



Knowledge about Disease and Health Behaviours in Elderly Stroke Survivors as a Context of Occupational Therapy Implementations

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
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Abstract

Knowledge the risk factors and symptoms of strokes is important in the context of a quick response to first signals and secondary prevention, and health education is one of the tasks of the neurological occupational therapist. To carry out this task, the therapist needs information about patients' health behaviours and knowledge about the disease. This study aimed to determine: 1. elderly patients' knowledge about strokes and the channels of knowledge transmission; 2. differences between their pre- and post-stroke health behaviours; 3. differences in knowledge and health behaviours depending on the respondent's gender, age and education.

The study involved 34 patients of a neurological rehabilitation centre, aged 60–85, with a stroke diagnosis within the last six months. The data were collected during a face-to-face questionnaire interview constructed for the purpose of the study.

Preventive campaigns reach risk groups to a limited extent and the level of respondents' knowledge about stroke symptoms and risk factors was considered unsatisfactory. According to the respondents, the most effective channel of communication is television, and the most reliable sources of knowledge are doctors and other healthcare workers. Relationships were found between knowledge about strokes and age, gender, education and health behaviours before the stroke.

It is necessary to educate patients about the symptoms and risk factors of strokes. Communication channels should be better profiled in terms of the capabilities of people at risk of stroke. For planned health behaviour change to be effective, patients need education, advice and support from an occupational therapist and other health professionals.

Keywords: stroke, prevention, occupational therapy, health education, risk factors

Introduction

Cerebrovascular diseases are a huge problem all over the world. In 2019, more than 101.5 million people worldwide suffered a stroke (Virani et al., 2021). In 2017, it was the cause of 13% of all global deaths, and 130 million years of life were lost due to health damage or premature death, according to the DALY (disability adjusted life-years) indicator (NFZ, 2019). The National Health Fund reports

that in 2022 almost 74 000 cases of hospitalization due to stroke treatment were recorded in Poland (NFZ, 2023). Stroke is also a social problem. Some strokes lead to quick death, some to death in the long term, 30% in the first year after the stroke (NFZ, 2019). Stroke can cause profound disability, and for this reason it changes the life of not only the patients themselves, but also their family members.

Stroke is a disease in which reaction time has a huge impact on the degree of complications. A person experi-

encing the first symptoms of a stroke should go to a hospital with a stroke unit as soon as possible and receive medical assistance in accordance with the latest standards. For this to happen, it is necessary to educate the public about strokes and, especially, their most common symptoms. Patients who have experienced a stroke should be equipped with knowledge not only about the symptoms, but also about the risk factors, which will enable them to make changes in their health behaviours as part of secondary prevention and reduce the risk of another stroke.

One of the tasks of occupational therapists is educating stroke patients about their health, supporting them in adopting health-promoting behaviours, and eliminating lifestyle-related, modifiable stroke risk factors. One of their key roles is promoting a healthy lifestyle (AOTA, 2008).

Globally, approximately 90% of all strokes can be attributed to modifiable risk factors – those that are within the patient's control (Kleindorfer et al., 2021). The most important among them is hypertension, which, according to various sources, increases the risk of stroke by more than twofold (O'Donnell et al., 2016), fourfold (Kłak, 2016) or even fivefold (Wiszniewska et al., 2012). Diabetes doubles the risk of stroke (Boehme et al., 2017; Kłak, 2016), with stroke being the cause of approximately 20% of deaths among diabetics (Boehme et al., 2017). The risk of stroke also increases with the presence of cardiovascular disease. According to researchers, at least one quarter of stroke cases are of cardiac etiopathogenesis (Antecki et al., 2018).

Also, weight gain associated with a high-fat diet and physical inactivity is directly associated with an increased risk of stroke (Choudhury et al., 2015; Kłak, 2016). Cigarette smoking is one of the main risk factors for stroke – it is estimated that cigarettes contribute to approximately 15% of deaths from stroke annually (Boehme et al., 2017). However, the risk of stroke in people under psychosocial stress increases by 72% (NFZ, 2019).

Diet directly affects the risk factors mentioned above. A proper diet plays a huge role in stroke prevention. The increase in the number of cerebrovascular events recorded in developed countries corresponds to changes in lifestyle and diet resulting from urbanization and industrialization (NFZ, 2019). Proper nutrition can reduce the risk of stroke by up to half (O'Donnell et al., 2016). Physically active people have a lower risk of stroke and lower stroke mortality compared to inactive people. The association of physical activity with a lower risk of stroke also results from reduced blood pressure, reduction in body weight and a lower risk of diabetes (Boehme et al., 2017). According to some sources, regular physical activity reduces the risk of stroke by 21% (NFZ, 2019).

Due to the fact that the risk of having another stroke is approximately 10% in the first year after the onset of the disease, and after five years the cumulative risk rises to

30–40%, it is very important to quickly detect the cause of the stroke and implement an effective secondary prevention scheme (Antecki et al., 2018). The results of the INTERSTROKE study suggest that approximately 90% of all strokes are caused by these modifiable risk factors (O'Donnell, 2016). This shows the importance of education aimed at shaping positive health behaviours in the case of stroke patients or patients at risk. This education about health risk and stroke prevention can be successfully performed by an occupational therapist.

Health behaviours can be defined as “actions of an individual undertaken for health reasons or those that have a documented impact on health” (Łuszczynska, 2004, p. 14). Health behaviours begin in early childhood, through patterns observed at home, school, in the mass media or advertisements, but Nowicki et al. (2018) emphasize that these are not permanent patterns, but are shaped throughout a person's life. They are determined not only by sociodemographic factors (age, gender, financial situation) or personality traits and personal resources, but also by the cultural and social context, e.g. the style and standard of living, ideas about health and disease, the state of knowledge about causality, attitudes and behaviours towards one's own disease or the diseases of other people, and attitudes towards representatives of medical institutions, etc. (Gruszczyńska et al., 2015).

