



# Exercise Boosting Health Promotion in the Elderly: A scoping review.

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Degree Thesis in Health Care and Social Welfare

Education: Bachelor of health care, Nursing

Vaasa: 2021

## BACHELOR'S THESIS

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Degree Programme: Nurse, Vaasa

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Title: Exercise boosting health promotion in the elderly: A scoping review

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Date: 24.11.2021

Number of pages: 20

Appendices: 1

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### Abstract

Everybody in society will eventually reach an elderly age. The aging global population is increasing, and extra efforts are being made to ensure their health status and quality of life is elevated. Engagement in physical exercise is one of the most critical stages toward maintaining elderly wellness. The aim of this thesis was to describe the benefits of exercise in the elderly. Whereas the two research questions were: How does exercise promote health in the elderly? What are the benefits of physical exercise in the elderly?

Scoping review research method was applied to analyse research articles by grouping and dividing previous research into categories, the process for identifying prior research provides an in-depth and comprehensive results that address the aims of this thesis. 15 different articles were used in the finding of results. These articles are of different research methods: scoping review, literature review and systematic, meta-analysis reviewed articles. This thesis analysed articles from different previously researches that have analysed the benefits of exercise to the elderly.

Three different themes on the benefits of exercise have been identified: exercise promotes mental and cognitive health and disease prevention, exercise prevents lifestyle diseases and promotes self-independence and exercise prevents the risk of falling. Additionally, the implication of the research is discussed. Challenges hindering exercise health promotion in the elderly were identified, for instance, the lack of availability of resources, funding and education, poor early detection of health care problems and inadequate support to the elderly among others. In terms of recommended further research, there is need of more research that is specific to each country to combat its specific problem.

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Language: English

Key words: Exercise, exercise health promotion and Elderly

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# 1 Introduction

Given that the bulk of the population is aging, there is indeed a significant demand for senior health promotion for a better health welfare in the latter part of life. For decades, the elderly have been told that exercise is the most utilized strategy to improve their health (Sharmila (2020)). Nevertheless, owing to their overall health, elderly adults with several ailments are limited in their actions. In Finland, around one-third of males and one-half of women did not engage in physical exercise by 75-years-old (Aartolahti, Lönnroos, Hartikainen & Häkkinen, 2020).

Regardless of physical body composition, older people with a higher workout fulfillment had superior psychological and emotional health (Gavelin et al., 2020). Although older persons with poor exercise activity levels could gradually increase their physical capacities, seniors who adhere to physical exercises, benefited from thriving health in many aspects including emotional and psychological health. They differed from those elderly individuals with moderate or low workout fulfillment. These results give early proof that exercising is beneficial in promoting a higher quality of life, promoting better psychological health. Furthermore, conducting proper assessments on exercise compliance may benefit in evaluating the state of a patient's abilities and health risks and its early prevention. (Aartolahti, Lönnroos, Hartikainen & Häkkinen, 2020).

It has long been considered in healthcare coverage, that wellness is primarily maintained by diet and medication. Workout has been undervalued or even disregarded in a real-world application, resulting in physical degeneration in individuals. Sleeping problems, for instance, are more common in older people thus significantly impacting the people and their communities. For this condition, senior individuals frequently utilize various medications, such as pain tablets, most of which have adverse effects. According to Mueller, D'Addario, Egger, Cevallos, Dekkers, Mugglin, & Scott (2018) current study's findings, aged patients subjected to continuous medium training had better sleep duration.

The aim of this study is to find out ways in which exercise can help promote health in the elderly. Sharmila (2020) highlights that the growing number of individuals living longer has sparked foreign attention in improving life and health standards later life. Nevertheless, the theoretical aspect of this study covers the definition of exercise, correlation between exercise and proper diet, understanding the importance of self-determination in exercising and lastly, considering information from earlier research concerning this topic of exercise health promotion in the elderly prior to the year 2016.

## 2 Aim and research question

The aim of this research is to describe the benefits of exercise in the elderly. Whereas the two research questions are:

1. How does exercise promote health in the elderly?
2. What are the benefits of physical exercise in the elderly?

## **3 Background information**

### **3.1 The elderly**

The word elderly is used to identify an individual living above 65+ years old. Usually at this age, the body is generally weakened thus an individual developing negative impacts, which may include a weakened immunity leading to numerous disease and health complications. In many cultures, it seems rude and disrespectful to refer to an individual as an elderly person, thus elaborating the reason behind the term "elderly" that is still widely employed, being referred as obsolete and possibly ageist word. (Rodriguez, 2018).

By 65 years of age or above, an individual is classified as an elderly person in the nation of Finland. But keep in mind that this age is primarily dependent on retirement age and the period at which welfare programs commences. However, majority of the people do not refer to an individual as an elderly person, until they have reached the age of 70-years-old, or the person appears aged. (Aartolahti, Lönnroos, Hartikainen & Häkkinen, 2020).

According to Canadian statistics, the number of individuals aged 85-years-old and above has increased by 19.4 percent between the year 2011 and 2016, approximately four times the total population growth rate (Sharmila (2020). As people are living longer lives, the era in which they are deemed elderly is changing.

### **3.2 Exercise**

An activity can be defined by body's movement caused by muscle tissue that requires more energy than resting consumption. Exercise is a type of physical practice that is organized, regulated, repeated, and deliberate in the notion that it aims to develop resistance, endurance and promoting physical fitness. Exercise is the constant movement of the body that leads to physical engagement and a good or better degree of fitness, both mentally and physically. Physical conditioning is a branch of physiology that studies the body's quick biochemical reactions to exercise, stress control, and adapt to physical activity resistance training. In this thesis, "exercise" is used to refer to a set of mechanical physical activities to improve fitness levels, psychological health, and overall health. (Ruby, Dunn, Perrino, Gillis & Viel, 2011).

On the other hand, it is important to briefly consider the aspect of proper eating habits in congruent to physical exercise. This is because, both physical exercises and proper diet consumption are essential in attaining and maintain health. Dieting refers to consuming a range of meals to provide the nutrients required for an active lifestyle. Dieting is frequently used in conjunction with physical activity to help people lose fat and reduce body weight, especially people considered as overweight and obese. Consuming wide range of meals that provides an individual with vitamins, vital nutrients to maintain healthy body functioning and general health, promoting mental health, as well as numerous benefits to body functioning. Proteins, carbs, lipids, water, vitamins, and ions are among the other nutrients micronutrients to be incorporated in daily meals. (Pirlich, Lochs, 2001).

