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Effectiveness of Nutritional Counselling on Dietary Habit and Practices among School Adolescents in a Public School of Rawalpindi. A Quasi Experimental Interventional Study

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ABSTRACT

Objective: To determine the effectiveness of nutritional counselling on dietary habit and practices among school adolescents in a public school of Rawalpindi using Diet Quality questionnaire.

Methodology: This quasi-experimental study was carried out on 109 females among public schools of Rawalpindi. Simple Random sampling was performed. After following inclusion and exclusion criteria, respondents were selected and DQQ questionnaire was distributed and responses calculated. Intervention include A school based, three-month nutrition education program based on HBM construct was delivered, consisting of twice-monthly sessions (30 minutes each), tailored to Pakistan's nutritional strategies to improve diet. Visual aid, lectures, charts and messages from Pakistan Dietary Guidelines were used to increase understanding. Counseling sessions were conducted during school hours, facilitated by health educators or school counselors. Post DQQ questionnaire was evaluated. Data was collected, entered and analyzed in SPSS version 26. Paired T test was applied and $p<0.05$.

Results: Mean age was 15.06 ±0.64. Interventional outcomes include NutritionalKnowledge and Unhealthy habits showed significant results $p<0.001$

Conclusion: The nutritional intervention interventions hold a positive impact on nutritional knowledge and unhealthy habits.

Keywords: Dietary Habits; Dietary Practices; Effectiveness; Nutritional Counseling; Scholl Adolescents.

INTRODUCTION

A proper diet is crucial for well-being and growth at all life stages, especially during puberty and prevents future health issues e.g. obesity, non-communicable diseases, and malnutrition. Adolescence (10-19 years) is a pivotal stage marked by rapid physical and mental growth, puberty, and lifestyle changes stated by Suleiman-Martos, (2021) [1]. As adolescents gain independence in food choices, guidance on healthy habits is essential. Locks, L (2022) divided this phase into Early (10-13): physical changes, puberty, and independence seeking, middle (14-17): increased independence, and immature decision-making and late adolescence (18-21+): improved self-control, clearer sense of self [2].

Globally, adolescents represent a significant population, with higher proportions in low-income (37.2%) than developed nations (17.2%) [3]. Concerning nutrition, low-income countries struggle with food insecurity and deficiencies, while high-income countries confront obesity and undernutrition, thus requires comprehensive approaches to address these disparate challenges [4]. Pakistan's national surveys reveal alarming rates of malnutrition, and stunting, in rural areas while obesity in urban teenagers due to consuming high-calorie foods, underscoring need for targeted interventions addressing these distinct problems [5]. Female adolescents in Rawalpindi, Pakistan, face unique nutritional challenges. Adolescent girls due to puberty and discrimination, have inadequate access to healthy food, medical care, and nutrition education, instigating stunted growth, and chronic diseases. This necessitates gender-specific approaches to support their optimal growth [6]. Limited access to nutrient-dense foods, and the rise of industrialization and globalization, has surged packaged and fast-food consumption, making it difficult for adolescents to make healthy choices [7]. Additionally, skipping breakfast, busy schedules and social pressures lead to lack of energy and unhealthy eating habits, increasing risk of obesity, chronic diseases, and eating disorders. Early marriage and pregnancy can further exacerbate nutritional deficiencies, emphasizing addressing these challenges through targeted interventions. An optimal adolescent nutrition can support their mental wellbeing, enhance focus, cognitive development and academic performance, resist illnesses, and actively engage them with their communities [8]. Almost 15% adolescent girls worldwide confront anemia, amid iron and vitamin D deficiency [9]. Adolescents require essential nutrients like amino acids, lipids, carbohydrates, and vital supplements e.g. vitamin D, calcium, iron, zinc, and omega-3 fatty acids to fuel tissue growth, energy metabolism, and brain function [10]. Research demonstrated a positive correlation between iron deficiency anemia (IDA) and depressive disorder (DD), with the severity of DD symptoms increasing in parallel with the degree of IDA [11]. A multifaceted approach combining education, policy development, and community involvement is required. Nutrition counseling through school programs can provide personalized guidance causing improved dietary habits. Nutrition education in curriculum empowers students to make informed food choices and develop lifelong healthy habits [12]. A systematic review of the literature identified a significant knowledge gap regarding the efficacy of preventive nutrition interventions, particularly among adolescents in low- and middle-income countries [13]. This study investigates the impact of counseling on dietary modifications in teenage girls, fostering informed choices for healthier future and explores potential solutions to support

their health and development.

MATERIALS & METHOD

This Quasi experimental Interventional study was carried out on 109 participants, at Federal Government Girl school of Rawalpindi between November 2023 to March 2024 after the approval letter from the Institutional Review Board (IRB). Sample size was calculated using prevalence of nutrition knowledge of students as 3%. Who sample size calculator used CI 95%, Margin of error 5%, We increase it to 109 for generalizability of results.

Inclusion Criteria: The study included adolescents (12-19 years), who were willing to participate.