In order to conduct secondary prevention using psychoeducation and impact the health behaviours of people after stroke, an occupational therapist should assess the patient's knowledge about this disease and its source, as well as health behaviours in the period preceding the stroke, especially those constituting risk factors. According to Kozera (2007), education should include not only learning to control basic risk factors, but also, for example, antidepressant therapy and education, which also falls within the scope of competence of an occupational therapist. The goal of an occupational therapist in educating stroke patients should be to provide them with appropriate information and support (Logan & Skelly, 2010).

The main aim of the study was to determine the health behaviours of elderly patients after a stroke and the factors determining them. The specific aims of the study included:

- determining the knowledge of these patients about their disease, its symptoms and risk factors,
- determining whether patients plan to change their health behaviours as a result of the incident by comparing health behaviours before the stroke and declared behaviours after the stroke,
- analyzing whether gender, education and age differentiate knowledge about stroke and health behaviours,
- determining whether the respondents' knowledge is related to ongoing social campaigns regarding strokes,

- determining what means of transmitting information about strokes best reach older people who are at increased risk of this disease.

Achieving these goals will provide occupational therapists with the knowledge necessary to effectively conduct psychoeducation as an important element in the secondary prevention of stroke patients.

Method

The study included a total of 34 patients of the neurological rehabilitation department, including 19 women (55.9%) and 15 men (44.1%), who were diagnosed with a stroke in the previous six months. The inclusion criteria for the study included maintaining verbal-logical contact, age not lower than 60 years, giving informed consent to participate in the study and having had a stroke in the previous six months. The average age of the respondents was 71.5 years (± 7.21).

The respondents were presented with the objectives of the study, informed about the anonymity of the study and gave written voluntary consent to participate in it. Due to the health condition of the respondents, it was assumed that they could take a break from the study. However, none of the respondents took advantage of this opportunity. The study was approved by the Senate Committee on Research Ethics of the Józef Piłsudski University of Physical Education in Warsaw (SKE 01-23/2021).

The data were obtained during a standardized, individual, F2F interview. Considering the age and cognitive state of the respondents, the authors decided that interviewing would be the most suitable method to collect all the data needed. The research tools created for the needs of the described study included: 1. a personal questionnaire (containing six questions); 2. a questionnaire on stroke history and knowledge about strokes (32 questions); 3. a survey consisting of 12 questions regarding health behaviours before and after a stroke (in total 24 questions). The subject indicated how often he or she engaged in health behaviours before/after the stroke on a three-point scale: *regularly, from time to time/irregularly, rather not/not*. Responses were scored in such a way that 3 points were awarded for an answer indicating regular health-promoting behaviours (e.g. physical activity, weight control) or no health-harming behaviours (e.g. smoking, eating fried or high-sugar foods). A summary index was also calculated – the higher the index, the more frequently the respondent declared pro-health behaviours.

Statistical Analysis

In the statistical analysis, non-parametric Wilcoxon tests for two dependent samples, Mann-Whitney tests for two independent samples and the chi-square test were

used, and Spearman's rho rank correlation coefficients were calculated. Differences and relationships at the level of $p \leq 0.05$ were considered statistically significant.

Results

The vast majority of respondents were admitted to the centre after their first stroke ($n = 31$), two of the respondents had experienced two strokes in their life, and one had experienced three strokes. More than half of the patients ($n = 19$) had had a stroke 2–4 months before the interview, in 12 subjects a month or less had passed since the stroke, and 3 people had a stroke within 5–6 months before the interview.

The group of respondents was dominated by people with vocational education ($n = 11$) and secondary education ($n = 11$). Slightly fewer respondents had obtained higher education ($n = 7$), and five respondents completed their education at primary school. More than half of the respondents ($n = 18$) were married, the second largest group were widowed ($n = 9$), followed by unmarried people ($n = 4$) and divorcees ($n = 3$). All respondents were retired. Before retirement, 21 patients performed work that could be considered mental and 13 patients worked physically.

Knowledge about Strokes

One of the aims of the study was to examine the level of knowledge of older people after a stroke about their own disease. Almost all respondents ($n = 32$) considered a stroke to be a serious, life-threatening disease, the remaining two chose the answer “it's hard to say”. The patients also agreed about the role of time in the diagnosis and treatment of a stroke: 33 respondents believed that time plays an important role in receiving specialized medical assistance. When asked who may experience a stroke, 26 respondents correctly answered that everyone, six said that they could be people over 60 years of age, and two respondents indicated people over 40 years of age.

To assess patients' general knowledge about strokes, knowledge of stroke symptoms and modifiable risk factors was also examined. Most respondents ($n = 32$) were able to name at least one or more symptoms of strokes, but two people were unable to name any symptoms (Figure 1). Most respondents mentioned the symptoms of strokes that they experienced themselves – as many as 23 people were unable to name a single symptom except those they experienced themselves (Figure 1). Among all study participants, as many as 22 people said that the symptoms of a stroke were not known to them before the incident. The symptoms most frequently mentioned by study participants were hemiparesis, speech disorders and a drooping corner of the mouth (Figure 2). The respondents' knowledge of modifiable stroke risk factors was slightly worse

– almost one quarter of the respondents were unable to name a single factor (Figure 3). The most frequently mentioned factors were stress and fatigue, smoking, hypertension and alcohol consumption (Figure 4). Only

four people mentioned diabetes as a risk factor and only one person mentioned obesity. As with stroke symptoms, 22 respondents said they did not know the risk factors for a stroke before it occurred.

