JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

ASSESSMENT OF PHYSICAL ACTIVITY IN DOCTORS WORKING IN JAIPUR

[1]Mitul Purohit, [2]Kanika Varma

[1]Research Scholar, [2]Professsor
[1]P.G. Department of Home Science,
[1]University of Rajasthan, Jaipur, India

Abstract : This study was conducted to assess the physical activity of female and male doctors of Jaipur by using Global Physical Activity Questionnaire (GPAQ). Sample collection was done using two phase sampling process considering a total of 60 doctors, thirty in each category, based on gender-males and females. GPAQ data was calculated in Metabolic Equivalents (METs). Mean and percentages were calculated. The results revealed that the mean METs of total physical activity (PA) in a week was found to be 1310.0 and 762.4 respectively for male and female doctors. Doctors enganging in <600 MET minutes of PA in a week were more females than males. Almost double the number of female doctors in comparison to the male doctors were performing no activity. Obesity was found in more than 50% of the subjects. Abdominal obesity was found in more than 60% female doctors and more than 40% male doctors. Thus, it can be concluded that due to the hectic life style of the doctors their physical activity is taking a back seat. Lack of physical activity is one of the leading causes of NCDs. Therefore, there is an urgent need of identifying health risk indicators in doctors so that a remedial action plan can be instituted.

IndexTerms – Non-communicable diseases, Physical Inactivity, Doctors, Obesity

I. INTRODUCTION

World Health Organization (WHO) states that physical inactivity is one among top ten health risk factors that even lead up to death in the global scenario. Worldwide, one in four adults is not adequately active (2018). Annually, 1.6 million deaths are attributed to no or inadequate physical activity (WHO, 2018). Additionally, physical inactivity is likely to be one of the main causes for cancers, fractures, diabetes, heart disease burden and obesity (WHO, 2015). Strong evidence suggests that due to inadequate physical activity there is a risk of many serious health ailments which majorly includes non-communicable diseases (NCDs). Due to a large portion of the world population being physically inactive, the situation has changed into a key public health problem (Lee et al, 2012). Due to technological advancement, machines are being used for most jobs, leading to lack or no physical activity. This in turn has become a leading cause in the steep rise of NCDs. Thus, we can say that NCDs are the causative result due to changes brought upon by urbanization and technological advancement in the diet and physical inactivity patterns (WHO, 2013). India is succumbing to NCDs at an alarming rate, with 63% deaths attributable solely to NCDs (WHO, 2017). In a report by WHO (2018), in 2016 , 33% Indians (aged 18+ years) were found to be physically inactive out of which 24% were males and 43% were females. Insufficiently active people have an increased risk of 20% to 30% of all-cause mortality in comparison to those people who perform physical activity every week for at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity. Consistent physical activity helps in the reduction of disease risk of heart, cancers and diabetes. It also lowers the risk of depression, heart stroke and hypertension. Also, physical activity is crucial in determining expenditure of energy and hence, is essential in weight maintenance. WHO has included physical activity as one of the Sustainable Development Goals-2030 which calls for an increment of 10% in physical activity globally (WHO, 2018).

In India, doctors are at the pinnacle of the health care system. They are overburdened with work due to patient load, busy schedules and unpredictable working hours. This leads to insufficient time to indulge in physical activities and therefore they are susceptible to sedentary lifestyle despite being well-informed and having good socio-economic status. Despite having better health habits than the general population, doctors are found to have a high incidence of obesity and overweightness (Kumar et al, 2017).

II. AIMS AND OBJECTIVES

The aim of the study was to assess physical activity in female and male doctors working in hospitals of Jaipur by using GPAQ.

III. METHODOLOGY

The study was conducted in Jaipur city on a sample size of 60 doctors. Two phase sample selection was used in which one government and one private hospital, more than 200 bedded, were randomly selected. From the obtained list of doctors proportional allocation was done to include 30 doctors from government hospital and 30 doctors from private hospital. The study subjects with age group 30-60 years were selected from various departments of the hospitals. Written consent was taken from each participant of the study prior to the data collection. Pregnant, lactating female doctors and non- responsive doctors were excluded from the study. Ethical approval was obtained by the Ethics Committee of the Department of Home Science, University of Rajasthan, Jaipur.

