

## Original papers

### The level of knowledge of family doctors on climate change

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#### Abstract

Currently, the question is no longer if the climate is changing because the magnitude and speed of climate change, but it is a fact confirmed by many teams of specialists. It has become a hotly debated topic for politicians, businessmen, environmentalists, society and media. We designed a pilot study using a questionnaire in order to identify the level of knowledge, skills and practices of family physicians regarding the impact of their work on the environment and climate change. The questionnaire included 42 items regarding socio-demographic data, doctors' knowledge regarding climate change, global warming, heatwave, thermal stress, the activity performed by doctors during the heat wave and the information received by doctors about heatwave periods. The research results confirm the hypothesis that doctors have some knowledge about the phenomenon of climate change, but there are some gaps and misunderstandings of the cause and effect of the phenomenon, as well as the methods to combat them. There is a need for additional training and guidance of physicians on the relationship between climate change, global warming and population health.

**Keywords:** *climate change, family doctors, global warming, heatwave, thermal stress*

#### Introduction

Currently, the question is no longer if the climate is changing because the magnitude and speed of climate change is a fact confirmed by many teams of specialists. That is why climate change has become a hotly debated topic for politicians, businessmen, environmentalists, society and the media. Climate change affects the oceans, soil, open and closed environments. Environmentally harmful activities facilitate the production and use of greenhouse gases

[3]. Hot days are a real challenge for the population. Undoubtedly we are heading for a continuous rise in temperatures and summers will become increasingly hot and in the middle of the 21st century excessive heat could be considered normal for the European area.

The most widely publicized effects of global warming are:

- slow but steady rise in sea level,
- increasing the frequency of climate extremes,
- progressive melting of glaciers and ice caps,

- extinction of many species,
- significant influence on human and animal health [5, 6, 9].

Probable consequences of global warming can be [7, 8, 10, 12, 13]:

- increasing the number of cases of intestinal infections, which have a considerable seasonal manifestation, with regular registration in many countries in recent years;

- resurgence of diseases (malaria, yellow fever, etc.);
- the expressed fluctuation of daily and weekly morbidity,

- changing the frequencies and character of hospitalizations during warmer summers;

- changing the qualitative and quantitative assessments of morbidity, trauma and mortality forecasts.

Climate change has many effects on health, and the medical sector is one of the main links in the prevention or treatment of these clinical conditions. Doctors are specialists who could help raise public awareness of climate change and its impact on health. They can be seen as health educators because they are considered reliable sources of information and because they come in contact with a wide audience, to whom they can pass on this knowledge [2]. There are studies published in the literature on this topic, but in the Republic of Moldova such research has not been conducted. The aim of the study was to identify the level of knowledge of family doctors about climate change. A second objective is to identify the skills and practices of family physicians applied in consultations during heatwave periods. Because in the university and postgraduate study programs, in the process of organizing and monitoring the health of the population, little attention is paid to the phenomenon of global warming, at the beginning of the study we submitted the following research hypothesis: family doctors have superficial knowledge about climate change and its influence on the health of the population.

## Material and methods

The material included in this article is the result of a pilot study to develop, test and improve the questionnaire to identify the level of knowledge, as well as the skills and practices of family physicians regarding the impact of their work on the environment and climate change. The pilot study was a qualitative study involving 54 family physicians. The working tool was the CAP type questionnaire (knowledge, attitudes and practices).

The questionnaire included 42 items grouped into:

1. socio-demographic data;
2. doctors' knowledge regarding climate change, global warming, heatwave, thermal stress;
3. the activity performed by doctors during the heat wave;
4. informing doctors about heatwave periods.

The first component of the CAP questionnaire - the level of knowledge of doctors about the phenomenon of global warming was completed with 8 questions, and 3 questions underwent changes and concretizations. A questionnaire with a total of 19 questions was initially used. In the second stage, the questionnaire was adjusted by supplementing with 26 new questions and modifying 7 initial questions.

Socio-demographic data were recorded for the study, and the results were statistically processed.

