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Physical fitness assessment of the selected adult men of Udaipur city

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Abstract
To control major health problems, the main focus should be on the root cause-unhealthy living habits-and not only on the treatment of the diseases which may be considered as only the symptoms. Regular participation in moderate to vigorous exercise is believed to increase life span and decrease risk for many types of chronic disease. Researchers suggest males have been underrepresented in exercise intervention studies, resulting in less understanding of their exercise practices. Therefore, the present investigation attempts 'To assess the physical fitness of selected adult men of Udaipur city', with the objectives of assessing the nutritional status of adult men, finding out the body composition of the selected adult men and assessing the physical fitness of the selected adult men through a given activity. The results revealed a clear association between the nutritional status of the subjects, their body composition and their physical performance could be seen. A majority of subjects were observed to be in the normal and healthy ranges of the various health and fitness determining aspects. The poor physical fitness index of subjects which were not able to complete the test could be associated with high WHR, high body fat percentage, high BMI. The subjects thus should be motivated towards improving and maintaining an active style of living.

Keywords: physical fitness, adult men, Udaipur city

Introduction
Humans have lived on the earth for a few million years. Most of the human existence was in small nomadic or semi-nomadic groups which sustained by hunting and gathering foods. Suffice it to say that now most of us are not living the kind of life for which our evolutionary development prepared us.

Among the arbitrary time periods, during the pre-agricultural period, humans lived by hunting and gathering. They got a lot of exercise and ate a diet high in complex carbohydrates and low in fat. The major causes of mortality were starvation and violent deaths due to accidents, natural disasters and wild animals. As the agricultural period developed, people were able to drop nomadic habits and settle in groups to grow food and raise animals. Most people were still physically active and diets also remained simple.

In the industrial period, people moved in the cities to work in factories and the infrastructure for an industrialized society was created. Extensive crowding occurred and the masses were subjected to inadequate diets, environmental pollution and an inadequate public health or medical care system. The nuclear or technological period developed rapidly in the industrialized world during the last half of the twentieth century. Labor saving devices became increasingly available as a result of the spread of electrical power and the internal combustion engine. Foods supplies became generally adequate, in many cases abundant but still inadequate in other cases. The people experienced profound and rapid changes in living conditions and factors affecting health. These factors have led to the epidemic of cardiovascular diseases, cancer diabetes and other chronic diseases which we are facing in our lives.

To control major health problems, the main focus should be on the root cause-unhealthy living habits-and not only on the treatment of the diseases which may be considered as only the symptoms. Regular participation in moderate to vigorous exercise is believed to increase life span and decrease risk for many types of chronic disease (U.S. Centers for Disease Control and Prevention [CDC], 2014).

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Wellness is an expanded idea of health. It is the optimal health and vitality, encompassing physical, emotional, intellectual, spiritual, interpersonal and social, and environmental well-being. A lifestyle based on good choices and healthy behaviors maximizes the quality of life. It helps people avoid disease, remain strong and fit and maintain their physical and mental health as long as they live. The most important behaviors and habits that contribute to wellness are being physically active, maintaining healthy body weight, having a healthy diet managing stress effectively, avoiding tobacco, alcohol and drug use and protecting the body from injury and disease.

Given the evidence through many studies that increased levels of *physical activity* are beneficial to the overall health of the community, it can be defined as 'any body movement carried out by the skeletal muscles and requiring energy'. A physically active lifestyle helps generate more energy, control the body weight, manage stress, boost the immune system, provide psychological and emotional benefits and provide protection against heart disease, diabetes, high blood pressure, depression, anxiety, osteoporosis, and some types of cancer. It also increases the physical capacity so as to be able to meet the challenges of daily life with energy and vigor.

There is consistent evidence from longitudinal observational studies that physical activity (PA) is positively associated with healthy ageing (HA), regardless of definition and measurement. Future research should focus on the implementation of a single metric of HA, on the use of objective measures for PA assessment and on a full-range of confounding adjustment. In addition, our research indicated the limited research on ageing in low-and-middle income countries (Stubbs *et. al.*, 2017) [17].