General information of the subjects related to their age, gender and employment status were noted. GPAQ was used to calculate the physical activity status of the doctors. It comprised of 16 questions grouped under three domains-work, travel and recreational activities. Two sub-domains, vigorous and moderate intensity activities, were incorporated under work and recreational activity domains which consisted of questions regarding the time spent (in hours and minutes) in doing the activity for the number of days in a week. In the travel domain, the number of days in a week and time spent in walking or cycling was assessed. Time spent in sedentary activities which included sitting or reclining was also covered. Metabolic Equivalents (METs) was used for analysis of GPAQ data suggested by GPAQ analysis guide (2017) which describes, one MET to be equal to the ratio of metabolic rate of a person who is at work relative to the metabolic rate of a person at rest. It is considered as the cost of energy expenditure of a person seated quietly which is measured to be equal to 1 kcal/kg/hour of consumption of calories. It is estimated in the analysis guide that a moderately active person has four times caloric consumption as compared to a quietly sitting person and eight times of a vigorously active person. Four METs were assigned for the time spent in moderate intensity activities, eight METs for the time spent in vigorous intensity activities and four METs for the time spent in walking/cycling. MET score less than 600 was considered as insufficiently active or physically inactive. Further, moderate intensity activity of minimum 150 minutes in a week or vigorous intensity activity of minimum 75 minutes in a week or more than equal to 600 MET minutes in a week was taken to be physically active. A question on sedentary behavior is also included which records the minutes a person spends in sitting/reclining in a day.

Body weight was measured with the help of calibrated Omron bathroom weighing scale. Height, hip circumference and waist circumference were measured by a non-stretchable tape. Body mass index (BMI) and Waist-Hip ratio (WHR) were calculated. The collected data was tabulated, summarized and analysed in Microsoft excel-2016. MET score of each category was calculated. Mean, standard error of the mean (SEM) and percentages were also found out. BMI was assessed by using WHO classification for BMI (WHO/IASO/IOTF, 2000; WHO, 2004) and WHR was interpreted as per the standard cut off, that is, >0.90 for men and >0.85 for women (WHO, 2000). Test of significance (t-test) was applied to assess the significant difference between the mean of values in both the genders. Co-relation between sedentary behavior and BMI as well as WHR and physical inactivity were calculated with the help of SPSS 24 for Windows 10.

IV. RESULTS

A total of 60 doctors, 30 (50%) males and 30 (50%) females participated in this study where 18 male doctors and 20 female doctors were from the government hospital and rest were from the private hospital. Doctors were from 30-60 years age group with mean age 46±7.8 irrespective of the gender. Body mass index (BMI) and Waist Hip Ratio (WHR) were also calculated to know the body adiposity and central adiposity classification in doctors.

Table 1, depicts the physical activity in three domains and their sub-domains. The total mean MET minutes spent in a week on PA for females (762) was found to be almost half in comparison to that of male doctors (1310). The mean MET minutes per week spent on travelling was found to be more in men than women. Similar pattern was seen in physical activity at work. The time spent in recreational activities did not have much difference between both the genders as both were expending more than 300 mean minutes doing moderate intensity PA whereas females were spending 209.3±38.2 and males 298.7±119.3 mean MET minutes per week in vigorous intensity physical activity.

