International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

An Observational Study on the Whole Body and Visceral Fat Percentages among Female Students Pursuing Health Profession

Ch. Lalana[1], J. Shalini[2], Dr. A. Viswanath Reddy[3], Dr. K. Madhavi[4]

[1, 2]BPT INTERNEES, College of Physiotherapy, SVIMS, Tirupati

[3]MPT (Sports)., Ph. D., Associate Professor, College of Physiotherapy, SVIMS, Tirupati

[4]MPT (CT)., Ph. D., Professor, College of Physiotherapy, SVIMS, Tirupati

Abstract: ***This is an observational study on the whole body and visceral fat percentages among female students pursuing health profession. Need of the study: Due to the life style of health professionals, the incidence of obesity has been increasing day by day which may cause blood pressure, heart disease and stroke in future. So a need arises to know the prevalence of increased fat percentage among them. Aim of the study: An observational study on whole body and visceral fat percentages among female students pursuing health profession. Objectives and methodology: The data has been obtained from 577 female students of SVIMS University. Conclusion: In terms of total body fat, more than half of the sample falls into "fatter than normal" category. A striking 97.1% of participants have abnormal visceral fat, suggesting widespread concerns regarding visceral fat among this population.***

Keywords: Body composition analyzer, visceral fat, health, heart disease, blood pressure

1. Introduction

Overweight and obesity are significant health concerns worldwide, affecting millions and leading to severe health consequences [1]. According to the Obesity Medicine Association defines them as chronic, neurobehavioral diseases with diverse consequences resulting from abnormal fat accumulation and subsequent dysfunction in adipose tissue [2]. In India, particularly among students, these issues are underscored by recent data from the National Family Health Survey (NFHS - 5), which indicates that 23% of women and 22.1% of men are overweight as per the BMI criterion [1].

Factors contributing to the rising incidence of overweight and obesity among students are diverse and well - documented. Sedentary lifestyles, characterized by extended periods of television watching, computer usage, and mobile phone engagement, play a crucial role [2]. This dysfunction contributes to adverse metabolic, biochemical, and psychosocial health outcomes [3]. The academic demands on students, particularly in the medical field, contribute to a lifestyle characterized by long study hours, long practical hours, stress and irregular eating habits [3].

The shift from traditional, healthier diets to high - calorie fast food exacerbates their susceptibility to complications such as hypertension, dyslipidemia, and impaired glucose tolerance. Various anthropometric parameters are available to correlate with the visceral and body fat percentage, screening the general population for high risk of obesity - related diseases [4].

Body fat tissue is distributed into two main compartments with different metabolic characteristics: subcutaneous adipose tissue (SAT) and visceral adipose tissue (VAT) [5]. Visceral fat is more sensitive to lipolytic stimuli, and less sensitive to anti - lipolytic stimuli (such as insulin), compared with subcutaneous fat. Therefore, visceral fat is more likely to release free fatty acids into the circulation causing increased free fatty acid levels, which may lead to ectopic fat storage in muscle, liver, and pancreas [6] [7] [8] [9]. It has been argued, however, that the quantitative contribution to circulating free fatty acid levels of subcutaneous fat is probably much larger because there simply is much more of it. However, the release of free fatty acids from visceral fat into the portal vein that directly leads to the liver, may cause reduced hepatic insulin clearance, increased gluconeogenesis and increased dyslipidaemia [10] [11]

Body fat is a multifaceted and complex organ [12]. Besides functioning as a system for excess energy deposition, protection from the cold and everyday hazards, adipose tissue produces an assortment of molecular messengers (adipokines), which influence a diverse array of functions, including appetite, fertility, neuronal development and plasticity, inflammatory responses, and the action of other hormones, including insulin [13].

Yet, despite these positive functions, a close association between excess body adiposity and the development of non - communicable diseases has been reported in many epidemiological studies. Moreover, these associations are further strengthened if age and physical activity (or the lack of it) are included in the paradigm [14].

Sophisticated equipment like computed tomography [CT] and magnetic resonance imaging [MRI] can provide direct measures of cross sectional areas or volumetric measures of body fat tissue. However these are time consuming, costly and difficult to use in epidemiological studies [15].

