



ISSN: 2395-7476
IJHS 2021; 7(2): 28-32
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www.homesciencejournal.com
Received: 18-03-2021
Accepted: 21-04-2021

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Effect of physical exercise and dietary pattern in males aged between 35-55 years in Mumbai

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Abstract

The purpose of this study was to determine the effect of physical exercise and dietary pattern in males. The study was conducted within the Mumbai Metropolitan city. The study group consisted of subjects between 35-55 years from the heterogeneous population. The subjects were selected through purposive convenience sampling. Sample size included in the study were 100 participants. The data was collected with the help of a well-structured online questionnaire designed for this study. Background data, Data related to dietary assessment (Food frequency questionnaire and 24 hour dietary recall of 15% of sampled data pool), physical activity and lifestyle patterns were collected for the study. Data was analyzed and results showed that a positive correlation was observed between the consumption of breakfast and the frequency of exercise performed at (p value = 0.015). There was no significant relation observed between frequency of exercise performed by the subjects and the pre workout meal (p value = 0.499). When the data was compared between the frequency of exercise and the post workout meal, it was observed that post workout meal showed a highly significant difference (p value = 0.000) as maximum number of subjects consumed post workout meal either a boiled egg, chicken salad, porridge or a smoothie. There was no significant relation between frequency of exercise and the consumption of protein supplements (p value = 0.664). Thus, the study concluded a significant difference between frequency of exercise and dietary patterns among males.

Keywords: Physical activity, dietary patterns, lifestyle patterns, post workout meal

Introduction

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Nutrition is a critical part of health and development. People with adequate nutrition are more productive and can create opportunities to gradually break the cycles of poverty and hunger. (www.who.int)

Over nutrition

Overeating refers to the consumption of an energy intake that is inappropriately large for a given energy expenditure leading to obesity. There are several environmental and cultural factors that have met in the past few decades to significantly increase the risk of both active and passive (involuntary) overeating. Among these are the increased availability and promotion of cheap energy-dense diets (usually high in fat) and the transition toward extremely sedentary lifestyles. Data showed that there is the strong interactions between diet and physical activity in relationship to the over-consumption of energy. Overeating of certain specific dietary components which includes saturated and trans-fatty acids may also lead to health risks. (Prentice, 2001) ^[6].

Optimal Nutrition/Balanced Diet

Optimal Nutrition is the condition when all the essential nutrients demands are met. This can only be achieved when a person is consuming adequate amount of essential nutrients through diet. Having a proper balanced diet helps in normal physical and mental development and improves the quality of life. (Srilaxmi, B., 2018, p.2) ^[9].

Obesity is the fastest developing public health problems due to sedentary lifestyle, unhealthy food choices and low physical activity. People need to have a balanced, healthy diet as it provides the energy and nutrients required to survive and stay healthy.

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Combining a healthy diet with an active lifestyle has huge health benefits and helps reduce the risk of major health problems such as heart disease, cancer and obesity. (Price, 2005) [7].

Physical Activity and Exercise

Physical Activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure. Some examples in which people are seen to be active are through walking, cycling, sports and recreation, and can be done at any level of skill and for enjoyment. Exercise is any bodily movement or activity which helps us to maintain our physical fitness, mental health and overall improves the quality of life. Regular physical activity helps in maintaining the body weight. The prevention of obesity, cardiovascular risk and other metabolic syndrome can be reduced by performing physical activity daily for at least an hour. (www.who.int)

Outcomes of regular and adequate levels of physical activity are as follows

Improves muscular and cardiorespiratory fitness; improves bone and functional health; reduces the risk of hypertension; coronary heart disease; stroke; diabetes; various types of cancer (including breast cancer and colon cancer); and depression; reduces the risk of falls as well as hip or vertebral fractures; and are fundamental to energy balance and weight control. (www.who.int)

Intra-abdominal obesity is an important risk factor for low-grade inflammation, which is associated with increased risk for diabetes mellitus and cardiovascular disease. In order to prevent overweight and obesity, physical activity like aerobic endurance training, resistance training, etc. is important. However, due to the metabolic consequences of reduced muscle mass, it is proven that normal ageing and decreased physical activity might lead to a higher prevalence of metabolic disorders. In a study, it was stated that resistance training may promote a negative energy balance and may change body fat distribution. Hence, it is possible that an increase in muscle mass after resistance training may be a key mediator leading to a better metabolic control. (Strasser, *et al.*, 2012) [10].