Table 1. Physical activity in mean metabolic equivalent (MET) minutes per week of government and private hospital doctors

Physical Activity		Metabolic Equivalent (MET) minutes per week (Mean)[a]		
Domain	**Sub Domain**	**Male Doctors (N=30)**	**Female Doctors (N=30)**	**t-Test[b]**
Activity at Work	Vigorous Intensity Activity	264±180.2	0±0	0.15
	Moderate Intensity Activity	193.3±120.3	121.1±22.1	0.58
Travel to and from Places		218.7±54	130±23.7	0.20
Recreational Activity	Vigorous Intensity Activity	298.7±119.3	209.3±38.2	0.57
	Moderate Intensity Activity	335.3±81.2	302±55.1	0.77
Total Physical Activity		1310±297.9	762.4±139.2	0.13

[a]Mean ±Standard error of the mean (SEM); [b] p>0.05 (not significant)

Almost double the number of female doctors, to that of male doctors, fall in the category of not meeting the WHO recommendations of PA, that is, less than 600 MET minutes/week. **Fig.1,** shows the comparison between the pan-India study using GPAQ conducted by NNMS (National Noncommunicable disease Monitoring Survey) and our study results. Ramamoorthy, Kulothungan, and Mathur (2022) found in the survey result that 31% males and 52.5% females were physically inactive. In comparison to the general population, our study findings suggest similar results that women (66.7%; 20 doctors) are more insufficiently active than men (33.3%;10 doctors) though both genders are found to be more physically inactive than the general population. Major reason could be that the work load on doctors leave them with less time to exercise and women doctors lagging further behind could be because of the double burden of family and work.

Table 2 shows, percentage of doctors doing no physical activity (i.e. 0 MET minutes per week) was found in 33.3% female doctors and 16.7% male doctors. This table depicts percentage of no physical activity done by both the genders spending 0 MET minutes per week in all the three domains. No vigorous intensity activity at work was performed by 100% of the female doctors and 85% male doctors. It can be observed from the above table that more than 70% of doctors are expending 0 Met minutes in a week at work. While travelling (to and from places) more females (66.7%) were physically inactive in comparison to males (53.3%) as they mentioned being tired from the day's work and relaxed during travel by using vehicles. Also, the hurry to reach was more as many instances were cited when the patient was serious or an emergency case came up. In recreational activities, only 40% male doctors were not moderately active even though in comparison more than half of the female doctors spent 0 MET minutes/ week. But, vigorous activity was not performed by more than 70% doctors in a week.