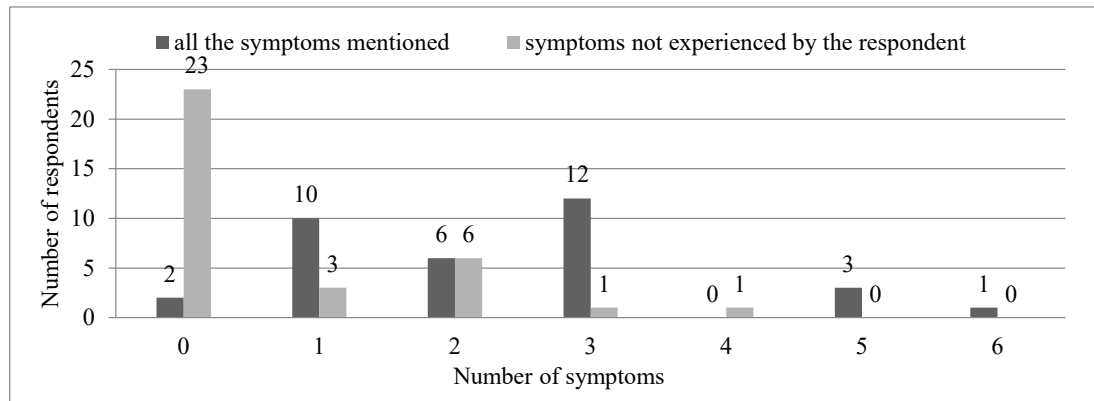


Figure 1. Number of symptoms mentioned by the respondents

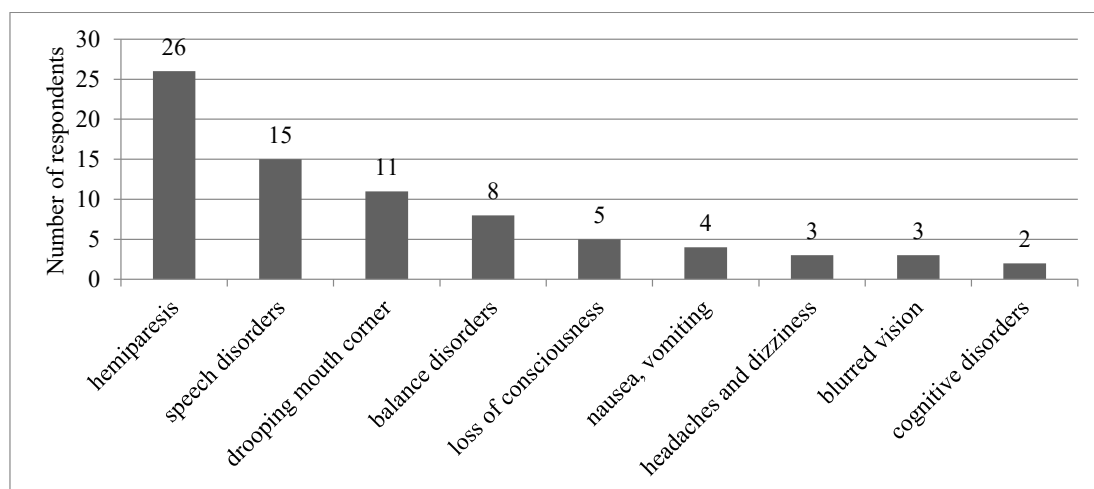


Figure 2. Stroke symptoms mentioned by the respondents

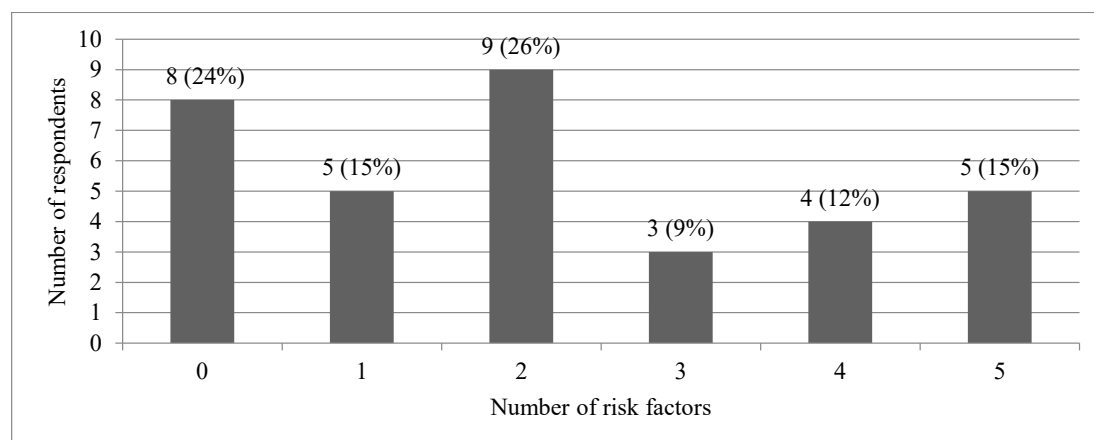


Figure 3. Number of modifiable risk factors mentioned by the respondents

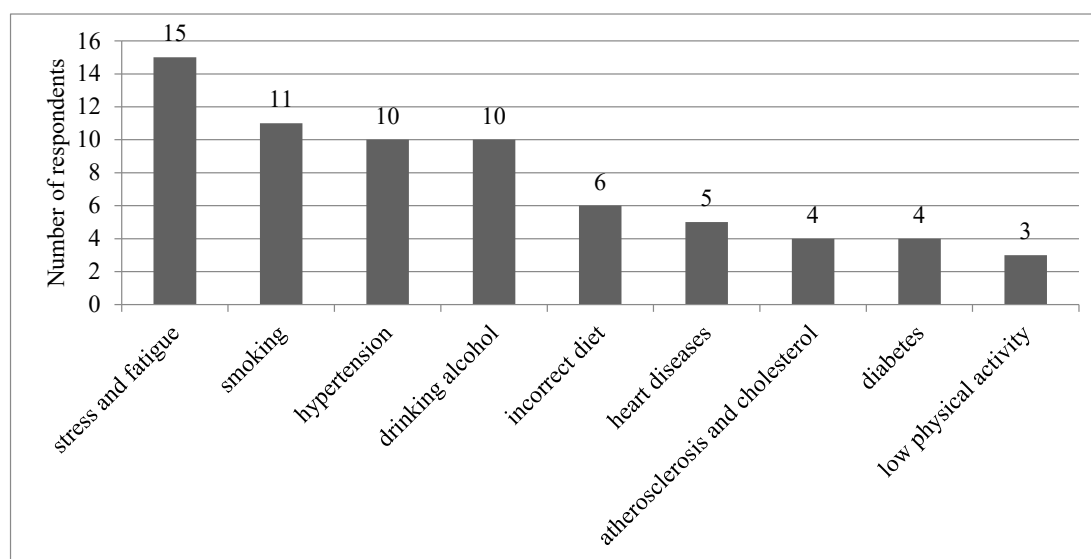


Figure 4. Modifiable stroke risk factors most frequently mentioned by respondents

More than half of the respondents ($n = 19$) were unable to name the two basic types of stroke (ischemic and hemorrhagic stroke), three people mentioned one type, and the rest ($n = 12$) both types.

