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# Assessment of the Health-Related Fitness among Healthcare Professionals

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## Abstract

**Background:** Physical inactivity's prevalence is alarming increasing worldwide leading to various non-communicable diseases. Studies highlight disparities in activity levels among people with occupational variations. Addressing fitness is essential for mitigating occupational health issues and enhancing overall productivity among medical professionals.

**Methods:** This descriptive cross-sectional study was conducted in multiple tertiary care facilities. A total of 78 participants were recruited using the non-probability convenience sampling technique. Participants performed four different assessments in the following order: (i) BMI by weight and height measurements (ii) Cardiorespiratory endurance by 3 minutes step-test (iii) Muscular endurance by abdominal curl up and (iv) Flexibility by shoulder scratch test and sit and reach test, the session lasted for approximately 20 minutes, with 3 minutes of resting period between exercises. The analysis was performed using SPSS V.21.

**Results:** The results show an average age of 28 years for the participants. The mean Basal Metabolic Rate (BMR) was 1375.98 kcal. The Dietary Calorie Restriction (DCR) was 1907.32 kcal. (RAPA) shows that 34% of n=78 is mildly active which results in very good muscular endurance of 29.5% and excellent $VO_2$ Max of 59%. Flexibility was excellent with 40-48%.

**Conclusion:** The study reveals notable physical fitness among healthcare professionals, highlighting positive outcomes in key parameters such as BMR, DCR, muscular endurance, flexibility, and $VO_2$ max.

***Keywords***

*Basal Metabolism, Body Composition, Comorbidity, Exercise, Physical Activity.*

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## Introduction

Physical fitness (PF) is a significant predictor of health and a powerful indicator of health-related outcomes[1]. It is "a set of qualities that an individual has or achieves that relates to their ability to perform physical activity," according to the American College of Sports Medicine (ACSM)[2]. The worldwide burden related to physical inactivity is significant. A 2018 report gathered data from 358 surveys over 168 countries, resulting in an estimated sample size of 1.9 million. The findings showed a 27.5% prevalence rate of physical inactivity worldwide. They hypothesized that the global physical activity objective for 2025, a 10% absolute decline in inadequate activity levels, wouldn't be fulfilled if the same trend persisted[3]. Physical inactivity has been the leading cause of fatalities, up to 69% worldwide. Lack of physical activity is associated with non-communicable diseases, which vary from 1.6% for hypertension (HTN) to 8.1% for Alzheimer's disease[4]. The level of physical activity decreases as age advances, as reported in a study in which the prevalence of physical activity level was assessed among teenagers (n=520,533) from 105 low, middle and high-income countries. It showed a decrease in percentage from 28.2% (in early childhood) to 21.2% (in teenage)[5].

A systematic review was published in 2022 that showed the prevalence of inactivity in diverse South Asian countries, including India (18.5%-88.4%), Pakistan (60.1%), and Sri Lanka (11.0%-31.8%). Additionally, this study revealed that leisure-related inactivity in these regions was greater than 75%, and persons were more physically engaged in the transit region compared to the other regions[6]. Furthermore, a survey among adolescents found that 14.52% of the population had an obese and overweight BMI, and the proportion of obese girls was higher than that of obese boys. As a result, it was shown that boys were generally more dominating in strength, cardiovascular fitness, and endurance, but females had stronger core muscles than males.

As we reflect on the epidemiology of physical inactivity, it becomes imperative to pivot our focus towards the pivotal role that regular physical activity plays in safeguarding the health and well-being of healthcare professionals. In the dynamic healthcare environment, where patient welfare is the primary concern, focusing on the healthcare providers' health is critical. Healthcare professionals' capacity to provide the best treatment possible, manage difficult work conditions, and maintain a demanding career all depend critically on their physical and mental fitness levels[7]. These professionals constitute the backbone of the healthcare system and are frequently involved in demanding tasks, long hours, and high-stakes decision-making; therefore, evaluating their level of health-related fitness is a vital undertaking[8].