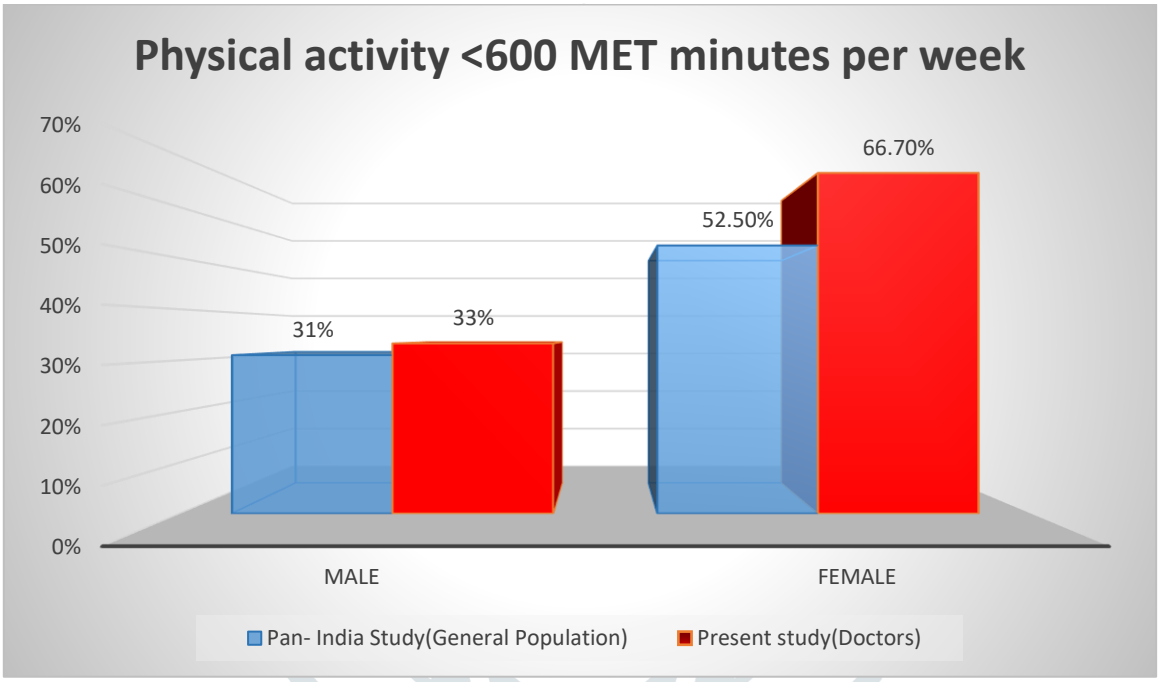

Figure 1. Comparison between percentage of males and females doing less than 600 MET minutes of physical activity in pan-India study (Ramamoorthy, Kulothungan, and Mathur,2022) and present study

Table 2. Percentage of doctors with no physical activity

Physical Activity		Male Doctors (n = 30)	Female Doctors (n = 30)
Domain	**Sub-Domain**		
Activity at Work	Vigorous Intensity Activity	86.7% (26)	100% (30)
	Moderate Intensity Activity	73.3% (22)	76.7% (23)
Travel to and from Places		53.3% (16)	66.7% (20)
Recreational Activity	Vigorous Intensity Activity	70% (21)	86.7% (26)
	Moderate Intensity Activity	40% (12)	53.3% (16)
Total Physical Activity		**16.7% (5)**	**33.3% (10)**

In figure 2, the mean minutes spent in sedentary activity per day was found to be more in females than males. The total mean sedentary activity was found to be 467.8 minutes per day which comes out to be around 8 hours overall. People who spend more time sitting have got 1.4 times higher chance of premature death (Daneshmandi et al, 2017). Sedentary behavior is considered as time spent in sitting or reclining but not including the time spent in sleeping. Female doctors (508±28) were found to be more sedentary than their male (427.7±28.1) counterparts spending on an average 8.46 hours per day sitting/reclining, in comparison to males who were found to spend 7.13 hours per day. Laskowski (2022) states that sitting for more than 8 hours in a day without being physically active has similar risk of premature deaths as posed by tobacco use (smoking) or obesity.

From table 3, it is evident that 60% of total doctors are in the obese category out of which 66.7% and 53.3% female and male doctors, respectively, have BMI ≥25 kg/m^2. Only13.3% of women and 20% of men fall in the normal BMI category though more men (26.7%) were found to be in the overweight category than women (20.0%). High WHR was found more prevalent in women

than men, that is, 63.3% and 43.3% respectively. Després et al (1991) mentioned that women have a high consumption but low expenditure of energy while exhibiting poor lipolytic response of adipose tissue thus making fat reduction difficult for them. Lack of physical activity has a direct bearing on the high abdominal visceral fat (Pitanga, Pitanga and Beck,2018).

In table 4, significant co-relation could be seen between sedentary behavior and BMI (r= 0.30; p<0.05). A positive co-relation can be seen between sedentary state and obesity. Whereas, a negative co-relation between WHR and physical inactivity (r = -0.27, p <0.05) was also found. The low physical activity state is the reason behind the high WHR in more than 40% subjects. Two tailed p-value less than 0.05 was considered significant for correlation. Hence, it can be concluded that more the sedentary behavior and physical inactivity more would be the obesity. NCDs are widespread in today's time, lack of PA is amongst the causative factors for obesity which is clear from the results.

.