Normal muscle strength has been associated with general health benefits, increased life expectancy, psychological benefits, prevention of illness, and reduction of disability in older adults. Static flexibility programs were shown to improve joint range of motion and tolerance to stretch but did not show any reduction in musculoskeletal injury and may impair muscle performance immediately after a static stretch. Dynamic flexibility might enhance power and improve sports-specific performance. Stability training leads to improved balance and neuromuscular control, may prevent injury to the knee and ankle joints, and can be used for treatment of patients with low back pain. (Micheo, *et al.*, 2012) [5].

Running is a popular and convenient leisure-time physical activity (PA) with a significant impact on longevity. In general, runners have a 25%-40% reduced risk of premature mortality and live approximately 3 years longer than non-runners. (Lee, *et al.*, 2017) [3].

Hence, performing physical activity with consistent can improve physical fitness and health and help in the prevention of disease. Several studies have shown that physically active adults are healthier and have a higher physical fitness than inactive adults throughout different nations and populations groups. Therefore, physical activity is a part of healthy

lifestyle. (Schmidt, *et al.*, 2017) [8].

Ethical consideration

The research proposal was approved by the Institutional Ethical Committee (IEC) on 2nd October, 2020.

Methodology

Sample Size and Sample Selection

The subjects were selected on the basis of purposive convenience sampling within the Mumbai Metropolitan city. The sample size included in the study were 100 participants within the age group of 35-55 years from the heterogeneous population. The study group was focused only on middle-aged male individuals. Subjects more than 55 years or less than 35 years of age were not included in the study and those who live outside the city limits of Mumbai were also excluded from the study.

Tools used

Online consents were taken from the participants before recruiting them as subjects. The data was collected with the help of online questionnaire, food frequency questionnaire (FFQ) and 24-hour diet recall of 15% of sampled data pool.

Collection of Data

Background data and data related to medical condition and medication taken to understand life-style amongst the study group. Dietary assessment was carried out to understand dietary pattern and food intake which was taken with the help of FFQ and 24-hour diet recall of 15% of sampled data pool. Subject were asked to recall his exact food intake of previous day. The recall included day, date, time, meal, menu, amount, source of food and location of food consumed. The subjects were asked to estimate amounts of food consumed with the help of household measurements such as spoons, plate, katori/vaati, glass or cup. The household measurements were converted into standard portion sizes and raw amounts. The nutrient content that included energy, carbohydrate, protein, fats, fiber in the diet were calculated with help of IFCT (2017).

Food and Nutrition Technical Assistance (FANTA) project works with an aim to improve the health and well-being of vulnerable individuals, families and communities in developing countries by strengthening food security and nutrition policies, strategies, programs. FANTA also fosters collaboration and cooperation among all government sectors and levels to improve nutrition and food security. It works both at global and country levels. (<https://www.fhi360.org>). Food Frequency Questionnaire (FFQ) is a dietary assessment tool used to collect the dietary pattern. Subjects were asked the frequency at which they consumed food items based on a predefined food list. According to the Guidelines for Measuring Household and Individual Dietary Diversity by FANTA project, the food groups are divided into 16 groups, namely, Cereals, White roots and tubers, Vitamin A rich vegetables and tubers, Dark green leafy vegetables, Other vegetables, Vitamin A rich fruits, Other fruits, Organ meat, Flesh meat, Eggs, Fish and seafood, Legumes, Nuts and Seeds, Milk and milk products, Oils and fats, Sweets, Spices, Condiments and Beverages. (<http://www.fao.org/3/a-i1983e.pdf>).

All the subjects were asked about their physical activities through online questionnaire. The intensity, frequency and duration of physical activity were important factors. Intensity indicated how hard an individual works to do the activity.