Exercise is a subset of physical activity. It is a planned, structured, repetitive movement of the body designed specifically to improve or maintain the physical fitness.

The term physical fitness is used in two closed meanings: general fitness (a state of health and wellbeing) and specific fitness (a task oriented definition based on the ability to perform specific aspects of occupation and sports). Physical fitness is the functioning of the heart, blood vessels, lungs, and muscles at optimum efficiency. In previous years, fitness was defined as the capacity to carry out the day's activities without undue fatigue. Automation increased leisure time, and changes in lifestyles following the industrial revolution meant this criterion was no longer sufficient. Optimum efficiency is the key. "*Physical fitness* is now defined as the body's ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypo-kinetic diseases, and to meet emergency situations".

The President's Council on Physical Fitness (USA) explains physical fitness as the ability to carry out the daily tasks with vigor, alertness, without undue fatigue and with ample energy to meet unforeseen emergencies.

Cardio-respiratory endurance is a major component of physical fitness and can be defined as the ability of the body to perform prolonged, large muscle, dynamic exercise at moderate to high levels of intensity. Cardio-respiratory fitness is determined by both age and heredity factors, but individual variation in the response to a physical activity also influences the individual fitness. Cardiovascular endurance is the most important aspect of total physical fitness program. It helps the heart, lungs and the circulatory system to perform more efficiently. It also improves the aerobic capacity of the body thus leading to an improved supply of oxygen to the muscles which need oxygen to sustain intense activity.

With the increase physical activity capacity, the maximum heart rate level also increases. The *Heart rate* is a measure of the number of heart beats per minute (bpm). The average resting heart rate is 70 bpm, varying significantly between individuals based on fitness, age and genetics. The *Maximum heart rate* (HR_{max}) is the highest number of times your heart can contract in one minute. It is used as a base number to calculate target heart rate for exercise.

In all types of work, it is important to ensure acceptable adjustment between person and work, in order to promote health and safety and to improve the quality of work and performance. To achieve the goal, it requires knowledge of individual's capabilities and limitations from the physical, physiological point of view and in this respect; the job-demand- fitness compatibility is an important consideration. In order to ensure health and safety of people at work, demand and fitness should match. It is known that every individual has certain potential work capacity known as aerobic work capacity, a fraction of which is utilized while performing a given task. Thus it is essential to assess the status of physical fitness of an individual. The knowledge about the present status can also help in providing a fitness program in order to improve or maintain the desired fitness state of the body.

Effective exercise interventions are needed to improve quality of life and decrease the impact of chronic disease. Researchers suggest males have been underrepresented in exercise intervention studies, resulting in less understanding of their exercise practices. Findings from preference survey methods suggest reasonable association between preference and behavior (Chatfield *et al.*, 2018) [15].

Therefore, the present investigation attempts 'To assess the physical fitness of selected adult men of Udaipur city', with the following objectives:

- To assess the nutritional status of adult men.
- To find out the body composition of the selected adult men.
- To assess the physical fitness of the selected adult men through a given activity.

Methodology
The present investigation was undertaken "To assess the physical fitness of selected adult men Udaipur." The method followed in the study included the following:

Selection of sample & size of sample: For assessing the fitness of adult men, the non-teaching male members of an institution were selected for the study. The selection of sample was done according to systematic sampling design. A source list of all the non-teaching male staff members of the institution was procured and all were invited for the physical fitness test. A total of 40 subjects participated for the assessment. Thus, the final sample size for the study was considered as 40.

Development of tool: A performa was developed to record the data obtained from the subjects.

Collection of data: The data was collected by face-to-face interview and physical appraisal performed in a laboratory setup. The subjects were interviewed about their general information regarding the educational status, occupation other than college service and food habits. Also specific information related to prevalence of any chronic disease and its duration, and type and frequency of exercise performed

regularly was recorded.

The height was measured using the height measuring tape against a straight wall. Waist and hip measurements were taken using a flexible and non-stretchable measuring tape.

