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PSYCHOLOGY

Dorota Ortenburger[1(ABCDEFG)], Jacek Wasik[1(ACDEFG)], Alena Bukova[2(ADEFG)], Tomasz Gora[1(BEFG)]

[1] Institute of Physical Education, Tourism and Physiotherapy, Jan Dlugosz University, Czestochowa (Poland),
address: ul. Armii Krajowej 13/15; 42-200 Czestochowa (Poland)

[2] Institute of Physical Education and Sport, Pavol Jozef Safarik University, Kosice (Slovakia)
address: ul. Ondavska 21, Kosice, Slovakia; contact e-mail: alena.bukova@upjs.sk

Comparison of strategies used by patients undergoing treatment for chronic pain people performing *taekwon-do* – a pilot study

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Key words: taekwon-do, strategies for coping with pain, psychological factors, proactive

Abstract

Background. An assumption was made that mental condition has an impact, playing an active role in both pain treatment and martial arts. In the light of the referenced literature concerning health psychology it may be related to the main of beliefs and psychological strategies concerning individuals'ability to cope with pain.

Aim. The aim of this work is to present the results of research dealing with pain in two different groups: patients undergoing treatment for chronic pain and a group of people practising *taekwon-do*.

Method. The paper presents the results of research conducted on two groups, considerably different in respect of their physical fitness. The first group was composed of 29 individuals who practise taekwon-do (30.5±8.9 years). The second group comprised 30 pain treatment patients (33.5±11.9 years). Questionnaires used in psychology and health promotion were applied in the research to collect relevant pain-related data (Coping Strategies Questionnaire and Pain Beliefs Questionnaire).

Results. The results obtained indicated that taekwon-do trainees use strategies for coping with pain on their own more frequently than patients. They are also more proactive 8,17±1,94 (cluster 1) and 6,50±3,03 (cluster 2) than patients 3,01±0,82 (cluster 1) and 5,05±1,95 (cluster 2). The type P strategy in the taekwon-do group was 11.53±3.91, while for patients it is 13.68±4.64. A strategy based on trusting doctors, was 10.87± 4.09 in the taekwon-do group and for patients was 11.71 ± 5.02.

Conclusions. Taekwon-do trainees demonstrate higher proactivity. Revealing two subsets provided much valuable information concerning the structure of the analysed data: the people examined were very different. The patients make up a group that contains two sub-groups those with lower and those with higher proactivity (similarly to the TKD group). A strategy based on trusting doctors and strategy "P"- experience, intensity and frequency of pain – depending neither on doctors nor the individuals themselves, were rather similar.

Introduction

Both the psychological sphere and mental condition are very important, as can be seen in the subject literature and by common-sense observation of everyday life. As the results of the conducted research show, we can cautiously confirm that certain strategies for coping with pain occur equally in both groups, the people practising *taekwon-do* as well as patients undergoing pain treatment. The question arises as to whether people with high levels of fitness who practise taekwon-do on the one hand, and pain therapy patients on the other hand, can share experiences which promote health and recovery.

Data from the literature allow us to make the assumption that the level of proactive attitude towards the experienced ailments is influenced in different ways by the effects of the treatment. It is assumed that people are responsible for their everyday experiences and may strive to a certain extent for their quality of life, just as they can for their health. This reflects an holistic understanding of health as a process directed at providing dynamic equilibrium between the subject and their surrounding [Edwards *et al.* 1992; Wasik, Ortenburger, Gora 2015]. The presence of pain, particularly connected with the tendency to catastrophise the problem, increases anxiety and dramatically worsens the patient's psychological condition [Strong 2008; Dobrogowski, Wordliczek 2004]. Pain perception, together with strategies for coping with pain, are under both the influence of one's own personality and by temporary mediating variables. Coping has

been defined as intentional efforts to deal with the negative impact of a particular stressor [Unruh, Henriksson 2009]. In another study, around one-third of people with pain reported pain as the main stressor in their lives. Hence, the ways of coping with pain are considered important by many different people.