The modern healthcare setting is the complex interaction between several elements that affect healthcare workers' general well-being and physical condition. Their well-being may be at risk due to the demanding nature of their jobs and the rising incidence of sedentary work habits. Understanding the importance of health-related fitness in this setting becomes critical not only for the professionals but also for improving patient outcomes and the overall effectiveness of healthcare delivery[9]. Exercise is one external factor that influences the primarily inherited degree of physical fitness. A high PF is thought to reduce the risk of Musculoskeletal Disease (MSD) [10].

The prevalence of physical inactivity around the world presents a clear image of a severe public health issue with consequences for non-communicable illnesses and general health[11]. Examining the concerning data, we can see that tackling the problem of physical inactivity is essential to reducing the related health hazards. This insight becomes more critical when we focus on healthcare providers and the backbone of the healthcare system and recognize how important it is to their overall health to provide the best possible care for their patients. Evaluating healthcare professionals' health-related fitness becomes necessary in the dynamic healthcare environment to improve their well-being and as a calculated move to strengthen their efficacy and resilience.

## Methodology

### *Study Design and Setting*

This is a descriptive cross-sectional study conducted in different tertiary care setups in Karachi.

### *Target Population*

Health care professionals including doctors, nurses, physiotherapists, and occupational therapists.

### *Sample Selection Criteria:*

- ***Inclusion Criteria***
  - All healthcare professional.
  - Age 23 years to 65 years.

- ***Exclusion Criteria***
  - Patient with musculoskeletal diseases.
  - Patient with neurological conditions.
  - Unhealed fracture.

### *Data Collection Procedure*

Seventy-nine participants were recruited via the convenience method of the non-probability-sampling technique. This cross-sectional study involved healthcare professionals from tertiary care hospitals. The participants were informed in detail about the survey and ensured that their

records would be kept confidential. Afterwards, informed consent was obtained from all participants before data collection.

All participants voluntarily attended a testing session that lasted approximately 20 minutes at the gym of their respective setup. The participants performed warm-up and cool-down exercises for 10 minutes before and after the assessment. A minimum of 3 minutes rest was provided between tests. All four researchers are physiotherapists who were hired to collect the data from different setups in Karachi, and every part of the information was gathered by the researcher (physiotherapist) to avoid mistakes.

Each participant performed four different assessments in the following order: (i) BMI by weight and height measurement, (ii) cardiorespiratory endurance by step test, (iii) muscular endurance by curl up, (iv) flexibility by shoulder scratch test and finger reach test.

The details of the tests are given below:

- ***Body Composition***
  Participants' height and weight were measured and recorded on the stadiometer while standing straight without shoes. The BMI was calculated as weight/height (kg/m2) according to the Asian scale of BMI values were generally divided into four groups based on the Asian scale underweight for BMI < 18.5(kg/m2), normal for BMI = 18.5 to 24.9(kg/m2) or overweight/obese for BMI > 25 to 29.9(kg/m2), for obese I > 30 to 34.9 for grade II obese >35 to 39.9 and for grade IV > 40 (kg/m2)[12].

- ***Cardiorespiratory Endurance by Step Test***
  Cardiorespiratory fitness was measured using a three-minute step test (about 12 inches in height). In this test, participants were asked to repeat the movement up-up-down-down for three minutes while listening to a metronome (96 beats per minute). The test outcome was the heart recovery rate (HRR) between five and twenty seconds after the end of the step test[13].

- ***Muscular Endurance***
  Muscular endurance was assessed by curl-up test. For the curl-up test, individuals were instructed to repeat the curl-up exercise at their own pace with no rest until fatigued. The investigator then noted the total number of test repeats14.

- ***Flexibility Test***
  - **Upper Limb:** Upper limb flexibility was assessed using the shoulder scratch test. Participants were asked to reach their right shoulder and down their back while also placing their left hand behind their back and attempting to contact the right hand's fingers. The scoring is recorded as either YES or NO, for each side
  - **Lower Limb:** lower limb flexibility was assessed by using the sit and reach test box. Each person sat on the test device barefoot and gradually reached forward as far as they could with their knees stretched.

-For scoring < 20 consider poor.
-30 to 40 considered fair.
-50 to 60 is considered the average.
-70 to 80 is good.
-Greater than 90 is considered excellent.

The test was recorded twice, with the better score being kept[14].