The TANITA Body Composition Analyzer was used for assessing the body composition of the subjects. It utilizes 'foot-to-foot' BIA technology to make measurements and uses 8 electrodes to show the body mass readings.

Physical fitness was assessed by a 3-minute Cycle-run test. The subjects were sitting in upright and comfortable position, with loose clothing for recording of the resting heart rate with the POLAR Heart Rate Monitor. The physical test was performed by the subjects for 3 minutes at the 3rd level of inclination. The speed of running the cycle was maintained at 20km/hr. The subjects were encouraged to complete the test. The peak heart rate during the activity and 3 minutes recovery heart rates after the completion of activity were recorded.

Analysis of data: The collected data was tabulated and classified. The Waist Circumference was classified according to the guidelines provided by the American College of Sports Medicine; Waist-Hip Ratio according to the YMCA standards; BMI as per the standards provided by NIN, Hyderabad and the Body Fat Percent according to the NIH/WHO Guidelines.

The fitness profile was calculated using the following formula:

Average Recovery Rate = 3 min. recovery pulse count / 3

The result obtained was classified as per the fitness index chart given by *Anderson & Johnson* in the Physical Fitness Digest.

The mean value of fitness activity (VO2 max) was also calculated and classified for Physical Fitness index using the following formula:

Males: VO2 max (ml/kg/min) = 111.33 - (0.42 × recovery heart rate)

The data was analyzed statistically in terms of Simple Arithmetic Mean, Percentage and Standard Deviation.

Results

General information: The subjects selected were classified for their educational status and it was seen that 37.5% subjects were graduates, 25% had completed their middle-school certificate, 20% completed only primary-school certificate, 7.5 had studied the intermediate and high school certificate and only 2.5 subjects were illiterate (Table 1).

Physical characteristics: The physical characteristics, influencing the nutritional status of subjects, depicted that the age ranged from 20-60 years and the average age of the selected men was 44.85 years (±10.99) (Table 2).

The waist circumference was ranging from 63-112cm and average measured as 87.30cm (±10.56) which indicates that most of the subjects came under the low risk category. The hip circumference ranged from 82-114cm and mean was 95.10cm (±7.32) (Table 2).

The WHR of the subjects was ranging from 0.74-1.03 (Table 2) and mean was recorded as 0.92 (±0.06) which shows that the subjects came under the average category of risk for developing chronic diseases, being slightly above the no-risk or normal category.

The average men measured a body height of 167.78cm (±5.45) and a weight of 62.56kg (±10.36) (Table 2) which

come under the normal category as proposed by the ICMR for Indian adult men.

The BMI of average men was 22.09 (±3.41) and the recordings ranged from 16.4-32.3 (Table 2). Subjects when classified into categories according to the NIN standards showed that 50% of the males were under the normal category and 25% in the low weight normal category (Table 3). 7.5% of the subjects came under CED Grade I and 12.5% came under the Obese Grade I category.

These findings depicted that the group selected was a homogenous group with maximum of the subjects being nutritionally fit.

Body composition: Classification of subjects into categories showed that 40% of the total subjects were healthy, 27.5% were under fat and overweight and only 5% were obese (Table4). The Body Fat Percentage of the selected subjects varied widely from 1.6-28.8. The average Body Fat % was recorded as 16.44(±7.99) (Table 5),

Table 4 depicts that the Body Fat Percentage of the subjects came under the healthy category for the average age of 44.85yrs. The mean body fat mass of the selected adult men was recorded as 10.80kg (±6.39) and its range for the 40 subjects was 0.7-25.6 (Table 5). The fat free mass and total body water were recorded as 51.77(±6.53) and 37.90 (±4.79) (Table 5).

