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Original Article

Treatment Outcome of Malnourished Patients with Respiratory Tract Infections

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Abstract:

Introduction: Malnutrition is associated with negative outcomes for patients, including higher infection and complication rates, increased muscle loss, impaired wound healing, longer length of hospital stay and increased morbidity and mortality. The negative effect of malnutrition on respiratory infection and muscle strength has also been established. Therefore, this study was designed to find out the treatment outcomes of malnourished acute respiratory infection (ARI) patients.

Objective: To observe the relation between the poor nutritional status & outcome of patients

Materials & Methods: In this study there were 23(44.2%) male and 29(55.8%) female cases while 27(51.9%) cases were in 16-35 years of age, 7(13.5%) cases were 35-45 years old and 18(34.6%) cases were 45-65 years old. This observational & prospectivestudy was conducted atSKBZ/CMH Muzaffarabad Azad Kashmir.All patients who fulfilled inclusion criteria were included consecutively. All cases with age 16-65 years of either gender were included. Treatment outcome was labelled as good or bad. Mean and standard deviations were calculated for quantitative variables and frequency and percentages were calculated for qualitative variables.

Results: A total of 42(80.8%) cases had length of hospital stay for 1-7 days, 9(17.3%) cases had 8-14 days and 1(1.9%) cases had ≥ 14 days. According to final outcome 17(32.7%) cases had bad and 35(67.3%) cases had good outcome. Moreover, 34(65.4%) cases had improved, 2(3.8%) cases were referred or left against medical advice and 16(30.8%) remained in follow up.

Conclusion: Malnutrition remains a burden for general healthcare and has considerable impact on worsening the treatment outcome of ARI in malnourished patients.

Keywords: Respiratory tract infection, malnourishment, hospital stay, outcome

Introduction

As far as we consider infections in human beings, it has been found out that infections of respiratory tract are most prevalent and common. Also infections of respiratory tract are major cause of morbidity and deaths in a large number of population as its attack, severity and rates are of high intensity.[1] When pediatric population is considered then infections like pneumonia and also bronchiolitis that affect lower part of respiratory tract and some other infections affecting upper respiratory tract cause severe adverse implications on children's health provided the attacks are recurrent. In rural areas Pneumonias is considered a fatal infection at some times as a consequence of lack of immediate and emergency health care facilities. When urban areas are compared to rural areas, there are more immediate interventions available because of presence of tertiary health care centers.[2]

Respiratory tract infections are the leading cause of mortality in the world. Tuberculosis has high prevalence in Pakistan and causes more deaths globally than any other infectious disease. Acute Respiratory Tract Infection (ARI) is related to a number of variable risk factors. In the developing countries the presence of high morbidity rate and mortality rates caused by acute lower respiratory tract infections points towards a large number of risk factors.[3] So, to lessen the burden of ARI in populations determination of related risk factors is inevitable.[4] One such important yet least acknowledged risk factor is malnutrition.

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An abnormal condition in which there is nutritional imbalance resulting from various factors like excessive food intake or over-eating to a total lack of nutrition due to under-eating is known as Malnutrition. Over-eating is often a factor in the developed world and under-nutrition is seen in many developing countries or undeveloped countries. Under-nutrition may also be observed in hospitals and residential care facilities in developed nations. It can be a consequence of decreased nutritious intake or decreased dietary intake, some disease leading to an elevated level of nutrition required by a person, decreased intestinal absorption or increased renal loss of nutrients due to some underlying sickness, or can be a result of all above mentioned abnormalities.[5, 6]Various negative outcomes are observed in patients suffering from malnutrition. These include a higher infection rate and complication intensity, increased muscle atrophy or simply muscle loss, decreased wound repairing, increased duration of hospital stay and costs that eventually contribute to increased morbidity rate and mortality cases. [7]

There is a complex and undeniable association between a variety of inflammatory diseases and malnutrition. [8]. As found out by solid epidemiological findings, malnutrition leads to increased vulnerability of patients towards infection and has severe implications on immunity which can cause variety of infections and muscle atrophy or weaknesses. [9, 10]. As there is a loss of muscle power especially smooth muscles affecting normal respiratory function this eventually leads to increased vulnerability of patients to chest infections which consequently reduces cardiac function and decreases immune defense. So in patients with decreased immune function there is a high risk of morbidity and mortality so such patients require a longer hospital stay and have to cover extra health costs. [11]

According to a study in Latin America the noted prevalence of malnutrition as observed in general patients is as much as 50.2%. There is a strong evidence in research studies that relate negative effect of malnutrition to respiratory infection and loss of muscle strength. Inspite of all this evidence and high prevalence of malnutrition, health physicians' are unaware of these consequences of malnutrition, and a regular nutritional therapy and governmental policies for improving these therapies are scarce. [12] Particularly in our country, the literature of malnutrition in patients with ARI and its impact on treatment outcome is absent. Therefore, this study was designed to to determine the association of poor nutritional status of patients, their vulnerability toward respiratory tract infections and to find out the treatment outcomes of malnourished ARI patients.

