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ASSESSMENT OF MALNUTRITION AND ITS DETERMINANTS AMONG THE ELDERLY POPULATION OF KEMARI, PAKISTAN

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ABSTRACT

Objectives: To determine the prevalence and contributing factors of malnutrition among the elderly population of Kemari visiting the rural health centers (RHC).

Methods: A cross-sectional study was conducted at RHC Kemari from 2019 to 2020. A total of 472 elderly population (60 years of age and older) were recruited through consecutive non-probability sampling. The Mini Nutritional Assessment (MNA) tool and Body Mass Index (BMI) were used to evaluate nutritional status. Descriptive statistics, chi-square tests, and odds ratio computations using SPSS version 24 were all included in the statistical analysis. P-values less than 0.05 were regarded as statistically significant.

Results: The results revealed that 46% of the 472 participants (63% male) were undernourished, and 41% were at risk. Malnutrition was substantially correlated with economic dependency, which was seen in 53% of cases (p=0.01). Poor nutritional outcomes were associated with 10% of cases of diabetes and 19% of cases of hypertension (p=0.00 and p=0.01, respectively).

Conclusion: The results show Community-based nutritional screening, targeted health education, and integrated dietary and socioeconomic interventions are urgently recommended to improve elderly health outcomes."

Keywords: Elderly population, Nutritional status, Dietary habits, Rural health centers

INTRODUCTION

The global population of the elderly aged sixty and above is multiplying (1). The World Health Organization (WHO) reports that the cumulative number of the world's elderly adults (aged 60 years) will exceed 1.2 billion by 2025, which will rise furthermore to 2 billion by 2050; this involves about

840 million people from countries with low- and middle-income (2). This demographic pattern is evident not only in Asia but also in Pakistan. In 2019, approximately fifteen million people in Pakistan were over 60 years old and accounted for 7% of the country's total population. The number of elderly persons is projected to double by 2050, i.e., forty million persons over 60 years of age. In Pakistan, only 2.3% of the population is older than the statutory age at which they are eligible for retirement benefits. This demographic shift contributes to chronic disorders, changing disease patterns, shifting social attitudes, and challenges in managing aging populations (3). These vital trends are expected in some Southeast Asian countries. In the long term, to have economic security during old age, there would be many fewer working-age individuals (4). Surveillance and monitoring of demographic data on Pakistan's elderly population are lacking.

Malnutrition and infectious disease are incredibly prevalent amongst the poor population of Pakistan, and along with it, intergenerational support is becoming less likely. In addition, the societal class difference has a significant impact on the health of the elderly in Pakistan. It means that women have no advantage over men, unlike in most countries (5). Similarly, malnutrition refers to the deficiencies, excesses, or imbalances in an individual's dietary intake or nutrient intake (6). Intrinsically, nutrition is broadly classified into two subgroups of conditions: According to WHO guidelines, one is undernutrition/malnutrition, including reduced height for age, muscle wasting, low weight for height, underweight, and micronutrient insufficiency or deficiency (7). The other is overweight, obesity, and diet-related non-communicable diseases known as comorbidities (such as ischemic heart disease, other heart diseases, stroke, diabetes, and cancers). The malnourished elderly population accounts for 5-12% although the fitness, efficiency, self-sufficiency, and quality of life depend on the nutritional status. The research was conducted on the elderly population specifically to assess the burden of malnutrition, which will help in making healthy decisions and developing prevention and recovery strategies to combat malnutrition. The current health system will suffer if this is not addressed promptly, especially in light of the growing number of elderly people.

Furthermore, the evaluation of the two types of malnutrition will help us to formulate policies to identify gaps and plan preventive measures for all diseases related to being overweight, while preventing economic collapse that may occur due to huge expenditures on rehabilitation care. This study intends to ascertain the most common demographic aspects of malnutrition among the elderly population during visits to the Rural Health Center (RHC) in Karachi, Pakistan.

