EVALUATING THE NUTRITIONAL STATUS OF HOSPITALIZED GERIATRIC PATIENTS ON THE DAY OF ADMISSION & DISCHARGE

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ABSTRACT

Background:
As the global population ages, the health and well-being of older adults become increasingly important. The aging process is accompanied by physiological changes that impact nutritional needs. Malnutrition in hospitalized geriatric patients is a significant and often overlooked issue that can have profound consequences on health outcomes. Geriatric individuals are particularly vulnerable to malnutrition due to a combination of factors such as age-related changes in metabolism, decreased appetite, and the presence of chronic illnesses & existing nutritional challenges, leading to inadequate nutrient intake. Therefore, significant Nutritional screening and assessment is crucial in Hospitalized geriatric patient to evaluate their nutritional status and hence, to provide optimal nutrition to ensure a Healthy and good quality of Life.

Objective:
To analyze the changes in the Nutritional Status Score of the First and last day of hospitalized geriatric patients. The study also focuses on identifying the changes in dietary intake, changes in Anthropometric measurements, and assessing changes in muscle strength of the admission and discharge from the Hospital.

Methodology:
The study conducted was an observational study that included 100 patients from D. Y. Patil Hospital Nerul, Navi Mumbai. The patient was selected through convenience sampling and based on inclusion and exclusion criteria. The data of patients were collected after the consent of the patients, through personal interviews of the subject or the relatives of the subject with the Help of validated and reliable tool MNA Form, Hand grip dynamometer, and a short questionnaire. General Information involving age, sex, food habits, Anthropometric measurements, Mobility, psychological status, Presence of Comorbidities, consumption of medication & pressure sores, and ulcers of overall tools involved in conducting the thesis. The study involved assessment on the admission and on the day of discharge. The short questionnaire was filled at last i.e. on the day of discharge which included an assessment of notable changes in nutritional status score, changes in handgrip strength, and if the nutritional

intervention was provided. Nutritional status was evaluated based on the individual's Nutritional status score that is provided by the MNA form.

Result:
In this study, we analyzed the nutritional and health status of 100 hospitalized geriatric patients. Gender distribution varied across age groups, with males constituting 44.40% and females 55.60% among those aged 65-74, an equal distribution at 50% each for ages 75-84, and females making up 100% of patients over 85. Nutritional status showed significant improvement from admission to discharge, with the mean score rising from 2.04 to 2.28 (p < .001). Dietary intake improved notably: dairy product consumption increased from 0.27 to 0.51 servings/day (p < 0.001), legumes or eggs from 0.25 to 0.50 servings/week (p < 0.001), fluids from 1.54 to 1.91 liters/day (p < 0.001), fruits or vegetables from 0.00 to 0.08 servings/day (p = 0.004), and the number of meals per day from 1.40 to 1.90 (p < 0.001). Meat, fish, or poultry intake remained stable (p = 0.482). Anthropometric measurements showed significant weight increases (mean difference -0.160, p < 0.001) and BMI (mean difference -0.130, p = 0.002), while changes in mid-arm circumference was slightly increased and calf circumference were not significant. Hand grip strength significantly improved from 17.90 kg to 19.80 kg (p < 0.001). These findings highlight the positive impact of hospital care on the nutritional health and muscle strength of geriatric patients.

Conclusion:
The study "Evaluating the Nutritional Status of Hospitalized Geriatric Patients on the Day of Admission & Discharge" demonstrates that hospital care significantly improves the nutritional status and physical health of geriatric patients. Key findings include enhanced nutritional scores, increased intake of dairy, legumes, fluids, fruits, vegetables, and more frequent meals. Significant gains in weight, BMI, and hand grip strength further indicate better nutritional and muscle health. Although some anthropometric measurements showed modest, non-significant changes, the overall positive trend underscores the effectiveness of tailored nutritional interventions. This research highlights the need for ongoing improvements in nutritional care for hospitalized geriatric patients to optimize their outcomes and quality of life.