### 3.3 Healthier life

The term "health" and "healthier life" refers to a condition of predominant physical, psychological, and interpersonal health, not just the absence of illness. It is indeed a term that emphasizes the eight dimensions of health into an individual's lifestyle, as per physical activity guidelines for World Health Organization, WHO (2019): psychological, ecological, monetary, cognitive, vocational, physiological, interpersonal, and spiritual. Using this general category, health is defined as a condition of total bodily, intellectual, and interpersonal health, not just the absence of illness or disability. Healthcare is a valuable word stressing personal and social resources and physical strength, and this is a tool for daily life, not the purpose of life. Health is a human entitlement that is necessary for personal growth as well as development as a whole. It is also critical for a country's economic progress and national unity. (WHO, 2019).

## 4 Theoretical Framework

### 4.1 Theory of self-determination

Self-determination theory, STD is a theory derived that explains the aspect of a person's personality and self-motivation in a social environment or context that is different from motivation derived from being controlled and autonomous. The theory addresses the effects of external reward on inward motivation. The theory has been divided into smaller theories: development of external motivation and self-discipline through internal work, conflicts in motivation, psychological requirements that are needed for personal growth and wellness and lastly, the influence of goals on individual performance and well-being. These mini theories address every aspect relating to motivation, such as energy needed to be motivated, and how it fluctuates, maintenance of wellness and health, awareness of conscious and unconscious behaviours/ patterns relating to motivational habits. (Deci, Ryan, 2012; Gagne, Deci, 2005).

Even though there are various ways of behaviour modification, studies have found that lengthy fitness participation is useless without a continuous inspirational area based on autonomous supporting activities (Mueller, 2018). On the other hand, the self-determination theory involves a series of steps by which an individual engages the motivation to begin and sustain new health-related activities throughout life. To attain such cognitive progress, persons must experience the following, as per self-determination philosophy (Gillison, Rouse, Standage, Sebire, & Ryan, 2019):

- The elderly must grasp an activity and acquire a variety of hobbies.
- People require a feeling of belonging and connection to one another to feel connected, thus participating in groups is essential and beneficial.
- Independent persons require a sense of control over their actions and objectives.

While some people exercise regularly for the sheer pleasure of it, many tend to work out to get intrinsically or extrinsically treats, such as weight loss, improved appearance, or acknowledgment

from significant others (Gagné & Ryan, 2018). According to previous studies, people who engage in exercise for pleasure rather than internal or exterior benefits are more likely to stay in a prescribed fitness routine (Ryan & Deci, 2019). This is because the objective of health practitioners is to encourage people to maintain a healthy lifestyle, even if they are not currently fulfilling the present physical activity requirements. Nevertheless, the aspect of continuous routine development and discipline in physical exercise is currently being examined, hence the increasing interest in this area of research. (Deci, Ryan, 2012; Gagne, Deci, 2005).

In terms of health, people are energetic, engaged, interested, and eager to achieve, whereas it is also understood that people can be disengaged, apathetic, or disillusioned. Therefore, explaining the variances in motivational styles, which originate from the interplay between people's intrinsic activity and the social contexts that promote or obstruct that tendency (Gillison et al., 2019). In conclusion, exercise requires motivation, consistency, and determination to produce effective results. The elderly need to be motivated and encouraged to exercise regularly and be determined to do it as part of their lifestyle. (Gillison et al., 2019).

## **5 Exercise health promotion prior to 2016**

According to Nied and Franklin (2002), by the year 2030, 23% of American population will be above the age of 65-years-old, approximately 70 million people will be classified as the elderly. Moreover, only 75% of them in 2002 participated in exercising. Therefore, continuous exercising was promoted due to its benefits on the senior citizen when it comes to diseases prevention and increasing the mortality life. Examples of exercises advised to the elderly population in America included strength training, aerobic exercise, exercises to build flexibility and balance (Nied, Franklin, 2002; Frankel, Bean & Frontera, 2006; Fleg, 2012).

Physical inactivity has been established to be an independent risk factor for a range of chronic diseases and conditions that threaten the health of the nation. However, only a minority of the population is currently meeting the recommended levels of regular physical activity, which have been linked with important health and quality-of-life benefits. Older adults are at particular risk for leading sedentary lifestyles. (King, 2001).

Nevertheless, regular training is an essential intervention for preventing a variety of functional impairments that occur as people age. Furthermore, the potential of older people to adjust and react to both strength and endurance exercise demonstrates their trainability. Endurance exercise can assist in maintaining and increase cardiac health, such as cardiac output and the arteriovenous O<sub>2</sub> differential. Reduced risks associated with illness states, for example, promote quality of life and contribute to a longer lifespan. Regular exercise can help compensate for the decrease of muscular strength and muscle that comes with age. These exercise modifications, taken together, considerably improve the functional ability of elderly individuals, consequently improving their quality of life. Enhanced bone health and, as a result, a lower risk of osteoporosis. Additionally, exercise in the elderly can be used as a tool of diabetes mellitus control and management (Tessier, Menard, Fulop, Ardilouze, Roy, Dubuc, Dubois & Gauthier, 2000). (Cavanagh, Evans, Fiatarone, Hagberg, McAuley, & Startzell, 1998).



Even though no amount of exercise may prevent biological aging, there is proof that daily exercise can reduce the physiological impacts of a sedentary life and extend active life span by preventing the onset and progression of chronic illness and debilitating disorders. In 2009, there was already mounting evidence that daily exercise involvement by older persons has considerable perceptual and behavioural advantages. Aerobic physical, muscle strength training, and mobility exercises was advised to be included in an exercise therapy for older persons. (Chodzko- Zajko, Proctor, Singh, Minson, Nigg, Salem & skinner, 2009).

In the year 2004, research done by Heyn and Abreu determined that exercise essential for the cognitive functioning of elderly. This was further beneficial for the elderly with cognitive diseases such as dementia. It was proven that exercise, promoted positive behaviour in the elderly with cognitive disease. (Heyn, Abreu, 2004).

Furthermore, the research by Nied and Franklin (2002) went further in identifying the challenges and difficulties experienced by the elderly when it comes to exercising, for instance, the attitude of the elderly, discomfort of exercising, ataxia, disability, lack of funds, fear of making a mistake and acquiring injuries, prior illness, decline in cognitive health that greatly impacts the elderly's functionality and possible environmental factors.

