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Determination of Nutritional Assessment and Dietary Management for Various Diseases among Patients in Pakistan

Aiman Ali¹, Usman Ahmad^{2*}, Fizzah Ashfaq¹, Muhammad Alam³, Irfan Mumtaz², Altaf Hussain⁴ and Abdul Mateen²

¹The KAIMS International Institute, Multan, Pakistan

²PMAS Arid Agriculture University, Rawalpindi, Pakistan

³Rehman Medical Institute (RCAHS), Peshawar, Pakistan

⁴Sargodha University, Sargodha, Pakistan

Abstract

Background: Adequate nutrient intake plays a crucial role in strengthening the immune system and preventing the development of various diseases. Malnutrition, whether due to deficiency or excess, can significantly impair health and contribute to the progression of chronic conditions.

Objective: To carry out a nutritional assessment based on standard classifications (Types A, B, C and D), and to examine dietary management approaches aimed at addressing malnutrition in patients with various health conditions.

Methods: An observational hospital-based study was conducted involving both male and female patients. Physical assessments were performed daily, and data were recorded using screening forms provided by the hospital. The focus was on determining nutritional status and identifying related disorders.

Results: Among the assessed patients, the prevalence of major disorders included diabetes mellitus (45%), cardiovascular diseases (17%), coeliac disease (17%), obesity in males (10%), underweight status (8%), and polycystic ovary syndrome (PCOS) (3%). Nutritional deficiencies were identified as contributing factors to the onset and progression of these conditions, largely due to limited awareness regarding the importance of adequate nutrition.

Conclusion: Malnutrition remains a pressing concern among patients, primarily due to poor hygiene, poverty, inadequate knowledge of healthy living practices, improper domestic waste management, and frequent consumption of inadequately prepared meals. These factors collectively deteriorate patients' physical health and underscore the necessity for comprehensive public health education and nutritional interventions.

Keywords: dietary guidelines; food consumption patterns; non-communicable diseases; nutrient reference values.

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* **CONTACT:** usmanahmad239@yahoo.com

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Introduction

Nutrition transition and lifestyle changes have contributed to a rising prevalence of overweight and obesity, along with a global pandemic of non-communicable diseases (NCDs), including diabetes, cardiovascular diseases (CVDs), hypertension, and cancers [1]. These conditions represent the leading causes of premature mortality in both developed and developing nations and accounted for 38 million of the world's 56 million deaths in 2012 [2]. The economic burden associated with the treatment of NCDs runs into billions of dollars annually, leading to reduced physical productivity, increased disability, and a significant loss in economic output and quality of life at individual and societal levels [3]. NCDs are thus responsible for substantial losses in productive life years and cause extensive suffering for families and communities.

In Pakistan, the estimated prevalence of diabetes is 26.3%, with a higher occurrence in urban areas (28.3%) compared to rural areas (25.3%) [4]. Cardiovascular diseases, similarly, rank among the leading causes of disability and premature mortality globally, with low- and middle-income countries bearing over 80% of the global disease burden, along with disproportionate healthcare expenditures [5,6]. In Pakistan, CVDs account for 19% of all adult deaths in the 30-70 age group.

Given the strong association between nutrition and disease, optimal nutritional status is essential for the prevention, management, and control of diet-related disorders. To curb the growing impact of malnutrition and diet-related diseases, evidence-based dietary practices and lifestyle interventions are urgently needed. Comprehensive dietary recommendations should target all age and gender groups, and be informed by existing data on food intake, nutritional requirements, dietary patterns, lifestyle factors, and the known relationships between diet and disease [7,8].

The formulation of population-specific dietary guidelines necessitates a thorough review of local food consumption behaviours, nutritional intake, health status indicators, and socioeconomic determinants, as well as a contextual understanding of prevailing public health challenges related to diet and nutrition [9,10].

The primary objectives of the present study were as follows:

- To assess the nutritional composition of staple foods in relation to physical health requirements of patients with various clinical conditions.
- To develop balanced dietary plans tailored to the nutritional needs of male and female patients with different diseases.