1. TITLE: EVALUATING THE NUTRITIONAL STATUS OF HOSPITALIZED GERIATRIC PATIENTS ON THE DAY OF ADMISSION & DISCHARGE.

According to the World Health Organization (WHO), "Malnutrition refers to deficiencies or excesses in nutrient intake, imbalance of essential nutrients, or impaired nutrient utilization".[4] Malnutrition frequently affects older adults, leading to substantial expenses and unfavorable consequences. [8] Despite being a prevalent issue among older adults, malnutrition places a significant strain on healthcare, social welfare, and aged-care systems. This vulnerability stems from age-related declines in bodily functions, limited access to nutrient-rich foods, and the presence of multiple health conditions. Clinical recommendations advocate for the regular screening of malnutrition in older individuals, alongside comprehensive nutritional assessments and tailored support for those considered & evaluated as at risk. [9]

Table 1:Demographics

Gender	Age (in years)		
	65-74	75-84	More than 85
	%	%	%
Male	44.4	50.0	0.0
Female	55.6	50.0	100.0
Total	100.0	100.0	100.0

INTERPRETATION: The table presents the distribution of gender among hospitalized geriatric patients across different age groups: 65-74 years, 75-84 years, and over 85 years. Initially, among patients aged 65-74 years, males constitute 44.4% while females make up 55.6%. In the 75-84 age group, the distribution becomes more equal, with both males and females representing 50.0% each. Interestingly, among patients aged over 85 years, there are no male

patients, with females comprising 100.0% of this age group. This data suggests a gender discrepancy in the distribution of older hospitalized patients, with a higher proportion of females, particularly in the oldest age bracket.

Table 2: To Analyse the changes in the Nutritional Status Score of the First and last day of hospitalized geriatric patients.

Table 2.1 (A): Paired Sample Statistics (nutritional status score) :

	Nutritional Status Score	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Total Assessment On Admission	2.0	100	.650	.065
	Total Assessment on Discharge	2.2	100	.570	.057

Table 2.2 (B): Paired Sample tests (nutritional status score) :

	Nutritional Status Score	Paired Differences					t	df	Sig. (2-tailed)/ p-value
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Total Assessment - Total Assessment on Discharge	-.240	.515	.051	-.342	-.138	-4.662	99	.000

INTERPRETATION: The primary objective of this research was to analyze the changes in the nutritional status score of geriatric patients from their first to last day of hospitalization. The study involved 100 hospitalized geriatric patients whose nutritional status was assessed upon admission and again upon discharge. The mean nutritional status score on admission was 2.04, with a standard deviation of 0.650 and a standard error of the mean of 0.065. Upon discharge, the mean nutritional status score increased to 2.28, with a standard deviation of 0.570 and a standard error

of the mean of 0.057. This upward trend in nutritional status is further supported by the paired differences analysis, which revealed a standard deviation of 0.515 and a standard error of 0.051, and a statistically significant mean difference of -0.240 (p < .001) which is a p-value of .000, 95% (CI) confidence interval difference [-0.342, -0.138]) between the total assessment scores on admission and discharge. The negative value indicates an improvement in nutritional status & ultimately the score from admission to discharge. This suggests that the interventions and care provided during hospitalization positively influenced the nutritional well-being of geriatric patients.

Table 3: To Identify the changes in dietary intake of hospitalized geriatric patients.

Table 3.1 (A): Paired Sample statistics (Dietary intake).

Overall Dietary Intake		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Milk/cheese/yogurt/day on Admission	.27	100	.446	.045
	Milk/cheese/yogurt/day on Discharge	.51	100	.502	.050
Pair 2	2 or more servings of legumes or eggs/week on Admission	.25	100	.435	.044
	2 or more servings of legumes or eggs/week on Discharge	.50	100	.503	.050
Pair 3	Meat,fish or poultry/day on Admission	.89	100	.314	.031
	Meat,fish or poultry/day on Discharge	.91	100	.288	.029
Pair 4	Fluid/day on Admission	1.54	100	.521	.052
	Fluid/day on Discharge	1.91	100	.288	.029
Pair 5	2 or more Servings of fruits or vegetables/day On Admission	0.00	100	0.000	0.000

	2 or more Servings of fruits or vegetables/day on Discharge	.08	100	.273	.027
Pair 6	Meals / day on Admission	1.40	100	.586	.059
	Meals / day on Discharge	1.90	100	.362	.036

Table 3.2 (B): Paired Sample Test (Dietary Intake).