The study methodology was approved by the Research Ethics Committee of Nicolae Testemitanu State University of Medicine and Pharmacy (No 13 from 15.03.19).

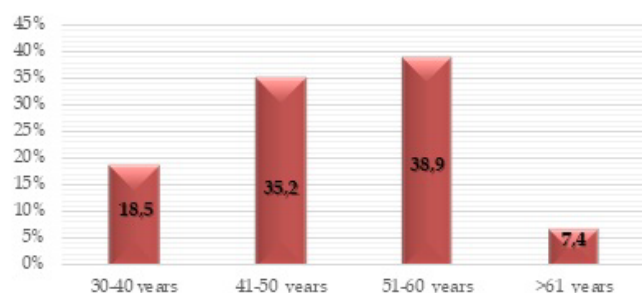
## Results and discussions

### Sample characteristic

The pilot study was conducted on a group of 54 family physicians, including 9 (16.6%) men and 45 (83.4%) women. The mean age in the study group was  $49.03 \pm 1.16$  years, with age limits of 32 years and 63 years, respectively. Most doctors were between 40 and 60 years old (74.1%) (Figure 1). According to the environment of residence, the distribution was approximately equal, with a slight predominance of respondents from rural areas (51.9%). The results show that the doctors interviewed in most cases worked more than 40 hours a week, due to the large number of requests, lack of human resources, especially in rural areas and the need to fill several workloads (Figure 2). Most respondents in the research group reported more than 10 years of work experience. Thus, a work experience of 2-5 years of activity had only 1 (1.8%) respondent, 6-10 years - 3 (5.6%) respondents, 11-20 years - 14 (25.9%) respondents, > 20 years - 36 (66.7%) respondents.

### Family physicians' knowledge of climate change, global warming, heat waves, heat stress

The first question in the researched section of the questionnaire was aimed at highlighting physicians' knowledge of climate change.



**Figure 1.** Characteristic of the sample by age

The question was open-ended and was completed by only 39 respondents (72.2%). Most doctors (24 out of 39 respondents) were of the opinion that global warming is taking place; four respondents mentioned that climate change is affecting health and the fact that we have dry summers, with little rainfall during the year; two respondents specified that glaciers are melting and floods are occurring; and two other respondents said they knew little about the phenomenon. Other opinions have focused on the fact that in the summer the temperature rises to 40°C, then suddenly decreases in autumn; these changes could be the manifestations of a new ice age and are a result of industrialization. Although 95% of cases, family doctors stated that there is a danger of global warming and for the most part, the answers were true, it does not demonstrate a thorough knowledge of the phenomenon of climate change and global warming.

The source from which doctors learned about the phenomenon of climate change and global warming, respectively, was a multiple-choice question. Practically all doctors (98.1%) know the problem from the information on TV and many (88.9%) found out about the mentioned phenomenon by accessing the internet. More than half of the doctors were informed on the radio (57.4%) and in the newspapers (55.6%). As the issue of climate change and global warming is highly publicized at national and international level, media sources and the internet are a current method of raising public awareness of this issue [1,15]. About a third of doctors (35.2%) have heard from friends about climate change, global warming. Academic publications / journals and public libraries helped a small number of doctors (20.4% and 14.8%, respectively) to know this phenomenon. Each of the 3 doctors (5.6%) heard about climate change, global warming from government agencies and the local administration council.