Frequency indicated how often an individual carries out session lasts.
physical activity and duration indicated how long an activity

Results

Table 4.1: Shows the significant values and f-values for correlation between food intake and exercise

	How often do you perform exercise?	N	Mean ± SD	df	F-value	Sig.
Cereals	Daily Weekly Twice/week Thrice/week Rarely Total	100	17.12 ± 7.67 22.86 ± 7.86 10.00 ± 0.0 16.50 ± 6.97 22.85 ± 8.98 20.57 ± 8.69	4	3.252	0.015*
Dals/Legumes	Daily Weekly Twice/week Thrice/week Rarely Total	100	23.77 ± 10.89 34.93 ± 11.46 .00 22.00 ± 10.17 30.23 ± 12.66 28.14 ± 12.63	4	4.479	0.002**
Green Leafy Vegetables	Daily Weekly Twice/week Thrice/week Rarely Total	100	16.12 ± 7.74 27.33 ± 11.67 8.00 ± 0.0 21.33 ± 7.99 23.08 ± 9.83 21.31 ± 10.14	4	4.766	0.002**
Other Vegetables	Daily Weekly Twice/week Thrice/week Rarely Total	100	33.41 ± 11.23 42.93 ± 11.55 12.00 ± 0.0 38.16 ± 6.55 41.74 ± 13.23 38.83 ± 12.79	4	3.890	0.006*
Fruits	Daily Weekly Twice/week Thrice/week Rarely Total	100	31.00 ± 15.57 40.66 ± 19.39 9.00 ± 0.0 25.33 ± 9.89 42.34 ± 18.85 37.22 ± 18.43	4	3.438	0.011*
Roots/Tubers	Daily Weekly Twice/week Thrice/week Rarely Total	100	8.51 ± 5.08 12.06 ± 6.06 .000 12.66 ± 5.31 13.80 ± 6.12 11.70 ± 6.21	4	5.023	0.001**
Nuts/Oilseeds	Daily Weekly Twice/week Thrice/week Rarely Total	100	15.96 ± 11.65 29.60 ± 12.12 5.00 ± 0.0 18.66 ± 7.08 26.38 ± 13.48 22.96 ± 13.45	4	5.090	0.001**
Fats/Oils	Daily Weekly Twice/week Thrice/week Rarely Total	100	15.54 ± 9.05 18.73 ± 9.20 5.00 ± 0.0 12.66 ± 7.25 18.27 ± 8.68 17.03 ± 8.88	4	1.428	0.231
Sugars	Daily Weekly Twice/week Thrice/week Rarely Total	100	8.64 ± 3.45 10.60 ± 3.96 5.00 ± 0.0 6.83 ± 3.97 9.74 ± 3.99 9.31 ± 3.88	4	1.758	0.144
Miscellaneous foods	Daily Weekly Twice/week Thrice/week Rarely Total	100	2.64 ± 2.37 4.46 ± 2.35 2.00 ± 0.0 4.00 ± 2.19 3.87 ± 2.78 3.57 ± 2.61	4	1.756	0.144

Milk and milk products	Daily Weekly Twice/week Thrice/week Rarely Total	100	14.19 ± 6.33 18.06 ± 6.40 8.00 ± 0.0 12.50 ± 5.35 19.00 ± 9.46 16.87 ± 8.22	4	2.553	0.044*
Egg, Poultry & Animal meat	Daily Weekly Twice/week Thrice/week Rarely Total	100	5.25 ± 4.71 6.06 ± 4.86 5.00 ± 0.0 9.00 ± 3.40 6.55 ± 5.11 6.21 ± 4.86	4	0.863	0.489
Marine fish, Marine shellfish & Mollusks	Daily Weekly Twice/week Thrice/week Rarely Total	100	8.84 ± 11.80 13.07 ± 10.19 .00 20.83 ± 9.23 16.85 ± 14.63 13.87 ± 13.33	4	2.530	0.045*

The data was correlated between the frequency of exercise performed by the subjects and food intake. From the table 4.44, it was observed that roots/tubers, (p= 0.001), nuts/oilseeds (p= 0.001), dals & pulses (p=0.002), and green leafy vegetables (p= 0.002) showed a highly significant difference with the exercise performed by the subjects. Apart from this, even cereals (p= 0.015), other vegetables (p=

0.006), fruits (p= 0.011), milk & milk products (p= 0.044) and marine fish (p= 0.045) all showed a positive correlation with the frequency of exercise performed by the subjects. While other food items like sugars, fats and oils, miscellaneous foods, poultry did not have a correlation with the exercise performed by the subjects.

