

“To Evaluate the Association of Fibre Intake and Physical Activity on Obesity among Women aged 35-65 Years”

Suvarna Hebbar*¹, Joniya Galbao², Rachitha³

^{*1}*Department of Clinical Nutrition and Dietetics, Manipal College of Health Professions, MAHE, Manipal.*

²*Department of Clinical Nutrition and Dietetics, Kasturba Hospital, Manipal*

³*Department of Clinical Nutrition and Dietetics, Kasturba Hospital, Manipal*

Abstract

Obesity is a major contributor to the worldwide burden of chronic illnesses and is one of the twin burdens of malnutrition. Today, more people are fat than underweight. Physical exercise and consuming high-quality dietary fibre enhances a person's overall health. The aim of the study was to evaluate the association of fibre intake and physical activity on obesity among women aged 35-65 years. This was a hospital-based cross-sectional research with 564 participants aged 35 to 65 years. A systematic interview schedule was used to examine socio-demographic data, biochemistry history, and lifestyle habits. Dietary queries were performed using a 3-day 24-hour meal recall and food frequency questionnaire, and nutritional score was determined using the DietCal version 6.3 software. The Global Physical Activity Questionnaire was used to measure physical activity. The data was analysed with the SPSS software (version 16.0). According to the study, the majority of the subjects (55.5 percent) were obese, followed by the overweight (19.7%). Nutrient adequacy ratio revealed that the majority of the participant's energy (56.9%), carbohydrate (58.3%) and total fat (62.2%) consumption was excessive, while protein (51.4%) was marginally sufficient, and dietary fibre intake (76.1%) was significantly deficient. Physical activity assessment showed most of them were sedentary. There was a substantial link between BMI, physical activity, fibre, and obesity, indicating that these factors do have an impact on weight.

Keywords: Obesity, dietary fiber, body mass index, physical activity, overweight, nutritional status, female, weight loss.

1. Introduction

Obesity and overweight are described as abnormal or excessive fat build up that puts one's health at danger. Obesity and overweight are now substantially on the rise in low- and middle-income countries, particularly in urban areas, while they were once considered a problem mainly in high-income countries. [1]

Weight gain was shown to be negatively linked to the consumption of high-fiber, whole-grain meals but positively connected to the consumption of refined-grain foods, indicating the significance of differentiating whole-grain goods from refined-grain items when it comes to weight loss.[2] An adult's daily diet should include at least 40g/2000 Kcal of dietary fibre, as suggested by the Indian Council of Medical Research.[3][4] Most people, however, do not consume enough fiber-rich foods to fulfil this recommendation, and obese persons, in particular, report lower dietary fibre intake than those of normal weight.[5]

A well-known fact proved by different studies that inadequate or reduced consumption of fruits, vegetables and fibre along with minimal physical activity is associated with obesity. Reduced physical activity, low dietary fibre consumption, and a high fat intake not only lead to a high body fat percentage, but also to chronic illnesses such as coronary heart disease, diabetes, and other malignancies. With this data, obesity may be avoided by increasing physical activity and consuming high-quality dietary fibre. [6]

2. Subjects and Methods

A hospital-based cross-sectional research was done at Manipal, Karnataka, for 9 months from June 2019 to March 2020, after ethical permission. 564 female participants of the age group 35-65 years were recruited. Participants with secondary disorders that affect their nutritional status, such as tuberculosis, HIV, cancers, chronic kidney failure, liver cirrhosis, and heart failure, as well as vulnerable subjects such as the handicapped, those who rely on trolleys, pregnant, and lactating females, were excluded from the study. Patients were screened and biochemical data were taken using hospital medical records. The study included a structured health interview schedule to collect the information of socio-demographic details, dietary, lifestyle and medical history. The confidentiality and right of the subject not to enroll her in the study, purpose of the study was explained and written informed consent was taken. The study was registered under the Clinical Trials Registry – India as (CTRI/2019/08/020494).

The standard methodology was followed for measuring height, weight, waist and hip circumference with a stadiometer, digital weighing machine, and non-stretchable measuring tape, respectively. Using 24-hour recall and meal frequency questionnaire, a comprehensive dietary investigation was conducted. The Global Physical Activity Questionnaire was used to evaluate the subject's physical activity. The SPSS software version 16 was used to investigate and analyses all statistical analyses, resulting in the research's conclusion. The results were analyzed using correlation and chi-square analysis. DietCal version 6.3 software was used to determine the nutritional content of the foods ingested by the participants.

3. Results

The mean age of 564 participants was 47 ± 8.07 years. Majority of them were from rural area (61.9%) and belonged to Upper Lower (IV) class (64.9%). Highest number of participants were obese (55.5%) and about (84.2%) led a sedentary lifestyle. The majority of participants (39.2%) had a low waist circumference, whereas (48.8%) of participants had a high waist hip ratio. About (70%) of the participants had taken the GlycoHb test, with (25.2%) and (22.9%) falling into the diabetes and pre diabetic category respectively. Majority (80%) were non-vegetarians and consumed substantially inadequate amount of total dietary fiber (mean intake 12.57 ± 3.18). The nutritional adequacy ratio revealed that macronutrient consumption, such as energy, carbohydrate and fat, was higher than the RDA, with the exception of protein intake, which was inadequate. Table 1 shows the association of varied factors concerning diet and lifestyle with obesity. The link between several parameters related to food and obesity was investigated using a correlation test. Chi-square test was performed to understand the link between obesity and physical activity. Table 2 illustrates the link between socioeconomic level and fibre consumption.