Exclusion Criteria: Individuals with food allergies or diet-related issues, e.g. Celiac disease or Diabetes type 1. And patients with multiple comorbidities, patients having psychological issues. Before enrolling all participants, written consent and assent was obtained, and their rights, confidentiality, and voluntary participation was ensured at all levels. Also, minimal disruption to academic activities through coordination with school administrators was assured. Participants underwent baseline assessment with validated Diet Quality Questionnaire (DQQ) to evaluate dietary habits, and nutritional knowledge. Diet Quality Questionnaire (DQQ), a validated, user-friendly tool assessing diet quality through 29 food category questions. It's quick (5min administration), reliable, and doesn't require specialized nutrition knowledge. DQQ has been validated in various countries, showing strong agreement with 24-hour recall data (88.6%-96.3%), effectively capturing dietary factors related to noncommunicable diseases. To mitigate the risk of recall bias in self-reported data, we validate the DQQ results with objective measures. Specifically, participants completed a food diary for a period of 5 days to provide a more detailed and reliable account of their dietary intake. A school based, three-month nutrition education program based on HBM construct was delivered, consisting of twice-monthly sessions (30 minutes each), tailored to Pakistan's nutritional strategies to improve diet. Visual aid, lectures, charts and messages from Pakistan Dietary Guidelines were used to increase understanding. Counseling sessions were conducted during school hours, facilitated by health educators or school counselors. Follow-up data collection sessions evaluated longitudinal changes in dietary habits and nutritional knowledge. Data were entered and analyzed using Statistical Package for Social Sciences (SPSS)26.0. The consumption of all the 29 items were assessed pre and post intervention. Descriptive statistics were expressed as mean ±standard deviation (Mean ±SD). To assess changes in outcome measures, McNemar's tests were used for categorical variables with p-value <0.05 to be considered as significant.

RESULTS

109 teenage females were asked for DQQ as quasi-experimental study. Mean age was 15.06 ±0.64. Most females 64 (58.7%) were of 15 years old. DQQ assessed 29 food groups, (binary Yes/No) based on 24-hour recall, excluding unprocessed red meat due to the Pakistani study population. It revealed significant changes in consumption, pre and post intervention. The McNemar tests identified significant increase in Whole grains ($p <$

.001), Vitamin A-rich foods (p = .03, p <.001), Yogurt (p < .001), and Fruit juice/drinks (p < .001) consumption while significant decrease in Grains-based foods (p < .001), Citrus (p < .001), Sweets (p < .001, p = .01), fried foods (p = .001), fluid milk (p < .001), sugary drinks (p = .03, p < .001), fast food (p= .03) consumptions. The food diary data also supports and validates the self-reported data.

Table I: Consumption of 29 Food

DQQ Questions	Pre-Intervention	Post Intervention	p-value
	n (%)	n (%)	
Foods made from grains	101 (92.67%)	77(70.64%)	<0.001
Whole grains	37 (33.95%)	92(84.40%)	<0.001
White roots, tubers, and plantains	66 (60.55%)	74(67.89%)	0.31
Pulses	69 (63.31%)	55(50.46%)	0.06
Vitamin A-rich orange vegetables	26 (23.86%)	42(38.53%)	0.03
Dark green leafy vegetables	50 (45.87%)	44(40.37%)	0.49
Other vegetables	98 (89.91%)	103(94.50%)	0.30
Vitamin A-rich fruits	7 (6.43%)	55(50.46%)	<0.001
Citrus	84 (77.06%)	31(28.44%)	<0.001
Other fruits	54 (49.54%)	54(49.54%)	1.00
Baked / grain-based sweets	92 (84.40%)	43(39.45%)	<0.001
Other sweets	93 (85.32%)	42(38.53%)	<0.001
Eggs	72 (66.06%)	56(51.38%)	0.06
Cheese	4 (3.67%)	7(6.42%)	0.55
Yogurt	38 (34.86%)	82(75.23%)	<0.001
Processed meats	10 (9.17%)	16(14.68%)	0.31
Unprocessed red meat (ruminant)	37 (33.94%)	46(42.20%)	0.24
Poultry	64 (58.72%)	68(62.39%)	0.66
Fish and seafood	19 (17.43%)	13(11.93%)	0.36
Nuts and seeds	46 (42.20%)	50(45.87%)	0.68
Packaged ultra-processed salty snacks	73 (66.97%)	53(48.62%)	0.01
Instant noodles	49 (44.95%)	49(44.95%)	1.00
Deep fried foods	74 (67.89%)	48(44.04%)	0.001
Fluid milk	91 (83.49%)	64(58.72%)	<0.001
Sweet tea / coffee / cocoa	93 (85.32%)	80(73.39%)	0.03
Fruit juice and fruit-flavored drinks	19 (17.43%)	57(52.29%)	<0.001
Soft drinks (sodas, energy drinks, sports drinks)	42 (38.53%)	16(14.68%)	<0.001
Fast food	24 (22.02%)	11(10.09%)	0.03