In the present paper, proactivity is understood as a bio-psycho-social model of treatment. It assumes that actively attempting to soothe current physical ailments, and the use of different possibilities to prevent any increase in limitations in ability caused by pain, is being beneficial. The benefits of proactivity are visible in the process of regaining health and in situations where attempts are made to increase fitness of healthy individuals [Strong *et al.* 2008].

As the literature on health psychology shows, there are a number of principal beliefs concerning individual abilities for coping with pain: they reflect how people themselves regard the possibility of influencing their own situation when that pain is reduced (its intensity and frequency). The "W"- type beliefs and strategy is referred to as relying on oneself, one's internal possibilities of coping with ailments and pain. In the "L"- type beliefs regarding considerations over the possibilities of influencing the situation, the dominance of health-related belief exists. According to this, it is medical doctors who have the major influence on the situation and can reduce ailments (in respect of the intensity and frequency of pain). In the case of an individual's "P"- type beliefs there is a dominance of health beliefs that experience, mood, intensity and frequency of pain neither depend on doctors nor the person themself , but on accidental events and external effects [Strong 2008; Cook, Degood 2006; Juczynski 2009]. The aim of this work is to present the results of the research concerning dealing with pain in two different groups: a comparison of pain treatment strategies for dealing with pain in a group of patients undergoing chronic pain therapy and in a group of people practising taekwon-do.

Methods

Material

The paper compiles the results of research conducted in two groups that are considerably different in respect of their physical fitness. The first group was composed of 29 people who practise *taekwon-do* (TKD), age range: 18-45 years (average 30.5±8.9 years). In the sample group, the majority practise 2-3 times a week, some people practise once or twice a week, and almost the same number of people 4 or more times. The minority practise every day. The second group comprised 30 patients aged 19-51 years (average 33.5±11.9 years) (Patients).

Research tools

Questionnaires used in psychology and health promotion were applied in the research (Coping Strategies Questionnaire and Pain Beliefs Questionnaire). Sufficient psychometric value is attributed to them [Strong 2008; Juczynski 2009; Cook, Degood 2006; Edwards *et al.* 1992]. These measures concern cognitive and behavioural coping strategies that patients can use to help them manage pain. Adjustmen to the patients with chronic pain, or the ability to manage pain, can be measured using the Coping Strategies Questionnaire [Rosenstiel, Keefe 1983]. Two of the strategies assessed in the Coping Strategies Questionnaire are: diverting attention and catastrophising. According to the literature catastrophising is linked with disability and depression [Strong 2009].

Statistical

Due to the fact that the obtained data is self-descriptive (it derives from surveys and questionnaires), the analysis was performed applying the methods recommended for processing "non-acute" imprecise data that frequently appears in the humanities, health science and economics [Gatnar 1988]. Explorative techniques that aim at identifying subgroups within multidimensional data collection were also applied. Among others, cluster analysis with the use of k-means clustering was carried out. Thanks to the above, clusters that possibly differ from one another were identified. The k-means method will produce exact k-different clusters of the greatest possible distinction (minimizing variations inside clusters – and maximizing them between clusters [Everit *et al.* 2011].

Results

The results obtained indicate that within each group examined there are subgroups (clusters) that are different from one another with respect to the average result within the variable "proactivity" and the variable "W" - type strategy for coping with pain. The strategies were used by patients undergoing chronic pain treatment and people performing *taekwon-do* (Table 1 and Table 2). Tables 3 and 4 contain the average values of proactivity and strategies for coping with pain in the research groups (after k-means clustering). Figures 1 and 2 illustrate the average results (after k-means clustering) in terms of proactivity and strategy in the two selected clusters in both groups (TDK N=29 and Patients N=30).