Subsequently, the degree of confidence of physicians

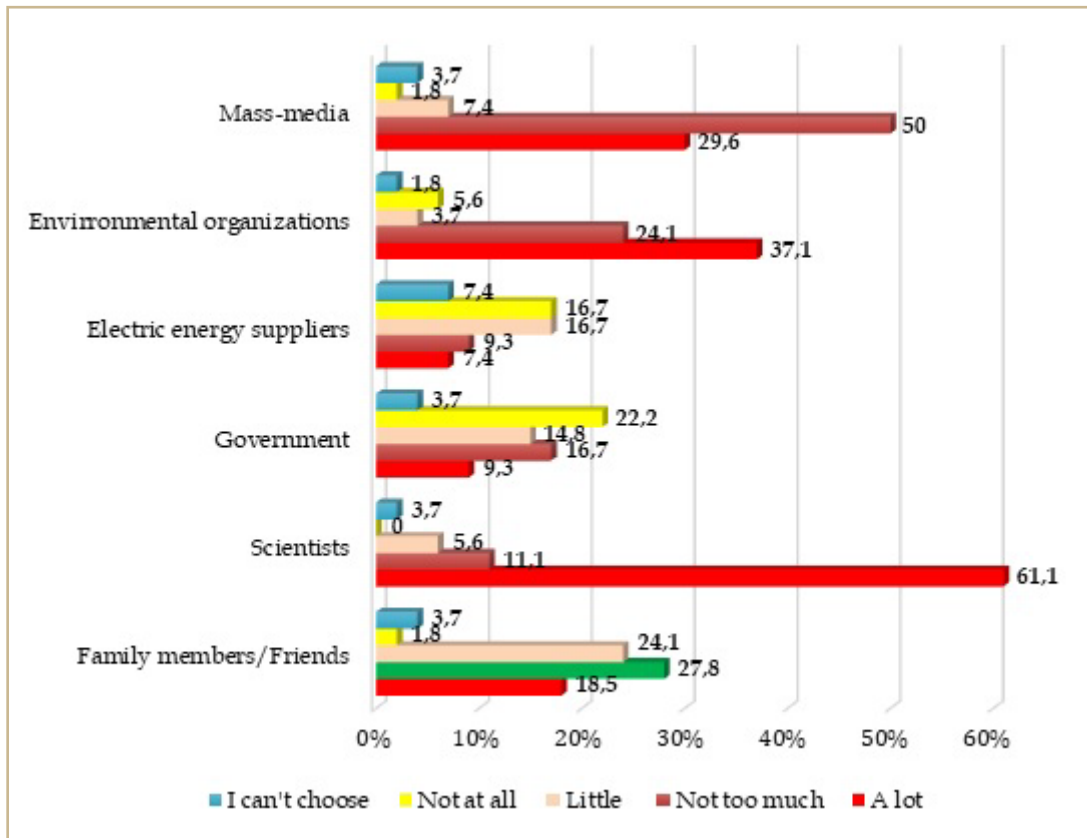


**Figure 2.** Distribution of the sample according to the number of hours worked per week

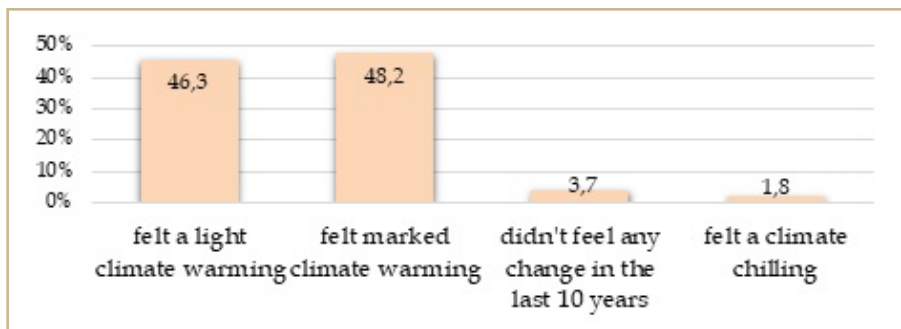
in climate change information sources was studied. When the information came from family members / friends, only 10 (18.5%) respondents mentioned a lot of trust in the source of information, and most respondents were skeptical about the accuracy of the information (27.8%). When the information is obtained from scientists, more than half of respondents (61.1%) say they have a lot of confidence. When the source of information is the Government, only 5 respondents (9.3%) answered that they have a lot of trust, and most - 12 (22.2%) respondents do not trust at all. When the information is provided by the electricity suppliers, 4 respondents (7.4%) and 9 (16.7%) have a lot of confidence in the information obtained - they answered that they do not trust. When the information is provided by an Environmental Organization, a large share of doctors (37.1%) answered that they have a lot of trust, but there are also doctors who do not trust at all - 3 respondents (5.6%). If the source of the information is the media, 16 (29.6%) respondents answered that they have a lot of trust, 27 (50%) of the respondents answered that they do not have much trust. Thus, family physicians have more confidence in scientists, environmental organizations, but also in the media, which means that media sources can be widely used to raise awareness of global warming (Figure 3).