Research Methodology

General Background

The present study was conducted at the Pak Nutritional Clinic and South Punjab Hospital, Multan, Pakistan. A total of 175 patients were enrolled, comprising 70 males and 105 females diagnosed with various diseases. Patients were assessed daily through clinical observation to monitor their physical health status. Additionally, each participant completed a structured questionnaire to gather information on their physical condition and lifestyle-related social factors. To formulate appropriate balanced diet plans, nutritional energy values of staple foods were calculated in accordance with patient-specific health requirements. Suitable food combinations were determined to address malnutrition among patients with different medical conditions. Cases presenting with serious health concerns were referred to the relevant hospital departments for further medical intervention.

Study Setting

Pak Nutritional Clinic and South Punjab Hospital, Multan, Pakistan.

Inclusion Criteria

Mentally competent male and female patients present in the hospital and willing to participate in the study.

Exclusion Criteria

Patients with a history of drug abuse or alcohol dependency, and those unwilling to provide consent, were excluded from the study.

Analysis Plan

Frequencies and percentages were calculated for categorical variables, and data were presented in tabular form. The relationship between nutritional deficiencies and the presence of various diseases was assessed using a one-way ANOVA test, with statistical significance set at $p < 0.05$.

Research Results

A total of 175 sample sizes were taken in this study 40% were male, and 60% of participants were female. The frequency of Malnutritional was greater in females than males in the Malnutritional department of Pak Nutritional Clinic and South Punjab Hospital, as shown in Table 1. These differences may be attributed to gender biases in seeking healthcare. Another reason might be that in rural areas, females work at home and spend most of their time around their residence, and they do not have proper awareness about their health.

Table 1. Frequency of Malnutritional patients on Gender basis (n=175)

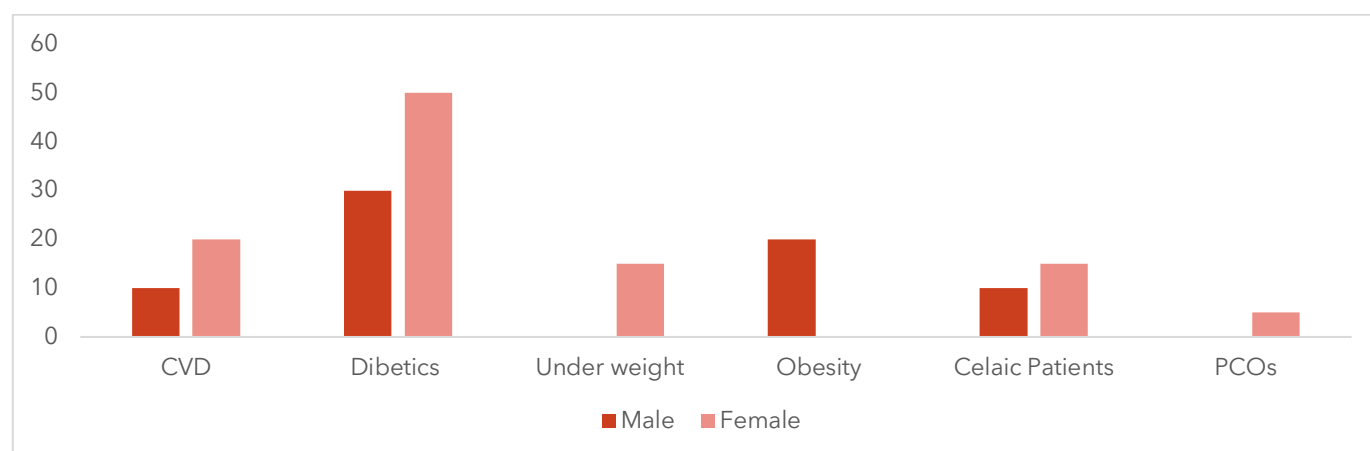
Gender	Frequency (Patients)	Relevant Frequency %	Cumulative Percent %
Male	70	40%	40
Female	105	60%	100