- ***Level of Physical Activity***
  A Rapid Assessment of Physical Activity (RAPA) questionnaire was introduced to check the physical activity level of individuals[15]. Other nutritional status checks by BMR and DCR in kcal.

## *Data Analysis Strategies*

The Statistical Package for Social Sciences version 21 (SPSS V.21) was used to analyze the data. The mean and standard deviation (Mean SD) of all continuous data like age, height and weight BMI, BMR, DCR were reported using descriptive statistical analysis, while categorical data like gender were reported using percentages (%). The risk factors were subjected to univariate analysis with 95 percent confidence intervals. P-values of 0.05 or less are considered significant.

## Results

A total of 78 participants were recruited in this study, out of which 61 were female and 17 were male. All participants (n= 78) completed the study. Among 78 individuals the mean age was 28 years with 3.99 SD. The BMI interpretation is shown in the figure 1. The mean Of Basal Metabolic Rate (BMR) was 1375.98 kcal with 243.45 SD and the mean of Dietary Calorie Restriction (DCR) was 1907.3216 ±379.60.

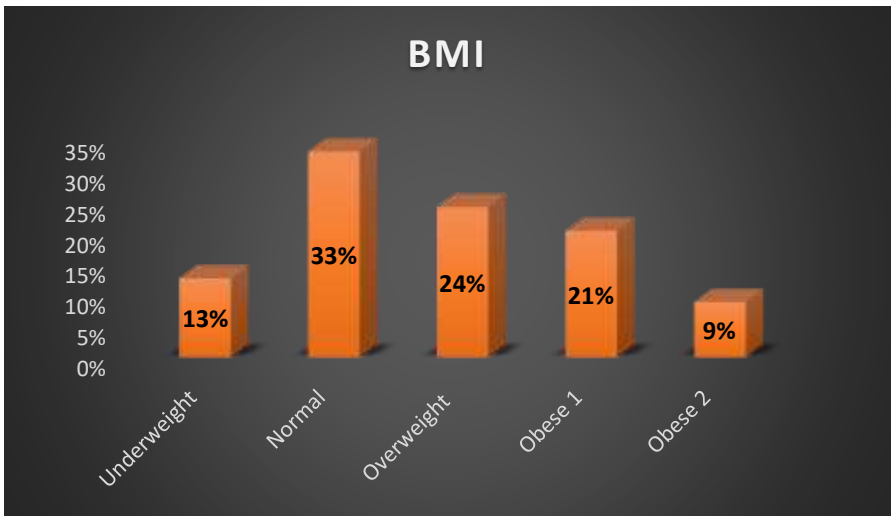


***Figure-1 BMI of the Participants***

Figure-2 illustrate the comorbidity of the participants included in the study which shows that 68% have no comorbidity, 4% hypertension, 1% diabetes, 1% cardiovascular disease, and 26% have other comorbidities.

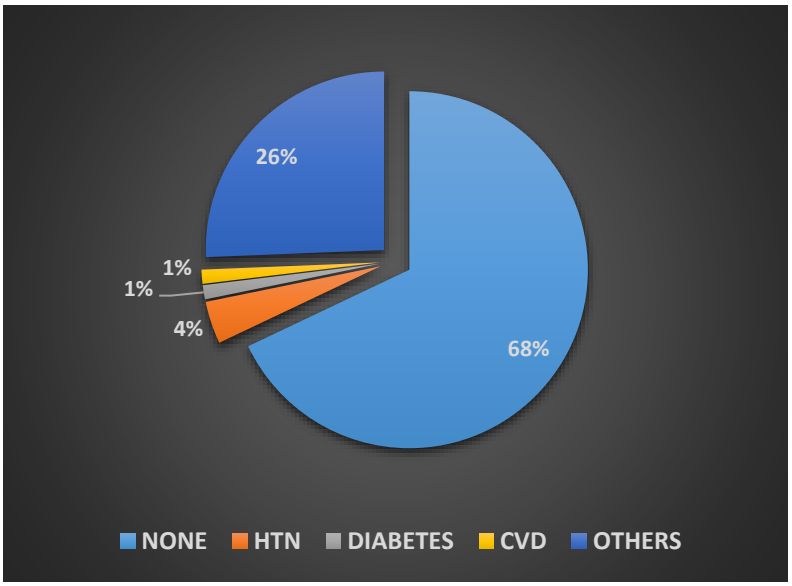


***Figure-2 Different Co-morbidities of participants***

The Figure-3 illustrates a Rapid Assessment of the Physical Activity Level (RAPA) of the participants included in the study which shows that 34% are lightly active, 22% are underactive, 10% are sedentary, 6% are moderately active, 4% are active and 2% are vigorous active.

