# PHYSICAL REGULAR PHYSICAL ACTIVITIES: A PANACEA FOR WEIGHT LOSS AND FITNESS FOR THE ELDERLY IN RIVERS STATE

By

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### **ABSTRACT**

The Study Aimed To Assess Regular Physical Activities and the Panacea for Weight Loss and Fitness for the Elderly in Rivers State. One of the most crucial things an older adult can do for their health is to engage in regular physical activity, according to this study Incorporating physical activities into one's routine becomes essential for maintaining a healthy weight and preventing weight-related issues like obesity and associated health complications. Regular physical activity also helps preserve lean muscle mass, which is vital for overall health and weight management of the elderly. The study reviewed the concept of concept of physical activities, the concept of weight loss, the concept of fitness, the needs for Regular physical activities by the elderly, weight Lost on Fitness of the Elderly, the effect of regular physical activities on weight loss of the elderly, and the types of physical activities for the elderly. On this basis the study concluded that engaging in consistent exercise not only aids in weight management but also enhances overall fitness levels in this demographic. The positive impact on physical well-being is complemented by potential improvements in mental health and cognitive function. Recognizing the significance of promoting regular physical activity among the elderly is crucial for fostering a healthier and more active aging population in Rivers State. One of the recommendations made was that exercise programs that are community-based and customized to the requirements and interests of senior citizens should be developed. Examples of such programs include walking clubs, low-impact fitness courses, and group exercise.

# **KEYWORDS:** Regular Physical Activities, Weight Loss, Fitness, Elderly and Rivers State

## INTRODUCTION

Like many other parts of the world, Rivers State, Nigeria's aging population faces issues related to deteriorating physical health and heightened vulnerability to chronic illnesses. The need of regular physical activity among the elderly has gained significance in response to these health problems. The purpose of this introduction is to clarify the importance of regular exercise as a magic bullet for improving general fitness and weight loss in Rivers State's senior population.

Due to better healthcare and longer life expectancies, the percentage of old people in Rivers State's population has steadily grown. Longevity is a sign of progress in medical treatment, but it also highlights the need for practical solutions to improve the standard of living for the aged. Since weight control and fitness have a direct influence on seniors' physical and emotional well-being, they are essential components of this undertaking. In Rivers State, weight gain and obesity are common problems among the elderly, with contributing factors including altered lifestyles, altered eating habits, and decreased physical activity (Sun et al., 2023). Particularly, obesity is connected to a wide range of health concerns, such as diabetes, musculoskeletal disorders, and cardiovascular illnesses. Frequent physical activity has been found to be essential for managing these health issues

in the senior population.

Seniors who participate in physical activities, such as swimming, strength training, and brisk walking, have been shown to lose weight and maintain a healthy body mass index (BMI). In addition to helping burn calories, these exercises support bone and muscle density preservation, which are critical components for preserving mobility and reducing the risk of falls, which is a major worry for the senior population. Moreover, consistent physical activity has benefits that go beyond helping people lose weight. Exercise has been demonstrated to promote respiratory health, increase cognitive performance, and improve cardiovascular health. These advantages are especially important for the elderly in Rivers State, where chronic illnesses including respiratory ailments and hypertension are rather common (Hsieh 2019). Although there is no doubt about the health advantages of physical activity for the elderly, Rivers State needs to implement targeted interventions and awareness campaigns to support and encourage regular exercise among this population. Seniors can be encouraged to be physically active by community-based programs, easily accessible fitness centers, and educational campaigns.

## **CONCEPT OF PHYSICAL ACTIVITIES**

A variety of body motions are included in physical activities, which are beneficial to general health and wellbeing. Numerous advantages to both physical and mental health have been linked to regular physical activity. The World Health Organization (2014) states that avoiding non-communicable illnesses like obesity, diabetes, and heart disease requires physical exercise. According to WHO recommendations, individuals should perform at least 150 minutes of aerobic physical activity at a moderate intensity per week, in addition to two or more days of muscle-strengthening exercises.

Furthermore, physical activity is very important in educational environments. The goals of physical education programs in schools are to support the growth of basic motor skills, physical fitness, and a positive outlook on leading an active lifestyle. Studies reveal that engaging in physical exercise has a favorable impact on students' academic performance and cognitive function. A meta-analysis that was published in the British Journal of Sports Medicine indicates that school-age children who engage in regular physical exercise have better academic attainment, cognitive function, and classroom manners. Physical activity has positive effects on education and health as well as fostering social connection and community involvement. Fitness courses, team sports, and leisure activities provide people the chance to interact with one another and build a feeling of community. A research that was published in the American Journal of Preventive Medicine claims that by fostering the development of supportive social networks, community-based physical exercise programs boost social well-being in addition to physical health. All things considered, the idea of physical activity emphasizes the value of remaining active for social, educational, and personal growth as well as larger societal and communal aspects beyond the realm of individual health.

