ASSESSMENT OF NUTRITIONAL STATUS AMONG ADULT GIRLS AT PESHAWAR

Shahnaz Attaullah[1], Naila Gulfam[2], Seemab Tayyab[3], Sheema Rahim[4], Umair Wadood[5], Noreen Wadood[6]

ABSTRACT

OBJECTIVES

The aim of this study was to examine the relation of Mid Upper Arm Circumference (MUAC) with Body Mass Index (BMI) and waist-to-hip ratio among adult girls.

METHODOLOGY

A descriptive or cross-sectional study was conducted among adolescent girls 18 plus by BS students at Jinnah college for the women's University of Peshawar, in collaboration with Pakistan Health Research Council (PHRC) Khyber Medical College Peshawar. MUAC is a useful cheap, and non-invasive technique used for the assessment of nutritional status that has important effects on health in recovery from illness. The analysis of data was conducted as a review of the filled questionnaire. The statistical relationship between variables and their prevalence was assessed using the Chi-Square test.

RESULTS

Results showed that according to MUAC 20.8% and BMI of 22.55% adult girls were underweight. Our study also revealed that 7(5.83%) adult females were underweight according to MUAC measurements but had normal BMI with a statically significant value of p 0.000. In correlation with waist-hip ratio and MUAC, 24.2% of adult females were having an unacceptable hip ratio (which means that their waist-to-hip ratio is either average, high, or extreme) but had normal MUAC. This correlation between MUAC and waist-to-hip ratio was also highly significant (p 0.046). Besides, we also got the measurements of obese and overweight girls.

CONCLUSION

In this study, mid-upper arm circumference (MUAC) was statistically and significantly correlated with body mass index (BMI) (p=0.000). As MUAC is a very simple and inexpensive method to assess nutrition, so this is a very good tool to be used in underdeveloped countries like Pakistan.

KEYWORDS: BMI, Nutrition, Non-Communicable Diseases, Health

Correspondence

[1]Shahnaz Attaullah, Assistant professor, Jinnah College for Women, University of Peshawar
📞: +92-343-9827631
✉: dr.shahnazattaullah@gmail.com
[2]Assistant professor, Jinnah College for Women, University of Peshawar
[3]Student BS, Bio Chemistry, Jinnah College for Women, University of Peshawar
[4]Student BS, Bio Chemistry, Jinnah College for Women, University of Peshawar
[5]Assistant Professor, Rehman Medical Institute, Hayatabad Peshawar-Pakistan
[6]Professor, Kabir Medical College, Gandhara University, Peshawar

INTRODUCTION

Nutrition is the science that understands the interaction of nutrients and other substances in food in relation to the maintenance, growth, reproduction, health, and disease of an organism. It includes food intake, absorption, assimilation, biosynthesis, catabolism and excretion.[1] A poor diet may cause health problems, causing diseases such as blindness, anaemia, scurvy, preterm birth, stillbirth, and cretinism. According to Walter Gratzer, the study of nutrition began during the 6th

century BC.[2] Pakistan is distinctive in its peculiar right, with erratic ranks of getting developed in terms of nutritional policies and advancement. Attempts have been made to improve different methods of nutritional services for women and children. The country presents maximum knowledge about enhancement of female's and children's nutrition which is to be necessarily done. The problem of malnutrition is becoming an emergent issue in Pakistan, with overweight females exceeding underweight females.[3] To maintain a normal body condition both diet and physical activities are important factors. Strong scientific study shows that physical activity can help us maintain our weight over time. Nutrition shows the interaction of nutrients and other substances in food in relation to the maintenance, growth, reproduction, health, and disease of an organism.[4] Balanced nutrition is important to keep basic body physiological processes because consumption of an imbalance diet results in under-nutrition or Over-nutrition. Several health issues occur because of insufficient intake of basic nutrients.[5] These health issues include low physical and mental development, weakness and low weight in children and adults, low immunity, and the occurrence of repeated infectious diseases. Besides, cardiac diseases, hypertension and diabetes mellitus are some of the chronic diseases which also result due to consumption of improper diet or nutrients. Thus, an assessment of nutritional status is required to determine the severity of poor nutritional status resulting from reduced food intake or impaired metabolism of the body.[6] To assess the nutritional status of a person number of methods are implied and these methods are called anthropometric measurements. Among these methods, mid-upper arm circumference (MUAC) and body mass index (BMI) are important anthropometric measurements to assess the nutritional status of an individual. MUAC measurements are fast, easy, and accurate.[7] Despite some limitations, anthropometry remains the most practical tool for the assessment of nutritional status among members of the community in developing countries. Body mass index (BMI) is widely accepted as one of the best ways of nutritional status in adults.[6] Like other anthropometric measurements, MUAC is a non-invasive, and suitable method for evaluating the nutritional status in population studies, and hence could be a valuable tool for use by community health workers (CHWs) for early recognition of acute malnutrition in infants in the community level. Being the simplest measure, MUAC has