Dietary Intake		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Milk/cheese/yoghurt/day	.240	.515	.051	.138	.342	4.662	99	.000
Pair 2	2 or more servings of legumes or eggs/week	.250	.520	.052	.147	.353	4.809	99	.000
Pair 3	Meat,fish or poultry/day	.020	.284	.028	-.036	.076	.705	99	.482
Pair 4	Fluid/day	-.370	.597	.060	-.489	-.251	-6.195	99	.000
Pair 5	2 or more Servings of fruits or vegetables/day	.080	.273	.027	.026	.134	2.934	99	.004
Pair 6	Meals / day - Meals / day	-.500	.595	.059	-.618	-.382	-8.409	99	.000

INTERPRETATION:

The second objective of this research was to identify changes in the dietary intake of hospitalized geriatric patients from admission to discharge. The study involved 100 geriatric patients whose dietary intake was assessed upon admission to the hospital and again upon discharge. The study examined various aspects of dietary intake, including consumption of milk, cheese, yogurt, legumes or eggs, meat, fish, or poultry, fluids, servings of fruits or vegetables, and the number of meals per day.

Pair 1, The mean intake of milk, cheese, and yogurt per day upon admission, was found to be 0.27, with a standard deviation of 0.446 and a standard error of the mean of 0.045. Upon discharge, the mean intake increased and was found to be 0.51, with a standard deviation of 0.502 and a standard error of the mean of 0.050. The paired differences analysis revealed a standard deviation of 0.515 with a standard mean error of 0.051 and a statistically significant mean difference of 0.240 servings (p < 0.001, where the p-value = .000, 95% (CI) confidence interval difference [0.138, 0.342]) between the intake of milk, cheese, and yogurt per day on admission and discharge. This indicates a notable increase in the consumption of dairy products from admission to discharge. Therefore, there was a significant increase in the consumption of milk, cheese, and yogurt per day from admission (mean = 0.51 servings) to discharge (mean = 0.27 servings).

Pair 2, Upon admission, the mean intake of two or more servings of legumes or eggs per week was recorded at 0.25, with a standard deviation of 0.435 and a standard error mean of 0.044. However, Upon Discharge, the mean intake increased and was found to be 0.50, with a standard deviation of 0.503 and a standard error mean of 0.050. The paired differences analysis revealed a standard deviation of 0.520 with a standard error mean of 0.052 and a statistically significant mean difference of 0.250 servings (p < 0.001, where p-value = .000, 95% (CI) confidence interval difference [0.147, 0.353]) between the intake of two or more servings of legumes or eggs per week on admission and discharge. This finding indicates a substantial increase in the consumption of legumes or eggs from admission to discharge. Such a change may suggest alterations in dietary preferences, accessibility to certain foods, or adherence to dietary recommendations during the hospitalization period. Therefore, the intake of two or more legumes or eggs per week increased significantly from admission (mean = 0.50 servings) to discharge (mean = 0.25 servings).

Pair 3, Upon admission, the mean intake of meat, fish, or poultry per day was recorded at 0.89 servings, with a standard deviation of 0.314 and a standard error mean of 0.031. Upon discharge, the mean intake was found to be 0.91 servings, with a standard deviation of 0.288 and a standard error mean of 0.029. The paired differences analysis revealed a standard deviation of 0.284 with a standard error mean of 0.028 and revealed a statistically non-significant mean difference of 0.020 servings (p = 0.482, where p-value = 0.482, 95% (CI) confidence interval difference [-0.036, 0.076]) between the intake of meat, fish, or poultry per day on admission and discharge. Conversely, there were slightly significant changes observed i.e. increase in the consumption of meat, fish, or poultry per day from admission (mean = 0.91 servings) to discharge (mean = 0.89 servings).

Pair 4, Upon admission, the mean fluid intake per day was recorded at 1.54, with a standard deviation of 0.521 and a standard error mean of 0.052. Upon discharge, this mean intake increased to 1.91, with a standard deviation of 0.288 and a standard error mean of 0.029. The paired differences analysis revealed a standard deviation of 0.597 with a standard error mean of 0.060 and revealed a statistically significant mean difference of -0.370 (p < 0.001, where p-value = 0.000, 95% (CI) confidence interval difference [-0.489, -0.251]) between the fluid intake per day on admission and discharge. This finding indicates a notable increase in fluid intake from admission to discharge among hospitalized geriatric patients. The increase in fluid intake during the hospitalization period may reflect efforts to optimize hydration status and support overall health and recovery. Therefore, the average fluid intake per day increased significantly from admission (mean = 1.54 liters) to discharge (mean = 1.91 liters), indicating a positive change in hydration practices during hospitalization.