The next question about their own observations of climate change lately showed that most doctors (94.5%) to some extent felt climate change (Figure 4).

Analyzing the attitude of family doctors towards the problem of global warming, we found that more than half of doctors believe that people destroy nature, contributing to climate change, and half of doctors are concerned about the problem of climate change. Every ninth doctor mentioned that he/she did not think about this problem. Of the number of doctors surveyed, 5.6% mentioned that they do not really understand the field in question (Figure 5).

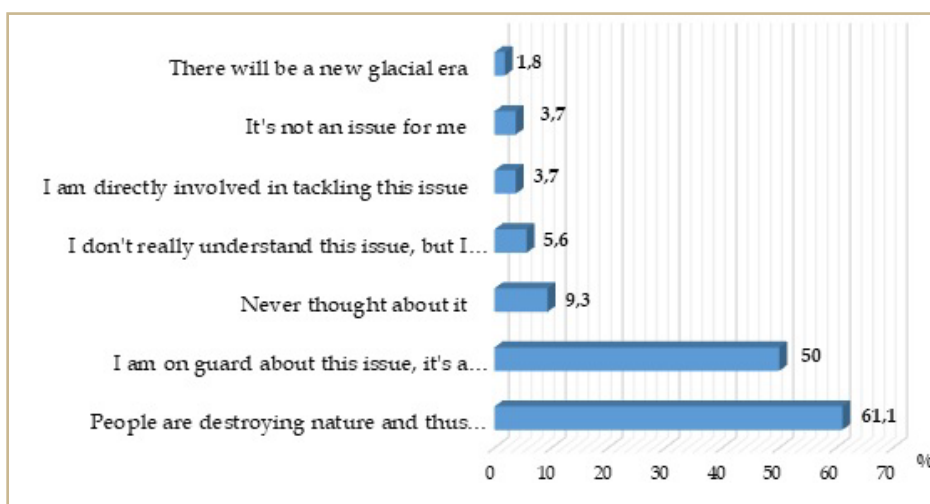


**Figure 3.** Representation of respondents according to the degree of confidence in information sources on global warming



**Figure 4.**

Physicians' opinion on their own observations of climate change



**Figure 5.**

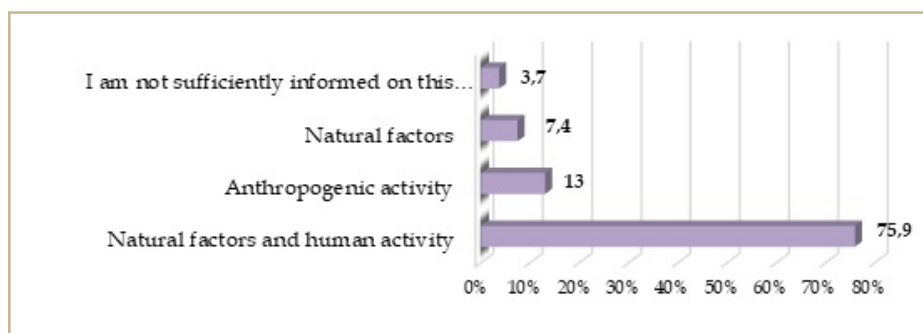
Physicians' attitude towards the problem of global warming

Asked about the cause of climate change and global warming, ¾ among family physicians mentioned that these phenomena are caused by both natural factors and human activity, 13% of doctors believe that only human activity leads to these phenomena, 7.4 % consider that only natural factors are the problem. Out of the total number of doctors surveyed, 3.7% mentioned that they had insufficient information on the topic (Figure 6). When asked how important is the problem of climate change, global warming for them, 31 respondents (57.4%) answered that it is a very important problem, 17 (31.5%) respondents answered that it is a very important problem, and 3 respondents (11.2%) answered that for them this problem is not important.