Discussion

The data contained in Table 1 indicate that taekwon-do trainees use the strategy to cope with pain on their own more frequently than patients. Taekwon-do trainees also demonstrate higher proactivity (Table 2). The strategy

Table 1. Coping with pain strategy

Explanatory variable	TDK N=29		Patients N=30	
	Mean (1-36)	SD	Mean (1-36)	SD
W- type strategy	20.03	3.95	13.79	6.89
L -type strategy	10.87	4.09	11.71	5.02
P-type strategy	11.53	3.91	13.68	4.64

W - coping with the situation on one's own, L - appeared, the strategy based on "trusting doctors", P - experience, intensity and frequency of pain neither depend on doctors nor the individual.

Table 2. Proactivity

Explanatory variable	TDK N=29		Patients N=30	
	Mean (1-10)	SD	Mean (1-10)	SD
Proactivity	7.55	2.48	4.63	2.18

Table 3. Proactivity and "W" - type strategy – taekwon-do group

	Cluster 1		Cluster 2		Variance between clusters	Variance from within, inside cluster	F	p
	Mean	SD	Mean	SD				
Proactivity	8.17	1.94	6.50	3.03	15,02	139,43	2,58	0,12
W-type strategy	22.35	1.69	15.60	2.36	287,70	94,33	73,19	0,00

W- coping with the situation on one's own, appeared

Table 4. Proactivity and "W"- type strategy – patients group

	Cluster 1		Cluster 2		Variance between clusters	Variance from within, inside cluster	F	p
	Mean	SD	Mean	SD				
Proactivity	3.01	0.82	5.05	1.95	21,16	70,94	9,95	0,00
W type strategy	6.10	3.07	18.05	4.05	918,86	363,84	65,66	0,00

W- coping with the situation on one's own, appeared

based on trusting doctors and the strategy "experience, intensity and frequency of pain neither depending on doctors nor the person themself" were rather similar (Table 1).

In order to improve the precision and clarity of the description of the clustering analysis, the exposed F-value that derives from variation analysis performed in each examined dimension, for variable proactivity and strategy W, is set out in two tables (Table 3 and Table 4). We based this data on the statistical literature which indicates that the F-value is considered to be an accurate indicator of how much a particular dimension discriminates clusters [Everit *et al.* 2011]. The degree of difference between the revealed subgroups was specified based on the criterion of differences between subgroups and similarities within groups – shown in table 3 and table 4 (Analysis of variance – minimizing variance inside clusters – and maximizing it between clusters). The result, the identification of two different clusters was obtained through the application of the k-means method (that belongs to non hierarchical methods). This method covered gradual optimization i.e. improvements to certain grouping quality indicators obtained in the further stages of input processing. It agrees with the aims of the research, as the aim of non hierarchical algorithms is to find such a division that allows an optimal value of a certain criterion to be obtained (Table 3 and Table 4). Criterion optimization is obtained e.g. though iterative relocation of objects between groups [Everit *et al*. 2011; Gatnar 1998].

The literature on health psychology and martial arts for health shows that TKD training may improve a practitioner's endurance and positive outlook on life [Wasik, Ortenburger 2015], as well as female students' self-esteem [Finkenberg 1990; Fong, Shamay 2014]. Most studies on the long-term effects of martial arts training agree that martial arts are effective in producing positive social and psychological changes. Evidence has suggested that *taekwon-do* training may decrease anxiety in adults, improve self-regulation and induce positive mood state changes in college-aged students [Fong, Shamay 2014; Toskovic 2001; Kurian *et al*. 1993].