MATERIALS AND METHODS

This investigation, which emphasized the issue of malnourishment among the elderly population, was carried out in the form of a cross-sectional survey at a Rural Health Center (RHC) located in Kemari, Karachi, Sindh, from 2019 to 2020. The study recruited both male and female individuals who were aged 60 and above and belonged to the Kemari district. These individuals were either seeking medical treatment at the RHC Kemari or accompanying patients. Those who failed to provide informed consent, were diagnosed with dementia or any debilitating condition, or had language barriers were excluded from the study.

Initially, the calculated sample size was determined to be 384, and after the incorporation of a 20% increment to account for potential data loss, the final sample size was established as 472. To select participants, a non-probability consecutive sampling technique was employed. A comprehensive survey was developed to collect demographic details such as age, gender, educational attainment, marital status, employment status, ethnicity, family composition, economic self-sufficiency, and individual lifestyle choices.

Furthermore, anthropometric measurements such as height, weight, and Body Mass Index (BMI) were documented. The evaluation of nutritional status was conducted using the Mini Nutritional Assessment (MNA) tool, a widely recognized and validated instrument developed by the Nestle Foundation specifically for elder populations. The main reason for using this tool was its simplicity, effectiveness, and non-intrusive approach to assess the nutritional well-being of the elderly

population. It effectively classifies people 60 years of age and older according to their nutritional status, highlighting the necessity of any possible nutritional interventions.

Participants' occupational statuses were classified into three distinct groups: reliant (not currently employed), partially reliant (limited employment), and autonomous (actively employed or retired from active employment). BMI was calculated using the formula of weight in kilograms divided by height in meters squared. To guarantee precision, weight was measured using a calibrated analog scale, while height was determined using wall-mounted calibrated tapes. The typical time required to complete the survey varied from 10 to 15 minutes per participant.

The Social Sciences Statistical Package (SPSS) version 24 was used for comprehensive processing and statistical analysis. The first action in the analytical process involved generating descriptive statistics for all variables included in the study. Categorical variables were represented through frequencies and percentages, while numerical variables were described using their modes and standard deviations. To investigate the associations between malnutrition and its related factors, the Chi-square test was utilized. Additionally, to assess potential risk factors associated with malnutrition, odds ratios were calculated. Throughout the analysis, a *p*-value threshold of less than 0.05 was set as the criterion for statistical significance.

RESULTS

The descriptive analysis of numerical variables for subjects shows that a total of 472 individuals were enrolled, comprising 297 males and 175 females, resulting in a gender ratio of approximately 1.69:1 (male: female). The participants had 5.3 years (SD = 6.2) of formal education. The mean age of the cohort was 67 years (SD = 7.2). Regarding anthropometric measurements, the body weight was recorded at 51 kg (SD = 10), and the height was 1.61 meters (SD = 0.07), leading to a Body Mass Index (BMI) of 19.6 (SD = 3.8). Additionally, the data revealed 2.08 dependents (SD = 2.1) per participant.

Table 1: Nutritional Status by Demographic Characteristics (n = 472)

Variables	n	Normal	Underweight	Overweight	Obese	p-value
Gender						
• Male	297	138 (46.5%)	133 (44.8%)	18 (6.1%)	8 (2.7%)	18.27
• Female	175	56 (32.0%)	84 (48.0%)	29 (16.6%)	6 (3.4%)	(0.00)
Marital Status						
• Married	412	167 (40.5%)	193 (46.8%)	40 (9.7%)	12 (2.9%)	4.22
• Single	41	19 (46.3%)	14 (34.1%)	6 (14.6%)	2 (4.9%)	(0.64)
• Divorced/Widowed	19	8 (42.1%)	10 (52.6%)	1 (5.3%)	0	
Family Status						
• Joint	244	90 (36.9%)	123 (50.4%)	23 (9.4%)	8 (3.3%)	4.56
• Nuclear	228	104 (45.6%)	94 (41.2%)	24 (10.5%)	6 (2.6%)	(0.19)
Living Arrangement						
• Alone	54	22 (40.7%)	22 (44.4%)	8 (14.8%)	0	
• With spouse	223	101 (45.3%)	102 (45.7%)	13 (5.8%)	7 (3.1%)	
• With a single daughter	14	6 (42.9%)	5 (35.7%)	3 (21.4%)	0	18.54
• With a married daughter	38	14 (36.8%)	20 (52.6%)	2 (5.3%)	2 (5.3%)	(0.23)
• With an unmarried son	14	6 (42.9%)	6 (42.9%)	1 (7.1%)	1 (7.1%)	
• With husband	129	45 (34.9%)	60 (46.5%)	20 (15.5%)	4 (3.1%)	