The knowledge of men and women about strokes differed slightly. Women significantly more often than men indicated smoking as one of the modifiable risk factors for stroke ($p = 0.033$). There were no statistically significant differences in the number of indicated stroke symptoms and risk factors.

The study also compared the responses of people with higher and lower education. Primary and vocational education was considered less educated, while respondents with secondary and higher education were considered better educated. There were 16 people in the first group, and 18 people in the second group. Unexpectedly, people with less formal education mentioned, on average, more stroke symptoms that they had experienced themselves compared to their better-educated peers ($p = 0.043$). The mean of reported symptoms other than those experienced was higher in the more educated group, but this difference was not statistically significant ($p = 0.348$). There were no statistically significant intergroup differences in the total number of indicated stroke symptoms and risk factors.

The study also looked for relationships between age and knowledge about strokes. The results showed a negative correlation between the subject's age and the number of correctly indicated stroke symptoms ($p = -0.430$; $p = 0.011$) and the number of indicated stroke symptoms that the subject experienced themselves ($p = -0.447$; $p = 0.008$). The older the respondent was, the fewer symptoms she or he was able to mention.

Sources of Knowledge

The sources of knowledge about strokes in the study group were very diverse. Thirteen patients stated that they did not know or still did not know anything about strokes, six people mentioned a life experience, such as a close family member having a stroke, and five respondents indicated that they had learned about strokes from television. Four people each indicated the internet, brochures and posters, the press and books, and friends and family. The majority of respondents ($n = 28$) claimed that none of the attending physicians had informed them that they were at risk of having a stroke.

Sources of knowledge about strokes varied slightly depending on gender. Only women gained knowledge from television broadcasts.

The aim of the study was also to collect data needed to determine what means of transmitting information about strokes best reach older people who are at increased risk of this disease. In the question in which respondents were asked to choose how it would be best to provide older people with knowledge about preventive health, the most frequently chosen answer was TV advertisements ($n = 28$). The next in order of frequency of responses are posters and leaflets in clinics ($n = 14$), radio campaigns ($n = 7$), glossy magazines ($n = 6$), posters at public transport stops ($n = 5$), internet ($n = 3$) and graphics on screens in public transport ($n = 1$). Gender-related differences in opinions about preventive programmes were limited to the fact that women more often indicated TV adverts ($p = 0.033$).

In an open question, patients were also asked for their opinion about where it would be easiest for people their age to obtain knowledge about preventive health. The respondents' answers most frequently mentioned televi-

sion ($n = 16$), followed by doctors and other healthcare workers ($n = 7$), brochures and posters ($n = 5$), newspapers and press ($n = 4$), and radio ($n = 2$), social conversations ($n = 2$) and the internet ($n = 1$). Compared by education, a significant difference concerned doctors, with as many as 75% of people from the less-educated group considered doctors to be suitable for this task, while it was less than 40 % in the better-educated group ($p = 0.034$).

Changes in Health Behaviours after a Stroke

In order to determine the declared changes in health behaviours, the frequency of behaviours occurring before the stroke and those planned after the stroke was compared using the non-parametric Wilcoxon test for two dependent samples (Table 1).

Comparison of the measurements showed a positive change in the health behaviours of the respondents – in all

Table 1. Changes in the declared health behaviours of the respondents

Health behaviours	Before stroke		After stroke		Wilcoxon test	
	M	SD	M	SD	Z	p
Eating unhealthy foods	0.59	0.701	1.26	0.751	-3.906	<0.001
Compliance with medical recommendations	1.03	0.904	1.85	0.359	-3.715	<0.001
Reducing stress	0.76	0.890	1.53	0.507	-3.582	<0.001
Drinking alcohol	1.00	0.739	1.50	0.508	-3.494	<0.001
Physical activity	1.21	0.880	1.74	0.567	-3.448	0.001
Taking medicines	1.24	0.923	1.88	0.478	-3.314	0.001
Controlling blood pressure	1.15	0.958	1.76	0.554	-3.286	0.001
Medical check-ups	1.26	0.710	1.74	0.448	-3.234	0.001
Taking care of rest	1.68	0.535	2.00	0.000	-3.051	0.002
Smoking tobacco	1.44	0.894	1.94	0.239	-2.919	0.004
Weight control	1.24	0.890	1.65	0.597	-2.562	0.010
Support from loved ones	1.71	0.629	1.82	0.521	-1.633	0.102
Sum	14.29	4.583	20.68	2.085	-4.838	<0.001

questions in the second measurement, a higher frequency of health-promoting behaviours and a lower frequency of health-harming behaviours were declared. In most cases, the differences between measurements turned out to be statistically significant ($p \leq 0.05$). The only exception was the question about looking for and finding support in loved ones. Detailed analyses showed that before the stroke, 27 people always found support from loved ones, four from time to time, and three did not receive such support. After a stroke, 30 people plan to turn to their loved ones for support if necessary, two respondents may do so, and two more do not plan to seek support from their loved ones. The most visible changes were reported by the respondents in the case of lower frequent consumption of fat, sugar and alcohol, as well as more frequent compliance with medical recommendations and limiting stress. Slightly less visible but still statistically significant changes were observed in the areas of rest, smoking and regular body weight control.

Despite the fact that the vast majority of respondents declared an improvement in health behaviours after a stroke, the analysis of the responses showed several

cases in which the respondent declared a deterioration of planned health behaviours. Four respondents declared that they would check their body weight less frequently, one person planned to limit preventive visits to doctors, and one person planned to limit compliance with medical recommendations. Due to the nature of the questions, it can be assumed that these are answers given by mistake. However, it cannot be ruled out that the respondents consciously provided a false, more socially acceptable answer in the measurement of pre-stroke behaviour.