The research conducted here revealed that in the group of pain treatment patients the strategy based on "trusting doctors" appeared more frequently than in the taekwon-do group. In the group practising taekwon-do the strategies based on taking matters into one's own hands dominated. The values calculated for the indicator of proactivity are lower in the group of patients than that of the TKD trainees. As has been outlined, the patients make up a group that contains two sub-groups, of lower and higher pro-

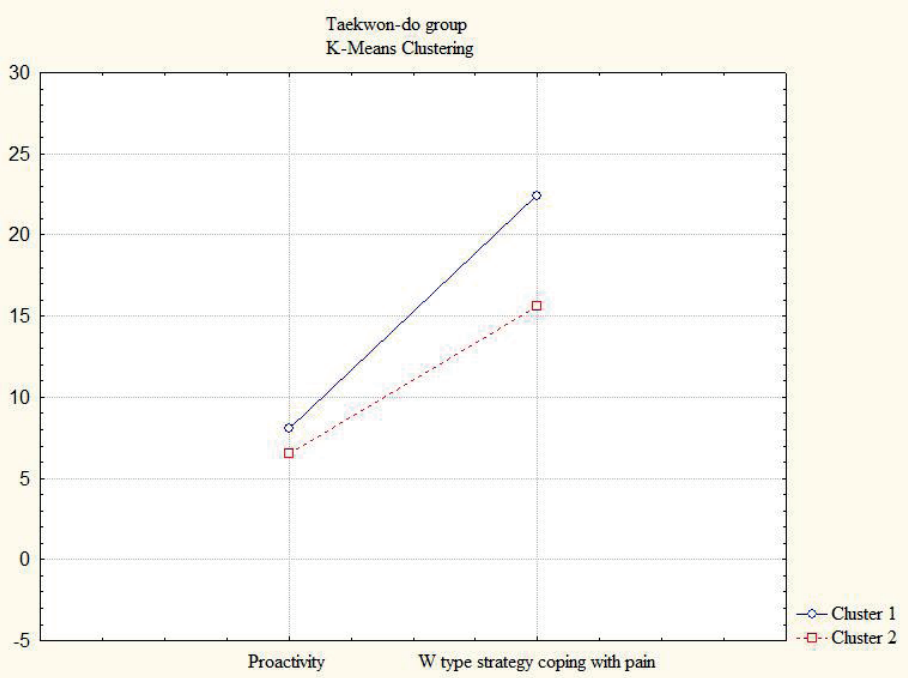

Figure 1. The diagram represents the result of cluster analysis with the use of k-means clustering – Proactivity and "W"- type strategy for coping with pain. Taekwon-do sample group ($p<0.05$).

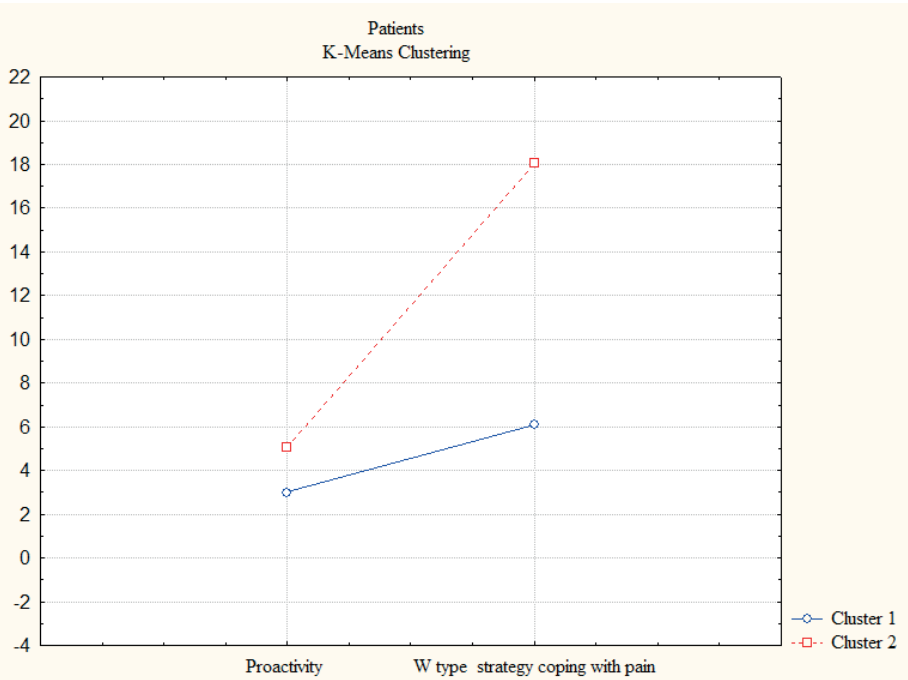

Figure 2. The diagram represents the result of cluster analysis with the use of k-means clustering – Proactivity and "W"- type strategy for coping with pain. Sample group of patients with chronic muscular and fascia pain ($p<0.05$).