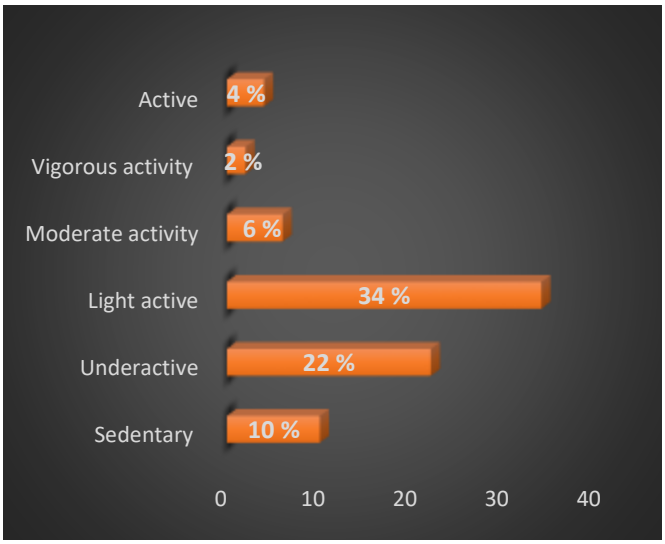


***Figure-3 Physical Activity Level of Participants***

The Figure-4 illustrates muscular endurance by curl up of the participants included in the study which shows that 29.5% are very good, 28.2% are good, 26.9% are excellent, 11.5% are fair, and 3.8% need improvement.

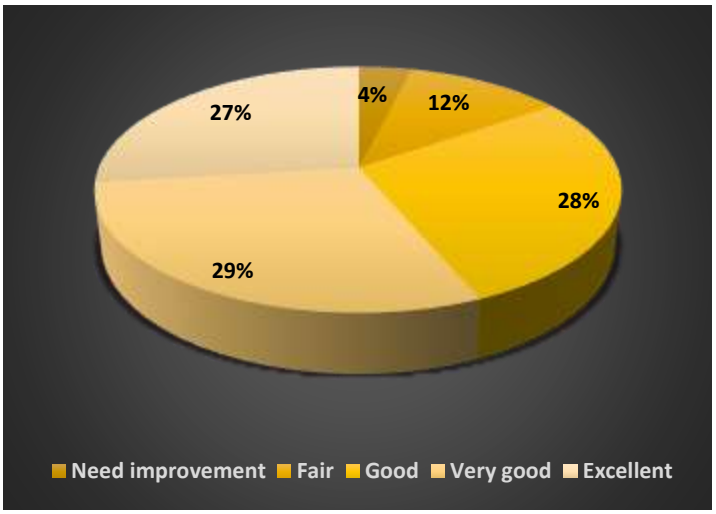


***Figure-4 Muscular Endurance of Participants***

The Table-1 illustrate flexibility of participant (n=78) which are divided into two groups. The Group-A (n=45) perform Sit and reach test which shows that 40% excellent,4.4% average,2.2% good, 6.7% fair and 46.7% poor. The Group-B (n=32) perform the Finger Touch test due to limitation of equipment during data collection which shows 48.9% yes and 22.2% no.

**Table-1 shows the flexibility of upper and lower limb**

| Variable | Grades | Frequency (%) |
|---|---|---|
| **Flexibility (Sit and reach)** | Poor | 21(46.7%) |
| | Fair | 3(6.7%) |
| | Average | 2(4.4%) |
| | Good | 1(2.2%) |
| | Excellent | 18(40%) |
| **Flexibility (Finger Touch)** | Yes | 22 (48.9%) |
| | No | 10(22.2%) |

Figure-5 illustrates VO2 Max of the participants calculated by the Step test, which shows that 59% are excellent, 32% are good, 7.7 % average and 1.3% are fair.