Offering fitness programs in or around the homes of older individuals may help solve several barriers to exercise. Residence and lifestyle fitness routines may overcome availability, security, timing, and other hurdles to exercise. Physical exercise programs using a lifestyle approach result in similar advancements in cardiac risk factors for heart disease and compliance as the more traditional program, according to the research of good health and overweight physically inactive adults. (Burbank & Riebe, 2001).

Moderate and intense exercise goals are challenging to achieve for older persons. Given that health and functional benefits have a dosages relationship. Research done in 2015, propose that changing the message to minimize inactive time by increasing light exercises may be more practical and prepare the way for even more vigorous exercise. (Sparling, Howard, Dunstan & Owen, 2015).

Healthier older individuals who engaged in at minimum moderate physical activity for even more than one hour a week have better health and quality of life in both the physiological dimensions than those that are less fit and healthy. As a result, increasing physical activity in the lives of inactive or moderately active elderly adults may enhance their health and quality of life. (Acree, Longfors, Fjeldstad, Fjeldstad, Schank, Nickel, & Gardner, 2006).

## **6 Methodology**

Scoping review is a method used in analysing research articles by grouping and dividing prior research into different categories. Precisely, scoping review analyses research articles according to its nature, the availability of prior research and topic at hand. This type of research is predominantly used not only due to its benefits in analysing research topics that are not widely researched, but also, in analysing widely researched, extensive topics such as the topic under investigation in this research. Nevertheless, scoping review is a straightforward strategy, that improves the study's reliability and responds to any criticism lacking methodological rigor. (Pham,

Rajic, Greig, Papadoulus & McEwen, 2014; Morris, Boruff & Gore, 2016; Levac, Colquhuom & O'Brien, 2010).

Moreover, scoping research is done due to numerous reasons that are beneficial to the research. For instance, scoping review is used to determine the need of a systematic research, underlining gaps in research, and providing a summary of topics. Additionally, these benefits are also beneficial in the healthcare field. Scoping review provides an opportunity to summarize healthcare topics, which does identify the gaps and determines the need of additional research in a certain health care topic. (Pham, et al. ,2014; Arkseley & O'Malley, 2005; Morris, Boruff & Gore, 2016; Levac, Colquhuom & O'Brien, 2010).

To conduct a scoping review, there are numerous factors to consider and implement during the article selection process. These factors include, the timeframe, which is used to determine the most suitable timeframe for the research. The research question provides a guideline to the process of finding the appropriate previous research. Nevertheless, scoping review provides the research process to the readers, explaining both the criteria of including and excluding the research to review. With these different factors adhered to, the quality of the research is immensely elevated. (Pham, et al. ,2014; Arkseley & O'Malley, 2005; Morris, Boruff & Gore, 2016; Levac, Colquhuom & O'Brien, 2010).

The design maintained the proponents of scoping reviews, that the procedures applied across the various steps are undertaken rigorously, and transparently underpins our approach to scoping research. In scoping research, the process for identifying prior research must yield in-depth and comprehensive results. The scoping review technique is directed by finding all relevant information independent of study type rather than a well-defined, specific research. (Pham, et al. ,2014; Arkseley & O'Malley, 2005).

Researchers are prone to progress by renaming search words and conduct keen literature searches as their acquaintance with the literature increases. For that reason, the researcher may not want to specify rigid parameters for search terms, study identification, or study selection right now. The approach is iterative rather than linear, requiring researchers to reflect on each stage and, when appropriate, repeating the steps again to ensure that all relevant material is covered. (Pham, et al. ,2014; Morris, Boruff & Gore, 2016; Levac, Colquhuom & O'Brien, 2010).

This thesis adheres to the framework guidelines used to perform a scoping study: selecting the question to research is the first step, identifying relevant studies, choosing a research study, analysing, and recording the findings. The first step is to place our research question. The research questions are: How does exercise promote health in the elderly? and What are the benefits of physical exercise in the elderly?

## **6.1 Article selection process**

This thesis has benefited from different articles from different databases. These databases include Medline, Excerpta Medical database (EMBASE), PubMed and Cumulative index to nursing and allied health literature (CINAHL). These databases were available and accessible online, with CINAHL being provided by Novia university of applied sciences.

During the article selection process, the data was scrutinized under a specific criterion thus reinforcing the quality of the results retrieved from this research. The criteria are based on several factors such year of publication, the availability of the research and its full text, the language of the research, the age group of the participants of the research and the topic being discussed in the research. The specific details of the research are analysed in the inclusion and exclusion criterion below, found in table 1.