Based on different disorders were recorded as Cardiovascular Disorders (CVD) 17%, Debates 45%, Underweight 8%, obesity disorder (male) 10%, Celiac Disorder 17% and Polycystic ovary syndrome (PCOs) 3%, out of the 175 participants as shown in table 2 and figure 1. Table 2 indicates different diseases among opposite genders; the most highlighted disease was diabetes. However, Cardiovascular problems and celiac disease (gluten intolerance) have almost the same number of patients [11,12]. Additionally, a specific number of clients claimed the problem related to weight management. Some females also experienced hormonal issues like Polycystic ovary syndrome. The significance of the different diseases among the patients was determined using the ONE Way ANOVA Test to determine their relationship. The results showed a P value of, which was less than α , indicating that nutritional deficiency was responsible for different diseases in patients.

Table 2. Frequency of malnutritional patients in hospital (n=175)

Disorders	Frequency (Patients)	ONE WAY ANOVA TEST P value 0.05	Relevant Frequency %	Cumulative Percent %	Status
CVD	30	0.02	17%	17	Significant
Diabetes	80	0.02	45%	62	Significant
Under weight (female)	15	0.02	8%	70	Significant
Obesity (male)	20	0.02	10%	80	Significant
Celiac Patients	30	0.02	17%	97	Significant
Polycystic ovary syndrome (PCOs)	05	0.02	3%	100	Significant

Figure 1. Frequency of malnutritional patients in hospital (n=175)



The nutrients used in the balanced diet for malnutritional patients represented the micronutrients and macronutrients that were present in our food and had synergistic and antagonistic effects in different combinations according to the patient's needs, as shown in Table 3. Different patients require different types of nutrient intake to recover from the deficiency of nutrients and to overcome the side effects of diseases. Nutrients also help enhance the immune system to protect against harmful diseases [13,14]. Different types of food combinations were

recommended to treat patients suffering from protein-energy malnutrition [15,16]. Table 3 depicts the good combination and the bad ones. Before giving a diet chart, good or bad combinations should be studied well in terms of the use of nutritional assessments for the patient's requirements [17,18]. Each and every nutrient has a recommended daily allowance as per the patient's age and gender.

Table 3. Nutritional assessment and its types in staple foods

Nutrients	Food Source	Food Quantity	Amount	RDA	Nutrient Density	Energy Density	Nutrient- Nutrient Interaction
Calcium	Buffalo (Milk)	1 Glass	250gm= 262kcal	1000mg	440mg/100 0mg *100 =44%	250/262 =0.95	Antagonist
Iron	Apple	2 Medium size	114 kcal	18mg	0.2/18*100= 1.1%	200/114 =1.75	
Vitamin A	Carrot	1	78gm=30kcal	900mcg	600/900*10 0= 66%	78/30= 2.6	
Zinc	Chickpeas (cooked)	1 cup	200gm=374kcal	18mg	2.8/15*100= 18%	200/374 =0.5	Synergistic
Protein	Chicken	1/4kg	250gm=468kcal	55gm	40/55*100= 80%	250/468 =0.5	
Thiamine (B1)	Wheat whole grain Flour	100gm	100gm=357kcal	1.2mg	0.30/1.2*10 0= 25%	100/357 =0.2	Antagonistic
Riboflavin (B2)	Lettuce	1 cup	100gm=18kcal	1.2mg	0.11/1.2*10 0= 9%	100/18= 5	
	Beef liver	3.5ounce	100gm=136kcal	900mcg	140/900*10 0= 15%	100/136= 0.7	
Copper/ Vitamin C	Orange	1	100gm=43kcal	90mg	43/90*100= 47%	100/43= 2.3	Antagonistic
Calcium	Buffalo (Milk)	1 Glass	250gm= 262kcal	1000mg	440mg/100 0mg *100 =44%	250/262 =0.95	Antagonist
Iron	Apple	2 Medium size	200gm= 114kcal	18mg	0.2/18*100= 1.1%	200/114 =1.75	
Copper Zinc Iron	Beef liver	3.5ounce	100gm=136kcal	900mcg	140/900*10 0= 15%	100/136= 0.7	Antagonistic
	Chickpeas (cooked)	1 cup	200gm=374kcal	18mg	2.8/15*100= 18%	200/374 =0.5	
	Goat liver	3 ounces	2.1gm per 85 Gm	18mg	2.1/18*100= 11.6%	85/135= 0.62	
Vit C Vit A Iron	Orange	1	100gm=43kcal	90mg	43/90*100= 47%	100/43= 2.3	Synergistic
	Carrot	1	78gm=30kcal	900mcg	600/900*10 0= 66%	78/30= 2.6	
	Apple	2 medium size	200gm= 114kcal	18mg	0.2/18*100= 1.1%	200/114 =1.75	
Iron Magnesium Maganese	Apple	2 medium size	200gm= 114kcal	18mg	0.2/18*100= 1.1%	200/114 =1.75	Antagonistic
	Milk	1 cup	26.8mg per 244 g (120kcal)	350mg	26.8/350*10 0= 7%	26.8/120 =0.22	
	Spinach	½ cup Boiled	0.8mg per 25kcal	2.1mg	0.8/2.1*100 = 38%	0.8/25 =0.032	
	Carrot	1	78gm=30kcal	900mcg	600/900*10	78/30=	