been suggested as a substitute for BMI when the rapid screening of an adult population is required as a prelude to targeting the provision of support to those who are undernourished.[8] Nutritional assessment in low-resource settings often depends on non-invasive, simple, and affordable anthropometric methods. Measures of body size and composition based on anthropometric methods have been used to describe nutritional status and quickly identify at-risk groups for appropriate interventions.[9] Advanced clinical methods to measure body composition, such as dual-energy x-ray absorptiometry (DEXA) or air displacement (Bod Pod), are considered the gold standards for the assessment of body composition, but they are expensive and unworkable for large population-based studies and programs.[10] BMI is used widely to assess both under and over-nutrition at a population level. However, it requires trained personnel and reliable equipment to measure weight and height (such as scales and standard-meters), as well as mathematical formulas to calculate the index from weight and height and in the case of children, standards, or reference tables to understand it.[11,12]

METHODOLOGY

The nutritional status of the study population was assessed in terms of BMI (Body Mass Index) and MUAC(Mid-upper arm circumferencence).[13,14] This study was carried out from September 2019 to May 2020. A total of 120 subjects were considered. The subject size was estimated based on the total number of enrolled students in the college using the standard WHO Calculator. MUAC tape technique was used to measure the circumference of the arm. For measuring height subjects were asked to stand straight along the wall. With the help of a ruler, the point at the top of the head is marked on the wall. The tape was kept flat against the wall to measure the height. Body weight was determined by digital balance. Nutritional status and demographic details were recorded in a proper questionnaire. The inclusion criteria were all girls who are willing to participate in this study. In this regards a proper consent form was designed to know whether the subjects are willing to be a part of this research work or not. Chronic non-communicable diseases (NCD) including obesity, and diabetes mellitus a major health risk factors Type 2 diabetes as apparently increases with fat gain and obesity. Girls suffering from any disease condition such as polycystic ovary syndrome (PCOS) or any other genetic

disorder were excluded. BMI was calculated by the formula: Weight In kgs ÷ (height in meters) Waist and hip measurements were carried out with help of standard tape, while Waist to hip ratio was measured by the formula: Waist circumference ÷ hip circumference.[2] The formula is in accordance with WHO recommendations by evaluating similarities or differences in the associations of waist circumference or waist-hip ratio with various health outcomes, across populations or population subgroups.[15] Statistical Package for Social Science (SPSS) was used for analysis. Obtained data were entered in MS excel and analysed through SPSS. The statistical relationship between variables and their prevalence was assessed using Chi-Square and P-value

RESULTS

Table 1 shows the mean and standard deviation of MUAC, BMI, and waist-to-hip ratio. Among BMI normal young female group 07(5.83%) have underweight MUAC Table 2. A significant Statistical correlation (p-value 0.000) was present between BMI and MUAC. Table 3 shows that among MUAC normal young female group 25 (24.2%) have an unacceptable waist to hip ratio. Significant Statistical correlation (p-value 0.046) was present between waist to hip ratio and MUAC.

Table 1: Mean and S.D for BMI, Waist to Hip (WH) Ratio and MUAC

	N	Mean	Standard Deviation
BMI	120	21.176	±04.106
WH Ratio	120	0.765	0.053
MUAC	120	24.465	03.209

Table 2: MUAC Correlation with BMI

		MUAC			Total	P-Value
		Normal	Obese	Under Weight		
BMI	Normal	73	0	07	80	
	Obese	01	03	0	04	
	Over Weight	09	0	0	09	0.000
	Under Weight	09	0	18	27	

Table 3: MUAC Correlation with Waist to Hip Ratio

MUAC	Waist to Hip Ratio		Total	P-Value
	Acceptable	Unacceptable		
Underweight	24	01	25	
Normal	67	25	92	0.046
Obese	00	03	03	