Paired t test was applied to find out any significant difference between pre and post nutrition knowledge, healthy eating habits and unhealthy heating habits. DQQ questions

were divided into 3 parts Nutritional Knowledge, healthy eating habits and unhealthy eating habits. The questions were used to assess the students' understanding of different food categories. Wide variety of food items, these questions also explored participants' consumption of beverages like milk and chai, fresh juices, and cold drinks, as well as their knowledge and awareness about fast food options like from KFC and McDonald's. healthy eating habits. These questions covered a wide variety of nutrition filled foods, such as whole grains like roti, also evaluated the use of protein-rich foods i.e. dal, chickpeas, beans, and peas. The inclusion of a variety of vegetables and fruits, such as carrots, tomatoes. Additionally, questions about eggs and dairy products consumption e.g. yogurt highlighted the importance of protein and probiotics in participants' diet. Unhealthy eating habits. Mostly focused on the consumption of refined and processed foods, high in sugars, fats, and empty calories. The intervention demonstrated a statistically significant increase in nutrition knowledge ($p < 0.001$), indicating its effectiveness in enhancing participants' understanding of healthy eating principles. While the intervention positively impacted nutrition knowledge, it did not result in a statistically significant change in overall healthy eating habits ($p < 0.231$). However, there was a statistically significant decrease in unhealthy eating habits following the intervention ($p < 0.001$), suggesting that the program successfully contributed to reducing detrimental dietary behaviour.

Table 2: Eating Habits & Nutrition Knowledge

Variables	Pre Intervention	Post Intervention	p-value
Mean ± SD	Mean ± SD		
Nutritional Knowledge	3.21 ± 1.59	4.89 ± 2.47	<0.001*
Healthy Habits	5.71 ± 2.35	6.07 ± 1.99	0.231
Unhealthy Habits	4.81 ± 1.60	3.01 ± 2.03	<0.001*

DISCUSSION

Adolescents' eating habits significantly impact their development and growth, with poor choices linked to obesity and non-communicable diseases later in life. The typical teenage diet is high in calories, fast food, and sweets, contributing to the global obesity trend. Healthy food choices during this period can mitigate overeating and undereating. Health beliefs, shaped by individual perspectives and experiences significantly impact the adoption of healthy behaviors. After intervention, there is a statistically significant increase in nutrition knowledge ($p < 0.001$), indicating its effectiveness in enhancing participants'. Despite this increase, brief intervention may not be sufficient to substantially alter deeply ingrained eating habits. Sharif Ishak et al.'s study found that intervention group showed increased knowledge scores post-intervention, but no significant differences in attitudes and practices compared to control group. (Sharif Ishak et al 2020) [14]. The intervention incited a significant decrease in soft drinks consumption (38.53% to 14.68%). Participants replaced sugary drinks with water, with female adolescents motivated by skin health concerns. Participants eating vitamin A-rich vegetables daily increased from 26% to 42% after intervention. The small increase suggests high baseline adherence and ease of incorporating vegetables into daily diets. Kate et al.'s study found that school-based interventions can increase fruit and vegetable consumption and improve fat intake. (O'Brien et al 2021) [15]. Nut, seed, and pulse consumption decreased post intervention, indicating potential barriers. Targeted education strategies are needed to promote these nutrient-dense foods. However, sweet food consumption significantly decreased, showing effectiveness of focused education and behavioral techniques. Abir et al.'s systematic review evaluated the impact of behavioral and educational interventions on weight and health outcomes in children and adolescents (4-16 years) and successfully reduced sugar-sweetened beverage (SSB) consumption, with reducing SSB intake being primary endpoint (Abir Abdel Rahman et al 2018) [16]. The study found a significant increase in female participants abstaining from fast food after the intervention, rising from 78.0% (85) to 89.9% (98). While this 11.9% increase indicates a positive trend towards reduced fast-food consumption, it falls short of the intervention's objectives. Nora A et al.'s cross-sectional survey of 127 adolescent and 69 young adults' Saudi girls found that while protein, riboflavin, iron, and salt intake was adequate, other nutrients were deficient. Alarmingly, 95.4% consumed fast food, with 79.1% doing so weekly. Higher fast-food intake was linked to larger waist and hip circumferences in teenagers. (ALFaris et al 2015) [17].

Limitations of the study

This study is subject to several limitations that may compromise its validity, long term effectiveness, reliability, and generalization. These include, the a small sample size, which may not be representative of the larger population, a brief intervention period, which may not adequately capture sustained effects, inadequate control over external influences, including, family eating habits and socioeconomic status, that shape individual behaviors, sociocultural pressures, social media, and peer dynamics that impact motivation, physical activity levels, which significantly affect9 overall well-being, potential biases and inaccuracies inherent in self-reported data, and restricted generalization due to the specific study population and context. By recognizing these limitations, we can refine our understanding of the study's implications and pinpoint areas for future research to address these gaps.

CONCLUSION

The nutritional intervention demonstrated modest improvements in young female students' eating practices, reduced fast food and soft drink consumption, and a slight increase in vegetable intake. Hence these interventions hold a positive impact on nutritional knowledge.

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