activity (similarly to the TKD group) (Table 3 and 4). In the group with higher proactivity, a higher average of strategies, based on aiming at coping with the situation on one's own appeared (Figures 1 and 2).

In the light of the data obtained, the factor referred to as proactivity differentiates the examined group of people practising taekwon-do. In the group of people with a higher median of proactivity, there is a lower median of catastrophising. Similar results were obtained in the group of patients. Though generally there are higher value results within inadaptive catastrophising (people lose interest in activities they previously enjoyed due to being engaged with their ailments), within the same group a lower level of catastrophising is present in the cluster of patients characterized by higher proactivity. In terms of concentration (cluster 1), the medium val-

ues of the indicator of psychological factor specified as belief in interior pain control and the possibility of soothing ailments through taking matters into one's own hands, are higher.

Another important concept related to respondents' beliefs is pain appraisal. Individuals are active processors of information and not passive reactors. Pain perception, together with strategies for coping with pain, are under the influence of personality and temporary mediating variables [Dobrogowski, Wordliczek 2014; Hasenbring *et al.* 2012; Strong 2008]. A number of assessments are commonly used to measure an individual's psychological aspects which may arise from, or help stimulate, certain responses to pain [Strong *et al.* 2008; Tod 2014; Ortenburger, Wasik *et al.* 2015; Williams, Krane 2015]. An individual's response to pain is very personal. Not all types of pain worry people. Some pain, such as sports-related pain, are treated as a challanege. It has been suggested, in relation to pain, that belief in self-efficacy may partly explain the variability between a patient's skill level and their performance outside the treatment setting.

In selecting the most appropriate assessment, or battery of assessments, to be used for any particular patient, the aim is to balance the need for a measurement tool which can be administered efficiently. It may be that the most reliable measurement tool is very long-running and patients, sportspeople, and other people all have a short attention span [Hasenbring *et al* 2012; Strong 2008]. The selection of appropriate measurement tools, while far from an easy task, can be guided by using an assessment model which considers the description of a patient's pain, the responses of that person to pain, and the impact of pain on a person's life [Strong *et al.* 2008].

With reference to health psychology literature, we may talk about main types of coping with pain – whether by reason of education, religion, class, occupational status or whatever else. Some people will make light of their symptoms, shrug them off, and avoid seeking medical care, others will respond to the slightest twinges of pain or discomfort by quickly seeking such medical care as is available (Mechanic and Volcart 1960).

In systematic reviews of the psychological strategy for coping with pain, Strong [2008] identified a few trials that compared these psychological and behavioural factors with other non-medical factors, and Hasenbring *et al.* [2012] found 6 such studies of proactive strategy for back pain treatment. In relation to pain, it has been proposed that self-efficacy beliefs may explain in part the variability between a pain-treatment patient or other sports-person's skill level and their performance outside the treatment setting [Gage, Polatajko 1994]. Implications for treatment are developed within a wide repertoire of coping strategies for successful adjustment to pain. Pain perception, together with strategies for coping with pain, are influenced by personality and temporary mediating variables [Unruh, Henriksson 2008]. Comparison [Strong *et al.* 2008; Wasik, Ortenburger 2015] showed that proactivity understood under the bio-psycho-social model of therapy assume active undertaking of attempts to soothe current physical ailments as being rather beneficial.