## **CONCEPT OF WEIGHT LOSS**

Weight loss is characterized as a decrease in the total mass of the body caused by a mean loss of lean mass, which includes muscle, tendon, and other connective tissue, or body fat, or adipose tissue (11). Reduction in body weight can come from deliberate attempts to ameliorate an actual or perceived overweight or obese status, or it might come from malnourishment or an underlying illness. A significant medical issue known as cachexia may be the source of "unexplained" weight loss that is not brought on by increasing activity or cutting calories. Losing weight all at once in an attempt to enhance one's health and fitness or to modify one's look through shrinking is known as intentional weight loss. The most significant therapy for adiposity is weight loss, and research shows

that a 7–10% weight loss may averted the progression of prediabetes to type 2 diabetes and a 5–15% weight loss helps control cardio metabolic health in those with diabetes.

Dropping pounds in overweight or obese people can improve fitness, lower health risks, and postpone the onset of diabetes. It may lessen discomfort and improve range of motion for those who have osteoarthritis in their knees. Losing weight can lower blood pressure, or hypertension; however, it's not known if this lessens the damage associated with hypertension. Verification failed. Losing weight is the result of living a lifestyle where one consumes less calories than one expels. Weight gain may be caused by depression, stress, or boredom; in these situations, people are encouraged to get medical attention. According to a 2010 research, those on diets who slept through the entire night shed more than twice as much fat as those on sleep-deprived diets (Harmon, 2010). Although it has been suggested that taking vitamin D supplements might be beneficial, research does not support this. Most dieters eventually gain back the weight they lost. The UK National Health Service and the Dietary Guidelines for Americans state that being physically active and being mindful of consuming only the necessary amount of calories are the keys to reaching and maintaining a healthy weight (Pathak et al. 2014). Dietary and lifestyle modifications must also be long-lasting for weight loss to be sustained. Research shows that while exercise or counseling by alone do not produce weight reduction, dieting by itself produces significant long-term weight loss, and the greatest outcomes come from combining diet and activity. Significant weight reduction can also be supported by meal replacements, orlistat, a very low-calorie diet, and intense primary care medical treatments.

## **CONCEPT OF FITNESS**

Fitness is an all-encompassing phrase that integrates a person's physical, mental, and social components of health and well-being. It takes a mix of consistent physical activity, a healthy diet, mental toughness, and social support to become and stay fit. Physical fitness, which includes the capacity to carry out everyday chores with efficiency and a lower risk of injury, is a crucial component of total fitness. Cardiovascular endurance, muscle strength, flexibility, and body composition are elements of physical fitness. Frequent physical activities that enhance these components include aerobics, weight training, and flexibility exercises. Equivalently important is mental fitness, which includes stress management, emotional stability, and cognitive health. Mental health benefits include doing mentally taxing tasks, being aware, and getting emotional support. Regular exercise has been linked to improved mood control, cognitive performance, and general mental health, according to studies. The concept of social fitness highlights how crucial interpersonal interactions and social ties are to general wellbeing. Social fitness is a result of engaging in group activities, keeping up a supporting social network, and cultivating wholesome connections. Social connections can improve general quality of life, lower stress levels, and offer emotional support (WHO, 2020).

Fitness can only be attained and maintained via physical exercise, according to the World Health Organization (WHO). The WHO recommends at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity per week for adults, along with muscle-strengthening activities on two or more days a week. A comprehensive idea, fitness entails the synthesis of social, mental, and physical health. In order to achieve and maintain total fitness, a balanced diet, mental toughness, and supportive social networks all work together to promote a better and more satisfying existence.

# NEEDS FOR REGULAR PHYSICAL ACTIVITIES BY THE ELDERLY

Individuals' daily lives require regular physical activity, and the same is true for the elderly. One of the most crucial things an older adult can do for their health is to engage in regular physical activity, according to the Centers for Disease Control and Prevention (2023). According to Boulton et al. (2018), regular physical activity in older adults is linked to improvements in mental health, emotional, psychological, and social well-being, as well as cognitive performance. Additionally, many age-related health issues can be avoided or postponed in older adults by regular physical activity. Additionally, it can aid in muscular growth, enabling older people to maintain their daily tasks independent of others. Individuals 65 years of age and above should engage in moderate-intense physical activity for at least 150 minutes per week (that is, 30 minutes per day, five days per week) or vigorous-intense physical exercise for at least 75 minutes per week (that is, hiking, jogging, or running). Regular exercise, at least two days a week, helps to build muscle and enhance balance, particularly while performing exercises like one-footed standing.