Variables	n	Normal	Underweight	Overweight	Obese	p-value
Economic Dependency						
• Dependent	251	107 (42.6%)	114 (45.4%)	20 (8.0%)	10 (4.0%)	7.76
• Partially Dependent	98	38 (38.8%)	50 (51.0%)	10 (10.2%)	0	(0.25)
• Independent	123	49 (39.8%)	53 (43.1%)	17 (13.8%)	4 (3.3%)	
Decision-Making Power						
• Yes	300	118 (39.3%)	140 (46.7%)	34 (11.3%)	8 (2.7%)	6.32
• No	107	48 (44.9%)	49 (45.8%)	5 (4.7%)	5 (4.7%)	(0.38)
• Sometimes	65	28 (43.1%)	28 (43.1%)	8 (12.3%)	1 (1.5%)	

As shown in Table 2, the study examined the relationship between several demographic variables and the nutritional status of the elderly population. There was a significant correlation between gender and weight, with women more likely to be overweight or obese and men more likely to be underweight or of normal weight. However, there was no discernible relationship between nutritional status and other factors like marital status, family structure, living arrangements, economic dependency, or decision-making power. This implies that of the variables examined, the only one that had a significant impact on the nutritional health of the elderly population was gender.

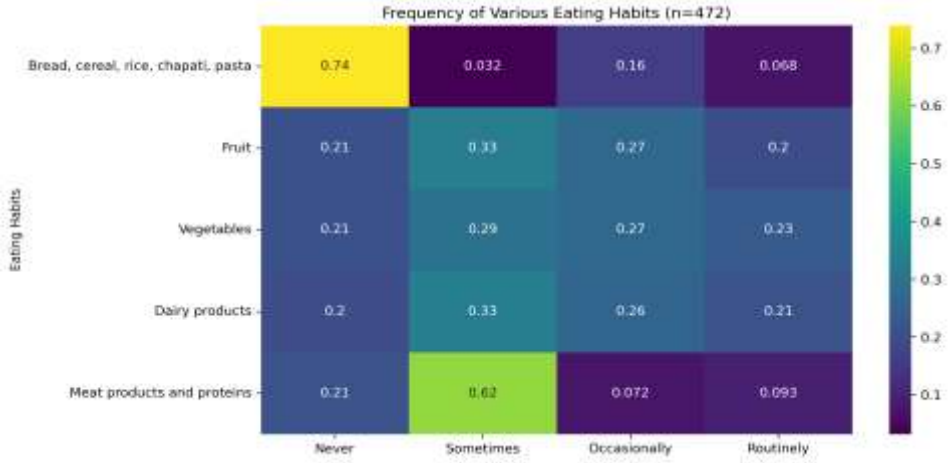
Table 1- Association between Life Habits and Nutritional Status (n = 472)