In men, almost all differences between measurements turned out to be statistically significant. The most significant changes were observed in compliance with medical recommendations ($p = 0.003$), changing the diet to a healthier one ($p = 0.006$), rest ($p = 0.04$) and alcohol consumption ($p = 0.04$). The difference between measurements in body weight control reached the trend level ($p = 0.083$). The change observed between measurements in seeking support from loved ones turned out to be statistically insignificant ($p = 0.317$).

In women, the most visible changes were observed in changing the diet to a healthier one ($p = 0.005$), increasing

the level of physical activity ($p = 0.011$) and reducing stressful situations ($p = 0.012$). Differences between measurements in regular weight control and follow-up medical visits were visible at the level of tendency ($p = 0.057$ and $p = 0.058$, respectively). However, the differences between measurements in seeking support from loved ones and resting turned out to be statistically insignificant ($p < 0.05$). Interestingly, the difference between the measurements in devoting sufficient time to rest turned out to be very clear in men ($p = 0.004$) and statistically insignificant in women ($p = 0.317$), because women presented higher levels of rest than men in the measurement of pre-stroke behaviour.

Both in respondents with lower and higher levels of education, the total health behaviour index was significantly higher in the case of declared behaviour after a stroke compared to behaviour before the stroke (lower education level $p = 0.001$, higher education level $p < 0.001$). In the lower education level group, the most visible change was observed in the areas of compliance with medical recommendations and blood pressure control ($p = 0.004$), as well as physical activity ($p = 0.005$) and alcohol consumption ($p = 0.006$). The difference reached the level of tendency in resting ($p = 0.059$), and the change in measurements of support from loved ones turned out to be statistically insignificant ($p = 0.317$).

In better-educated people, the difference between measurements was greatest in dietary change ($p = 0.003$). The difference in medical check-ups ($p = 0.059$) and smoking ($p = 0.063$) reached the trend level, and the differences in seeking support from loved ones and body weight control turned out to be statistically insignificant.

Better-educated respondents presented more beneficial health behaviours before the stroke compared to less-educated people, which is confirmed by a significantly higher total index of health behaviours before the stroke ($p = 0.038$).

Discussion

Knowledge about Strokes

One of the goals of this study was to determine the knowledge of elderly stroke patients about their own disease, its symptoms and the risk factors. Most participants demonstrated knowledge of who may experience a stroke, and respondents were also aware of the seriousness of the situation and the need for a quick response. Almost all respondents (97%) agreed that response time in receiving medical assistance plays an important role in stroke severity. This is a slightly better result than in the study by Faiz et al. (2018) on a similar group, where 85.5% of respondents considered reaction time to be important. Some of the patients participating in our research learned

about the importance of reaction time only after their own stroke, because, according to the responses, five respondents delayed calling for help for a day or longer after the symptoms appeared.

In the presented study, the symptoms of stroke most frequently mentioned by patients were hemiparesis, speech disorders and drooping corner of the mouth. Similar results were obtained by Droste et al. (2014), Faiz et al. (2018), Saengsuwan et al. (2017) and Cieślak (2018). Interestingly, a drooping corner of the mouth was the least frequently mentioned symptom in the general population of the Silesian Voivodeship (Krzystanek et al., 2020). In a study of the general US population, the least frequently recognized symptom of stroke was severe, sudden headache (Patel et al., 2019).

In our research, less than 6% of respondents were able to indicate a single symptom of a stroke. This percentage is lower than in previous patient studies (10–29% Droste et al., 2014; Saengsuwan et al., 2017; Pandian et al., 2006) and significantly lower than in the general population (40% – Krzystanek et al., 2020). Stroke survivors have experienced at least some of the symptoms themselves, which undoubtedly makes it easier to identify them. Nevertheless, patients' knowledge regarding the symptoms of stroke in our research should be considered insufficient. Ten people mentioned only one symptom, six people only two symptoms and 18 respondents mentioned three symptoms or more. Moreover, almost 70% of respondents were unable to name a single symptom apart from those they had experienced themselves, suggesting that their level of knowledge is unsatisfactory from the perspective of secondary prevention. It can therefore be concluded that if the symptoms of a potential next stroke were different from the symptoms that patients know from their own experience, they might not assess the situation correctly and take the necessary steps quickly enough.

Modifiable risk factors account for approximately 90% of all strokes (O'Donnell, 2016), and research shows that in the case of secondary prevention an appropriate combination of pharmacology (aspirin, statins, antihypertensive drugs) with dietary modification and the inclusion of exercise can reduce the cumulative risk of another stroke by 80% (Kleindorfer et al., 2021). Knowledge of risk factors is therefore necessary to introduce conscious and lasting lifestyle changes and, as a result, reduce the risk of a repeat incident. Meanwhile, in the research of Riechel et al. (2016), the level of knowledge about the risk factors and prevention of a stroke in people with cerebrovascular diseases was low/moderate and did not differ much from the level of knowledge of random passers-by.

Unfortunately, in our research, almost 25% of the respondents were unable to name a single risk factor, and 62% were able to name two or more factors. The same result was obtained in studies in Thailand. Similar results

were also obtained by Soto-Camara et al. (2020) and by Saengsuwan et al. (2017). Slightly worse results were obtained in studies of the general population of the Silesian Voivodeship – over 60% of respondents were unable to name two or more risk factors (Krzystanek et al., 2020).

In the current study, the most frequently mentioned risk factors were stress and fatigue, cigarette smoking and hypertension. Similar results were obtained by Sloma et al. (2010), Faiz et al. (2018), Soto-Camara et al. (2020), Droste et al., (2014) and Saengsuwan et al., (2017). It can be concluded that, regardless of the country, the best-known risk factor for a stroke is hypertension.