Materials and Methods

This observational & prospective study was conducted at SKBZ/CMH Muzaffarabad Azad Kashmir. All patients who fulfilled inclusion criteria were included consecutively. Patients who fulfilled inclusion criteria were enrolled and their basal metabolic index waist circumference and mid arm muscle circumference were recorded using steel measuring tape and weight scale, outcome was recorded. The treatment outcome was labeled as good for those who showed improvement and were discharged to home and bad for those who were diagnosed as pulmonary tuberculosis and were put on anti-tuberculous treatment. Those who were referred to pulmonology unit or who left against medical advice were kept in bad outcome. Mean and standard deviations were calculated for quantitative variables and frequency and percentages were calculated for qualitative variables.

Operational definitions:

Mal nourished patients are labelled according to following criteria in the study:

Mid arm circumference: less than 23.5 cm

BMI: less than 18.5

Waist circumference: less than 102 cm in male and less 88 cm in female measured at midway between highest point on iliac crest and lowest point of the rib cage.

Results

In this study there were 23(44.2%) male and 29(55.8%) female cases while 27(51.9%) cases were in 16-35 years of age, 7(13.5%) cases were 35-45 years old and 18(34.6%) cases were 45-65 years old. The mean weight, height and BMI were 50.10 ± 12.12 kg, 1.63 ± 0.12 m and 18.83 ±3.93 respectively. The mean waist circumference was 73.36± 6.08, mean mid arm circumference, 22.38± 2.61 and mean Hemoglobin was 11.85± 2.44. The mean total leucocyte count was11.53 ±4.90, mean Platelets count was 269.69±117.17, mean erythrocyte sedimentation rate 31.62± 21.39 and Serum albumen 42.74± 4.79 A total of 33(63.5%) cases belonged to District Muzaffarabad, 9(17.3%) cases were from District Hattian and 5(9.6%) cases were from Neelam. A total of 36(69.2%) cases had productive cough and 16(30.8%) of the cases were non-productive cases, 52(100%) cases had fever and 33(63.5%) cases had breathlessness, 9(17.3%) cases had white and serous sputum, 25(48.1%) cases had colored and mucoid while 2(3.8%) cases had Hemoptysis . A

total of 2(3.8%) cases had hypertension, 9(17.3%) cases had TB in past and 6(11.5%) cases had COPD/Asthma in past while history of past illness was found in 35(67.3%) of the cases. A total of 10(19.2%) cases were smokers, 18(34.6%) had job and 40(76.9%) cases were married. A total of 13(25%) cases had ≥ 100 / minute pulse rate, 1(1.9%) were hypertensive, 19(36.5%) had pallor, 2(3.8%) had jaundice and Cyanosis each and 4(7.7%) cases had lymph node. Antibiotics were used for 10 days in 30(57.4%) of the cases, it was used for more than 10 days in 7(13.5%) cases and 15(28.8%) cases had anti TB drug. A total of 42(80.8%) cases had length of hospital stay for 1-7 days, 9(17.3%) cases had 8-14 days and 1(1.9%) cases had ≥ 14 days. According to final outcome 17(32.7%) cases had bad and 35(67.3%) cases had good outcome. Moreover, 34(65.4%) cases had improved, 2(3.8%) cases were referred or left against medical advice and 16(30.8%) remained in follow up.