Variables	n	Nutritional Status				p – value
		Normal	Underweight	Overweight	Obese	
Household Activities						
• Yes	375	149(39.7)	42 (11.2)	171 (45.6)	13 (13.5)	
• No	97	45 (46.4)	5 (5.2)	46 (47.4)	1 (1)	
If yes, type of activity						5.25 (0.15)
• Cooking	153	74 (48.4)	14 (9.2)	61 (39.9)	4 (2.6)	
• Housekeeping	119	49 (41.2)	10 (8.4)	56 (47.1)	4 (3.4)	
• Groceries	79	27 (34.2)	8 (10.1)	41 (51.9)	3 (3.8)	
• Looking after grandchildren	24	6 (25)	4 (18.7)	13 (54.2)	1 (4.2)	
Smoking habits						
• Current	132	71 (53.8)	50 (37.9)	9 (6.8)	2 (1.5	30.09 (0.00)
• Former	139	63 (45.3)	67 (48.2)	7 (5)	2 (1.4)	
• Never	201	60 (29.9)	100 (49.8)	31 (15.4)	10 (5)	
Beverages						
• Tea	214	92 (43)	93 (43.5)	21 (9.8)	8 (3.7)	
• Coffee	15	4 (26.7)	8 (53.5)	3 (20)	0	19.94 (0.06)
• Green tea	76	39 (51.3)	31 (40.8)	5 (6.6)	1 (1.3)	
• Soft drinks	32	10 (31.3)	14 (43.8)	8 (25)	0	
• Alcoholic	135	49 (36.3)	71 (52.6)	10 (7.4)	5 (3.7)	
Substance Abuse						
• Never	216	78 (36.1)	106 (49.1)	27 (12.5)	5 (2.3)	
• Betel tobacco	83	35 (42.2)	40 (48.3)	5 (6)	3 (3.6)	12.1 (0.43)
• Betel nut	25	15 (60)	7 (28)	2 (8)	1 (4)	
• Betel quid	135	60 (44.4)	58 (43)	13 (44.4)	4 (3)	
• Alcohol	13	6 (46.2)	6 (46.2)	0	1 (7.7)	

Preferred time of sleep						
• Night	364	147(40.4)	167 (45.9)	38 (10.4)	12 (3.3)	6.04 (0.41)
• Morning	56	29 (51.8)	24 (42.9)	2 (3.6)	1 (1.8)	
• Afternoon	52	18 (34.6)	26 (50)	7 (13.5)	1 (1.8)	
Physical Activity						
• Never	140	62(44.3)	62 (44.3)	13 (9.3)	3 (2.1)	7.7 (0.56)

Figure 1 demonstrates the study population's varied dietary patterns. It demonstrates a more varied consumption of fruits, vegetables, dairy products, and meats, as well as a lower intake of staple foods like bread, cereal, rice, chapati, and pasta.

Figure 1: Proportional Distribution of Dietary Habits among Participants (n = 472)



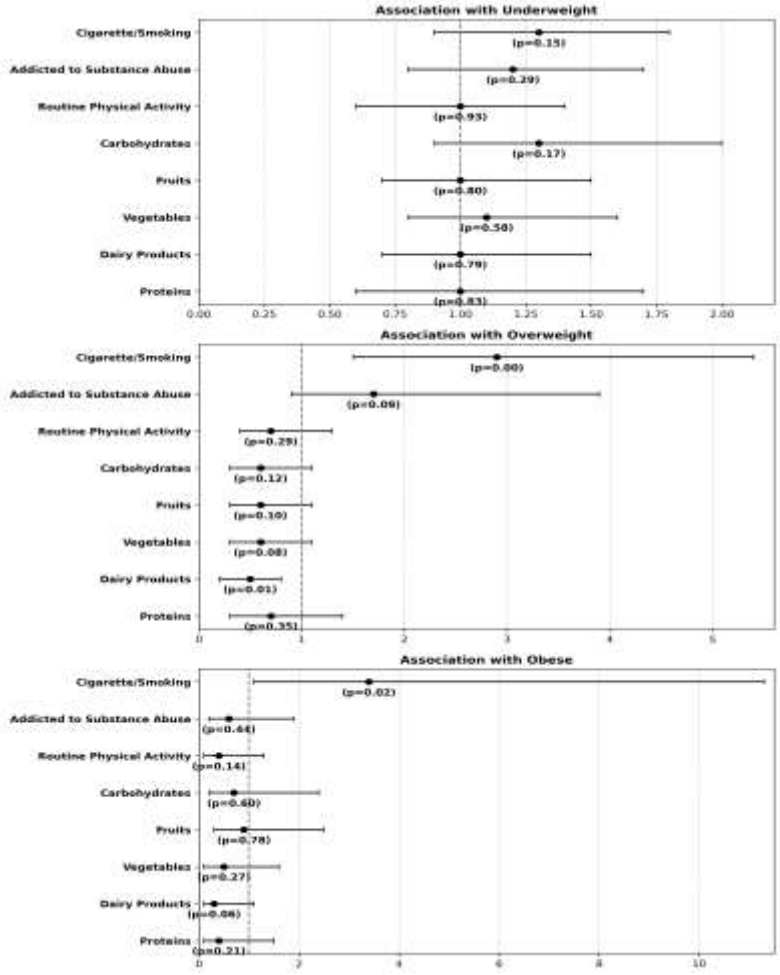
Multivitamin and calcium supplement users tended to have better nutritional status, possibly reflecting health awareness. Regular medicine intake was also associated with being normal or underweight. No significant link was found between sleeping pill use and nutritional status. Notably, diabetes was strongly associated with underweight status**,** while hypertension was more prevalent among overweight individuals**,** highlighting a significant relationship between chronic conditions and nutrition.