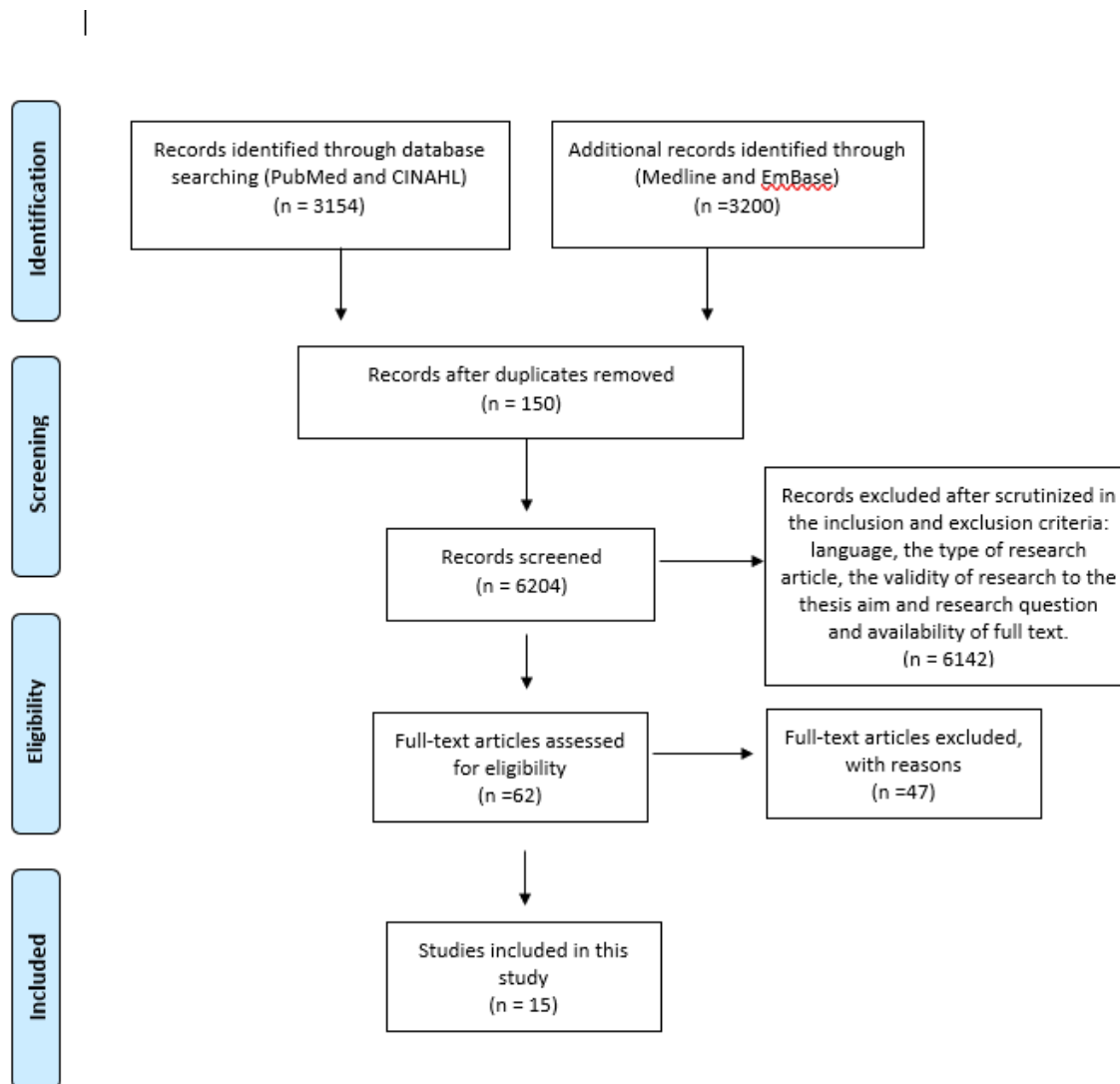
Table 1: Inclusion and exclusion criteria

<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
Articles from the year 2016-2021	Articles written before the year 2016
Available articles, free articles	Article requiring payments
Availability of full text	Lack of full text
Research done in English Language	Research done in different languages apart from the English language
Research with the population of the elderly	Research focused on children and young adults below 65-years-old
Research of exercise	Research on non- exercise related such as nutrition and medications
Healthier lifestyle	-
Previously research articles such as literature review, scoping review, meta-analysis, qualitative research	Ordinary articles such as interviews, blog posts and newspapers

Data analysis is necessary to obtain necessary information regarding to the research question and the aims of this study. The search strategy criteria are essential in the analysis process of distinguishing between necessary, reliable, effective articles compared to non-reliable articles. On the main databases (CINAHL and PubMed), the keywords utilized were exercise, healthier lifestyle, and elderly, which gave a summation of 3154 together with two additional databases (Medline and EMBASE) summing up to a total of 3200 articles. 150 duplicates are excluded. A total of 6204 articles is scrutinized under the inclusion and exclusion criteria. In which a total of 6142 articles are released and excluded from the cluster of articles. The remaining number of articles after scrutinizing under inclusion and exclusion criteria is 62 articles. 62 full-text articles are scrutinized for eligibility. Further 47 articles are excluded after being scrutinized with reasons such as not specifically answering the research questions nor the aims of this study, therefore, 15 articles are selected and employed in this research. Additionally, the articles selected are not only scoping reviewed articles, but also literature reviewed articles and one systematic, meta-analysis

review (see appendix 1). The information above is summarized in figure 1: PRISMA flow diagram below.

Figure 1:PRISMA flow diagram



Nevertheless, the search parameters were implemented during the search process, thus proving essential in article selection process. The research questions: How does exercise promote health in the elderly? And what are the benefits of physical exercise in the elderly? are broken down to provide different parameters that facilitates article searching process. These is represented below:

“Exercise OR physical exercise OR physical activity OR physical fitness OR fitness AND Elderly OR older OR elder OR aged OR geriatric OR senior OR old people OR elder people OR 65+ years-old OR senior citizens AND Healthier life OR healthier lifestyle OR longer life OR disease-free lifestyle OR illness free lifestyle”.

## **7 Ethical considerations**

According to the Finnish Advisory Board on research integrity guidelines, all research whether involving human participants or not, must be conducted responsibly. Most importantly, the research board pays key attention of honouring previous research and publications, acknowledging them in the research writing. (Finnish Advisory Board on Research Integrity, 2012).

This thesis is done according to Novia’s University of applied sciences reporting guidelines. Nevertheless, every information detailed in the research is referenced with the original’s researchers’ information thus avoiding plagiarism. Information utilised both in the background, and the results and findings as well as other aspects of the research are cited properly. Information from sources such as scientific articles, research articles, medical reports, health publications among others are referenced. Nevertheless, the report is submitted to a database that detects plagiarism. (Orb et al, 2000).

## **8 Results and Findings**

From the previously selected research articles, three different themes are defined. These themes extensively elaborate the numerous benefits of exercise in the following categories: exercise promotes mental and cognitive health and disease prevention; exercise prevents lifestyle diseases and promotes self-independence and exercise prevents the risk of falling. The themes are identified by analysing the chosen fifteen articles and categorizing similar topics and themes according to the aim of this research (to describe the benefits of exercise in the elderly) and answering the research questions (How does exercise promote health in the elderly? What are the benefits of physical exercise in the elderly?). The articles covered on the benefits of exercises, in which this study grouped the information to form a summary of numerous researches into one research/thesis.

### **8.1 Exercise promotes mental and cognitive health and diseases prevention**

It has been established that regular exercise is inversely related to cognitive deterioration. Regular exercise appears to have a protective effect against Alzheimer's disease in clinical studies (Hátlová, Ségárd, Probst, Chytrý, and Chalupová, 2020). Regular exercise proofs to having a more compelling preventive impact on Alzheimer's disease and numerous cancer symptoms together in observational studies. According to Hátlová and other researchers (2020), there is no substantial evidence that exercise or physical activity causes harm. Exercising is proven to be linked to reducing depressive emotions associated with psychiatric, like melancholy, negative self, and separation anxiety. Therefore, the benefit of exercising goes further to promoting mental health among the elderly. (Hátlová et al., 2020).