So, this study has focused on most commonly used measure for prediction of body fat percentage and visceral fat

percentage by using body composition analyzer, which is easier, cost effective than other equipment [16] [17].

Normal Values:
Total body fat % - 20 to 29 years – 16 to 24% [Females]
Visceral fat % - 10% of the body fat.

Aim:
An observational study on whole body fat percentage and visceral fat percentage
among female students pursuing health profession

Need:
The incidence of obesity has been increasing day by day, due to the life style of health professionals which may cause hypertension, heart diseases, stroke and other risk factors in future. So a need arises to know the level of total body and visceral fat percentages among female health professional students.

2. Methodology

Methods:
1) Study design: Observational study
2) Sample size.: 577 students
3) Study setting: SVIMS university
4) Sample collection: SVIMS university
5) Sampling method: Convenience method
6) Materials: Body composition analyzer

Inclusion criteria:
1) Age: 20 – 25 years
2) Gender: female

Exclusion criteria:
1) Age of above 25 years
2) Males
3) Cardiovascular diseases
4) Pregnant ladies
5) Spinal problems

Procedure:
In this study we have observed the female students pursuing medical profession on their total body fat and visceral fat percentages. The total number of 577 students were included and the whole body fat and visceral fat percentages were recorded by using body composition analyzer.

Stastical analaysis

Table 1: Data showing demographic and descriptive statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Age (yrs)	577	13	20	33	22.08	0.057	1.362	1.855
Weight (kgs)	577	55	33	88	54.807	0.4257	10.2258	104.566
Height (cms)	577	31	140	171	157.61	0.241	5.798	33.619
Total Body Fat	577	30	9	39	26.57	0.266	6.383	40.745
Visceral Fat	577	11	0	11	3.7	0.104	2.49	6.201

Interpretation:
Age: The ages range from 20 to 33 years, with an average age of 22.08 years. The variation in age is small, indicated by a standard deviation of 1.36 years, suggesting that most participants are close in age.
Weight: Weights range from 33 kg to 88 kg, with an average of 54.81 kg. The standard deviation of 10.23 kg shows a moderate spread in weights, indicating a diverse weight distribution among participants.
Height: Heights range from 140 cm to 171 cm, with an average height of 157.61 cm. The standard deviation of 5.8 cm suggests that most participants have similar heights, though there is some variation.

Table 2: Data showing total body fat distribution of female health professionals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Leaner than Normal	10	1.7	1.7	1.7
	Normal	237	41.1	41.1	42.8
	Fatter than normal	330	57.2	57.2	100
	Total	577	100	100	

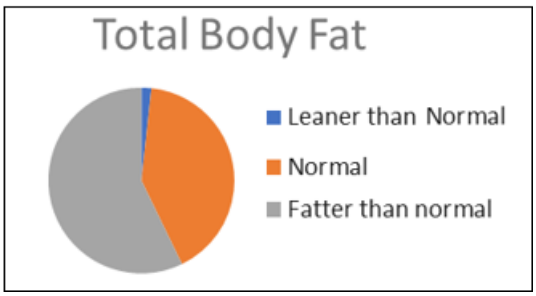

Figure 1: Data showing total body fat distribution of female health professionals

Interpretation
Leaner than normal: 10 participants (1.7%) have a body fat percentage that is considered below the normal range.
Normal: 237 participants (41.1%) have body fat within the normal range.
Fatter than normal: The majority, 330 participants (57.2%), have body fat above the normal range.

This indicates that a significant portion (57.2%) of the sample has a higher - than - normal body fat percentage, with only 1.7% being leaner than normal.