When responding to the reasons that make this issue important (open question), 26 respondents

answered (48.1%). The reasons why doctors consider it an important issue were: the negative influence on health (13 respondents), the negative impact on the economy (6 respondents), the negative ecological impact, the fact that it endangers life and nature, the danger of drought or floods, the consequences on drinking water, air pollution, increasing the amount of waste, radioactivity. These are correct statements, also found in the literature [3, 4, 11, 14].

In descending order, the reasons invoked were: air pollution (66.7% of respondents), genetically modified food (59.3%), river pollution (48.1%), poor waste management (48.1%) , climate change (33.4%), radioactive waste - (33.4%), traffic congestion (24.1%), depletion of planetary resources - (20.4%), ozone hole (18 , 5%), overcrowding - (14.8%), financial crisis - (14.8%), floods (12.9%).



**Figure 6.**

Physicians' opinion on the causes of climate change, global warming

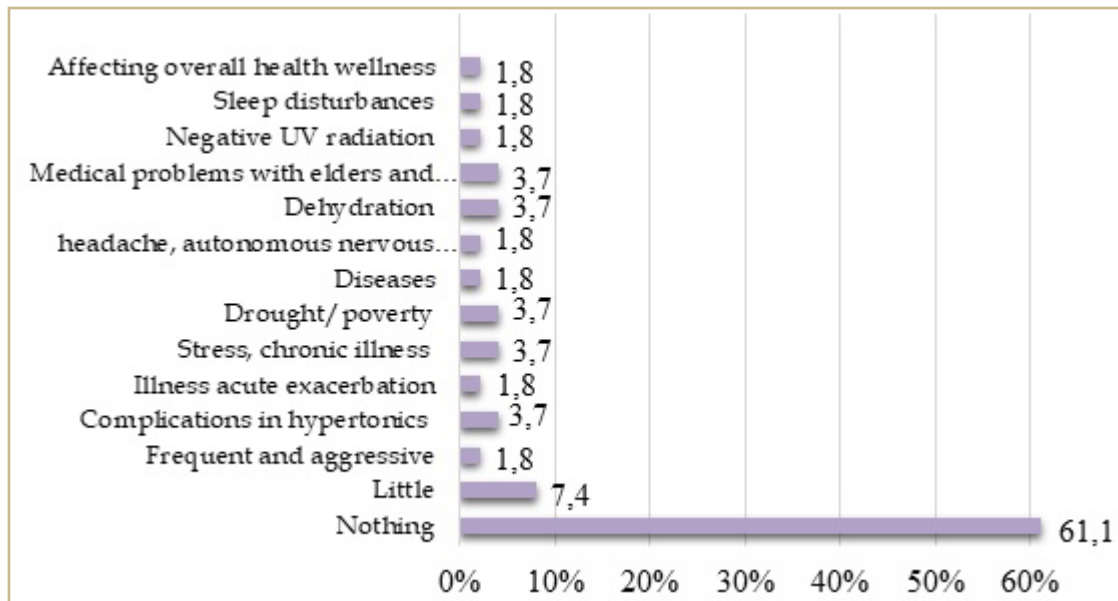
Through the next open-ended question, we were interested if family doctors knew the impact of climate change. Half of the doctors answered this question (28 out of 54 respondents). The answers were very different: some correct, some less correct (because they did not specify certain consequences, but rather causes; in some cases the answer was confusing, which demonstrates ignorance of the problem). Some doctors have referred directly to the impact on health (people get sick, decreased immunity, frequent illnesses of children and the elderly, stress, insomnia, fatigue, decreased quality of life, disability, increased incidence of cancer, cardiovascular disease, epidemics of deaths, etc.); others described the situation from a more general perspective (drought, extinction of plant species, animals, floods, additional costs in agriculture, declining crops, air pollution, worsening living conditions, worsening financial crisis, climate catastrophes, etc.). Out of the total number of doctors surveyed, 31 (57.4) mentioned that climate change and global warming is something that affects them personally. Twentyone respondents (38.9%) are not personally affected by this problem and two