Regular exercise improves mental well-being, cognitive ability, and physical well-being; however, many older persons fail to exercise regularly. A tailored approach based on low-cost behavioral methods is offered to encourage a healthy lifestyle and achieve long-term lifestyle changes in persons who may be at an increased risk of poor quality of care and life. (Lachman, Lipsitz, Lubben, Castaneda-Sceppa, & Jette, 2018).

Frequent workout routines significantly impact aerobic fitness levels when used as part of an alcoholism rehab program. The effects of yoga in addiction treatment are less documented and researched. Exercise and improved self-esteem, greater sobriety, regulated consumption, and decreased levels in anxiety are now inconclusive in both fields of rehabilitation (Ekkekakis, 2019). Exercise is essential for mental healthcare. Hátlová et al. (2020) underlines two additional explanations as to why mental care should incorporate an exercise program: Persons with psychological illnesses can communicate with their carers regularly. Therefore, exercise is beneficial to the elderly with conditions such as dementia, being physical active promotes cognitive functioning. (Ekkekakis, 2019; Hátlová et al., 2020).

The effects of aging-related mental impairment and disability on older persons' daily lives are significant. The global population's aging rate and the resulting wave of dementia necessitates immediate prevention methods to lower the likelihood of cognitive deterioration. Regular exercise has been shown to improve mental performance in older people through neuroplasticity mechanisms. However, recent research by Gheysen, Poppe, DeSmet, Swinnen, Cardon, De Bourdeaudhuij, and Fias (2018) suggests that more considerable cognitive benefits are elicited when physical activity therapies are paired with cognitive engagement. (Gheysen et al. 2018).

## **8.2 Exercise prevents lifestyle diseases and promotes self-independence**

Alcántara, Diaz, Cosenzo, Loucks, Penedo, and Williams (2020) summarized the impacts of programs targeted to improve physical exercise among healthy individuals in a meta-analysis research. The researchers discovered that programs aimed at increasing regular exercise were partially successful. Reduced heart disease, pre-diabetes, cerebrovascular disease, and poor mental health. On the other hand, the benefits are numerous, including gaining of muscle, weight control, cognitive ability, reduced illness, stronger immunity, and elevated quality of life are part of the benefits of beginning and maintaining exercise routine in the elderly. (Alcántara et al., 2020).

Immune senescence is a significant cause of poor health in elderly adults. Raising the chances of illnesses, cancers, and proinflammatory illnesses contribute to age-related comorbidities (Duggal, Niemi, Harridge, Simpson, & Lord, 2019). When studying the immunological response of an older adult, it's important to remember that physical exercise has a significant effect on human health. The amount of physical activity done regularly decreases as an individual grows older, substantially impacting muscle strength and functioning. Muscle tissue is an essential immune modulator that produces myokines with anti-inflammatory and resistant protective properties. Several researchers have found that sustaining physical exercise in older persons has immunological advantages, such as reducing systemic inflammation linked with chronic maturity level disorders. Regular exercise prevents or alleviates multimorbidity by improving immunological function. Physical activity can help enhance immunotherapy results in age-related diseases like cancer. (Duggal et al., 2019; Gheysen et al., 2018).

Regular exercise is linked to improved adherence, reduced rigidity, and ejection fraction, lowering the chance of potential cardiogenic shock. However, improving an individual's health, such as better brain stimulation performance. (Ghram, Briki, Mansoor, Al-Mohannadi, Lavie, & Chamari, 2021). Regular exercise has been linked to a lower incidence of sarcopenia and enhanced muscle strength in elderly adults. Cardiovascular workouts have antiatherogenic impacts at the genetic level, such as a reduction in blood triglycerides and increasing high density lipoprotein, and a reduction low density lipoprotein in elderly adults. (Ghram et al. 2021).

In older persons, residence physical activity can help mitigate the physical and emotional effects of COVID-19 and promote self-esteem, a feeling of healthiness and physical training aspects (Ghram et al., 2021). Given the health prestige of elderly individuals and the lack of widely accessible, secure tools and components for exercise among majority of older citizens, it is suggested that they use the options that are available in their homes, such as cardio, strength training, and available therapy.

### **8.3 Exercise prevents the risk of falling**

Physical activity is required to prevent or delay the onset of old age illnesses. In older persons, a shortage of physical activity may be linked to more COVID-19 severe advancement and risk (Ghram et al., 2021). As a result, physical activity is generally suggested for older persons to preserve health and enhance daily activities. Fitness level and psychophysiological health have been linked in epidemiological research and therapeutic trials. As a component of the healthcare system, regular exercise is an essential approach in older persons to minimize or avoid cognitive disability, the incidence of falls, the advancement of neurodegenerative, and frailty. (Rehfeld, Lüders, Hökelmann, Lessmann, Kaufmann, Brigadski, & Müller, 2018). Furthermore, the advantages of regular exercise are not restricted to the prevention of diseases and ill-health but also include biopsychosocial benefits and a reduction in the negative physiological system, enabling elderly individuals to remain mobile and self-reliant for longer. Nevertheless, reducing the risk of falling in the elderly. (Ghram et al., 2021; Rehfeld et al. 2018).

## **9 Discussion**

Physical exercise is linked to a variety of favorable outcomes, including improved wellness and interpersonal well-being. The elderly who engages in physical activity have a better chance of maintaining a healthier life and are less likely to develop illnesses linked to inactivity and lifestyle choices. According to the results attained, intellectually active persons who participate in physical exercise are much less likely to partake in harmful habits such as alcoholism and health risks than the elderly who are not active in physical exercise. Inactivity was linked to a less healthy life, risks of being diagnosed with new conditions and poor self-perception of health. Engaging in a structured exercise treatment program increases self-esteem in the elderly. There is evidence that physicians can help with depressive emotions, including melancholy and poor self-esteem. (Gheysen et al., 2018; Hátlová et al., 2020; Duggal et al., 2019; Lachman et al., 2018).

In elderly individuals, physical activity has many health benefits, for instance, heart rate inconsistencies, diabetes, high blood cholesterol, arthritis, osteoarthritis, risk of falling and

cognitive functioning. Nevertheless, regular exercise is linked to lower death and aged level illness. Cardiovascular activity, resistance training, strength and flexibility are the three parts of endurance training that aid effective health benefits to the elderly. However approximately 75% of seniors are not physically active to reap these advantages. Therefore, a wide population of the elderly are at a risk of diseases and poor quality of life. (Gheysen et al., 2018; Hátlová et al., 2020; Duggal et al., 2019; Lachman et al., 2018).