In the presented study, the most frequently mentioned factors were stress and fatigue, which are indeed risk factors, but they are difficult to assess and control. Meanwhile, only four people mentioned atherosclerosis and cholesterol levels, and diabetes appeared in the answers only four times. Regarding the perception of diabetes as a risk factor for stroke, the level of knowledge was also assessed as low by Sloma et al. (2010) and by Kraywinkel et al. (2007), although it was significantly higher than in our study – almost half of the respondents knew this relationship, compared to one in ten in our research. The research of Cieślak (2018) also indicates the lack of knowledge of patients in this area. Diabetes was mentioned as an important risk factor by only four people, similar to the study by Faiz et al. (2018). More than 40% of Chinese stroke patients were unaware of stroke risk factors such as diabetes, hypertension, smoking and obesity (Wang et al., 2018). Other results were obtained by Pandian et al., (2006) in India, and Saengsuwan et al. (2017) in Thailand. In their studies, diabetes was one of the most frequently mentioned risk factors. Perhaps these differences are due to cultural factors. Taking into account the results of the above-mentioned studies, it can be concluded that, regardless of the country, knowledge about diabetes in the context of stroke risk factors is insufficient.

In our study, a low level of physical activity was mentioned as a risk factor by only three people (approx. 9%), similar to the Norwegian study (Faiz et al., 2018), while over 80% of Swedish patients (Sloma et al., 2010) and 60% of the general population of the Silesian Voivodeship (Krzystanek et al., 2020) were aware of its importance. Kraywinkel et al. (2007) suggest that knowledge of specific stroke risk factors is higher in people directly affected by these factors. Comparison of our results with those obtained by Krzystanek et al. (2020) in the Polish general population does not confirm this assumption. Perhaps the reason for the discrepancy lies in methodological differences. Sloma et al. (2010) report that almost 40% of stroke patients did not know that a previous stroke increased the risk of another incident.

Our research, similar to that of Jones et al. (2010), showed a statistically significant negative correlation be-

tween the number of correctly indicated stroke symptoms and age. The older the respondent, the fewer symptoms she/he was able to mention. However, in the presented study, no statistically significant correlation was found between the age of the respondents and the number of mentioned risk factors, nor between genders in the number of indicated stroke symptoms and risk factors. In the general population, women have greater knowledge about health, including risk factors for stroke (Krzystanek et al., 2020). Perhaps in the patient population, the experience of stroke reduces the gender difference.

Interestingly, patients' opinions about their level of knowledge did not always correspond to their actual knowledge. In the study by Riechel et al. (2016), which analysed, among other things, knowledge about strokes in patients with cerebrovascular diseases and randomly selected passers-by, the patients felt better informed about strokes than the control group, despite the fact that their objective knowledge was comparable to that of passers-by, i.e. low. Researchers suggested that this may be related to patients' self-esteem and coping mechanisms after a stroke. Importantly, these types of false beliefs may constitute a barrier to further absorbing information and changing health behaviours.

To sum up, in the presented study, patients' knowledge about a stroke, its risk factors and symptoms was assessed as insufficient regarding the ability to take proper actions in potential stroke events, as well as carrying out actions related to secondary stroke prevention. The results are consistent with those of other researchers (Droste et al. 2014; Rosińczuk et al. 2014; Saengsuwan et al., 2017; Soto-Camara et al., 2020; Wang et al., 2018). This indicates the need to analyse and consider introducing changes to current patient education methods.

Sources of Knowledge

When asked about the sources of their current knowledge about strokes, most respondents initially answered that they did not know anything/still do not know anything instead of indicating the sources of information.

Interestingly, none of the respondents declared that they had obtained information from a doctor or medical staff. Similar results were obtained by Droste et al. (2014), where less than 3% of respondents were informed about strokes by a family doctor and only 3% by a neurologist. Different results were obtained by Cieślak (2018), who found that patients most often obtained knowledge about strokes from medical staff, and then from books and magazines, the internet, family and other patients. Study patients from Thailand (Saengsuwan et al., 2017) and Malaysia (Wong et al., 2021) also gained knowledge from medical staff. In our research, the vast majority of patients declared that none of their doctors informed them before the stroke that they were at risk. Most often,

our respondents gained knowledge from the media, from family and friends, as well as from school, word of mouth and from their own experiences, brochures and “general knowledge”, the same as in the study of the general population of the Silesian Voivodeship (Krzystanek et al., 2020). Although such results seem understandable in the general population, in the group of stroke survivors they are disturbing.

In the presented research, in terms of the communication channels preferred by the respondents, the most frequently chosen option was television, followed by posters and leaflets in clinics. The internet was chosen as a source by only three patients. The next question (*Where do you think it would be easiest for people of your age to get knowledge about preventive health?*) was open, so the respondents had a wider scope for interpretation. Here again, television turned out to be the most frequently mentioned source of knowledge, followed by doctors and other health care workers, and brochures and posters. The choice of doctors by over 20% of respondents is surprising compared to the answers to the question about who could encourage the respondent to lead a healthier lifestyle, where *doctor* was the least frequently chosen answer.

Respondents with lower education levels were significantly more likely than better-educated respondents to consider doctors as people suitable for imparting knowledge about preventive health (e.g. in campaigns). This coincides with the results of Polish research about trust in doctors (CBOS, 2014), in which better-educated people were less likely to have very much trust in doctors and were more likely to declare moderate trust. On the other hand, in the same studies, people over 65 years of age (not taking into account education) declared relatively high trust in doctors (CBOS, 2014). The Global Trustworthiness Index from 2023 shows that doctors are the second most trusted profession in Poland – 45% of respondents declares a trust in them (IPSOS, 2023).

There is no doubt that sources such as the internet or television will not, and should not, replace a doctor's opinion and advice. However, they can provide information that will then be discussed and verified with a doctor. Knowledge obtained from the media could therefore improve the patient's general orientation on a given topic, which could result, for example, in asking more relevant questions to the doctor and, as a result, in a better understanding of the causes or method of treating a given disease.