respondents answered that they do not know if it affects them personally. Of the doctors who consider that they are personally affected by the global warming phenomenon, 25 respondents are largely affected, and six are insignificantly affected. When asked if the heat wave is due to global warming, 37 respondents answered YES, 13 respondents answered that these are two phenomena only partially related, 4 respondents did not answer this question.

The knowledge of family doctors about the thermal stress associated with the heat wave was investigated through an open-ended question. More than half (61.1%) of the total respondents mentioned that they know nothing and 7.4% - know little. The other doctors gave short, incomplete answers, but most of them can be considered correct (Figure 7).

When asked about the consequences of thermal stress (open-ended question), 25 doctors answered. Three of them mentioned that they do not know what the consequences are. The answers of the other 22 doctors were: health disorders, negative effects, exacerbation of chronic diseases, increased death rate, overheating of the body, seizures, lipothymia,

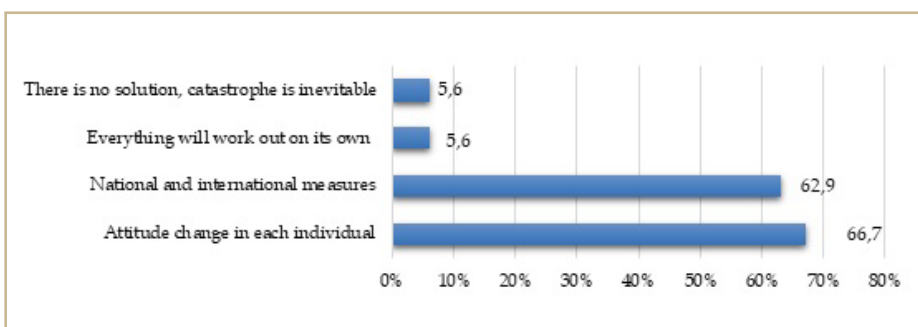




**Figure 7.** Physicians' knowledge regarding the thermal stress associated with the heat wave  
Here the "hypertonic" are probably hypertensive. It is a bit strange to associate the headache with vegetative disorders, but we will have to leave them like that.

asthenia, vegetative disorders, immune system disorders, increased cardiovascular disease rate. In order to better understand whether doctors know the problem of global warming well enough, they were asked to name a few control measures, to which only 46.3% of doctors responded, the other doctors stating that they do not know what measures can be taken. Among the answers of doctors were: the work of factories, plants, warehouses should be planned, an international program should be developed, the number of electronic devices used by the population should be reduced, everyone should be aware that it pollutes the environment, forests must be protected, properly managed water consumption, transport flow must be reduced, it is necessary to collect waste properly and recycle it, reduce the amount of harmful gases, conduct ecology lessons in schools, during the heatwave must change the work schedule, sprinkle the streets with water, avoid air pollution. It was also

mentioned that state strategies are needed, as well as solar power stations. The answers mentioned were in accordance with the measures proposed by specialists in the field, mentioned in the sources of the literature [4,16,17]. In the next item of the questionnaire, the respondents were suggested to select, from a proposed list, the solutions to solve the problem. Just little over half of the family physicians selected two answers each that are appropriate, and demonstrate knowledge in the field (Figure 8). To the question "Who do you think should bear the main responsibility for climate change?", 81.5% of respondents were of the opinion that international organizations are responsible, 53.7% of respondents believe that the national government, 42.6% of the respondents consider that the problem should be solved by the local public administration, 59.2% of the respondents consider - the environmental organizations.