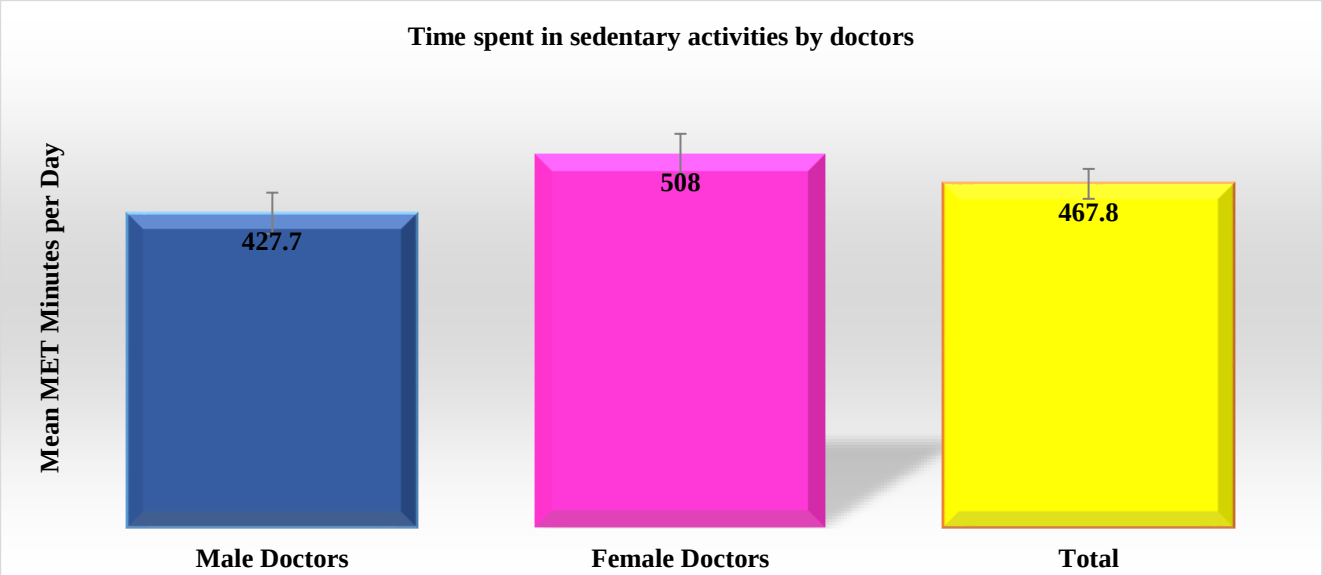

Figure 2. Mean Minutes per day Spent in Sedentary Activities by Male and Female doctors

Table 3. BMI and WHR Classification of Doctors

Health Indicators[b]	Percentage of Doctors [a]		
	Male Doctors (n=30)	Female Doctors (n=30)	Total Doctors (n=60)
BMI (Body Mass Index)			
Normal (18.5-22.99)	20.0% (6)	13.3% (4)	16.7% (10)
Overweight (23.00-24.99)	26.7% (8)	20.0% (6)	23.3% (14)
Obese (≥25)	53.3% (16)	66.7% (20)	60.0% (36)
WHR (Waist-to-Hip Ratio)			
Males: ≥0.90 cm; Females: ≥0.85cm	43.3% (13)	63.3% (19)	53.3% (32)

[a]Data in brackets represents the total number of doctors
[b]Source- WHO/IASO/IOTF, 2000; WHO, 2004

Table 4. Table showing Correlation between Variables for all doctors

Variables	Pearson's Co-relation co-efficient (r)	p-value
Sedentary Activity and BMI	0.30	p<0.05
WHR and Physical Activity	-0.27	p<0.05