## **9.1 Reflection on self-determination in health promotion of the elderly**

The theory of self-determination has been widely analysed using physical functioning. Adults have three primary physiological demands, according to the hypothesis: autonomy, competency, and connectedness. Human innate activities will be encouraged, appropriate motivation is fostered, and healthy psychological growth and behavioural results will be achieved when three main physiological demands are met. (Rigby, Ryan 2018).

This research shows that people who participate in active exercise have a greater chance of better health leading to various desirable outcomes, including psychological health and interpersonal well-being, supported by the theory of self-determination. Physical activity has also been linked to lower rates of heart disease, hypertension, anxiety, and weight control, all essential quality of healthcare and factors to life quality. Inactivity is also linked to a less healthy lifestyle choices and poor health perception, as highlighted in this research. Other prominent advantages of exercise include reducing harmful psychological well-being signs such as poor self-esteem and mental illness can be implemented as a source of self-determination and motivation to the elderly. Motivation to exercise and being active in promoting their health will yield benefits of better quality of health. (Rigby, Ryan 2018).

It is highly recommended that health care professions consider the solutions elaborated in this research. This research provides a guideline to health care professionals on the necessary health care to the senior citizens. It is highlighted both the negative state of emerging health risks associated with aging due to improper or inefficient physical activity, as well as the benefits of proper physical fitness and support towards the elderly in the society. This highlights the importance of the role of health care professionals to be vigilant in patients' guidance and education to maintain proper health and engage in physical activity. (Rigby, Ryan 2018).

Several governmental solutions on health activity have been issued in the last decade. Development measures have been included in national health exercise programs and projects. According to the study fitness and exercise are helpful to the elderly's health, independent coping, and the well-being. There is also proof of the economic advantages of exercise promotion and the expenses of lack of mobility. Individual and social costs of falls are exemplified by injuries caused by falls. Therefore, with this research, proper frequent exercise activities among the elderly are essential, thus benefiting not only the senior citizens, but also the economy and the burden of healthcare. Hence, this is a source of reason and motivation to policy makers to make reasonable and beneficial decisions that promotes the physical activity of the elderly. Providing availability of resources and accessible services such as less pricy sessions with physiotherapists, is an example of vital decisions to be made. This is because, supporting the elderly in maintaining good health



and independency, inadvertently reinforces the economy, and functioning of a nation. (Rigby, Ryan 2018).

## 9.2 Implication of the research

The population of the elderly and the changes in the geographical structure must be considered when preparing for exercise promotion. Exercise is a low-cost method of maintaining good health. When it comes to promotions, they should be utilized with care reducing health disparities, longevity and memory disorders that are increasing. Many elderly individuals will be living in nursing homes in the future. Lengthy institutional care and service housing fitness opportunities must be expanded within the realms of protection, service housing, and institutionalization as part of a rehabilitation strategy. (Gheysen et al., 2018; Hátlová et al., 2020; Duggal et al., 2019; Lachman et al., 2018).

The causes of immobility in diverse target groups have yet to be fully understood. Older adults with limited mobility should be identified earlier to ensure equal access to physical activities. Physical activity has been underutilized in preventing, treating, and rehabilitating mobility issues, cognitive diseases, and depression. (Lachman et al., 2018).

The physical activity of older individuals necessitates a particular focus on proper coordination. There is a lack of established conversation between administration and older people's advocates regarding elderly's training. Until now, the proportion of public funds allocated to enable training for the elderly and exercise guidelines and counselling has been insufficient. (Gheysen et al., 2018; Hátlová et al., 2020); Duggal et al., 2019; Lachman et al., 2018).

Health care professionals should inquire on the elderly about their activity's quantity, nature, and regularity as part of a comprehensive health evaluation, and inadvertently providing a health care plan that aims at promoting their physical activity and health. Health care workers collaborating can then provide lifestyle modifications that are appropriate to the elderly once they thoroughly understand the unique advantages of specific exercises. Several national initiatives back up the importance of fitness in health promotion.

Rapid rhythmical movements of vast muscle groups that carry the body over length or even against pressure should focus on physical exercise. Hiking, running, swimming, and biking are examples of these activities. For maximum health advantages, such actions are required at minimum every other day for half an hour or until 200-400 calories have been burned. (Gheysen et al., 2018; Hátlová et al., 2020; Duggal et al., 2019; Lachman et al., 2018).

Change should primarily focus on making sure that regular participation is maintained. To accomplish this, health care professionals have an immense duty of encouraging the elderly to engage in any actions in physical activities, such that it becomes more durable and manageable compared to a stressful activity. Individuals who are sedentary should be prescribed with moderate exercises in the beginning as progressing further and increasing intensity. Alternatively, exercise can be accomplished by combining several brief sessions of 10 minutes of training. Optionally, to attain the required guidelines, exercise durations should be gradually increased. Start with 10 minutes fewer exercises and prolong progressively the duration to 11 minutes, 15 minutes, until the ideal prescribed durations are met. This physical activity plan to improve physical fitness

should be formulated with care, considering factors such as safety, finances, and availability of services as well as resources. (Gheysen et al., 2018; Hátlová et al., 2020; Duggal et al., 2019; Lachman et al., 2018).

According to current standards by healthcare professionals, exercising done once a day for half an hour is better than extreme workouts rarely. Since specific exercises may be inappropriate for health reasons, elderly adults ought to meet a physician to undergo a check-up, prior to beginning an exercise regimen. Physicians frequently send elderly patients to a physiotherapist to devise a treatment plan tailored to their requirements. Senior citizens with significant physical demands will require a customized strategy tailored to their specific needs. (Gheysen et al., 2018; Hátlová et al., 2020; Duggal et al., 2019; Lachman et al., 2018).

A feeble older adult's exercise regimen will differ significantly from another elderly citizen above 65-year-old. Physiotherapists can suggest exercise routines for those who use a wheelchair or other special requirements. Before beginning an exercise program, the older adult should understand the need to invest in proper supportive and suitable clothing, shoes and tools for the area and activity, this is done to predominantly promote safety whilst exercising. The elderly, who are more susceptible to thermal instability, must avoid prolonged exertion during extreme temperatures. (Gheysen et al., 2018; Hátlová et al., 2020; Duggal et al., 2019; Lachman et al., 2018).