We were looking for an answer to the question: Are there any common points or similar factors in the group of people who have better results in treatment (the group of patients) and people who practise *taekwon-do*? In the light of the literature about martial arts for health, TKD training (and other martial arts) also tend to focus on mind-body integration through a combination of meditation and physical activity. This combination (meditation and physical activity) is part of many therapies. An increase in calmness during difficult situations improves intentional efforts to deal with the negative impact of the particular stressor [Unruh, Henriksson 2009]. Other results show that aikido training supports taking one's own responsibility for coping with stressful situations, but no significant difference between aikido levels was found [Reguli *et al.* 2014]. Different psychological factors and coping strategies bring about different effects. Asking about these common points in the strategies for coping with pain the persons, who differ in the level of physical ability and with respect to many other things, has been burden with the risk of examining heterogeneous groups. However, justified in the light of data of a bio-psychosocial trend, including psychology of health [Hasenbring *et al.* 2012].

By undertaking this project we hope that the data we have obtained may have a considerable practical value for the work conducted within analgesic programmes in those centres which aim at the comprehensive treatment of pain. The problem we considered has its practical and scientific dimensions. Clinical practice correlated with increasing amounts of scientific research show that an interdisciplinary view on the problems connected with the improvement of an individual's psycho-physical functioning multiplies and strengthens any therapeutic effects.

There are implications for treatment to develop a wide repertoire of coping strategies for an individual's successful adjustment to pain. Apart from improving our understanding of the kinds of non-medical strategies for coping with pain, we believe there is potentially a direct clinical benefit from this research. The investigation of psychological and behavioural strategy is in its infancy and requires further attention. Future research should pay careful attention to the techniques used to measure outcomes – studies will be continued.

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Porównanie strategii radzenia sobie z bólem u pacjentów objętych terapią przeciwbólową oraz osób trenujących *taekwon-do* – badanie pilotażowe

Słowa kluczowe: taekwon-do, strategie radzenia sobie bólem, czynniki psychologiczne, pro aktywność

Abstrakt

Perspektywa. W prezentowanej pracy oparto się na założeniu, że w sztukach walki oraz w procesach terapii odgrywają ważną rolę czynniki psychologiczne, które mają duże znaczenie dla sposobu interpretacji wszelkich odbieranych sygnałów, w tym bodźców bólowych. Ważnym elementem reakcji na ból jest sposób jego spostrzegania i następujące po tym dalsze reakcje. Każdy człowiek aktywnie przetwarza odbierane informacje, a nie jest jedynie ich pasywnym odbiorcą. Kiedy z różnych powodów pojawia się ból, podejmowane są różnorakie działania mające na celu jego złagodzenie i osłabienie jego wpływu na codzienne funkcjonowanie, w tym na obniżenie odczuwanego napięcia emocjonalnego. Takie działania, w świetle literatury

z psychologii zdrowia określane są jako różnorakie poznawcze i behawioralne strategie radzenia sobie z bólem, przez które rozumie się podejmowanie różnych wysiłków w celu pokonania negatywnego wpływu tego konkretnego stresora na samopoczucie.

Problem. Celem niniejszej pracy jest przedstawienie badań dotyczących strategii radzenia sobie z bólem najczęściej stosowanych w dwóch różniących się grupach: pacjentów objętych programem leczenia bólu chronicznego i grupy osób ćwiczących taekwon-do.

