the influence of health information on Internet on the patient's behavior. The questions are divided into six parts. Always you underline the statement that fits your explanation. It takes no more than 10 minutes to fill out this form. Please don't have any worry about your anonymity, this questionnaire is strictly personal. No one else is possible to read your answers.

A. Internet.
Please underline the statement that fits your explanation.
1. I go on the internet: never, once a month, once a week, once a day, several times a day
2. I consult health websites: never, once a month, once a week, once a day, several times a day
3. I ask my family members or friends to find for me health information: Yes, No
4. I trust health websites: Yes, No
5. Before this visit to the doctor I gathered information on a website: Yes, No

B. Cost.
Please note in which extent you are agree or disagree with following statement.
1. A visit to the doctor is very expensive: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.
2. A visit to the doctor takes a lot time: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.
3. Travelling to visit the doctor it takes a lot of time: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.
4. Travelling to visit the doctor is expensive: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.

C. Communication.
Please underline the statement that fits your explanation.
1. it is difficult to explain what I have to the doctor: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.
2. The doctor is very clear: Yes, No
3. The doctor takes enough time to explain what I have: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.
4. I don't feel comfortable to discuss with my doctor about my problem: Yes, No

D. Prevention.
Please underline the statement that fits your explanation
1. I go to the doctor for a checkup: once every two year, once a year, twice a year, more than two times a year.
2. People should visit the doctor only when they are very ill: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.

3. I consult websites to gather information to avoid getting ill: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.
4. I find necessary to discuss with my doctor the information I find on health websites: I strongly disagree, I disagree, neither I agree or disagree, I agree, I strongly agree.

E. Health.
Please fill out the following questions.
1. Do you have a chronic disease? Yes, No
2. How many times did you visit your doctor in the last 1 months: 1-2 times, 3 and more times
3. Do you have any disease which is relating with heritable reason? Yes, No
4. Do you receive any particular pharmaceutical therapy? Yes No
5. Would you say your current health is very good, good, fair, poor or very poor? Yes No

F. Demographic questions
Please fill out the following questions
1. Age:
2. Gender:
3. Education level
4. Occupation;

# Appendixes 3: SPPS Output

## Factor Analysis

**1. Internet Use for health information on Internet.**

**Table Ap.1: KMO and Bartlett's Test**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,803 |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 132,278 |
| | df | 10 |
| | Sig. | ,000 |

**Table A.2: Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| freq_health_inf | ,778 |
| trust_online_health_inf | ,766 |
| gather_inf | ,601 |
| gather_inf_vis | ,572 |
| freq_inform | ,524 |

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 6 iterations required.

**2 Opportunity Cost**

**Table Ap.3: KMO and Bartlett's Test**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,673 |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 64,456 |
| | df | 6 |
| | Sig. | ,000 |

**Table Ap.4: Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| travel_time | ,787 |
| travel_cost | ,643 |
| vis_time | ,468 |
| cost_vis | ,443 |

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 13 iterations required.

## 3 Quality of the relationship between patients and doctors

**Table Ap.5: KMO and Bartlett's Test**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,670 |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 57,651 |
| | df | 6 |
| | Sig. | ,000 |

**Table Ap.6: Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| time_explain | ,697 |
| under_doc | ,606 |
| dif_expl | -,582 |
| embar_patient | -,381 |

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 10 iterations required.

**4 Health status**

**Table Ap.7: KMO and Bartlett's Test**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,582 |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 50,137 |
| | df | 6 |
| | Sig. | ,000 |

**Table Ap.8: Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| pharmac_treat | ,883 |
| chron_il | ,570 |
| heritage_ill | ,328 |
| health_status | -,314 |

Extraction Method: Principal Axis Factoring.

a. Attempted to extract 1 factors. More than 25 iterations required. (Convergence=,001). Extraction was terminated.

# Appendixes 4: SPPS Output

## Regression Part

**Binary Regression Analysis.**

**Table Ap.9: Omnibus Tests of Model Coefficients**

|        |       | Chi-square | df | Sig. |
|--------|-------|------------|----|------|
| Step 1 | Step  | 24,129     | 4  | ,000 |
|        | Block | 24,129     | 4  | ,000 |
|        | Model | 24,129     | 4  | ,000 |

**Table Ap.10: Model Summary**

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|-------------------|----------------------|---------------------|
| 1    | 114,347[a]        | ,209                 | ,282                |