Table 3: Data showing visceral body fat distribution of female health professionals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	17	2.9	2.9	2.9
	Abnormal	560	97.1	97.1	100
	Total	577	100	100	

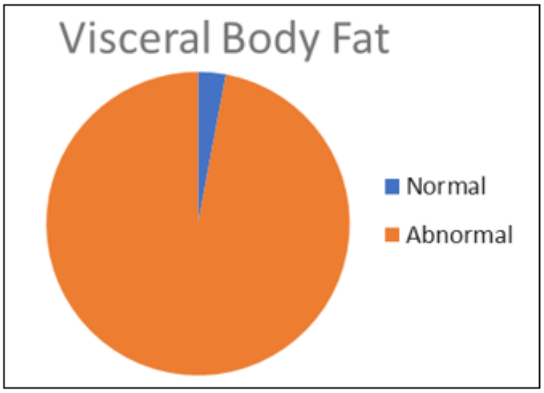

Figure 2: Data showing visceral body fat distribution of female health professionals

Interpretation:
Normal: 17 participants (2.9%) have normal visceral fat levels.
Abnormal: 560 participants (97.1%) have abnormal visceral fat levels.

The data shows that the overwhelming majority (97.1%) of the participants have visceral fat levels that are considered abnormal, indicating a potential risk factor for health issues.

3. Discussion

This study is an observational analysis focused on the whole body fat percentage and visceral fat percentage among female students pursuing health professions. With the incidence of obesity increasing globally, particularly among health professionals, it becomes essential to explore the body fat composition and its health implications among this population. The need for such a study arises from the sedentary lifestyles and stressful academic environments that health profession students often experience, leading to a higher risk of overweight and obesity.

The study included 577 female students aged between 20 to 25 years from SVIMS University. The observational design utilized a body composition analyzer to measure body fat percentages. The primary objective was to understand the prevalence of increased body fat percentages and the associated health risks. The findings suggest a range of body fat percentages that align with the normal values, which are 16 - 24% for total body fat and approximately 10% for visceral fat. However, the analysis highlighted variations and specific patterns that necessitate further discussion.

One significant observation from the study is the high mean percentage of total body fat (26.57%) and visceral fat (3.7%) among the sample population. These values indicate a tendency toward higher fat accumulation, even among young female students. The implications of these findings are multifaceted. Furthermore, the high percentage of body fat observed may be a result of the sedentary lifestyle patterns typical of students in rigorous academic programs.

The study also sheds light on the role of diet in influencing body fat percentages among the students. The shift from traditional, nutrient - rich diets to high - calorie, fast - food consumption is a critical factor contributing to the increase in body fat. High consumption of refined sugars, unhealthy fats, and processed foods has been associated with a higher risk of developing obesity - related complications, including hypertension, impaired glucose tolerance, and dyslipidemia. The findings underscore the importance of early intervention and targeted strategies to manage body fat levels among students in health professions. Given their future role as healthcare providers, it is vital that they themselves adopt healthy lifestyles and behaviours. Educational institutions can play a pivotal role by promoting regular physical activities, healthy eating habits, and stress management techniqes among their students.

Moreover, the study emphasizes the need for regular monitoring of body fat percentages as part of routine health assessments. The use of body composition analyzers, which are cost - effective and accessible, provides a reliable measure of body fat levels, facilitating early detection and prevention of potential health risks. Regular assessments can help in identifying students at higher risk and implementing necessary lifestyle modifications.

4. Limitations

Despite the valuable insights gained, the study has certain limitations. It is confined to female students only, which limits the generalizability of the findings to male counterparts or other populations. Additionally, only two parameters, total body fat, and visceral fat percentages, were observed, without consideration of other factors such as physical activity levels, dietary habits, or genetic predispositions that could influence body fat distribution.

5. Future Recommendations

The future study should expand the scope to include a more diverse population, including males and individuals from different age groups and academic disciplines. Incorporating additional variables such as physical activity levels, dietary patterns, and genetic markers would provide a more comprehensive understanding of the factors influencing body fat percentages among health professionals.

6. Conclusion

In terms of Total Body Fat, more than half of the sample falls into the "Fatter than Normal" category. A striking 97.1% of participants have Abnormal Visceral Fat, suggesting widespread concerns regarding visceral fat among this population.

References

[1] National Family Health Survey (NFHS - 5), India Report, Ministry of Health and Family Welfare,

Government of India. (2020). Available from: https: //rchiips. org/nfhs/NFHS - 5_FCTS/India. pdfObesity Medicine Association, 2022.