Table -1: Demographic characteristics

Demographic characteristics		Frequency	Percent
Gender	Male	23	44.2
	Female	29	55.8
Age	16-35 years	27	51.9
	35-45 years	7	13.5
	45-65 years	18	34.6
Resident	District Muzaffarabad	33	63.5
	District hattian	9	17.3
	District neelum	5	9.6
	Others	5	9.6

Table -2: Descriptive statistics of quantitative data

	Mean	S. D	Range	Minimum	Maximum
Weight in kg	50.10	12.12	55.00	30.00	85.00
Height in m	1.63	0.12	0.71	1.25	1.96
BMI	18.83	3.93	17.64	10.76	28.40
Waist circumference	73.36	6.08	26.50	63.50	90.00
Mid arm circumference	22.38	2.61	10.90	18.10	29.00
Hemoglobin	11.85	2.44	11.10	4.90	16.00
Total leucocyte count	11.53	4.90	22.70	4.00	26.70
Platelets	269.69	117.17	472.00	120.00	592.00
Erythrocyte sedimentation rate	31.62	21.39	94.00	10.00	104.00
Serum albumen	42.74	4.79	19.00	36.00	55.00

Table -3: Frequency distribution of outcome of cases

Outcome		Frequency	Percent
Antibiotics	Antibiotic upto 10 days	30	57.7
	Antibiotic more than 10 days	7	13.5
	Anti Tb drugs	15	28.8
Length of stay	1 to 7 days	42	80.8
	8 to 14 days	9	17.3
	More than 14 days	1	1.9
Final outcome	Bad	17	32.7
	Good	35	67.3
Outcome	Improved	34	65.4
	Referred or left against medical advice	2	3.8
	On follow up	16	30.8

Discussion

Malnutrition is an abnormality most common around the whole globe and hence is a major concern in patients and a burden on health care facilities. There is a large Literature that reports that malnutrition can significantly lessen respiratory muscle strength to cover and maintain increased ventilatory work. Although there is a continuous advancement in medicine provision and clinical services, yet there is no significant routine therapy for improvement of a patient's nutritional status and not considered as a sufficient medical priority.[13] This study assessed the effect of malnutrition on outcome of respiratory tract infection.

In this study there were 23(44.2%) male and 29(55.8%) female cases while 27(51.9%) cases were in 16-35 years of age, 7(13.5%) cases were 35-45 years old and 18(34.6%) cases were 45-65 years old. The mean weight, height and BMI were 50.10 ± 12.12 kg, 1.63 ± 0.12 m and 18.83 ±3.93 respectively. One study assessed the consistency between the presence of nutrition risk. According to another study the consistency of the presence of nutritional risk in patients was observed. A total of 101 patients were involved in this research study. Among those 101 patients, 52 patients were males and 49 patients were females and mean age found out to be 71±15 years. According to this research it was reported that 41 patients of which 24 were males and 17 were females with mean age of 78.9±10.7 years were at nutritional risk based on standard of NRS-2002.[14]

Those patients who improved on clinical, biochemical and radiological parameters and discharged home

were labelled as having good outcome. In this study, according to final outcome 17(32.7%) cases had bad and 35(67.3%) cases had good outcome.34(65.4%) cases had improved, 2(3.8%) cases were referred or left against medical advice and 16(30.8%) remained in follow up.As per another study which individually covered the severe effects of chronic hyperinflation and malnutrition on respiratory muscle strength (RMS) it was reported that RMS is affected by nutritional status of patients on a mild rate as assessed according to body mass percentile (BMP) and percentage ideal weight (PIWT). This affect was not as much of degree to be clinically significant. [15]

Also, in current study 2(3.8%) cases had hypertension, 9(17.3%) cases had TB in past and 6(11.5%) cases had COPD/Asthma in past, history of past illness was found in 35(67.3%) of the cases, 13(25%) cases had ≥ 100 / minute pulse rate, 1(1.9%) were hypertensive, 19(36.5%) had pallor, 2(3.8%) had jaundice and Cyanosis each and 4(7.7%) cases had lymph node. A total of 42(80.8%) cases had length of hospital stay for 1-7 days, 9(17.3%) cases had 8-14 days and 1(1.9%) cases had ≥ 14 days. A cross-sectional research that was multi-centered epidemiological study that included 9348 hospitalized patients with age range of patients being older than 18 yrs in Latin America. It was found out that Malnutrition was associated with age (>60 y), presence of cancer and infection, and longer length of hospital stay ($P < 0.05$). [12]

Our present study, in relation with other research studies in international literature clearly shows malnutrition to be a significant factor effecting treatment outcome of ART by worsening the adverse effects and general health parameters as well. More studies are needed to evaluate the detailed impact of malnutrition on common and critical health issues. Also, its inclusion in the clinical charts and general screening of patients should be ensured.

Conclusion

Malnutrition remains a burden for general healthcare and has considerable impact on worsening the treatment outcome of ART in malnourished patients.

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