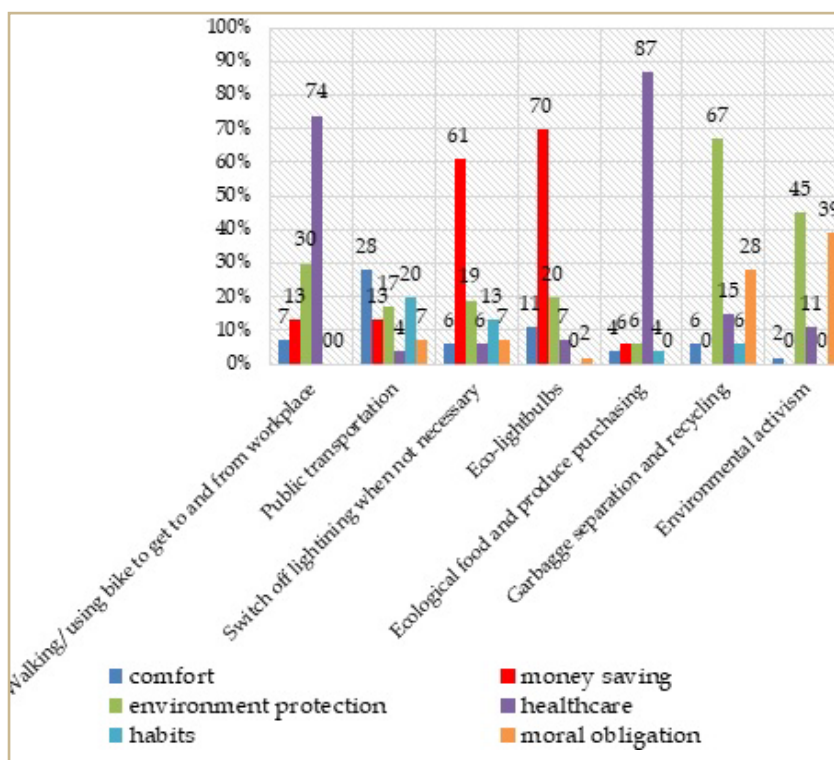
**Figure 8.**

Physicians' opinion on solutions to the problem of global warming

The last question in this section of the questionnaire was in the form of a table and included a series of questions aimed at confirming or refuting the answers to the previous questions, the so-called trap questions. They focused mainly on identifying the mentioned actions with priority priority of environmental protection. The first question was about why doctors would walk or bike to work. Among the causes of bicycle use, environmental protection is the main reason only 29.6% of respondents. Only 27.8% of respondents would use public transport to protect the environment. More doctors (61.2% of respondents) turn off the light when they do not need it to save money than those (18.5% of respondents) who do it for environmental protection. Most respondents (70.4%) buy energy-saving light bulbs to save money, but there are also a few doctors (7.4%) who are aware that their use is a measure of environmental protection.

Only 5.6% of respondents would buy organic food for environmental protection, and most (87.1%) - because they are important for health. A very important action at present is the sorting of rubbish in rubbish bins for recycling, and it is gratifying that a large number of doctors (66.7%) know this, do it or would do it if it were possible. 44.5% of respondents took part in a campaign on environmental issues or would do so for environmental protection (Figure 9).

Thus, money-saving measures are more easily adopted by respondents, such as turning off the lights and buying energy-saving light bulbs. Many actions would be done by respondents to maintain their health: walking / cycling, consuming organic products. But the respondents are also open to actions that, in their opinion, have as a priority the protection of the environment: participation in environmental protection campaigns, sorting garbage in garbage cans for recycling.



**Figure 9.** Distribution of respondents according to the reasons for actions aimed at environmental protection

## Conclusions

1. The research results confirm the hypothesis, doctors have some knowledge about the phenomenon of climate change, but some gaps and misunderstandings of the cause and effect of the phenomenon, as well as methods to combat them have been identified.

2. Based on the above, there is a need for additional training and guidance of physicians on the relationship between climate change, global warming and population health, but also the ways in which these relationships can be communicated without undermining the doctor-patient relationship.

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