Vit A Vit E Vit K					0= 66%	2.6	Antagonistic
	Roasted sunflower seeds	1/4cup 60ml	12mg= 45kcal	15mg	12/15*100= 80%	12/45= 0.266	
	Broccoli	4 sprouts	118mcg=5kcal	90mcg	118/90*100 = 131%	118/5= 23.6	
Vit D Calcium Phosphorous	Cheese	100gm	24IU= 402kcal	15mcg	6%	24/402= 0.05	Synergistic
	Milk	1 Glass		1000mg	440mg/100 0mg *100 =44%	250/262 =0.95	
	Dry salted Peanuts	1oz	103mg=166kcal	700mg	103/700*10 0= 14.7%	103/166= 0.6	
Vit E	Roasted sunflower Seeds	1/4cup 60ml	12mg= 45kcal	15mg	12/15*100= 80%	12/45= 0.266	Synergistic
Copper Zinc Iron	Beef liver	3.5ounce	100gm=136kcal	900mcg	140/900*10 0= 15%	100/136= 0.7	Antagonistic
	Chickpeas (cooked)	1 cup	200gm=374kcal	18mg	2.8/15*100= 18%	200/374 =0.5	
	Goat liver	3 ounce	2.1gm per 85 Gm	18mg	2.1/18*100= 11.6%	85/135= 0.62	
Zinc Folate Iron Vit B2 Vit B3	Chickpeas (cooked)	1 cup	200gm=374kcal	18mg	2.8/15*100= 18%	200/374 =0.5	Synergistic
	Spinach	1 cup		400mcg	58/400*100 =15%	100/27= 3.7	
	Spinach	1 cup	100gm=27kcal	18mg	4.8/18*100= 26%	100/27= 3.7	
	Lettuce	1 cup	100gm=18kcal	1.2mg	0.11/1.2*10 0= 9%	100/18= 5	
	Brown Rice	1 cup	5.2mg=160kcal	15mg	5.2/15*100= 34%	5.2/160= 0.03	
VitK Calcium	Broccoli	4 sprouts	118mcg=5kcal	90mcg	118/90*100 = 131%	118/5= 23.6	Antagonistic
	Buffalo Milk	1 Glass	250gm= 262kcal	1000mg	440mg/100 0mg *100 =44%	250/262 =0.95	
Fat Thiamine	Olive oil	1 tbsp	15gm=45cal	ND	--	15/45= 0.33	Antagonistic
	Wheat whole grain flour	100gm	100gm=357kcal	1.2mg	0.30/1.2*10 0= 25%	100/357 =0.2	
VitA Vit D	Carrot	1	78gm=30kcal	900mcg	600/900*10 0= 66%	78/30= 2.6	Synergistic
Protein Iron Copper	Chicken	1/4kg	250gm=468kcal	55gm	40/55*100= 80%	250/468 =0.5	
	Apple	2 medium size	200gm= 114kcal	18mg	0.2/18*100= 1.1%	200/114 =1.75	