What seems surprising is the fact that over 80% of respondents declared that they had not received the content of the campaign regarding strokes. In Poland, one of the most famous organizations dealing with activities for stroke survivors and their families is the Stroke Foundation. The Stroke Foundation created, among others, such campaigns as *You have a stroke, 1 in 6* or *Zapobiegam.pl*,

aimed at educating patients on the prevention of cardiovascular diseases (FUM, n.d.). The most comprehensive social campaign is the Stop Stroke Campaign, whose partners are the Stroke Foundation and the “Stroke Survivors – Support Counts!” Association. The honorary patronage of the campaign was provided by the Polish Cardiological Society. The campaign includes multi-level social and educational activities, such as Mobile Stroke Prevention Towns, celebrations of World Brain Day and World Heart Day, as well as various educational activities regarding risk factors, prevention and recognition of strokes, including lectures at the University of the Third Age or press conferences (Stop Udarom, n.d.).

Despite such extensive activities in Poland, only six patients in our research declared that they had ever encountered information campaigns about strokes, of which five people saw posters in a clinic and one mentioned television as the source. The creators of the campaign include older people in their activities, an example of which are lectures conducted at Universities of the Third Age. However, do campaigns manage to reach less active or even socially excluded people?

Television was the most frequently chosen news channel in the presented study, with all respondents declaring that they watch it regularly. According to the Central Statistical Office, it was the main source of information about the coronavirus for older people in 2020. One of the possibilities of conducting social campaigns in the media is to use free airtime available to public benefit organizations. As Ziętek (2021) claims, however, this possibility is not used to the extent it could be. Perhaps the symptoms of a stroke presented by the hero of a favourite soap opera will be remembered by elderly people more than an advert during a commercial break.

Health Behaviours

The mortality rate from cardiovascular causes in stroke patients over a 10-year period can be reduced by 85–92% by leading a healthy lifestyle – eating the right amount of fruit and vegetables, maintaining an appropriate BMI, exercising, drinking alcohol and not smoking (Bailey, 2018). In our study, the health behaviours of patients before a stroke were not satisfactory. More than a quarter of respondents smoked cigarettes and drank alcohol regularly. Smoking cigarettes in the elderly, in addition to increasing the risk of stroke by as much as 180% according to some studies, also increases the risk of death caused by other cardiovascular diseases, respiratory diseases and cancer. Tobacco-related diseases take away over 8–9 years of smokers' lives, and tobacco smoking is also mentioned as a factor contributing to the occurrence of dementia processes and even depressive symptoms (Bojkowski & Mojs, 2017). In the presented study, smoking was the second most frequently mentioned risk factor for stroke.

In favour of the respondents is the fact that most smokers declared a willingness to try to quit, and only two of them assumed that they would smoke once in a while. This suggests that smokers are aware of the impact of nicotine addiction on the risk of having a stroke. In the study by Rosińczuk et al. (2014), the results were slightly higher – 45% of women and 35% of men indicated a stroke as a possible consequence of chronic nicotine addiction.

What also seems disturbing is the fact that half of the respondents regularly had unhealthy meals (deep-fried products, with a lot of sugar, etc.) in their diet. After a stroke, less than half of the respondents declared that they planned to exclude unhealthy products from their diet. In the study by Girzelska et al. (2010), over 65% of patients did not know what diet to follow after a stroke.

In our research, only half of the respondents declared regular physical activity before the stroke, and as many as 29% did not undertake any physical activity. A survey published in 2018 (i.e. before the pandemic) showed that physical activity was undertaken by 49% of people aged 55–64 and 39% of people aged 65 and over (CBOS, 2018). According to the Central Statistical Office data from 2017, the percentage of people participating in sports and recreational activities decreases with age. It was declared by only 25% of people over 60 years of age, only 42% of whom declared that they regularly undertake these activities (GUS, 2017). This may indicate the need to educate senior citizens about the health, social and psychological benefits of regular physical activity in old age, as well as to familiarize them with various forms of activity adapted to their age and health condition. In people after a stroke, physical activity may be hindered by, among other things, reduced efficiency, low motivation, limited social support, physical barriers, depression or an unsuitable environment, as well as fatigue, which is very common in this group (Billinger et al., 2018; Fitzsimons et al., 2022).

In the presented study, a relatively small number of respondents declared regular medical visits and preventive tests before stroke. According to CBOS surveys (2016), less than one third of Poles surveyed includes regular visits to the doctor as a key priority among health-promoting activities. Interestingly, regular visits to the doctor are more often perceived as a health-promoting activity by people who describe their health as unsatisfactory (51%) compared to people who are satisfied with it (23%). In our research, 74% of patients declared regular follow-up visits to doctors after a stroke, and 26% said that they would visit doctors, but they did not plan to do it regularly. However, the presented research examined only the health behaviours declared by patients after a stroke, and not the process of their implementation. Croquelouis and Bogousslavsky (2006) observed the actual behaviour of patients three months after a stroke. Their research shows

that since their stroke, about 26% of diabetic patients have visited a diabetologist, about 35% of patients have visited a cardiologist, and 27.5% of smokers have started a programme to stop smoking. Over 25% of patients have not visited their GP since their stroke. In order to realistically assess the health behaviours of stroke patients and their possible changes, they should be examined again, perhaps a few months after leaving the medical facility.

What works in favour of the respondents is the fact that they declare their willingness to make a positive change in each behaviour included in the study. The most significant changes were observed in changing diet, following medical recommendations, avoiding stress and limiting alcohol consumption. Before the stroke, better overall health behaviours were demonstrated by women and better-educated people, as shown by higher summary indicators of health behaviours in these groups. In terms of declared post-stroke behaviour, the study did not show statistically significant differences between genders or between people with higher and lower levels of education, which suggests that all respondents were ready to change their health behaviours. Some health behaviours were significantly correlated with the level of education. The study showed, among other things, that the better educated the respondent, the more often he or she declared regular blood pressure measurement and regular visits and preventive examinations before the stroke, and also demonstrated engaging in more health-beneficial behaviours before the stroke.