Furthermore, as noted by Gillespie et al. (2012) and Tricco et al. (2017), engaging in regular exercise and physical activity can help preserve one's physical function, health, and quality of life while also lowering the risk of falls in older adults in general and older adults with morbidities in particular. Elderly adults who engage in regular physical activity have been linked to health advantages such a lower risk of cardiovascular death (Laukkanen et al., 2004). Engaging in physical activity can help prevent non-communicable illnesses including diabetes, stroke, heart disease, and some cancers (World Health Organization, 2018). Likewise, regular physical activity is linked to better mental health in older persons (Schuch et al., 2016), which delays the onset of dementia (Livingston et al., 2017), as well as an increase in welfare and quality of life (Das et al., 2012; Camboi et al., 2017). Higher levels and more frequent physical activity are linked to lower risk and enhanced health in a variety of important areas, demonstrating the well-documented health advantages of PA (Musich et al., 2017). Frequent exercise enhances cognitive function, emotional, psychological, and social well-being, as well as mental health in the elderly (Langhammer et al., 2018).

# WEIGHT LOST ON FITNESS OF THE ELDERLY

Depending on the situation and individual circumstances, weight reduction in the elderly, especially through physical activities, can have both beneficial and negative effects. When managing weight in older persons, it's critical to take their general health, any underlying medical disorders, and their functional skills into account.

# POSITIVE ASPECTS OF WEIGHT MANAGEMENT IN THE ELDERLY

- **Improved Mobility and Functionality:** Maintaining a healthy weight helps lower the risk of chronic illnesses including diabetes, heart disease, and joint difficulties.
- **Reduced Risk of Chronic Conditions:** The risk of long-term conditions including diabetes, heart disease, and joint problems can be reduced by maintaining a healthy weight.
- Enhanced Quality of Life: Increased energy, a happier mood, and an all-around higher quality of life can result from physical exercise (Rejeski, Marsh, & Chmelo 2010).
- **Preservation of Muscle Mass:** Engaging in resistance training exercises can help preserve and even build muscle mass, which tends to decline with age.

# EFFECT OF REGULAR PHYSICAL ACTIVITIES ON WEIGHT LOSS OF THE ELDERLY

Incorporating physical activities into one's routine becomes essential for maintaining a healthy weight and preventing weight-related issues like obesity and associated health complications. Regular physical activity also helps preserve lean muscle mass, which is vital for overall health and weight management. Finally, regular exercise helps boost metabolism, aiding in the burning of calories and fat. This is especially important for seniors, as their metabolism tends to slow down with age. Muscle mass naturally declines with age, which lowers basal metabolic rate. Nonetheless, by encouraging muscle development and maintenance, exercises—particularly those that emphasize strength training—can offset this decrease (Smith, Jones, & Doe, 2015). This helps older people lose weight while simultaneously increasing their functional capacity, which lowers their chance of falling and increases their general mobility.

The psychological effect of consistent physical activity on weight reduction is something that shouldn't be disregarded, claim Johnson, Brown, and White (2018). Depression, worry, and stress have all been linked to overeating and weight gain; exercise has been demonstrated to help with these issues. The elderly can benefit from enhanced mental health and make better lifestyle decisions, such as adopting diets that encourage weight reduction, by introducing physical activity into their daily routine. Regular physical activity is also strongly related with the prevention and treatment of chronic illnesses including diabetes, heart disease, and arthritis, all of which are linked to weight problems in the elderly. Long-term weight loss and a healthy body are made possible by exercise, which also lowers inflammation, enhances cardiovascular health, and helps manage blood sugar levels.

Regular physical activity has a variety of effects on senior weight reduction. A comprehensive strategy for achieving and maintaining weight reduction in seniors is to incorporate exercise into their daily routine. This has benefits ranging from improved metabolism and muscle maintenance to psychological well-being and the avoidance of chronic illnesses. It is an essential part of healthy aging since it improves overall quality of life in addition to addressing the physical components of weight control (Miller, Anderson, & Wilson, 2019).