Therefore, as mentioned earlier with the increasing in population of the elderly in the world, each country should take the responsibility to effectively analyse their current situation and provide solutions that will adequately prepare for the rising number of the elderly. This is essential as different countries has different policies, cultural policies, as well as economical situations. Hence, each country analysing their state will immensely eradicate future challenges.

## **10 Conclusion**

This research work has underlined the numerous benefits of exercise to the elderly in three different categories (exercise promotes mental and cognitive health and disease prevention, exercise prevents lifestyle diseases and promotes self-independence and exercise prevents the risk of falling) as well as the disadvantages of the elderly not pertaining in exercise activities. Therefore, this thesis proves that senior adults who participate in active exercise have a greater chance of better health leading to various desirable outcomes, including psychological health, cognitive health promotion in conjunction with diseases such as dementia and Alzheimer's disease, mental health benefits, reduced risk of falling, immunotherapy and susceptibility to COVID-19 severity and interpersonal health, supported by the theory of self-determination.

Nonetheless, as mentioned earlier, 75% of the elderly do not pertain in physical activity, posing a risk to the future. Thus, this thesis, highlights the challenges in exercise health promotion. For instance, lack of enough support to the elderly, uncoordinated structure in elderly care, insufficient funding, lack of enough rehabilitation institutions, insufficient earlier education and detection of upcoming health problems, underutilization of exercise in health promotion, lack of regular partnership with health care professionals and support whilst beginning exercising.

Thus, with increased funding, support to the elderly, health education and availability of the resources, the elderly can receive improvement in the quality of life. This thesis encourages each

country to partake in self analysis of their situation and determine effective solutions to their setbacks, and adequately prepare for the rising number in the elderly population.

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## Appendices

### Appendix 1: Summary of articles

Articles	Authors	Method	Aim	Results
Social determinants as moderators of the effectiveness of health behavior change interventions: scientific gaps and opportunities	Alcántara, C., Diaz, S. V., Cosenzo, L. G., Loucks, E. B., Penedo, F. J. & Williams, N. J. 2020.	Scoping review	Explaining sociodemographic features  Identifying the different types of social determinants explained as moderators of change of behaviour to healthy living	Conducted through meta-analysis testing. Race based, immigration, associated with sex diversity, and life - course sampling diversity were all lacking. In total, 73.5 percent of SDOH moderators' studies looked at recent health care diversity by age, racial group, and treatment context; none looked at neighbourhood characteristics. The number of SDOH tests was adversely linked with methodological rigor.
The effect of psychomotor therapy on mental health in in-patient schizophrenia treatment	Hátlová, B., Ségárd, M. A., Probst, M., Chytrý, V. & Chalupová, E. 2020.	Literature review	The goal of this research was to see if sensorimotor therapy might be used as a supplement in the rehabilitation of hospitalized individuals with schizophrenia.	Statistics processed by TIBCO statistica. The use of a psychomotor treatment center in the therapy of schizophrenic hospital patients has a considerable favorable effect on mental health.



Physical activity and mental health in the era of evidence-based medicine	Ekkekakis, P. 2019.	Scoping review	For children and teens, the data on physical exercise and mental health is less well established. Physical exercise and psychological health in children and teens.	Evaluation of systematic reviews and meta-analyses, with the goal of determining the extent to which correlations might be regarded causal. Regular exercise and melancholy, personality, and improve decision - making in youngsters have all seen considerable increases in study activity. The best case for a causal relationship seems to be in cognitive performance, with some evidence in depression.
Physical activity to improve cognition in older adults: can physical activity programs enriched with cognitive challenges enhance the effects? A systematic review and meta-analysis. <i>International Journal of Behavioral Nutrition and Physical Activity</i> , 15(1), 1-13.	Gheysen, F., Poppe, L., DeSmet, A., Swinnen, S., Cardon, G., De Bourdeaudhuij, I. & Fias, W. 2018.	Systematic review and meta-analysis	This meta-analysis compares effects on the brain after combination PA + CA treatments to PA treatments (PA only), CA treatments (CA only), and matched control to assess this possible synergic effect.	According to the results of the present meta-analysis, older persons' PA regimens could include rigorous cognitive training to help brain functions. Integrated PA + CA training should be marketed to prevent and treat cognitive deterioration in older people. To achieve effects on the brain, an academic abilities challenge appears to be more significant than large doses of intervention period.
Can physical activity ameliorate immunosenescence and thereby reduce age-related	Duggal, N. A., Niemi, G., Harridge, S. D.,	Literature review	Investigates how exercise can help avoid or alleviate maturity level multi-morbidity by improving	A review on immunosenescence, or the aging of the immune response, is a significant risk factor for poor wellness in older

<p>multimorbidity? <i>Nature Reviews Immunology</i>, 19(9), 563-572.)</p>	<p>Simpson, R. J. &amp; Lord, J. M. 2019.</p>		<p>immunological function, as well as if regular exercise can help enhance immunotherapy results in adult diseases like cancer.</p>	<p>persons, raising the risk of viruses, cancers, and chronic autoimmune illness, all of which contribute to age-related comorbidities.</p>
<p>Home-based exercise can be beneficial for counteracting sedentary behavior and physical inactivity during the COVID-19 pandemic in older adults. <i>Postgraduate medicine</i>, 133(5), 469-480.)</p>	<p>Ghram, A., Briki, W., Mansoor, H., Al-Mohannadi, A. S., Lavie, C. J., &amp; Chamari, K. 2021.</p>	<p>Scoping review</p>	<p>The influence of the COVID-19 epidemic on older individuals' sedentary body and social inactivity. The significance of PA in reducing the COVID-19 pandemic's negative consequences.</p>	<p>A scoping review done on severe acute respiratory syndrome coronavirus puts older persons at a significant risk of injury or death. To combat the COVID-19 epidemic, health authorities have implemented preventative health precautions such as confinement and self-isolation.</p>
<p>Long-term strength and balance training in the prevention of decline in muscle strength and mobility in older adults. <i>Aging clinical and experimental research</i>, 32(1), 59-66.</p>	<p>Aartolahti, E., Lönnroos, E., Hartikainen, S. &amp; Häkkinen, A. 2020.</p>	<p>Scoping review</p>	<p>In a society study of adult persons, the impacts of lengthy once-weekly strengthening and postural control on muscular function and muscular functioning were investigated.</p>	<p>Descriptive statistics. Both males and females increased their ability to rise from a chair during in the treatment. The strength of women's leg flexion and extension increased by 14.1 N and 16.3 N, correspondingly. Their maximum walking pace increased by 0.08 m/s as well. Throughout exercise and follow-up, there were no changes in muscular strength or strolling pace in men. At the conclusion of the treatment, no changes in BBS or TUG were found, however post-intervention</p>