Beef liver	3.5ounce	100gm=136kcal	900mcg	140/900*10 0= 15%	100/136= 0.7
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After analysing the synergistic and antagonistic effects of nutrient-nutrient interactions, a balanced diet plan was developed to address malnutrition [19, 20]. As shown in the table, meal timings and menus are outlined alongside macronutrient content and caloric values. Each meal or snack provides a specific number of calories designed to support the nutritional rehabilitation of patients. The balanced diet plan was tailored and implemented for malnourished patients to help restore nutritional status and support the management of various diseases. It was served daily to inpatients at the hospital [21, 22].

The balanced diet plan for patients with cardiovascular disorders (CVD) is presented in Table 4. The subsequent table outlines dietary recommendations specifically for individuals suffering from advanced heart conditions. Meals were prepared using olive oil due to its known cardioprotective effects, including the reduction of low-density lipoprotein (LDL) cholesterol levels. Chicken was grilled rather than fried, and skinless meat was preferred to minimise saturated fat intake [23, 24].

Table 4. Balanced diet for patients with cardiovascular disorders (CVD)

Meal	Menu	Carbs (g)	Proteins (g)	Fats (g)	Energy (kcal)
Breakfast (8:00am)	1 cup cooked oats	60	12	4	324
	1 cup milk (skim)	15	8	3	119
	1 apple	15	0	0	60
Snack (11:00am)	Smoothi (1/2 Banana, 1/2 mango, 1TBS honey, 1/2 cup almond milk, 5 TBS carrot powder)	42	6	1	201
Lunch (2:00pm)	4 oz grilled salmon	0	28	9	193
	2 ser boiled rice (2/3 cup)	30	6	1	153
	1 Tbsp Olive oil	0	0	15	135
	1 cup Broccoli	5	2	0	28
	6 Almonds	0	0	5	45
	2 ser boiled rice (2/3 cup)	30	6	1	153
	1 Tbsp Olive oil	0	0	15	135
Snack (5:00pm)	Grape fruit Juice 2/3 cup	30	0	0	120
Dinner (8:00pm)	1 chapati	15	3	0	72
	Mixed Vegetable Curry	41	9.5	10	292
	2.5 oz Chicken	0	18	8	144
	Raisins	15	0	0	60
		268	92	56	1946

The balanced diet plan for Diabetes is shown in Table 5. The table displays the diet plan for diabetic patients. A balanced diet for sugar patients includes single fruits instead of fruit salads [25, 26]. We suggested patients avoid direct intake of fruits in the early morning. We also recommended moringa powder or moringa leave tea. It lowers cholesterol levels and manages weight, plus controls blood glucose levels. We suggested the patient have sugar-free biscuits or stevia in liquid (milk or tea) [27, 28].

Table 5. Balance diet for Diabetes patients

Meal	Menu	Carbs (g)	Proteins (g)	Fats (g)	Energy (kcal)
Breakfast (8:00am)	2 Brown Bread	30	6	2	162
	2 ser boiled rice (2/3 cup)	30	6	1	153
	1 Tbsp Olive oil	0	0	15	135
Lunch (2:00pm)	1 brown bread	15	3	1	81
	Olive oil 1 tsp	0	0	5	45
	1 peach	15	0	0	60