Table 4.2: Shows the significant and t-test values for correlation between different meals and exercise

Do you eat something post your workout?		N	Mean ± SD	t-test	df	Sig. (2-tailed)
How often do you perform exercise?	No	33	2.33 ± 1.814	3.67	98	0.000*
	Yes	67	3.67 ± 1.664			
Do you consume breakfast regularly?		N	Mean ± SD	t-test	df	Sig. (2-tailed)
How often do you perform exercise?	No	7	1.71 ± 1.496	2.48	88	0.015*
	Yes	83	3.43 ± 1.775			
Do you like to eat anything before going to bed?		N	Mean ± SD	t-test	df	Sig. (2-tailed)
How often do you perform exercise?	No	70	3.53 ± 1.775	2.57	98	0.011*
	Yes	30	2.53 ± 1.756			

The data was correlated between the frequency of exercise performed by the subjects and different meals. From the table 4.2, it was observed that post workout meal showed a highly significant difference (p value= 0.000). Of all the subjects in the study, maximum number of subjects who performed the exercise consumed post workout meal which included either a boiled egg, chicken salad, porridge or a smoothie while others did not consume post workout meal. When data was correlated between the frequency of exercise performed by the subjects and the consumption of breakfast, it was observed that the consumption of breakfast showed a significant difference (p=0.015). Of all the subjects in the study, maximum number of subjects who performed the exercise consumed breakfast daily while other did not consume

breakfast. Data when correlated between the frequency of exercise performed by the subjects and the post dinner meal, observed that consumption of bed time meal showed a significant difference (p= 0.011). Maximum subjects did not consume bed time meal while other consumed bed time meal which included a glass of milk or fruit.

Table 4.3: 24 hour dietary recall of the 15 subjects

	N	Mean ± Std. Deviation
Energy kcal	15	1766.67 ± 205.66
Carbohydrate gm	15	268.33 ± 47.34
Protein gm	15	55.20 ± 14.17
Fats gm	15	40.87 ± 6.43



Fig 4.3: 24 hour dietary recall of the 15 subjects

Figure 4.7 depicted the 24- hour dietary recall of the 15% of total sample size. The above graph represents the average daily intake of energy, carbohydrates, protein and fats. It was observed that the average intake of the total energy was found to be 1766 kcal whereas the average intake of the total carbohydrates was found to be 268.33gm. The average intake of the total protein was found to be 55.20gm whereas the average intake of the total fats was found to be 40.87gm.

Discussion

Majority of the subjects preferred non-vegetarian diet. Maximum subjects consumed three meals per day and snacks were consumed in between the meals. Choices of food items matters when it comes to snacking as it plays a significant role for a healthy lifestyle. Cereal-based snacks such as poha, upma, etc. were preferred the most which was followed by namkeen such as chivda, biscuit, wafers, etc. Physical activity and exercise have a long-term health benefits. Primarily, regular physical activity can improve the quality of life. Physical activity plays an important role in a healthy lifestyle and reduce the risk of developing several diseases. Lifestyle habits of the study group indicated that majority of subjects were occasional drinkers, moderate working hours and sufficient sleep hours.

Conclusion

The study was focused to assess the dietary patterns, physical activity and the co-relationship between physical activity and eating behavior among the subjects from Mumbai City. Other than that, lifestyle factors were also assessed. Thus, the study concluded that highly significant difference was observed between frequency of exercise and dietary patterns among males. Dietary patterns, meal consumption, snacking option and food choices can be improved with a help proper diet counseling, nutritional education programs and thus, creating an awareness regarding the impact of both diet and physical activity for a healthy lifestyle, maintaining a healthy weight and reduce the risk of chronic diseases among all the subjects.

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