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Is it possible to tame fear through sport? Occurrence, diagnostics and therapeutic methods of fear of falling - literature overview

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ABSTRACT

Introduction: Fear of falling is described as a natural response to unstable balance resulting problems with postural control. It usually occurs in older people suffering from chronic diseases and lowers their quality of life. Importantly, general physical activity is limited by the fear of falling, which makes everyday functioning difficult.

Aim of the study: The aim of this paper is to present and submit the latest discoveries regarding the topic of fear of falling and physical activity.

Material and Methods: This article was created based on the PubMed and Scholar database. The literature was reviewed using the keywords: „fear of falling”; „physical activity”.

Results: Research shows that there are many chronic diseases, for example diabetic neuropathy, Parkinson's disease or hip fractures, that may predispose patients to fear of falling. The Falls Efficacy Scale - International (FES-I) is one of the several tools to assess fear of falling, which facilitates the selection of appropriate care and interventions. Well-selected exercises such as the Otago programme, can be implemented to reduce this problem. Generally physical activity combined with the proper encouragement to exercise at home is highly effective in reducing the fear of falling.

Conclusion: Considering that more and more people may be exposed to the experience fear of falling it seems significant how to combat this problem. There are appropriate methods to assess and interventions which can be implemented to reduce fear of falling by clinicians, but further studies are still needed.

Key words: “fear of falling”, “physical activity”, “older people”, “prevention”, “fall risk”

Fear of falling - what is about?

INTRODUCTION

As life expectancy increases, societies around the world are faced with the challenge of an aging population. It leads to a gradual change in the holistic approach to the treatment

and care of elderly. Luckily, the medical drugs are still better and therapeutic doses take into account the patient's condition such as a renal filtration rate or liver function, which may be reduced in older patients. Additionally, among this group of patients it is important to take attention to other difficulties limiting their quality of daily life. These inconveniences include dementia, problems with appetite resulting in malnutrition, depression, lack of close friends and social network or limitation of physical activity. Referring to the general physical activity, there is also another detailed issue mainly affecting older people - falls which also make quality of life or daily functional worse [1]. According to the available data, falls are one of the major problems of public health regarding more than 27% of adults over 65 years. What's more, this problem costs the U.S healthcare system tens of billions of dollars each year [2].

Falls and fear of falling are also mentioned as one of the barriers to physical activity in adults aged ≥ 70 years. Thus, to increase the amount of physical activity, which has multiple benefits for older adults, it seems important to change modifiable factors such as mentioned fear of falls [3].

Related to this term is fall risk appraisal - using for integrating perceived and objective fall risk measures. In other words, fall risk appraisal may describe the incongruence between fear of falling and physiological fall risk. Using this measure the researchers also discover that fear of falling is an important barrier to perform physical activity, which is significant - regardless of their balance and strength [4].

In this article, we would like to present the problem of fear of falling, specify risk factors, identify groups at risk and present the described methods to overcome this problem focusing largely on the use of physical activity.

Materials, Methods and Purpose:

The aim of this paper is to summarize the latest discoveries and research regarding fear of falling. For this purpose we analyzed the PubMed and Scholar database using the following keywords: „fear of falling”; „physical activity”.

Who may be affected by fear of falling?

Aging is a natural process in every human body, which we are not able to eliminate. Hence, a decrease in the mass, strength and function of skeletal muscles is quite a common problem among older people. These consequences of the body's aging lead to impaired balance causing decreased physical function. But what is worth mentioning, they also may cause the appearance of a fear of falling resulting in exacerbate functional loss [5].

There are many health conditions and diseases which may even more predispose or intensify fear of falling. One of them is diabetic neuropathy leading to weakness of muscles [6]. Emphasis on the issue of fear of falling is recommended in the management of health care among patients with multiple sclerosis also characterized in this field by sedentary behavior and falls [7]. Concerns about falling are noticeable in people with hip fractures, especially in the first three months after injury. It is influenced by situations in which their balance is threatened [8]. The research shows that nursing home residents also experience fear of falling mainly leading to depression and lower the quality of life [9]. Additionally, a relationship among fear of falling and falls was proven in a group of patients on hemodialysis [10]. Neurological disorders are also characterized by falls and fear of falling. People with Parkinson's disease experience mentioned issues resulting in fear of falling avoidance behavior [11]. Also among people after stroke the fear of falling is observed. Research including 35 studies shows that the prevalence of fear of falling in people after stroke is 42-93.8%. Risk factors in this group of patients include female gender, balance, use of assistive devices, limb dysfunction and functional mobility [12].

Suspicion of fear of falling - how can we check it?