V. CONCLUSION

Doctors are the support system of the society and the nation as a whole. Their health is of prime importance. The findings from the study indicate that the doctors are a vulnerable group irrespective of having knowledge and being aware of the consequences of developing NCDs. It has become clear from the study outcome that their mean physical activity score is poor. Around 50% of total doctors were found to be physically inactive (<600 MET minutes per week) which is lesser than that found in a study by Patra et al (2015) which mentions 62.3% doctors were not physically active. It could be because our study sample size has a smaller number as compared to the mentioned study. Further, total 25% doctors performed zero MET minutes per week of PA in all domains in our study. Whereas, 45% doctors (faculty), were found by Singh and Purohit (2011) in their study, to have performed 0 MET minutes per week of PA which is much more than our study findings which could be because the teaching faculty was taken as part of their study subjects while in the current study clinical allopathic doctors were taken who have a higher PA level than the teaching faculty. Doctors are the backbone of the healthcare system who are over-burdened with work and without proper action plan the system will

become frail, eventually. More than 50% male doctors and 66.7% female doctors were found to be obese which comes out to be a total of 60.0% study subjects. Gandhi et al(2012) revealed 69% doctors together in the overweight or obese category which is lesser than what we have found. Together obese and overweight categories reach upto more than 80% of above normal BMI range. High WHR was found more in females (63.3%) than in males (43.3%) and an overall ratio of 33.3% doctors had high WHR. Central adiposity has a clear link with high stress. It has been confirmed by many researchers that doctors suffer from high stress (Shoba and Lakshmi,2014, Sidhu et al,2021, Tellur et al,2022) in India. High stress levels give rise to cortisol secretion which leads to fat accumulation in the central and pelvic region which is a pre-disposition factor of central obesity (Mahajan et al,2009). Female doctors spent on an average more than 8 hours per day sitting or reclining as compare to the male doctors who spent around 7.13 hours being sedentary. A significant positive co-relation between sedentary behaviour and BMI was found which is similar to the findings mentioned in the study by Singh and Purohit (2011). A significant negative co-relation between WHR and physical activity was also seen in the results. Similar findings were stated by Singh et al (2015) that high WHR positively correlates significantly with sedentary habits and lack of physical activity. Thus, it can be concluded that physical inactivity directly impacts the overweight or obesity status of an individual.

With the ever-growing population of the country and not having enough doctors to compensate for the growing burden, it is all the more important for them to take care of their own health. The government must work towards the betterment of doctors' health at the earliest. NCDs in doctors can be prevented by substantial life style and behavioral changes. Steps must be taken to sensitize doctors of the coming tsunami towards their health.

