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Nutritional Status and Perceived Stress among Hospitalized Patients with Non-Communicable Diseases in Islamabad and Rawalpindi, Pakistan: A Cross-Sectional Study

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RN, SK Conception and design, SW, RA Collection and assembly of data, ZH, ZS, AM Analysis and interpretation of the data, A Statistical expertise, MZ, SK Final approval and guarantor of the article

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A B S T R A C T

Background: Non-communicable diseases (NCDs) are a leading cause of morbidity and mortality worldwide and are frequently associated with poor nutritional status and psychological stress, particularly among hospitalized patients. These factors can adversely affect disease management, recovery, and overall clinical outcomes.

Objective: This study aimed to evaluate the nutritional status and stress levels among non-communicable disease inpatients and examine the relationship between them. This study aimed to assess the nutritional status and perceived stress levels among hospitalized patients with non-communicable diseases in Islamabad and Rawalpindi, Pakistan, and to examine the association between these factors.

Methodology: A cross-sectional study was conducted between 20th February and 18th May 2023 in tertiary care hospitals in Islamabad and Rawalpindi, Pakistan. Data were collected from 400 hospitalized patients with non-communicable diseases using a non-probability convenience sampling technique. Included conditions were hypertension, diabetes mellitus, cardiovascular diseases, cancer, chronic liver disease, chronic obstructive pulmonary disease (COPD), chronic kidney disease, and gastrointestinal disorders, confirmed through medical records. Nutritional status and perceived stress were assessed using the Nutritional Risk Screening tool (NRS-2002) and the Perceived Stress Scale (PSS), respectively

Results: The study results showed that 60.5% of the participants were nutritionally at risk, while 39.5% were categorized as nourished. Among the study population, 42.75% reported moderate stress levels and 42.50% reported high stress levels. Logistic regression analysis demonstrated a statistically significant model ($\chi^2 = 59.93$, df = 6, $p < 0.001$). Increasing age (OR = 0.741, 95% CI: 0.639–0.860), presence of chronic medical conditions (OR = 0.850, 95% CI: 0.771–0.938), and higher perceived stress scores (OR = 0.496, 95% CI: 0.362–0.678) were significantly associated with nutritional status among hospitalized patients with non-communicable diseases.

Conclusion: This study highlights a high prevalence of nutritional risk and elevated perceived stress among hospitalized patients with non-communicable diseases in tertiary care hospitals. Nutritional status was significantly associated with age, chronic medical conditions, and perceived stress levels.

Keywords: Nutritional status, Stress level, Non-communicable diseases (NCDs), Inpatients

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Introduction

Hundreds of years ago, communicable or infectious diseases were the leading cause of death around the world. With medical progress in vaccines, antibiotics, and improved living conditions, non-communicable diseases (NCDs) began to emerge due to an unhealthy diet and lifestyle.[1] Conditions like cardiovascular disease (CVD), diabetes, cancer, and chronic respiratory disease are frequently seen as non-communicable diseases.[2] Globally, there has been a shift from communicable diseases in children to non-communicable diseases in adults.[3] The majority of NCDs demand recurrent interactions with the health system.[4]

NCDs kill 41 million people worldwide each year, which represents 74% of all deaths.[5] Hypertension affected 40.1% of individuals in Pakistan, while 15.8% had diabetes, and 17.0% were diagnosed with ischemic heart disease. Within the risk factors examined, 13.6% smoked, and 1.8% drank alcohol.[6]

Malnutrition is referred to as a lack of sufficient calories, proteins, or essential nutrients needed for bodily processes it develops due to underlying diseases, metabolic abnormalities, and limited nutritional availability.[7] A lot of factors lead to hospitalized malnutrition, including the impact of medical procedure, starvation (pre and post-operative), financial status, inappropriate knowledge about nutrition and hospital food services.[8] In hospitalized patients, Malnutrition threatens both quality of life and prognosis, increasing both the re-hospitalization rate and health costs.[9] During hospital stay a half (49%) of malnourished patients either maintain or aggravate their existing nutritional condition, admitted for longer than a week.[10] Furthermore, nearly one out of three patients with a normal nutritional status, experienced malnutrition during their hospitalization.[11] Stress can be either exhilarating or fearful, and it can be either adaptive or intentional. Stress affects the neuroendocrine and metabolic systems by affecting different hormones, which can lead to changes in an individual's health-related behavior.[12] Patients with chronic NCDs frequently have psychological morbidities.[13] Given the heterogeneity of non-communicable diseases, this study focused on commonly diagnosed chronic conditions among hospitalized adults to allow meaningful interpretation of nutritional and stress-related outcomes. Therefore, the objective of this study is to assess the nutritional status, stress levels, and the co-relation between these factors among inpatients with NCDs.