Metoda. W przedstawianej pracy dokonano zestawienia wyników badań prowadzonych w dwóch odmiennych grupach, diametralnie różniących się od siebie pod względem sprawności fizycznej. Grupa pierwsza składała się z 29 osób trenujących taekwon-do w średnim wieku 30.5±8.9 lat. Druga grupa, składała się z 30 pacjentów w średnim wieku 30.5±8.9 lat. Grupa pacjentów to osoby z różną regularnością korzystające z programu przeciwbólowego w Poradni Leczenia Bólu w Zespole Szpitali Miejskich w Częstochowie, z czego część w trybie regularnym, a część w sposób mniej systematyczny. W psychologii opisywanych jest szereg metod pomiaru poczucia własnej skuteczności w odniesieniu do zjawiska radzenia sobie z bólem. W prezentowanych badaniach zastosowano kwestionariusze stosowane w psychologii zdrowia, które są używane zarówno w badaniach osób zdrowych jak i u osób chorych (*Coping Strategy Questionnaire; Pain Beliefs Questionnaire*). Są to kwestionariusze o uznanej wartości psychometrycznej służące do badania poznawczych i behawioralnych strategii radzenia sobie z bólem. Do analizy statystycznej użyto metody analizy skupień k-średnich. Jest to metoda rekomendowana do interpretacji badań „nieostrych" uzyskiwanych w badaniach kwestionariuszowych, jakie występują między innymi w naukach humanistycznych i naukach o zdrowiu.

Wyniki. W grupie pacjentów i zawodników taekwon-do wyselekcjonowano dwie podklasy osób o wyższej proaktywności i wyższej wartości wskaźnika samodzielnego radzenia sobie z bólem. Średni wynik proaktywności w grupie taekwon-do wynosi 7,55±2,48, natomiast w grupie pacjentów 4,63±2,18; w skali od 1 do 10. W obu grupach występują dwie różne podklasy strategii radzenia sobie z bólem. U zawodników taekwon-do w podklasach wartość wskaźnika proaktywności wyniosła 8,17±1,94 (podklasa 1) oraz 6,50±3,03 (podklasa 2); a średnia wartość strategii typu W 22,35±1,69 (podklasa 1) i 15,60±2,36 (podklasa 2). Natomiast u pacjentów proaktywność była na poziomie 3,01±0,82 (podklasa 1) oraz 5,05±1,95 (podklasa 2); a średnia wartość strategii typu W 6,10±3,07 (podklasa 1) i 18,05±4,05 (podklasa 2).

Wartości wskaźników pozostałych strategii radzenia sobie z bólem wyniosły: strategia L w grupie taekwon-do 10.87± 4.09, a w grupie pacjentów 11.71±5,02; Strategia P w grupie taekwon-do 11.53±3,91, natomiast w grupie pacjentów 13.68±4.64.

Dyskusja. Ćwiczący taekwon-do ogólnie przejawiają wyższą proaktywność, częściej spotyka się w tej grupie przekonanie o możliwości własnego, samodzielnego i skutecznego radzenia sobie z odczuwanymi dolegliwościami. Jednakże stwierdzono również to, że w obrębie każdej ze zbadanych grup czyli i w grupie pacjentów i w grupie osób trenujących taekwon-do istnieją nierównoliczne podgrupy różniące się od siebie pod względem proaktywności. Ujawnienie dwóch podzbiorów w obu badanych grupach (skupienie 1 i skupienie 2) dostarczyło cennych informacji na temat struktury analizowanych danych. Tym samym uzyskane rezultaty wskazują, że te dwie strategie radzenia sobie z bólem wykazują się dużą zmiennością w obu badanych grupach. Wartości wskaźników innych zbadanych strategii radzenia sobie z bólem (L –polegania głównie na pomocy zewnętrznej, przede wszystkim lekarskiej i P- przekonanie o braku osobistego wpływu na redukcję dolegliwości) nie różnią się znacząco w grupie taekwon-do i w grupie pacjentów. Badania są nadal kontynuowane.

Konkluzje. Ćwiczący taekwon-do ogólnie przejawiają wyższą proaktywność od pacjentów, częściej spotyka się w tej grupie przekonanie o możliwości własnego, samodzielnego i skutecznego radzenia sobie z odczuwanymi dolegliwościami. Nie stwierdzono różnic pomiędzy zawodnikami taekwon-do, a pacjentami pod względem strategii radzenia sobie z bólem, takich jak poleganie na pomocy zewnętrznej, przede wszystkim lekarskiej i przekonanie o roli przypadku, braku osobistego wpływu na redukcję dolegliwości.