Snack (5:00pm)	Cinnamon tea 1 cup	20	12	11	224
	Walnut powder 1 tbsp	0	0	5	45
Dinner (8:00pm)	3 oz grilled salmon	0	21	9	165
	2 ser boiled rice (2/3 cup)	30	6	1	153
	1 cup Broccoli	5	2	0	28
	1 peach	15	0	0	60
Bed Time (10:00pm)	1 cup milk (skim)	12	8	2	98
	1 TBSP turmeric powder	1.43	0.17	0.22	7
		170	75	48	1415

The balance diet plan for underweight woman as shown in table 6. The following table shows that the meal plan for underweight female patients [29, 30]. Diet plan was prepared in which the caloric intake was high because underweight patients should increase their portion sizes and add up to the 500 kilocalories in the Daily caloric intake.

Table 6. Balance Diet for the Underweight female patients

Meal	Menu	Carbs (g)	Proteins (g)	Fats (g)	Energy (kcal)
Breakfast (8:00am)	1 paratha	15	3	1	81
	1 whole egg	0	7	4	84
	½ tbsp olive oil	0	0	7.5	67.5
	1 peach	15	0	0	60
Snack (11:00am)	Smoothi (2bananas, 1 tbsp peanut butter, 1 cup milk, 1tbsp honey, walnut powder)	57	15	16	432g
Lunch (2:00pm)	2oz grilled chicken	0	14	9	141
	1 chapati	15	3	1	81
	2/3 cup yogurt	15	8	3	119
Snack (5:00pm)	1 vegetable sandwich	33	19	10	254
	1 cup pineapple	15	0	0	60
Dinner (8:00pm)	1 chapati	15	3	1	81
	1 cup vegetable curry	24	5.6	5	163
	1 apple	15	0	0	60
Bedtime (10:00pm)	1 cup milk (skim)	12	8	0	80
	1 TBSP Honey	15	0	0	60
	1 TBSP Raisins	8	0	0	32
		253	83	57	1835

The balanced diet plan for Obese men is shown in Table 7. The table indicates that the meal plan for the obese patients. Obese patients cut their portion sizes to manage their weight. Caloric intake is reduced to 500 kcal per daily intake. Diet chart avoid the intake of saturated fat and sugars. A Balanced diet plan emphasises home-made fresh foods' importance [31, 32].

Table 7. Balance Diet for the Obese male patients

Meal	Menu	Carbs (g)	Proteins (g)	Fats (g)	Energy (kcal)
Breakfast (8:00am)	1 Chapati	15	3	1	81
	2 egg white	0	7	3	55
	½ tbsp olive oil	0	0	7.5	67.5
Snack (11:00am)	Smoothi (½ mango, 1TBS honey, ½ cup almond milk, 5 TBS carrot powder)	35	6	1	171
Lunch (2:00pm)	1 chapati	15	3	0	72
	Mixed Vegetable Curry	41	9.5	10	292
	2.5 oz Chicken	0	18	8	144
	Raisins 1TBsp	15	0	0	60
Snack (5:00 pm)	Grape fruit Juice 2/3 cup	30	0	0	120
Dinner (8:00pm)	3 oz grilled salmon	0	21	9	165
	1 ser boiled rice (1/3 cup)	15	3	0	72
	1 Tbsp Olive oil	0	0	15	135
	1 cup Broccoli	5	2	0	28
	1 apple	15	0	0	60
Bed Time (10:00pm)	Raisins 1 Tbsp	15	0	0	60
		216	72	44.5	1555

The balanced diet plan for Celiac patients is shown in Table 8. The following table shows the balanced diet for celiac disease (intolerance to gluten). It was suggested that patients avoid foods that are made up of wheat, rye and barley. The meal plan was full of a gluten-free diet. Patients should prefer corn, chia, flax and beans for the betterment of their health [33,34].