Table 3- Association of Nutritional Status with Lifestyle Habits and Health Conditions of the Elderly (n = 472)

Category	**n**	**Nutritional Status**				**p – value**
		Normal	**Underweight**	**Overweight**	**Obese**	
Health Status						
• Excellent	95	45 (47.4)	42 (44.2)	7 (7.4)	1 (1.1)	16.39(0.17)
• Very Good	87	41 (47.1)	34 (39.1)	10 (11.5)	2 (2.3)	
• Good	214	83 (38.8)	102 (47.7)	23 (10.7)	6 (2.8)	
• Fair	55	20 (38.4)	24 (43.6)	7 (12.7)	4 (7.3)	
• Poor	21	5 (23.8)	15 (71.4)	0	1 (4.8)	
Supplement Intake						
• Multivitamin	201	103(39.5)	125 (47.9)	24 (9.2)	9 (3.4)	9.42 (0.66)
• Calcium	153	69 (45.1)	67 (43.8)	13 (8.5)	4 (2.6)	
• Hormonal	23	11 (47.8)	8 (34.8)	4 (17.4)	0	
• None	35	11 (31.4)	17 (50)	6 (17.6)	1 (2.9)	
Suggested Medicine intake						6.09 (0.41)
• Always	287	119(41.5)	136 (47.4)	23 (8)	9 (3.1)	
• Sometimes	170	67(39.4)	77 (45.3)	21 (12.4)	5 (2.9)	

• Never	15	8 (53.3)	4 (26.7)	3 (20)	0	
Sleeping pills						
• Yes	148	62 (41.9)	69 (46.6)	14 (9.5)	3 (2)	1.83 (0.93)
• No	177	71 (40.1)	83 (46.9)	16 (9)	7 (4)	
• Sometimes	147	61 (41.5)	65 (44.2)	17 (11.6)	4 (2.7)	
Diagnosed Health Conditions Diabetes						
• No	424	160(37.7)	209 (49.3)	41 (9.7)	14 (3.3)	23.4 (0.00)
• Yes	48	34 (70.8)	8 (16.7)	6 (12.5)	0	
Cancer						
• No	396	187(42.2)	180 (45.5)	41 (10.4)	8 (2)	8.63 (0.03)
• yes	76	27 (35.5)	37 (48.7)	6 (7.9)	6 (7.9)	
Dyspepsia						
• No	391	185(42.2)	177 (45.3)	38 (9.7)	11 (2.8)	1.22 (0.75)
• Yes	81	29 (35.8)	40 (49.4)	9 (11.1)	3 (3.7)	
Hypertension						
• No	382	145 (38)	187 (48)	37 (9.7)	13 (3.4)	10.12 (0.01)
• Yes	90	49 (54.4)	30 (33.3)	10 (11.1)	1 (1.1)	

Figure 2 shows that dairy intake reduced the risk of being overweight**,** while smoking increased the risk of overweight and obesity**.** No significant links were found between underweight status and physical activity, substance abuse, or carbohydrate intake.