Table 1: The Association of Varied Factors Concerning Diet and Lifestyle with Obesity

Factors	BMI		Waist Circumference	
	r	p-value	r	p-value
Energy (kcal)	0.399	<0.01**	0.303	<0.01**
Protein(g)	0.402	<0.01**	0.304	<0.01**
CHO(g)	0.399	<0.01**	0.303	<0.01**
Fat (g)	0.372	<0.01**	0.269	<0.01**
Total Dietary Fiber (g)	-0.086	0.042*	-0.007	0.862 ^{NS}
Cereals and Millets, g/d	0.004	0.927 ^{NS}	-0.024	0.574 ^{NS}
Pulses, g/d	0.081	0.055 ^{NS}	0.081	0.237 ^{NS}
GLV, g/d	0.090	0.032*	0.090	0.462 ^{NS}
Other veg, g/d	0.038	0.362 ^{NS}	0.038	0.450 ^{NS}
Roots & tubers, g/d	0.038	0.371 ^{NS}	0.038	0.047*
Milk & pro, ml/d	0.001	0.974 ^{NS}	0.001	0.307 ^{NS}
Fruits, g/d	0.030	0.476 ^{NS}	0.030	0.426 ^{NS}
Nuts, g/d	-0.073	0.085 ^{NS}	-0.073	0.902 ^{NS}
Sugar, g/d	-0.071	0.093 ^{NS}	-0.071	0.202 ^{NS}
Fats and Oils	0.134	0.001**	0.134	0.009**
Socioeconomic status	0.098	0.710 ^{NS}	-0.018	0.795 ^{NS}
	χ^2	p-value	χ^2	p-value
Physical activity	80.223	<0.01*	3.745	0.154 ^{NS}
Rate of Eating	23.367	0.025*	25.158	<0.01*
Dietary Habits	11.11	0.268 ^{NS}	5.718	0.455 ^{NS}

** Significant at 1% level, * Significant at 5% level, NS- Not Significant

Table 2: Association of TDF Intake with Socio Economic Status

Social Economic Status	Total Dietary Fiber Intake	
	r	p-value
	0.059	0.159 ^{NS}

NS- Not Significant

4. Discussion

According to the findings, more over half of the participants were obese, and one-eighth were overweight. This result was largely seen because the majority of the participants had sedentary lifestyle. In terms of their eating habits, it was discovered that their

dietary fibre intake was significantly lower than the RDA, but their energy, carbohydrate, and fat intakes were significantly higher than the RDA, indicating that these women have a sedentary lifestyle with an unhealthy eating pattern, which could be a cause of their increased body weight, leading to obesity. We also discovered that socioeconomic status may have a role in women's weight gain in the upper middle class. Hence it can be concluded that intake of fiber rich diet along with consumption of food within recommended level and proper physical activity is essential for maintaining healthy body weight.

Due to a constraint, we were unable to acquire all of the patients' biochemical values; however, if we had, we would have been able to offer a more precise assessment of the connection between biochemical markers and obesity. Additional research, particularly dietary intervention trials, is needed to establish a stable base for dietary recommendations. Follow-ups and counselling can be carried out to check that the intervention is providing the desired results and putting a study in a new perspective.

5. Acknowledgment

We would like to convey our heartfelt gratitude to our adviser, Dr. Shashikiran Umakanth, Professor of Medicine, Dr. TMA Pai Hospital Udupi; MMMC, Manipal Academy of Higher Education, who has served as a fantastic mentor to us. Thanks to the Kasturba Hospital's Department of Clinical Nutrition and Dietetics for their assistance and support. We would also like to thank Ms. Pallavi Mahesh Shettigar, Assistant Professor – Selection Grade, Welcomgroup Graduate School of Hotel Administration, Manipal. A special thanks to our friend Ms. Amrutha M S, Kasturba Hospital, for her unwavering support.

6. References

1. World Health Organization. Obesity [Internet]. World Health Organization. 2020. Available from: https://www.who.int/health-topics/obesity#tab=tab_1
2. Liu S, Willett WC, Manson JAE, Hu FB, Rosner B, Colditz G. Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. *Am J Clin Nutr.* 2003;78(5):920–7.
3. Puri S, Krishnaswamy S, Joshi S, Urooj A, Sharma N. Position of the Indian Dietetic Association : Dietary Fibre and Health. 2018;(December):1–14. Available from: https://eatrightindia.gov.in/ArchiveERI/assets/pdf/IDA_position_paper_fibre_final.pdf
4. Group AR of the E, Research IC of M, Nutrition NI of. Recommended Dietary Allowances and Estimated Average Requirements Nutrient Requirements for Indians - 2020. 2020;116–8. Available from: https://www.nin.res.in/RDA_Full_Report_2020.html
5. Namazi N, Larijani B, Azadbakht L. Are Isolated and Complex Fiber Supplements Good Choices for Weight Management? A Systematic Review. *Arch Iran Med.* 2017;20(11):704–13.
6. Al-Shammari E, Bano R, Al Rashidi S. Impact of Physical activity and Intake of fiber and fat on the anthropometric indices of university females in Hail city of Saudi Arabia. *Curr Res Nutr Food Sci J.* 2015;3(2):121–9.