Materials and Methods

A cross-sectional examination was carried out at tertiary care hospitals located in Islamabad and Rawalpindi, Pakistan. Between February 20th and May 18th, 2023. Prior to the study's commencement, ethical approval was acquired from the ethical review bodies of the Allied health faculty at The University of Lahore Islamabad campus. Participants were given an information sheet explaining the study's aim and their written consent was sought.

The method of sample collection used in this study was non-probability convenience sampling. During the process, information was gathered from the 400 inpatients over 18 years of age with NCDs. Children, teens, patients without Non-communicable diseases, and people from outside of Rawalpindi and Islamabad were excluded from the study.

The study protocol was formulated in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) principles.[14]

Data regarding demographics, nutrition, anthropometrics, and stress levels was gathered utilizing pre-established questionnaires and tools including Nutrition Risk Screening (NRS-2002) and the Perceived Stress Scale (PSS).

The sociodemographic characteristics included age, gender, education attainment, marital status, job, household size and expenditure, and health associated behaviors such as cigarette smoking were evaluated. On the other hand, anthropometric data included weight, height, and body mass index (BMI). BMI calculations were performed following the WHO guidelines.[5]

To access nutritional status NRS-2002 was used. The scoring system ranges from 0-7 and consists of three parts: 1) disease severity, based on comorbidities and medical history (scored 0-3); (2) nutritional impairment status, considering BMI, body weight, and food intake (scored 0-3); and (3) age, with patients over 70 awarded an additional point. NRS-2002 scores of 3 were categorized as malnourished.[15]

Meanwhile, Stress levels were evaluated by PSS. The Final PSS scoring system categorizes stress levels as follows: Low stress (0-13), Moderate stress (14-26), and High perceived stress (27-40).[16]

IBM SPSS version 23.0 was utilized for data analysis, computing descriptive statistics for all categorical variables. Chi-square and Logistic regression analyses were executed with statistically significant p-value as < 0.05.

Results

Out of 400 inpatients, there were 200(50%) females and 200(50%) males. Most participants were aged 50-59 years, with male participants accounting for 11.25% and female participants contributing for 12.00%. The greatest number of

participants were from the post-secondary education category, with 25.25% males and 17.50% females. From overall sample data, most respondents 364(91.0%) were married. Furthermore, a sizable number 213(53.3%), fall into the category of having 1 to 4 children. 141(35.3%) of the respondents were employed, while (62)15.8% were unemployed. In BMI distribution, 74 (18.5%) participants were underweight, 149 (37.3%) were normal weight, 117 (29.3%) were overweight, and 60 (15%) were obese. In the entire sample, 229(57.3%) of the inpatients were reported getting < 7 hours of sleep. A significant majority 180(45.0%) described themselves as smokers at some point in their lives. This finding raises questions about smoking behavior and the causes of noncommunicable diseases. There was an equal distribution of Chronic Medical Conditions, non-communicable diseases (NCDs) in the overall study population.

In the current evaluation, 60.5% of individuals were nutritionally at risk. Nearly 42.5% of individuals had high stress levels (Figure 1).

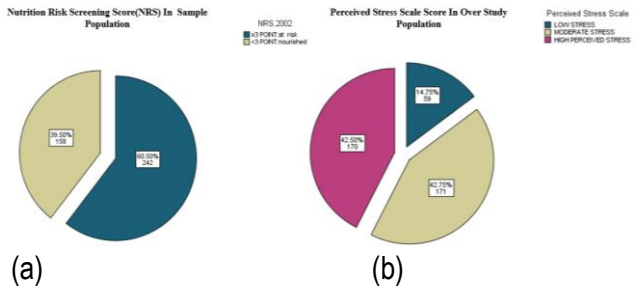

Figure-1: (a) The Nutritional status of study population (b) Stress levels among NCDs in study population

With regards to the research findings, 4.50% with hypertension, 7.50% diabetic, 7.50% with CVD, 8.75% with cancers, 6.50% with liver disease, 7.75% who had COPD, 9.25% with kidney disease, 8.75% with GIT diseases were nutritionally at risk. This indicated that nutrition risk was relatively greater in kidney diseases, followed by cancer, GIT disorders, COPD, CVD, diabetes, liver disease, and hypertension. According to the findings, chronic medical diseases may have an impact on nutrition status (Figure 2).