DISCUSSION

The current research has only been performed at the Rural Health Center, Kemari, Karachi; the findings are expected to depict the overall situation of malnutrition in the Pakistani area. Ahmad et al. published Pakistan's statistics in 2015, which showed that 43.3% of the population was at risk of malnutrition (8). Similarly, data from other parts of Pakistan showed that 8% in Islamabad (9), 20% in Karachi (10), and 5.53% in Sargodha (11) were malnourished. Moreover, using BMI as a malnutrition screen tool instead of an MNA tool will make a difference, even though it has a high predictive capacity for malnutrition (12).

Flegal et al. observed an elevated mortality risk in older and undernourished (BMI less than 18.5) people (13). Around 1.9 billion adults are overweight worldwide, while 462 million are underweight (14). A study investigated active elderly men living in Peshawar (Khyber Pakhtunkhwa) and found that malnutrition was prevalent among them. Another research conducted in Karachi (Sindh) showed that an integrated early detection strategy, nutritious food, lifestyle therapy, and the promotion of a shared family structure were necessary factors to counter malnutrition and its negative impacts (15,10).

The results related to dietary habits showed that about 21% of the population has never consumed meat, poultry, fish, eggs, and nuts, and only 9.3% consume these protein sources on a routine basis. Loss of appetite and changes in taste are part of aging, which often leads to more limited choices in food items and a reduced intake of a healthy diet. As our findings have shown, 53% economic dependency is much higher than the study conducted in Bangladesh in rural areas, with only 7%. An investigation has found that lower diversified food consumption increases the risk of starvation-related malnourishment for the elderly (16). Additional evidence has also found that economic inaccessibility is a significant risk factor for malnutrition (17). Moreover, research has also shown that the prevalence of sustainable incomes is linked positively to the elderly population's self-assessed health status (18).

Results revealed 54% had depression and anxiety, while 21% often felt depressed. Anxiety and depression play a role in the loss of appetite in the elderly population. Depression in the elderly can often lead to malnutrition or dehydration, inducing various kinds of physical illnesses. One study showed that a substantial rise in dietary risk is a symptom of depression (MNA score 22.86 vs. 24.96, $p < 0.001$) (19). Since depressive conditions are not a usual aspect of ageing, they are more severe mood disturbances that dramatically influence food intake and physiology. As a result, depression in elderly individuals can cause an increased risk of chronic health problems. Not only can depression in the elderly population cause a decrease in food intake, but it can also lead to changes in metabolism, increased oxidative stress, and immune system impairment. To reduce malnutrition and its harmful effects, encouraging healthy living and reducing sedentary living may both play critical roles (20).

The main limitation of the study is the lack of generalizability. Additionally, a more in-depth evaluation of a range of factors is required. The elderly population relies on children and family ties. It can also be inferred that the security net for the Karachi workers and the middle and lower-class elderly population is open to families and children, and in terms of financial assistance, emotional support, and support for the social network, this reliance is interconnected.

CONCLUSION

According to this study, malnutrition among the elderly population in Kemari is significantly associated with gender disparities, chronic health conditions, economic dependency, and inadequate dietary practices. Early detection and treatment of malnutrition depend on routine nutritional assessments using standardized instruments such as the Mini Nutritional Assessment (MNA), in addition to focused health education and integrated community support services. To improve the quality of life for the elderly and lessen the long-term strain on the healthcare system, policymakers and healthcare professionals should give priority to community-level interventions and routine nutrition screening in primary healthcare.

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