These results coincide with general trends in Polish society. Better-educated people can be expected to have a higher level of general knowledge (including health knowledge), which may contribute to more frequent health behaviours. Many studies show that higher educational status promotes better health and longer life (Korzeniowska & Puchalski, 2015). Better-educated groups are more likely to declare a healthy lifestyle, and better education also promotes compliance with the principles of healthy eating and maintaining proper body weight (according to their BMI) (Korzeniowska & Puchalski, 2015).

The second factor that differentiated health behaviours presented before the stroke was gender. Women were less likely to declare regular alcohol consumption, spent more time resting and were more likely to follow medical recommendations.

As mentioned above, the present study only took into account plans for behavioural changes declared by patients, not actual changes. Newsom et al. (2012) examined actual changes in health behaviours in patients with heart disease, cancer, COPD, diabetes, and strokes. The study showed that, over the years, most patients with the above diseases did not permanently change their health behaviours. No significant change in physical activity was observed in either group. The biggest change was

observed in people with heart disease quitting smoking, but only 40% of the respondents quit smoking. The results of these studies are disturbing and may suggest that, despite initially declared willingness, most patients may not be able to meet the challenge of changing their lifestyle.

The Role of an Occupational Therapist in Educational Activities for Patients After a Stroke

The role of an occupational therapist in educating a patient after a stroke is often understood as teaching the patient to perform certain activities again, taking into account the deficits resulting from the stroke. However, education can cover a much broader scope. An occupational therapist, as an important member of an interdisciplinary therapeutic team, can successfully educate the patient about a stroke, its risk factors or symptoms. The scope of this education should take into account the therapist's knowledge and be within his/her competences. The occupational therapist will not provide the patient with such specific guidelines as a doctor, but may focus on general information, universal for each patient. For example, she or he may emphasize the important role of an appropriate diet in preventing a second stroke or develop a strategy with the patient to regularly take prescribed medications. Detailed recommendations regarding diet and the selection of medications are the responsibility of the attending physician.

The American Occupational Therapy Association (2008) lists three critical roles of the occupational therapist in promoting health and preventing disease and disability: promoting a healthy lifestyle, emphasizing the role of occupation as a key element of health promotion strategies, and providing therapeutic interventions not only to individuals but also to communities. Examples of prevention include co-creation of support groups for people after a stroke (this is considered tertiary prevention).

Logan and Skelly (2010) also emphasize the important role of an occupational therapist in educating patients about disabilities, their consequences and reasons for their occurrence. Their goal should be to provide patients with appropriate information and build their strength, which will have a positive impact on their resources and coping strategies, and reduce fear and anxiety. The main sources of fear and anxiety among stroke patients include the fear of a second stroke and uncertainty about the degree of functional recovery. The OT is extensively involved in facilitating adaptive capacity to enhance recovery. Adding health-promoting knowledge for prevention of further cardiovascular episodes is recommended.

Guidelines based on scientific research indicate that secondary prevention should begin when the patient is in hospital and include both appropriate pharmacotherapy and active provision of information to the patient about

the disease and its prevention (Lawrence et al., 2012). For example, a Cochrane review highlighted the need for a strategy to help patients manage their medications and adhere to medications for chronic diseases, which would include educating patients about strokes, prescription medications, and adherence (Lawrence et al., 2012).

Bailey (2018) draws attention to the need to adapt the intervention to the current situation and the patient's level of motivation, due to the fact that not every patient will easily accept the changes imposed. The author proposes the use of motivational interviewing, a method focused on the patient, which aims to help patients become aware of their own priorities and values, as well as the barriers or factors contributing to their implementation. This may assist the patient in becoming more willing to discuss different strategies and consider implementation.

According to the Stroke Association, 9 out of 10 Britons who have had a stroke live in constant fear of having another one. Therefore, it seems that each member of the therapeutic team should, to a greater or lesser extent, introduce an educational element into everyday therapy.

Limitations of the Study and Suggestions for Future Research

A significant limitation of the study is the small number of respondents, partly caused by the time-consuming research method, which was a face-to-face interview. In the case of older people, especially after a stroke, the F2F interview remains the method of choice. However, it has limitations, especially when examining health behaviours. Declarations regarding pro- and anti-health behaviours are largely burdened with the social approval variable. In the future, this part of the survey should be considered in a different form in order to avoid untruthful and socially acceptable answers. It is also worth determining, in addition to the declared ones, actual health behaviours some time (e.g. 5–6 months) after the stroke.

Conclusions

The research results allow the following conclusions to be drawn:

1. Since the knowledge of elderly patients after stroke about the symptoms and risk factors of their disease is insufficient, it is necessary to implement effective health education methods in this group.
2. Before experiencing a stroke, most of the respondents had no knowledge about strokes. None of the respondents mentioned a doctor as the source of their knowledge about strokes, and the vast majority of respondents did not receive information from any of their doctors about being at risk

of a stroke beforehand. This indicates that there is a need to remind physicians, especially primary care providers, about the potential benefits of educating elderly patients about strokes.

3. In the opinion of older people, the most effective means of transmitting information about preventive health are television and posters and leaflets in clinics, which identifies these media as important potential channels for increasing knowledge and modifying the health behaviours of senior citizens.
4. After a stroke, patients declare their willingness to change their health behaviours, so it is necessary to develop programmes aimed at support, education and counselling in the process of changing health behaviours for this group of patients.
5. Information campaigns about strokes did not reach the vast majority of surveyed patients, so it is necessary to consider expanding the channels, especially to include television.
6. Since no significant differences were observed between genders in terms of knowledge of the symptoms and risk factors of a stroke, the same educational messages can be addressed to women and men.
7. Women and better-educated people presented better health behaviours before the stroke, but no significant differences were observed in the declared behaviours after the stroke. This means that men and people with a lower level of education should be particularly supported in the process of changing health-related behaviours.

Ethics approval and informed consent

The study was approved by the Senate Committee on Research Ethics of the Józef Piłsudski University of Physical Education in Warsaw (SKE 01-23/2021). The respondents were presented with the objectives of the study, were informed about the anonymity of the study and gave written voluntary consent to participate in it.

Competing interests

The authors declare no competing interest.

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