[2] Smith, A., Jones, B., & Taylor, C. (2020). The impact of sedentary behavior on student health. Journal of Adolescent Health, 56 (2), 123 - 30.

[3] World Health Organization. (2016). Obesity and overweight. Retrieved from WHO website.

[4] Ashwell, M., Gunn, P., & Gibson, S. (2012). Waist - to - height ratio is a better screening tool than waist circumference and BMI for adult cardiometabolic risk factors: Systematic review and meta - analysis. Obesity Reviews, 13 (3), 275 - 86. Misra, A., Chowbey, P., Makkar, B. M., Vikram, N. K., Wasir, J. S., Chadha, D.,. . . & Joshi, S. R. (2007). Consensus statement for diagnosis of obesity, abdominal obesity, and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical, and surgical management. Journal of the Association of Physicians of India, 55 (6), 163 - 70.

[5] kaess B. M., Pedley A., Massaro J. M., Murabito J., Hoffmann U., Fox C. S. The ratio of visceral to subcutaneous fat: A metric of body fat distribution is a unique correlate of cardio metabolic risk. Diabetologia 2012; 55: 2622–630.

[6] McGarry JD. Banting lecture 2001: dysregulation of fatty acidmetabolism in the etiology of type 2 diabetes. Diabetes 2002; 51: 7–18.

[7] Tiikkainen M, Tamminen M, Hakkinen AM et al. Liver - fat accumulation and insulin resistance in obese women with previous gestational diabetes. Obes Res 2002; 10: 859–67.

[8] Seppala - Lindroos A, Vehkavaara S, Hakkinen AM et al. Fat accumulation in the liver is associated with defects in insulin suppression of glucose production and serum free fatty acids independent of obesity in normal men. J Clin Endocrinol Metab 2002; 87: 3023–28.

[9] Goodpaster BH, Thaete FL, Kelley DE. Thigh adipose tissue distribution is associated with insulin resistance in obesity and in type 2 diabetes mellitus. Am J Clin Nutr 2000; 71: 885–92.

[10] Despres JP, Lemieux S, Lamarche B et al. The insulin resistancedyslipidemic syndrome: contribution of visceral obesity and therapeutic implications. Int J Obes Relat Metab Disord1995; 19 (Suppl.1): S76–86.

[11] Bjorntorp P. 'Portal' adipose tissue as a generator of risk factors for cardiovascular disease and diabetes. Arteriosclerosis 1990; 10: 493–96.

[12] J. C. Seidell et al. Assessment of intra - abdominal and subcutaneous abdominal fat: relation between anthropometry and computed tomography Am. J. Clin. Nutr. (1987).

[13] M. A. Foster et al. Nuclear magnetic resonance pulse sequence and discrimination of high - and low - fat tissues Magn. Reson. Imag. (1984) P. A. Fowler et al. Validation of the in vivo measurement of adipose tissue by magnetic resonance imaging of lean and obese pigs Am J. Clin. Nutr. (1992)

[14] N. Abate et al. Estimation of adipose tissue mass by magnetic resonance imaging: validation against dissection in human cadavers J. Lipid Res. (1994).

[15] Gamage P, Katulanda P, Andraweera N, Thilakarathne S, et al. Relationship between Body mass index (BMI) and body fat percentage, estimated by bioelectrical impedance, in a group of Sri Lankan adults: a cross sectional study chathuranga ranasinghe. BMC Public Health 2013; 13: 797.

[16] Vasudev S, Mohan A, Mohan D, Farooq S, Raj D, Mohan V. Validation of body fat measurement by skinfolds and two bioelectric impedance methods with DEXA–the Chennai Urban Rural Epidemiology Study. J Assoc Physicians India 2004; 52: 877–881.

[17] Meeuwsen S, Horgan GW, Elia M. The relationship between BMI and percent body fat measured by bioelectrical impedance in a large adult sample is curvilinear and influenced by age and sex. Clin Nutr 2010; 29 (5): 560–566.