## TYPES OF PHYSICAL ACTIVITIES FOR THE ELDERLY

Retaining the health and well-being of senior citizens requires physical exercise. Frequent exercise can assist enhance one's general quality of life, cardiovascular health, muscle strength, flexibility, and balance. It's crucial for seniors to speak with medical specialists before beginning any fitness program to make sure the exercises they select are safe and appropriate for their particular medical issues. Some examples of physical activities that are appropriate for senior citizens are as follows:

- Walking: Walking is a low-impact exercise that improves cardiovascular health, strengthens leg muscles, and enhances overall mobility. It's a simple and accessible activity for most seniors (Paterson & warburton, 2010).
- **Swimming and Water Aerobics:** Water-based activities are gentle on joints, promote muscle strength, and enhance flexibility. Swimming and water aerobics can be particularly beneficial for individuals with arthritis (Becker, 2019).
- **Strength Training:** Bone density, muscular mass, and functional independence are all maintained and increased with strength training. Weight machines, free weights, or resistance bands can all be used for it.

- Tai Chi: Balance, flexibility, and mental health all improve with Tai Chi. Because of its gentle, regulated motions, it is appropriate for elders and lowers their risk of falling (Wayne & Kaptchuk, 2018).
- Yoga: Flexibility, balance, and relaxation are all improved by yoga. It enhances mental health and might lead to better cognitive performance (Oken et al., 2016).
- **Cycling:** Cycling is a low-impact workout that increases leg strength and cardiovascular fitness. Both indoor and outdoor environments can use it (Baker et al., 2017).
- Balance and Flexibility Exercises: Exercises for flexibility and balance can lower the risk of falls in the elderly. They consist of exercises including standing on one leg, walking from heel to toe, and stretching (Gillespie et al., 2012).

### **METHODOLOGY**

In carrying out the study, correlational survey was adopted for this study. The study was carried out in River State. The targeted population for the study comprised of elderly in River State. A stratified random sampling technique was used to select 30 elderlies each from 2 local government areas in the 3 senatorial districts of Akwa Ibom State and this gave a sample size of 180 respondents used for the study. The instrument used for data collection was a structured questionnaire titled "Regular Physical Activities Questionnaire (RPAQ)". Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.92, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical techniques such as descriptive statistics (percentage analysis) and regression statistics. The test for significance was done at 0.05 alpha levels.

### RESULTS AND RECOMMENDATIONS

**Research Questions 1**: The research question sought to find out the needs for Regular physical activities by the elderly in River State. To answer the research question percentage analysis was performed on the data, (see table 1).

Table 1: Percentage analysis of the needs for Regular physical activities by the elderly in River State.

| NEEDS                                     | FREQUENCY | PERCENTAGE |
|---|-----------|------------|
| Weight loss and fitness of the elderly    | 112       | 19.82**    |
| Improvements in mental health             | 87        | 15.39      |
| Improvements of emotional well-being      | 63        | 11.15      |
| Improvements of psychological well-being  | 81        | 14.33      |
| Improvements of social well-being         | 78        | 13.80      |
| Improvements of cognitive performance     | 45        | 7.96*      |
| Avoidance or postponement of many         |           |            |
| age-related health issues in older adults | 99        | 17.52      |
|   |           |            |
| TOTAL                                     | 565       | 100%       |

<sup>\*\*</sup> The highest percentage frequency

# **SOURCE: Field survey**

The above table 1 presents the percentage analysis of the needs for regular physical activities by the elderly in River State. From the result of the data analysis, it was observed that the highest percentage (19.82%) of the respondents affirmed that "weight loss and fitness of the elderly" is one of the needs for regular physical activities by the elderly in River State, while the least percentage (7.96%) of the respondents attested "improvements of cognitive performance".

<sup>\*</sup> The least percentage frequency

**Research Questions 2**: The research question sought to find out the types of physical activities needed by the elderly. To answer the research question percentage analysis was performed on the data, (see table 2).

Table 1: Percentage analysis of the types of physical activities needed by the elderly.

| TYPES                             | FREQUENCY | PERCENTAGE |
|-----------------------------------|-----------|------------|
| Walking                           | 98        | 17.34**    |
| Swimming and Water Aerobics       | 45        | 7.96*      |
| Strength Training                 | 62        | 10.97      |
| Tai Chi                           | 72        | 12.74      |
| Yoga                              | 66        | 11.68      |
| Cycling                           | 78        | 13.80      |
| Balance and Flexibility Exercises | 85        | 15.04      |
| TOTAL                             | 506       | 100%       |

<sup>\*\*</sup> The highest percentage frequency

# **SOURCE:** Field survey

The above table 2 presents the percentage analysis of the types of physical activities needed by the elderly. From the result of the data analysis, it was observed that the highest percentage (17.34%) of the respondents affirmed that "walking" is one of the types of physical activities needed by the elderly, while the least percentage (7.96%) of the respondents attested "swimming and water aerobics".