Table 1: Educational Status of selected subjects

Education Status	Score	No. of Subjects	Percentage (%)
Profession/ Honors	6	-	-
Graduate/ Post Graduate	5	15	37.5
Intermediate/ Post-high-school	4	3	7.5
High-school Certificate	3	3	7.5
Middle-school Certificate	2	10	25
Primary-school/ Literate	1	8	20
Illiterate	0	1	2.5
Total		40	100

Table 2: Physical Characteristics of subjects

Variables	Mean	± S.D.	Range (n=40)
Age (yrs)	44.85	10.99	20-60
Waist Circumference (cm)	87.30	10.56	63-112
Hip Circumference (cm)	95.10	7.32	82-114
Waist-Hip Ratio (WHR)	0.92	0.06	0.74-1.03
Height (cm)	167.78	5.45	157-181
Weight (Kg)	62.56	10.36	46.3-89
BMI	22.09	3.41	16.4-32.3

Table 3: Body Mass Index classification of the subjects

Category	No. of Subjects	Percentage (%)
Grade III CED	-	-
Grade II CED	1	2.5
Grade I CED	3	7.5
Low Weight Normal	10	25
Normal	20	50
Obese Grade I	5	12.5
Obese Grade II	1	2.5
Total	40	100

Table 4: Body fat per cent of the subjects

Category	No. of Subjects	Percentage (%)
Under fat	11	27.5
Healthy	16	40
Overweight	11	27.5
Obese	2	5
Total	40	100

Table 5: Body Composition of the subjects

Variables	Mean	± S.D.	Range (n=40)
Body Fat %	16.44	7.99	1.6-28.8
Body Fat Mass (Kg)	10.80	6.39	0.7-25.6
FFM (Kg)	51.77	6.53	39.2-68
TBW (Kg)	37.90	4.79	28.7-49.8

Assessment of Physical Fitness: Assessment of physical fitness based on the 3-minute cycle run test revealed the fitness status of the selected men. The mean speed of running the cycle by the subjects was 19.35km/hr (±0.92) with an average distance covered of 0.90km (±0.21) in an average time of 166.38sec (±37.04) (Table 6).

The fitness profile of the subjects showed a mean resting heart rate value of 85.7 (±15.81), mean peak heart rate value during activity of 144.7 (±17.09) and mean recovery heart rate value after activity of 113.03 (±20.91) (Table 7).

About 75% (30) of the subjects could be classified as having excellent fitness with fitness index of 105.42 (±16.33) (Table 7&8). 10% (4) of the subjects were found to be having very good fitness index while 15% (6) of the subjects were classified for having poor fitness as they could not complete the test (Table 8).

The mean value of physical work capacity (VO2 max) was calculated to be 63.86ml/kg/min which can be classified as having superior fitness levels.

Table 6: Activity Data Sheet

Variables	Mean	± S.D.	Range (n=40)
Speed (km/hr)	19.35	0.92	16.3-20.6
Distance (km)	0.90	0.21	0.17-1.03
Time (sec)	166.38	37.04	30-180

Table 7: Mean Heart Rate counts obtained for physical fitness and fitness index

Variables	Mean	± S.D.
Resting HR (bpm)	85.7	15.81
Peak HR (bpm)	144.7	17.09
Recovery HR (bpm)	113.03	20.91
Fitness Index	105.42	16.33

Table 8: Fitness Profile of the subjects

Category	No. of Subjects	Percentage (%)
Poor	6	15
Average	-	-
Good	-	-
Very Good	4	10
Excellent	30	75
Total	40	100

Conclusion

From the above findings in this study, it can be inferred that most of the selected male members (non-teaching staff) of the institution were having good nutritional status, were able to maintain a desired body composition and were having a very good and excellent physical fitness. It can be said that the subjects are able to meet their job-demand without much fatigue and extra stress.

A clear association between the nutritional status of the subjects, their body composition and their physical performance could be seen. A majority of subjects were observed to be in the normal and healthy ranges of the various health and fitness determining aspects which can be attributed to regular physical activities like farming, participation in sports and active working style.

The poor physical fitness index of subjects which were not able to complete the test could be associated with high WHR, high body fat percentage, high BMI. The poor fitness may also be due to a sedentary lifestyle and more of sitting jobs with limited activity. The subjects thus should be motivated towards improving and maintaining an active style of living. This can be done by providing guidelines and person specific fitness programs.

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