Table 8. Balance Diet for the Celiac patients

Meal	Menu	Carbs (g)	Proteins (g)	Fats (g)	Energy (kcal)
Breakfast (8:00am)	1 maize chapati	15	3	1	81
	1 Cup milk	15	8	3	119
	1 apple	15	0	0	60
	1 tsp Olive oil	0	0	5	45
	1 whole egg	0	7	4	64
Snack (11:00am)	Smoothi (1/2 Banana, ½ mango, 1TBS honey, ½ cup almond milk, 5 TBS carrot powder)	42	6	1	201
Lunch (2:00pm)	4 oz grilled salmon	0	28	9	193
	2 ser boiled rice (2/3 cup)	30	6	1	153
	1 Tbsp Olive oil	0	0	15	135
	1 cup Broccoli	5	2	0	28
	6 Almonds	0	0	5	45
Snack (5:00 pm)	Grape fruit Juice 2/3 cup	30	0	0	120
	Half cup potato fries	15	3	1	81
	1 tsp Olive oil	0	0	5	45
Dinner (8:00pm)	Mixed Vegetable Curry	41	9.5	10	292
	2 tsp olive oil				
	2.5oz chicken	0	18	8	144
	Raisins 1 Tbsp	15	0	0	60

268

92.5

62

2000

The balanced diet plan for Polycystronic Ovary syndrome (PCO) female patients is shown in Table 9. The given diet chart is about polycystic ovary syndrome. Females having such hormonal issues should prefer seeds in their diet. Seeds such as pumpkin, sunflower and sesame help patients with balancing hormones and lower the level of inflammation in the body [35, 36].

Table 9. Balance Diet plan for the Polycystic ovary syndrome (PCOs) in female patients

Meal	Menu	Carbs (g)	Proteins (g)	Fats (g)	Energy (kcal)
Breakfast (8:00am)	2 Brown Bread	30	2	6	162
	2 egg white	0	7	3	55
	½ tbsp olive oil	0	0	7.5	67.5
Snack (11:00am)	Smoothi(½ cup spinach, 2 cup sliced peaches, 2 TBSP Honey, Water 1 cup)	37.5	0	1	154
Lunch (2:00pm)	2 oz grilled salmon	0	6	14	110
	1 Tbsp Olive oil	0	0	15	135
	1 cup Broccoli	5	2	0	28
	1 peach+ 1 apple	30	0	0	120
Snack (5:00 pm)	2 cup cube watermelon	30	0	0	120
Dinner (8:00pm)	1 plate vegetable chicken fried Rice	50	20	12	380
	Yogurt plain 1 cup	15	3	8	100
Bed Time (10:00pm)	1 cup milk	15	3	8	100
		240	56	58	1620

Discussion

Cereal grains and grain products are crucial for supplying minerals, vitamins (thiamine), protein, carbs, and vitamin E. It is the primary staple food that meets more than half of the body's protein, energy, vitamins, and minerals needs. For various age groups, 45–65% of total calories should come from carbs, according to the acceptable macronutrient distribution range [37]. Mutton, cattle, poultry, fish, liver, eggs, and pulses are all part of the meat and pulses group. These foods are high in proteins and minerals. For various age groups, the AMDR from protein in total calories is 10–35%, while for adults, it is 20–35% from fat. Children's acceptable ranges are comparable to those of adults, except that younger children require a somewhat larger proportion (i.e., 25 to 40%) of fat [5]. Milk and milk products are part of the dairy category and are necessary for neurological, muscular, and skeletal growth and development. Protein, lactose, calcium, phosphorus, minerals, and vitamins are abundant. Antioxidants, dietary fibre, vitamins, and minerals that shield the body from chronic illnesses, as well as a healthy metabolism, are all provided by vegetables [38, 39].