Pair 5, Upon admission, the mean intake of two or more servings of fruits or vegetables per day was recorded at 0.00 servings, with a standard deviation of 0.000 and a standard error mean of 0.000. However, upon discharge, the mean intake increased by 0.08, with a standard deviation of 0.273 and a standard error mean of 0.027. The paired differences analysis revealed a standard deviation of 0.273 while a standard error mean of 0.027 and revealed a statistically significant mean difference of 0.080 servings (p = 0.004, where p-value= 0.004, 95% (CI) confidence interval difference [0.026, 0.134]) between the intake of two or more servings of fruits or vegetables per day on admission and discharge. This finding indicates a notable increase in the consumption of fruits or vegetables from admission to discharge among hospitalized geriatric patients. Therefore, Additionally, there was a significant increase in the

consumption of two or more servings of fruits or vegetables per day from admission (mean = 0.08 servings) to discharge (mean = 0.00 servings), suggesting an improvement in dietary diversity.

Pair 6, Upon admission, the mean number of meals consumed per day was recorded at 1.40, with a standard deviation of 0.586 and a standard error mean of 0.059. However, upon discharge, this mean intake increased to 1.90 meals per day, with a standard deviation of 0.362 and a standard error mean of 0.036. The paired differences analysis revealed a standard deviation of 0.595 where the standard error mean was 0.059 and revealed a statistically significant mean difference of -0.500 meals per day ($p < 0.001$, where p-value is 0.000, 95% (CI) confidence interval [-0.618, -0.382]) between the number of meals consumed per day on admission and discharge. This finding indicates a notable increase in the number of meals consumed from admission to discharge among hospitalized geriatric patients. Therefore, Furthermore, the number of meals per day increased significantly from admission (mean = 1.40 meals) to discharge (mean = 1.90 meals), indicating a positive change in meal frequency during hospitalization.

Table 4: To assess the changes in the Anthropometric measurements of the day of Admission and discharge from the Hospital.

Table 4.1 (A): Paired Sample statistics (Anthropometric measurements).

Anthropometric measurements		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	weight on Admission	2.99	100	.859	.086
	Weight on Discharge	3.15	100	.821	.082
Pair 2	BMI on Admission	1.94	100	1.013	.101
	BMI on Discharge	2.07	100	1.008	.101
Pair 3	MAC on Admission	1.84	100	.395	.039
	MAC on Discharge	1.89	100	.345	.035
Pair 4	CC on Admission	.94	100	.239	.024
	CC on Discharge	.95	100	.219	.022

Table 4.2 (B): Paired Sample test (Anthropometric measurement).

Anthropometric measurements		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	weight– Weight on Discharge	-.160	.395	.039	-.238	-.082	-4.051	99	.000
Pair 2	BMI - BMI on Discharge	-.130	.418	.042	-.213	-.047	-3.109	99	.002
Pair 3	MAC - MAC on Discharge	-.050	.330	.033	-.115	.015	-1.517	99	.132
Pair 4	CC - CC on Discharge	-.010	.100	.010	-.030	.010	-1.000	99	.320

INTERPRETATION:

Pair 1, The anthropometric measurements collected from 100 patients on admission and discharge from the hospital reveal notable changes over the course of their hospital stay. The mean weight upon admission was recorded as 2.99, with a standard deviation of 0.859 and a standard error mean of 0.086, while on discharge, the mean weight increased slightly to 3.15, with a slightly lower standard deviation of 0.821 and standard error mean of 0.082. This data suggests a trend toward weight gain during the hospitalization period. Confirming this trend, the paired sample test indicates a standard deviation of 0.395 with standard mean error of 0.039 and reveals a statistically significant increase in weight from admission to discharge, with a mean difference of -0.160 and a p-value of less than 0.001 which is .000. Suggesting a good impact of nutritional intervention during the hospital stay.

Pair 2, The mean BMI on admission was recorded as 1.94, with a standard deviation of 1.013 & standard mean error of 0.101, while on discharge, the mean BMI slightly increased to 2.07, with a similar standard deviation of 1.008 & standard mean error of 0.101. This data suggests a trend towards an increase in BMI during the hospitalization period, indicating a potential improvement in the nutritional status of the patients. Confirming this trend, the paired sample test demonstrates a statistically significant increase in BMI from admission to discharge, with a mean difference of -0.130 and a p-value of 0.002 & standard deviation of 0.418 with standard error mean of 0.042. The observed increase in BMI could be attributed to various factors such as nutritional support, medical interventions, or recovery from underlying conditions.