REFERENCES

1. Daneshmandi H, Choobineh A, Ghaem H, Karimi M. Adverse Effects of Prolonged Sitting Behavior on the General Health of Office Workers. *J Lifestyle Med*. 2017;7(2):69-75. doi:10.15280/jlm.2017.7.2.69
2. Després JP, Pouliot MC, Moorjani S, Nadeau A, Tremblay A. Loss of abdominal fat and metabolic response to exercise training in obese women. *Am J Physiol.* 1991;261: 159-167.
3. Gandhi H, Vaishali K, Prem K, Vijayakumar K, Adikari P, UnniKrishnan B. A survey on physical activity and noncommunicable disease risk factors among physicians in tertiary care hospital, Mangalore. *Natl J Community Med*. 2012;3:7–13.
4. Global Physical Activity Questionnaire (GPAQ) Analysis Guide. Surveillance and Population-Based Prevention of Noncommunicable Diseases Department. World Health Organization. Geneva, Switzerland. 2017:3. Available at: https://www.who.int/ncds/surveillance/steps/resources/GPAQ_Analysis_Guide.pdf Accessed February 4, 2017.
5. Kumar P, Shekhar S, Kumar S, Akhtar MJ. An Observational Study of Cardiometabolic Status of Health Professionals Working At Tertiary Care Centre in Ranchi, Jharkhand. *Ann Int Med Den Res*. 2017; 3(2):BC09.
6. Laskowski ER. What are the risks of sitting too much? Mayo Clinic website. Available at: https://www.mayoclinic.org/healthy-lifestyle/adult-health/expert-answers/sitting/faq Published July 13,2022 Assessed November 2,2022
7. Lee I-M, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Impact of Physical Inactivity on the World's Major Non-Communicable Diseases. *Lancet*. 2012; 380(9838):219.
8. Mahajan DC, Birari SS, Khairnar GS, Patil YP, Kadam VJ, Joshi YM. Prevalence of non-communicable disease risk factors in two groups of urban populations. *Asian J Epidemiol*.2009; 2:1-8.
9. Patra L, Mini G K, Mathews E, Thankappan KR. Doctors' self-reported physical activity, their counselling practices and their correlates in urban Trivandrum, South India: should a full-service doctor be a physically active doctor?. *British journal of sports medicine*.2015;49(6), 413–416. doi:10.1136/bjsports-2012-091995
10. Pitanga FJG, Pitanga CPS, Beck CC. Physical Activity in the Prevention of Abdominal Obesity: Type, Duration and Intensity. *Int J Sports Exerc Med*.2018;4:106. doi.org/10.23937/2469-5718/1510106
11. Ramamoorthy T, Kulothungan V, Mathur P. Prevalence and correlates of insufficient physical activity among adults aged 18–69 years in India: findings from the national noncommunicable disease monitoring survey. *Journal of Physical Activity and Health*. 2022;19(3):150-159. doi:10.1123/jpah.2021-0688
12. Shoba,G and Lakshmi A. A study on job stress among private medical practitioners in vellore district, Tamil Nadu. *Asian J Sci Res*.2014;7:488-500
13. Sidhu TK, Kaur P, Kaur H, Kaur K. Stress among doctors: A cross-sectional study in a tertiary care hospital, North India. *Adesh Univ J Med Sci Res*.2021;3(1):18-24.
14. Singh A, Purohit B. Evaluation of Global Physical Activity Questionnaire (GPAQ) among Healthy and Obese Health Professionals in Central India. *Balt J Health Phys Activ*.2011; 3(1):34-43. doi: 10.2478/v10131-011-0004-6
15. Singh S, Issac R, Benjamin AI, Kaushal S. Prevalence and association of physical activity with obesity: an urban, community-based, cross-sectional study. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*, 2015;40(2), 103–107. doi:10.4103/0970-0218.153873 (Retraction published Indian J Community Med. 2016 Jan-Mar;41(1):77)
16. Tellur L, Yadavannavar MC, Sorganvi V, Patil S. Stress among doctors doing residency: a cross sectional study at a tertiary care hospital in Vijayapura, Karnataka. *Int J Community Med Public Health*.2022;9:1505-1509.
17. WHO/IASO/IOTF. The Asia-Pacific perspective: redefining obesity and its treatment. Health Communications. Australia, Melbourne.2000:18-20.
18. World Health Organization (WHO) Expert Consultation Group. Appropriate Body Mass Index for Asian populations and its implications for policy and intervention strategies. *Lancet*. 2004;363:157-163.
19. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013-2020.Geneva, Switzerland.2013:33-34.
20. World Health Organization. Noncommunicable diseases country profiles 2018. Geneva, Switzerland. 2018:106. Available at: https://www.who.int/nmh/publications/ncd-profiles-2018/en/ Accessed February 10, 2019.

21. World Health Organization. Noncommunicable Diseases Progress Monitor, 2017. Geneva: World Health Organization. 2017:93.Available at: http://apps.who.int/iris/bitstream/handle/10665/258940/9789241513029-eng.pdf?sequence = 1 Accessed October 10, 2018.
22. World Health Organization. Noncommunicable diseases: Key facts. Fact sheet, Newsroom, World Health Organization 2018. Available at: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases Accessed October 22, 2018.
23. World Health Organization. Obesity: Preventing and managing the global epidemic. Technical report series no. 894. 2000: 1-253.
24. World Health Organization. Physical activity: Fact sheet N°385. Media centre. January 2015. Available at: http://www.who.int/mediacentre/factsheets/fs385/en/ Accessed August 28, 2015.
25. World Health Organization. Physical Activity: Fact sheet. Newsroom, World Health Organization 2018. Available at: https://www.who.int/en/news-room/fact-sheets/detail/physical-activity Accessed October 22, 2018.