Increasing vegetable consumption to meet nutritional needs, maintaining a healthy body weight, supporting metabolic processes, and lowering the risk of developing chronic illnesses is advised. Fruits are vital for growth, development, and normal metabolic processes because they contain phytochemicals, dietary fibre, and vitamins and minerals [9, 10, 11]. Moderate fat, oil, salt, and sugar consumption can lower the risk of diabetes, cardiovascular disease, hypertension, and overweight or obesity [40, 41]. The body can obtain energy, dietary fibre, proteins, carbs, vitamins, minerals, and antioxidants from whole-grain cereals. They have been linked to a lower risk of coronary heart disease, diabetes, metabolic syndrome, hypertension, cancer, and other illnesses [42]. Consuming rice and other cereals with low or insignificant amounts of dietary fibre and refined wheat and wheat products (such as pasta, noodles, white bread, and other bakery goods) has been associated with an increased risk of colorectal cancer and

digestive issues. Foods high in carbohydrates should account for 45–65% of total calories [16]. When eaten with wheat, rice, and other cereals, pulses' high protein, dietary fibre, vitamins, minerals, and important amino acids—especially lysine—complement their nutritional makeup. When meat is scarce or prohibitively expensive, pulses may be used as a substitute because their protein level is nearly equal to that of meat. Since they tend to reduce the risk of chronic non-communicable diseases such as hyperlipidemia, heart disease, hypertension, diabetes, and cancer, they could be utilized as both preventative and therapeutic diets [43].

Proteins, iron, zinc, vitamin A, B12, and essential components of hormones, enzymes, and the immune system are abundant in meat, meat products, fish, and eggs. Eating lean meat instead of fatty meat is advised, often known as non-lean meat. Fish should be consumed at least once a week to give the body the protein and critical fatty acids it needs for growth and brain function. Avoid consuming too much cow, sheep, or goat meat to avoid consuming too much-saturated fat and cholesterol. Non-lean meat consumption has been linked to an increased risk of prostate, breast, and cardiovascular malignancies [44].

To meet the body's needs for protein and other vital nutrients, two to three portions of meat and meat products, chicken, fish, and eggs, should be consumed daily. In Pakistan, non-communicable diseases like diabetes, high blood pressure, heart disease, and cancer are becoming epidemic in scope. These are to blame for the growing strain on the healthcare system, human misery, and early mortality, all of which hurt the nation's productivity and socioeconomic advancement. Consumption of saturated fat and trans-fatty acids increases low-density lipoproteins (LDL) and cholesterol (bad fat), which raise the risk of hypertension and cardiovascular illnesses. Research indicates that substituting unsaturated plant oils for saturated fat and trans-fatty acids lowers bad fat (LDL and cholesterol) and raises good fat (high-density lipoprotein), which lowers the risk of CVDs.

Conclusions and Implications

The malnutritional problems are spreading among male and female patients due to unhygienic conditions, poverty, and unawareness of living conditions, such as improper domestic waste management, excessive use of improper cooked meals, etc., which affect the physical health conditions of patients. Older adults with poor mobility should perform physical activity to enhance their balance and prevent falls on 3 or more days per week. Muscle strengthening activities involving major muscles should also be done on 2 or more days a week. Older adults unable to perform moderate or vigorous intensity physical activity due to poor health should be physically active as their abilities and conditions permit.

Suggestions for Future Research

To effectively manage malnutrition in Pakistan, policy recommendations should focus on a multi-sectoral approach, including strengthening infant and young child feeding practices, improving access to nutritious food through food fortification and agricultural interventions, enhancing healthcare delivery, promoting nutrition education, and implementing robust social safety nets, with a particular focus on vulnerable populations like pregnant women, children under five years and old aged peoples.

Author Contributions

Aiman Ali to take part in the Pak Nutritional Clinic and South Punjab Hospital Multan to collect the data for further analysis. Aiman Ali, Fizzah Ashfaq and Usman Ahmad designed the study, performed the statistical analysis and wrote the manuscript. Muhammad Alam, Irfan Mumtaz, Altaf Hussain and Abdul Mateen assisted with data interpretation and manuscript revisions.

Data Availability Statement

Data and supplements available on request to the corresponding author.

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Institutional Review Board Statement

Ethics Review Committee of the KAIMS International Institute, Multan and Pak Nutritional Clinic and South Punjab Hospital Multan with Reference No /ERC No: PNS-1603.

Informed Consent Statement

Not Applicable

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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