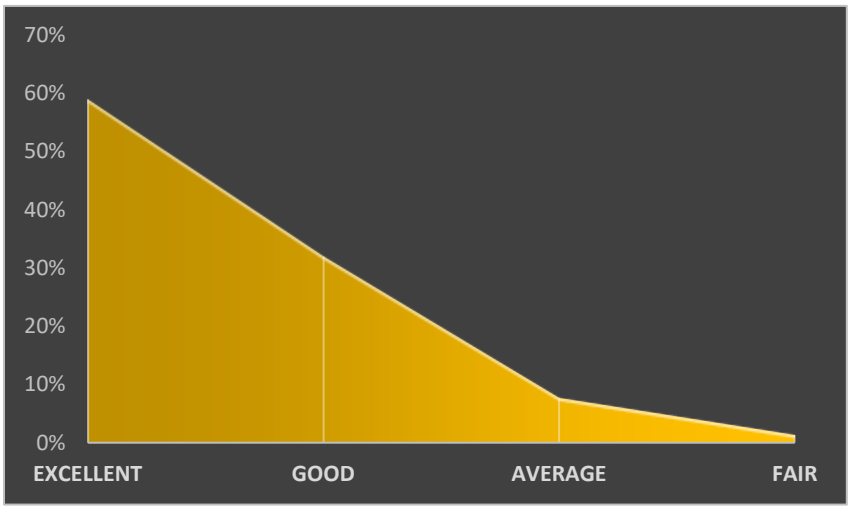


***Figure-5 $VO_2$ Max of Participants***

## Discussion

The findings of the study showed that the various aspects of participants' health and fitness. The results depict an overall good health related fitness among health care professionals. The reason for this might be majority of the participants belong to physical therapy with an environment that continuously promote fitness and the facilities promoting physical activity level. The findings were consistent with the findings of another study conducted in 2022 by jagdishchandra et al assessing the cardio-respiratory fitness in physiotherapy students. The results revealed that male participants had an average to good level of health related fitness[16]. In a similar study the cardio-respiratory fitness of physiotherapy students was identified which revealed an average level of cardio fitness among participants[17]. In a study conducted by Kyle et al to identify obesity prevalence among health care professionals in England on 20,103 participants revealed a high prevalence of obesity in all categories of professionals with unregistered care workers having the highest rate at 31.9%. The adjusted odds ratios showed that unregistered care workers had higher risks (aOR 1.46) of obesity than did other healthcare professionals, with nurses having significantly lower odds (aOR 0.52)[18].

The limitations of this study are the unavailability of the same measuring tools at all locations which can be the reason for biases, also the results were not generalizable because of the diverse sample of healthcare professionals and they were not grouped equally as per the profession. Further investigations are required to corroborate on a larger scale to provide more authenticity. However, our results influence researchers for future investigation by providing useful

information. There is good evidence in the literature showing that the physicians' own PA practice influences their clinical attitudes and counseling practice towards PA, which is another important reason to promote PA among physicians.

## Conclusion

The findings of this study show significant results of physical fitness among healthcare professionals with encouraging results in key fitness parameters like BMR and DCR. This level of physical fitness corresponds to positive outcomes, including very good muscular endurance, excellent flexibility, and an excellent VO2 Max. This study's approach provided a valuable framework for measuring and monitoring improvements in fitness over time, not only as an indicator for present fitness but also aid in identifying individuals at low risk of physical fitness-related health issues.

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None.

***Conflict of Interest***
None.

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None.

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**AUTHORS' CONTRIBUTION**

The following authors have made substantial contributions to the manuscript as under:

**Conception or Design:** Jalil S, Rehman A, Fayaz K

**Acquisition, Analysis or Interpretation of Data:** Jalil S, Bashir T, Bukhari H, Fayaz K, Sarfaraz A

**Manuscript Writing & Approval:** Jalil S, Bashir T, Rehman A, Bukhari H, Fayaz K, Sarfaraz A

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.