Global awareness of older people's problems related to falls and fear of falling is constantly increasing. To assess the fall risk factor, many algorithms and scales were created. The first that we would like to mention is the Falls Efficacy Scale - International (FES-I) which is the most commonly used [12]. Stopping Elderly Accidents, Deaths and Injuries (STEADI) is also a useful tool implemented by the US Centers for Disease Control and Prevention and contains 12 questions to assess psychological fears and physical or emotional risk factors. Subsequently the evaluation is deepened by the Timed-Up-and-Go, 4-stage balance assessment and if necessary, the recommendations for fall risk reduction are implemented. Although STEADI is considered as a good screening tool, it has the potential to overcategorize patients as high risk. Another questionnaire is Short Fall-Efficacy Scale International- which is a shorter version of FES-I and it is composed of 7 questions focusing on psychological problems associated with falls. Additionally, a direct physical evaluation of fall risk is connected with postural sway assessments. For its assessment can be used the BTrackS Balance System. This portable device measures postural sway by tracking the center of pressure on a force platform [13]. Additionally, when we suspect that a patient, especially with Parkinson's disease, is presenting a fear of falling avoidance behavior, as a supportive tool to assess mentioned problem is modified The Fear of Falling Avoidance Behavior

Questionnaire (mFFABQ) [11]. What is worth highlighting, there is still a need to create a uniform fear of falling measurement tool [12].

People experiencing fear of falling - what can we do?

Many studies highlight the benefits of reducing fear of falling. Stand out among them to increase quality of life, improve mental health and what significant, prevent future falls [9]. Thus the important question is - what should we do to help patients?

Physical exercise

Although there is still no clear evidence whether the effectiveness of physical activity has an impact on the fear of falling, especially in frail and pre-frail older adults, many studies examine this relationship. Randomized Control Trial including 13 studies published shows that physical intervention has a positive role in reducing the fear of falling. The significant fear of falling reduction was observed after, among other, a combination of muscle strengthening exercise and functional balance exercise or Tai Chi exercise [14].

However, as with any exercise, the best effect is observed with regular repetitions for example in group classes or individually at home. Specificity and complexity of exercises may be difficult to understand and implement regularly by older people themselves in their homes. Therefore there are many types of exercise programmes to encourage older people to continue exercise, namely supervised, partially supervised or self administered programmes. The study compared effectiveness different programs on fall prevention - an innovative partially supervised home-based exercise programme - the Test&Exercise based on the concepts of self-efficacy, self-confidence and empowerment delivered with a tablet, the Otago - partially supervised programme implemented by physiotherapist delivered with an illustrated manual and the Helsana - self administrated programme delivered with cards. This study shows that the highest dropout rate is noticed in self-administered home-based exercise programme. What is more, in both partially supervised programmes observed statistically significant improvements in physical activity compared with the self administered programme [15].

The impact of vestibular rehabilitation on the improvement of balance-related impairments is reported in the literature. Gaze stabilization exercise improves the vestibular response through the reciprocal interaction between the visual and vestibular system during head movements. In research, that type of exercise and mentioned earlier the Otago Exercise

Program (OEP) consisting of twelve balance exercises and 5 strengthening exercises, were beneficial in fear of falling [16].

To increase the patient's physical activity at home, also the Motor Control Home Ergonomics Elderlies "Prevention of Falls" (McHeELP) may be used. It is a motor control exercise program using the home environment such as moving furnishings etc. The results of pilot studies show that this program can be implemented in clinical practice and has a beneficial effect on functionality, balance and fear of falling [17].

Mind-body exercise

Although mind-body exercise improves mobility, flexibility, general well-being and quality of life, no positive effect was observed for fear of falling [18]. However, another study shows that after an 8-week yoga intervention improvement in concerns about falling was reported among patients with diabetic neuropathy [8].

Encouragement

Although home-based exercise usually requires less resources, participation and discipline in exercise at home generally remains low [15]. Thus it seems that different forms of encouragement may be useful. The aim of a randomized controlled trial conducted by Sydney researchers was to assess the effect of a coaching intervention (telephone-based health coaching) compared with control on physical activity and falls rate at 12 months among people over 60 years of age. The results reveal that there are not significant differences in physical activity (counts per minute) or falls rate at 12 months. Nonetheless the improvement was observed in overall well-being, quality of life, disability and other physical activity measures [19]

Newly tools

Apart from the mentioned solutions, new technologies and methods are being introduced to facilitate and improve patient access to rehabilitation.

One of them is a webpage-based tele-rehabilitation (@ctivehip) created for patients with hip fracture. In a study based on 71 participants noticed a higher decrease in fear of falling in comparison to those in the usual care. The authors of this programme point out that this intervention should not be applied in clinical care until confirmed by appropriate-designed randomized clinical trials, although it seems promising [20].

Another new method is using video game consoles for therapeutic therapy. Within the osteoporotic patient's group the statistically significant improvements in balance function and fall risk was observed after 12 weeks of balance exercise with a Nintendo Wii device and balance board under a physiotherapist's supervision in the hospital [21].

Virtual reality may prove to be a promising tool in diagnosing fear of falling. A mixed methods feasibility study protocol describes the possibility of assessing fear of falling while moving and walking in virtual environments in patients with Parkinson's disease compared to controls. It may provide information about a range of responses related to fear of falling such as cognitive factors, neuromuscular response and postural stability. In this case virtual reality can give the opportunity to experience different scenarios in which fear of falling may be induced [22].

Summary

Awareness of the fear of falling is increasing - that is why discovering patients with this problem is and will be more and more common in everyday practice. Using special questionnaires and scales, fear of falling can be recognized and with many various programs based on physical activity and mental encouragement, it may be successfully reduced. The results of mentioned activities include among others increase in quality of life, an extension of life expectancy and preventing future falls. These suggestions can help physicians provide comprehensive patient care. In addition, further studies are needed to deepen knowledge about fear of falling.

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