DISCUSSION

For the body to maintain a normal condition both diet and physical activity are important factors.[4] Strong scientific study shows that physical activity can help us maintain our weight over time.[4] Nutrition shows the interaction of nutrients and other substances in food in relation to the maintenance, growth, reproduction, health, and disease of an organism.[16] Nutritional assessment is a set of medical tasks to maintain the nutritional status of a person.[17] To assess the nutritional status of a person number of methods are implied and these methods are called anthropometric measurements. Among these methods, mid-upper arm circumference (MUAC) and body mass index (BMI) are important anthropometric measurements to assess the nutritional status of an individual. MUAC measurements are fast, easy and accurate.[18] It is also used as a screening tool in emergency settings.[19] For the indication of acute malnutrition MUAC is recommended because it is one of the easier and cheaper tools. This has been authorized by experts in WHO, UNICEF, WFP and SCN.[20] MUAC is a reasonable method to assess the nutritional status of adults and the measurement is simply obtained by using measuring tape.[21, 22] It is also used as a screening tool in conditions like famine and refugee crises.[23,24] In Pakistan, it is used in Thar, Thal and Cholistan where famine is simple to occur. MUAC is easier as a screening tool for severely malnourished adults than body mass index (BMI).[25] Our study was also based on MUAC and BMI measurements. This study was done among 120 adult girls of age limit between 18 to 27, in the institute of Jinnah College for Women. Basically, this study was based on checking the nutritional status of these girls. Our study results showed that according to MUAC 20.8% and BMI of 22.55% adult girls were underweighted. These percentages of underweight girls according to MUAC and BMI in our study were quite higher than 5.0% (MUAC) and 4.8%(BMI) reported by Angelina Jeyakumar.[26] The high percentages of our study were due to the reason that we were limited to a sample size of 120 girls while the sample size of the contrast study was 565 girls. Besides this, we also got the measurements of obese and overweight girls. Our study also revealed that 07(5.83%) adult females were underweight according to MUAC measurements but had normal BMI with a statically significant value of p 0.000. The positive correlation between MUAC and BMI was also reported among unmarried adolescent girls by Angelina Jeyakumar 2013(p.0.000) , a study among inpatients by Nestor Benitez 2016(p<0.001)[82],a study by ArumugamAndira

2016(p.1)[83], a study on adolescent girls in India by Kankana de 2016 (p=0.000)[84], a study among healthy adult females by J. R. Houghton and S. Smith 2011(p<0.001), research on Bangladeshi adults by Tania Sultana 2015(p<0.001).[27,28,29] In our work, we also correlate MUAC with waist-to-hip ratio (WH ratio). In correlation of waist to hip ratio and MUAC, 24.2% of adult females were unacceptable hip ratio but had normal MUAC. This correlation between MUAC and WH ratio was also highly significant (p 0.046) (Table 3). We cannot find the correlation between MUAC and waist-to-hip ratio in any research paper. Due to the present study, we find that MUAC is a valuable method to assess nutritional status and due to this method, we can categorize girls into different categories of nutritional status. So mid-upper arm circumference and body mass index are useful and easy methods to find nutrition in adults.

CONCLUSION

Our study was based on a demonstration of nutrition in adult girls by applying MUAC and other methods. So, in this study, we successfully find out the nutrition of these girls and categorize them according to their nutritional status. In the present research work, Mid Upper Arm Circumference (MUAC) was statistically and significantly correlated with body mass index (BMI) (p=0.000). As MUAC is a very simple and inexpensive method to assess nutrition, so this tool is to be used in underdeveloped countries like Pakistan. Also, this should also be a suitable method to be used for other age groups in assessing their nutritional status.

LIMITATION

First, this study does not show the variation of age as the MUAC measurement and BMI of this age group has not had much diversity because the growth of all these girls remains almost the same as if compared with the children or older persons. Secondly, we select only a limited sample size of 120 girls. So, in this study, the correlation of MUAC with respect to age was not significant. Thirdly, also the candidates were selected from one area only.

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CONTRIBUTORS
1. **Shahnaz Attaullah** - Concept & Design; Supervision
2. **Naila Gulfam** - Drafting Manuscript
3. **Seemab Tayyab -** Data Acquisition; Data Analysis/Interpretation
4. **Sheema Rahim**- Data Acquisition; Data Analysis/Interpretation
5. **Umair Wadood** - Critical Revision
6. **Noreen Wadood** - Final Approval