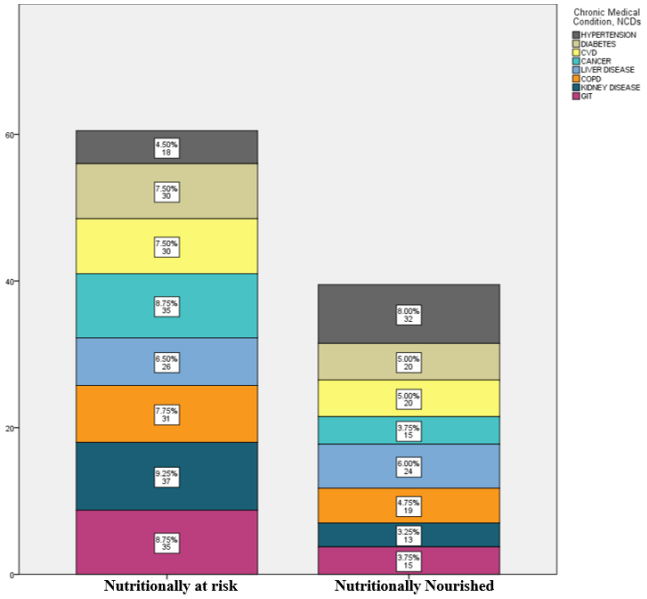

Figure-2: Nutritional status of inpatients according to chronic medical conditions classified as; Hypertension, Diabetes, Cardio-vascular diseases, Cancer, Liver diseases, COPD, Kidney diseases, and Gastrointestinal diseases, NCDs, ≥3 shows nutritionally at-risk group, and <3 shows nourished inpatients in the sample population.

In the current study, it was observed that among inpatients with hypertension, 6.3% indicated moderate perceived stress, while 3.3% demonstrated high perceived stress. Similarly, for individuals with diabetes, 6% expressed moderate perceived stress, with 3.3% displaying high perceived stress. Among those diagnosed with CVD, 5.5% exhibited moderate perceived stress, and 6.0% showed high perceived stress. In the case of cancer patients, 5% manifested moderate perceived stress, and 7.5% reported high perceived stress. For individuals with liver disease, 5.3% had moderate perceived stress, while 5% indicated high perceived stress. Among COPD patients, 5% presented moderate perceived stress, and 5.5% portrayed high perceived stress. In the category of kidney disease, perceived stress considered as 4.5%, and 6.8% revealed high perceived stress. Lastly, 5.3% of patients with GIT disease exhibited both moderate and high perceived stress. These findings imply that chronic diseases may influence perceived stress levels (Figure 3)

The logistic regression analysis revealed a significant model (df=6, X2 =59.93, p= <0.001), indicating that older age, the presence of chronic medical conditions, and elevated stress levels were associated with a higher risk of malnutrition among inpatients with non-communicable diseases. However, sociodemographic factors such as gender, work status, and sleep quality did not emerge as significant predictors in the model (Table II).

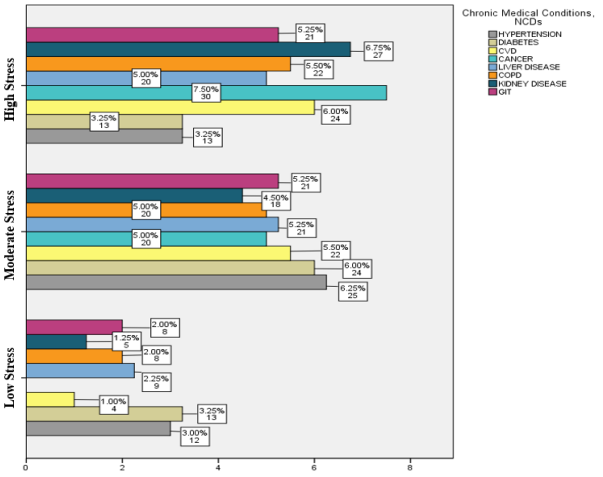

Figure-3: Perceived stress scale score based on chronic medical condition, NCDs classified as; Hypertension, Diabetes, Cardio-vascular diseases (CVDs), Cancer, Diseases of Liver, Coronary obstructive pulmonary disease, Kidney diseases, and Gastrointestinal diseases, The stress levels categorized into three groups based on scores: low stress levels (0-13), moderate stress (14-26), and high stress levels (27-40).