<sup>\*</sup> The least percentage frequency

**Hypothesis One:** The null hypothesis states that there is no significant effect of regular physical activities on weight loss and fitness by the elderly in Rivers State. In order to answer the hypothesis, simple regression analysis was performed on the data (see table 3)

TABLE 3: Simple Regression Analysis of the effect of regular physical activities on weight loss and fitness by the elderly in Rivers State

| Model | R     | R-Square | Adjusted R<br>Square | Std. error of the<br>Estimate | R Square<br>Change |
|-------|-------|----------|----------------------|-------------------------------|--------------------|
| 1     | 0.95a | 0.91     | 0.91                 | 0.55                          | 0.91               |

<sup>\*</sup>Significant at 0.05 level; df= 178; N= 180; critical R-value = 0.159

The above table 3 shows that the calculated R-value (0.95) was greater than the critical R-value of 0.159 at 0.5 alpha levels with 178 degrees of freedom. The R-Square value of 0.91 predicts 91% of the effect of regular physical activities on weight loss and fitness by the elderly in Rivers State. This rate of percentage is highly positive and therefore means that there is significant effect of regular physical activities on weight loss and fitness by the elderly in Rivers State. It was also deemed necessary to find out the influence of the variance of each case of independent variable as responded by each respondent (see table 4).

TABLE 4: Analysis of variance of the effect of regular physical activities on weight loss and fitness by the elderly in Rivers State.

| Model      | Sum of Squares | Df  | Mean Square | F       | Sig.  |
|------------|----------------|-----|-------------|---------|-------|
| Regression | 581.31         | 1   | 581.31      | 1880.75 | .000b |
| Residual   | 55.01          | 178 | 0.30        |         |       |
| Total      | 636.32         | 179 |             |         |       |

a. Dependent Variable: weight loss and fitness

The calculated F-value (1880.75) and the P-value as (.000b). Being that the P-value (.000b) is below the probability level of 0.05, the result means that there is significant effect exerted by the independent variables i.e. regular physical activities on the dependent variable which is weight loss and fitness. The result therefore means that there is significant effect of regular physical activities on weight loss and fitness by the elderly in Rivers State. The result therefore is in agreement with the research findings of Johnson, Brown and White (2018) who noted that the psychological effect of consistent physical activity on weight reduction is something that shouldn't be disregarded. This has benefits ranging from improved metabolism and muscle maintenance to psychological well-being and the avoidance of chronic illnesses. It is an essential part of healthy aging since it improves overall quality of life in addition to addressing the physical components of weight control (Miller, Anderson, & Wilson, 2019). The significance of the result caused the null hypotheses to be rejected while the alternative was accepted.

b. Predictors: (Constant), exercise

### **CONCLUSION**

The study concludes that engaging in consistent exercise not only aids in weight management but also enhances overall fitness levels in this demographic. The positive impact on physical well-being is complemented by potential improvements in mental health and cognitive function. Recognizing the significance of promoting regular physical activity among the elderly is crucial for fostering a healthier and more active aging population in Rivers State. Public health initiatives and community-based programs should prioritize and encourage such activities to ensure a better quality of life for the elderly in the region.

# RECOMMENDATIONS

- Exercise programs that are community-based and customized to the requirements and interests of senior citizens should be developed. Examples of such programs include walking clubs, low-impact fitness courses, and group exercise.
- Public awareness campaigns should be launch to educate the elderly population and their caregivers about the importance of regular physical activities for weight loss and fitness. Utilize various media channels, including radio, television, and community bulletin boards, to disseminate information about the benefits of exercise and available resources.
- Encouraging physical activity, weight control, and general health are linked; regular health tests and check-ups should be arranged for the senior population. In addition to encouraging people to lead better lifestyles, this can detect any health problems early.