Pair 3, The assessment of anthropometric measurements, particularly Mid-Arm Circumference (MAC), in 100 patients on admission and discharge from the hospital provides valuable insights into their physical changes during their hospital stay. The mean MAC upon admission was 1.84, with a standard deviation of 0.395 & standard error

mean of 0.039, while on discharge, the mean MAC slightly increased to 1.89, with a reduced standard deviation of 0.345 & standard error mean of 0.035. Although there is a trend towards an increase in MAC, the difference was not found to be statistically significant according to the paired sample test, with a mean difference of -0.050 and a p-value of 0.132 & standard deviation of 0.330 with standard error mean of 0.033. While the increase in MAC may indicate improvements in muscle mass or overall nutritional status, further investigation is warranted to understand the underlying factors contributing to this change.

Pair 4, The investigation into anthropometric measurements, specifically Calf Circumference (CC), among 100 patients on admission and discharge from the hospital offers valuable insights into their physiological changes during their hospitalization. The mean CC upon admission was 0.94, with a standard deviation of 0.239 & standard error mean of 0.024, while on discharge, the mean CC slightly increased to 0.95 & standard error mean of 0.022, with a slightly reduced standard deviation of 0.219. However, the paired sample test revealed that this change was not statistically significant, with a mean difference of -0.010 and a p-value of 0.320 with standard deviation of 0.100 with standard error mean of 0.010. While the increase in CC may suggest improvements in muscle tone or overall leg health, further exploration is necessary to elucidate the underlying reasons for this observation. These findings underscore the importance of comprehensive monitoring of anthropometric measurements to better understand patients' physiological responses during their hospitalization and to tailor interventions effectively.

Table 5: To assess the Changes in muscle strength on the first & last day by using a Hand Grip Dynamometer.

Table 5.1 (A): Paired Sample Statistics (HGS).

Handgrip Strength		Mean	N	Std. Deviation	Std. Error mean
Pair 1	HGS on Admission	17.90	100	5.649	.565
	HGS on Discharge	19.80	100	5.362	.536

Table 7.41 (B): Paired Sample Tests (HGS).

Hand Grip Strength	Paired Differences					t	df	Sig. (2-tailed)/ p value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			

Pair 1	HGS - HGS on Discharge	-1.900	3.161	.316	-2.527	-1.273	-6.011	99	.000

INTERPRETATION: The secondary objective of this research aimed to assess the changes in muscle strength among hospitalized geriatric patients from their first to last day using a Hand Grip Dynamometer. The study involved 100 geriatric patients whose hand grip strength (HGS) was measured upon admission and again upon discharge. The mean hand grip strength on admission was 17.90 kg, with a standard deviation of 5.649 and a standard error of the mean of 0.565. Conversely, upon discharge, the mean hand grip strength increased to 19.80 kg, with a standard deviation of 5.362 and a standard error of the mean of 0.536. This upward trend in Hand grip strength is further supported by the paired differences analysis that revealed, a standard deviation of 3.161 with a standard error mean of 0.316, and a statistically significant mean difference of -1.900 kg, ($p < .001$) where p-value = .000, and 95% of (CI) Confidence interval of [-2.527, -1.273]) between the hand grip strength scores on admission and discharge. This negative difference suggests an improvement in muscle strength from admission to discharge. The findings indicate that the interventions and care provided during hospitalization positively influenced not only the nutritional status but also the muscle strength of geriatric patients.

4. CONCLUSIONS

The study "Evaluating the Nutritional Status of Hospitalized Geriatric Patients on the Day of Admission & Discharge" provides valuable insights into the nutritional status, dietary intake, anthropometric measurements, and muscle strength of hospitalized geriatric patients. The findings highlight significant improvements in various aspects of nutrition and physical health from admission to discharge, underscoring the positive impact of hospital care and interventions on the well-being of this vulnerable population. Specifically, the study observed notable enhancements in nutritional status scores, dietary intake of dairy products, legumes or eggs, fluids, fruits or vegetables, and meal frequency. Moreover, there were significant increases in weight, BMI, and hand grip strength, indicating improved nutritional status and muscle strength among the patients. While some anthropometric measurements showed modest increases that were not statistically significant, the overall trend suggests positive outcomes in nutritional management. These findings emphasize the importance of comprehensive nutritional assessment and tailored interventions for hospitalized geriatric patients to optimize their clinical outcomes and enhance their quality of life. Moving forward, further research and continuous quality improvement initiatives are warranted to refine nutritional care practices and address any remaining gaps in the management of geriatric patients during hospitalization.

6. REFERENCES

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