Discussion

The aim of the study was to assess the nutritional status, stress levels and their relationship among inpatients with NCDs. The findings of current analysis revealed that chronic medical illnesses may have an impact on nutrition status and stress levels. Like our study, (Boutata et al., & Khan S, et al., 2022) also screened significant prevalence of malnutrition, due to reduced food intake, in Algerian inpatients with NCDs.[17,18]

Current research observed that kidney disease inpatients are at high risk of poor nutritional status. Research outcomes suggest that malnutrition is prevalent in hospitalized CKD patients, as evidenced by an NRS>3, and is linked with increased in-hospital mortality rates.[19]

Based on the present research, there is a significant association between NCDs and poor nutritional status. A previous review showed that chemotherapy, cancer, and undernourishment all have a statistically significant relationship. Intervention is essential to enhance problem detection and to promote awareness and enhance the nutritional status of impacted patients.[15]

The study findings suggested that due to chronic medical conditions, patients' perceptions about them may influence stress levels, with various chronic diseases and multi-morbidity being associated with significantly increased reported stress among individuals in low- and middle-income nations, with those in the poorest socioeconomic groups facing the greatest challenges.

Table I: Baseline characteristics based on Nutrition risk screening score and perceived stress score among inpatients with Chronic medical conditions, Specifically NCDs.

Variables	Variable Classification	Nutrition risk screening score			Perceived Stress Scale Score			
		At risk	Nourished		Low Stress	Moderate Stress	High Stress	
		Count	Count	*p*-value	Count	Count	Count	*p*-value
Age	18-29	8	15	0.000	4	11	8	0.060
	30-39	22	24		8	17	21	
	40-49	43	31		14	30	30	
	50-59	53	40		17	40	36	
	60-69	42	32		7	33	34	
	70-79	49	12		8	32	21	
	> 80	25	4		1	8	20	
Gender	Male	119	81	0.683	28	84	88	0.524
	Female	123	77		31	87	82	
Sleep Quality	< 7 Hour	142	87	0.284	27	93	109	0.040
	7-9 Hour	94	63		30	74	53	
	>10 Hour	6	8		2	4	8	
Body Mass Index	Underweight	58	16	0.118	3	30	41	0.405
	Normal	81	68		32	65	52	
	Overweight	64	53		14	55	48	
	Obese	39	21		10	21	29	
Chronic Medical Condition	Hypertension	18	32	0.001	12	25	13	0.015
	Diabetes	30	20		13	24	13	
	CVD	30	20		4	22	24	
	Cancer	35	15		0	20	30	
	Liver Disease	26	24		9	21	20	
	COPD	31	19		8	20	22	
	Kidney Disease	37	13		5	18	27	
	GIT disorders	35	15		8	21	21	

The World Health Organization (WHO) provides Body Mass Index (BMI) classifications: underweight (BMI ≤ 18.5 kg/m²), normal weight (BMI 18.5-24.9 kg/m²), overweight (BMI 25-29.9 kg/m²), and obese (BMI ≥ 30 kg/m²). Abbreviations include CVD for Cardiovascular diseases, COPD for Chronic obstructive pulmonary disease, and GIT for Gastrointestinal

tract. Statistical significance is represented as *** ($p < 0.001$), ** ($p < 0.01$) and * ($p < 0.05$).

Table II: Malnutrition risk indicators.

Malnutrition Risk Variables	B	*p*-value	OR (95% CI)
Constant	2.084	0.000	8.035
Age	-0.299	0.000	0.741 (0.639-0.860)
Gender	-0.105	0.651	0.900 (0.571-1.419)
Work status	-0.109	0.239	0.897(0.748-1.075)
Sleep quality	0.073	0.713	1.075(0.731-1.583)
Chronic medical conditions	-0.163	0.001	0.850(0.771-0.938)
Perceived stress scale score	-0.702	0.000	0.496(0.362-0.678)
-2LL		476.816	
Omnibus test		X^2 =59.93, df=6, p=<0.001	
Nagelkerke test		18.8%	
Classification accuracy		69.5%	

Further, logistic regression showed significant results between nutrition risk, age, chronic medical conditions, and stress. In cancer patients, malnutrition has been associated with psychological stress. Timely intervention in mental health and nutrition proved advantageous, potentially improving the psychological well-being of cancer patients.[20]

The current research possesses several notable strengths such as random participant assessment, ease of conduct, participant compliance, and rigorous quality assurance during data collection, collectively contributing to the study's credibility and reliability.

Limitations of the current study involved in the data did not include information about co-morbidities or other potential factors contributing to nutritional risk and high stress levels. More research and analysis are required to acquire a complete knowledge of the association between chronic medical illnesses, nutritional status, and perceived stress.

Conclusion

NCD patients are nutritionally at risk and are more prone to moderate high levels of stress. The need to use nutrition status and stress assessment tests in routine health care is required to better identify and treat the causes of disease-based hospital malnutrition and to execute strategic therapies. This study also indicated that, to treat malnutrition and stress, patients suffering from NCDs may require suitable diet and stress management advice.

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