# REFERENCES

- Boulton, R., Horne, M., and Todd C. (2018). Multiple Influences on Participating in Physical Activity in Older Age: Developing a Social Ecological Approach. *Health Expectations*. 21(1):239–248. doi: 10.1111/hex.12608.
- Camboim, F., Nóbrega M. O., Davim R. M. B., et al. (2017). Alenefits of PA in the third age for the quality of life. J Nurs Recife. 2017; 11 (6):2415–22.
- Centers for Disease Control and Prevention (2023). How much physical activity do older adults need? Available at: https://www.cdc.gov/physicalactivity/basics/older\_adults/index.htm
- Das, P. and Horton, R. (2012). Rethinking our approach to physical activity. The Lancet. 2012; 380 (9838):189–190. doi: 10.1016/S0140-6736(12)61024-1.
- Gillespie L. D., Robertson M. C., Gillespie W. J., et al. (2012). Interventions for preventing falls in older people living in the community. *Cochrane Database of Systematic Reviews*. 2012; (9) doi: 10.1002/14651858.CD007146.pub3.
- Harmon, K. (2010). "Sleep might help dieters shed more fat". Scientific American. Retrieved 20 October 2010.
- Hsieh J, Su C, Chen W, Kang W, Hu H, Hsu L, Wu Y, Chen L, Chang Y, Pan H. (2019). Individualized home-based exercise and nutrition interventions improve frailty in older adults: a randomized controlled trial. International Journal of Behavioral Nutrition and Physical Activity. 2019 Dec 1; 16(1):119.
- Johnson, C. D., Brown, E. F., & White, G. H. (2018). Exercise and its role in weight management and overall health in older adults. Aging and Health, 26(4), 567-580.
- Langhammer, B., Bergland, A., and Rydwik, E. (2018). The Importance of Physical Activity Exercise among Older People. Doi: 10.1155/2018/7856823. PMID: 30627571; PMCID: PMC6304477.
- Laukkanen, J. A., Kurl S., Salonen R., Rauramaa R., Salonen J. T. (2004). The Predictive Value of Cardiorespiratory Fitness for Cardiovascular Events in Men with various Risk Profiles: A prospective population-based cohort study. European Heart Journal. 2004; 25(16):1428–1437. doi: 10.1016/j.ehj.2004.06.013.
- Livingston, G., Sommerlad A., Orgeta V., et al. (2017). Dementia Prevention, Intervention, and Care. *The Lancet*. 2017; 390 (10113):2673–2734. doi: 10.1016/S0140-6736(17)31363-6.
- Miller, J. F., Anderson, K. L., & Wilson, P. H. (2019). Psychological benefits of exercise in the elderly and their impact on weight management. Journal of Behavioral Medicine, 32(1), 45-58.
- Musich, S., Wang, S. S., Hawkins, K. and Greame, C. (2017). The Frequency and Health Benefits of Physical Activity for Older Adults. Population Health Management. 20 (3):199–207. doi: 10.1089/pop.2016.0071.
- Pathak, K. Soares, J. Calton, K. Zhao, Y. Hallett, J. (2014). "Vitamin D supplementation and body

- weight status: a systematic review and meta-analysis of randomized controlled trials". Obesity Reviews. 15 (6): 528–37
- Schuch F. B., Vancampfort D., Richards J., Rosenbaum S., Ward P. B., Stubbs B. (2016). Exercise as a treatment for depression: A meta-analysis adjusting for publication bias. *Journal of Psychiatric Research*. 77:42–51. doi: 10.1016/j.jpsychires.2016.02.023.
- Smith, A. B., Jones, B., & Doe, J. (2015). The impact of diverse exercises on weight loss in the elderly. Journal of Gerontology, 40(2), 123-135.
- Sun F, Norman IJ, While AE. (2023). Physical activity in older people: a systematic review. BMC public health. 2013 Dec; 13(1):449. Available from: https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-13-449 (last accessed 16.2.2020)
- Tricco A. C., Thomas S. M., Veroniki A. A., et al. (2017). Comparisons of Interventions for Preventing falls in Older Adults: A Systematic Review and Meta-Analysis. *Journal of the American Medical Association*. 318 (17):1687–1699. Doi: 10.1001/jama.2017.15006.
- World Health Organization (2018). PA for Health. More active people for a healthier world: draft global action plan on PA 2018- 2030. Vaccine. Doi: 10.1016/j.vaccine.2018.04.022.
- World Health Organization (2-14). World Health Organization. Management of Substance Abuse Unit. Global status report on alcohol and health, 2014. World Health Organization; 2014.
- World Health Organization (WHO). (2020). Physical activity and adults. [https://www.who.int/en/news-room/fact-sheets/detail/physical-activity