				adopt in men revealed a decrease in BBS.
When adults don't exercise: Behavioural strategies to increase physical activity in sedentary middle-aged and older adults. <i>Innovation in Aging</i> , 2(1), igy007.)	Lachman, M. E., Lipsitz, L., Lubben, J., Castaneda-Sceppa, C. & Jette, A. M. 2018.	Literature review	The goal of this study is to investigate the use of reduced attitudinal and cognitive strategies for boosting physical exercise, that could have much further effects on individuals and populations.	A literature review on exercise is among the most potential non-pharmacologic, invasive, and cost-effective strategies of promoting health, yet data reveal that only a small number of middle-aged and older persons exercise regularly.
An autonomous robotic exercise tutor for older adults. <i>Autonomous Robots</i> , 41(3), 657-678.	Görer, B., Salah, A. A. & Akin, H. L. 2017.	Scoping review	Peripheral supported living is a concept that advocates using innovative solutions to maintain wellness of the aged.	A scoping review in an emulation architecture, the robot masters a range of physical workouts from a human demonstration and does them in an activity situation while observing the elderly person and providing verbal feedback.
Dance training is superior to repetitive physical exercise in inducing brain plasticity in the elderly. <i>PloS one</i> , 13(7), e0196636	Rehfeld, K., Lüders, A., Hökelmann, A., Lessmann, V., Kaufmann, J.,	Scoping review	The older study participants were required to learn new and progressively challenging choreographies on a regular basis. This six-month program was compared to	A statistical description when compared to other forms of exercise, dancing resulted in bigger volume increases in the cerebral hemisphere, striatum, caudate, and sensory cortex. Only

	Brigadski, T. & Müller, N. G. 2018.		matched-intensity conventional physical training.	dance was linked to a rise in BDNF blood levels. Both subgroups increased their focus and spatial cognition in terms of cognition, although there were no major differences between them.
Physical limitations, walkability, perceived environmental facilitators, and physical activity of older adults in Finland. <i>International journal of environmental research and public health</i> , 14(3), 333	Portegijs, E., Keskinen, K. E., Tsai, L. T., Rantanen, T. & Rantakokko, M. 2017.	Literature review	The researchers wanted to see if objectively measured walkability of the surroundings and participant perceptions of contextual facilitators for outdoors mobility might be used to forecast physical exercise in older persons with or without physical restrictions.	A statistical description for one week (n = 175), inertial sensors step rates were recorded. Higher related to perceived contextual enablers (p 0.001) and physical exercise (self-reported p = 0.021, step count p = 0.010) were linked to better pedestrians. Ambient enablers were related with higher probabilities of having at least exercise regularly (p 0.001), but not foot counting, particularly among individuals with physical restrictions.
Prevalence and associated factors of poor sleep quality among Chinese older adults living in a rural area: a population-based study.	Wang, P., Song, L., Wang, K., Han, X., Cong, L., Wang, Y. & Du, Y. 2020.	Literature review	The goal of this study was to investigate the frequency of sleep problems among society older people in a remote community in North China, and the factors that contribute to it.	A statistical description on the total incidence of poor sleep was 37.8% in the general sample, 38.2% in females, and 27.3 percent in males. Long - term sleep delay (38.7%), reduced sleeping patterns (33.0%), and impaired sleeping hours effectiveness were the most prevalent irregular sleeping

				domains (27.8 percent). Insufficient sleep was reported to be linked with female gender and diagnostic multimorbidity such as high blood pressure, coronary heart disease, and chronic obstructive pulmonary disease in multivariable linear regression analysing.
Diagnosis and disruption: population-level analysis identifying points of care at which transitions are highest for people with dementia and factors that contribute to them. <i>Journal of the American Geriatrics Society</i> , 64(3), 569-577.	Sivananthan, S. N. & McGrail, K. M. 2016.	Literature review	Aims to Study the changes that people with dementia go through over time and determine the times in care where transitions are most common, as well as the contributing factors to those changes.	A statistical description, accounting for finish or temporarily relocating to a lengthy treatment centre, individuals suffer an increase in transfers each year after diagnoses, driven mostly by hospitalization. This happens regardless of length of life or the place of care. People not in LTCFs have a significant rise in hospitalizations in that year of the mortality, often surpassing admissions in the year of diagnoses, irrespective of survival duration. Receiving prescribed dementia care as well as receiving elevated primary care were both linked to fewer transfers between healthcare setting.

<p>A classification of motivation and behaviour change techniques used in self-determination theory-based interventions in health contexts. <i>Motivation Science</i>, 6(4), 43.</p>	<p>Teixeira, P. J., Marques, M. M., Silva, M. N., Brunet, J., Duda, J. L., Haerens, L., ... &amp; Hagger, M. S. 2020.</p>	<p>Literature review</p>	<p>The goal of the research is to create a classification system for the technologies that allow up self-determination hypothesis treatments, with psychological fulfilment as the overarching framework.</p>	<p>A literature partaking specialists (N = 17) evaluated each method on the preparatory ranking for redundant systems, essence, distinctiveness, and the suggested connection between the method and a common psychological require using an incremental expert panel process. A total of 21 motivation starts changing techniques were classified because of the process. The finished MBCTs were compared to methods from established behaviour modify method taxonomies for layoffs.</p>
<p>Effects of chair-based, low-load elastic band resistance training on functional fitness and metabolic biomarkers in older women. <i>Journal of Sports Science &amp; Medicine</i>, 20(1), 133.</p>	<p>Stojanović, M. D., Mikić, M. J., Milošević, Z., Vuković, J., Jezdimirović, T. &amp; Vučetić, V. 2021.</p>	<p>Scoping review</p>	<p>The goal of this study is to see how workable wellness and physiologic biomarkers in elderly ladies respond to twelve weeks of seat, reduced strength training with a rubber waistband.</p>	<p>A statistical description, 4 months of EBT appears to be a realistic approach for ensuring a high training needed to monitor and is highly advantageous for increasing wellness fitness and metabolism markers in older women.</p>