

# Long-Term Healthcare Workers' Assessment of Nutritional Status and Metabolism in Respiratory Diseases

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**Abstract** In the prevention and treatment of respiratory diseases, nutrition plays a crucial role in providing the body with the necessary physiological parameters for strength, cell and tissue construction, and constant renewal, as well as energy supply for replenishing the body's energy expenditure. Consumption of food leads to the production of enzymes, hormones, metabolic processes, and other regulators of vital functions in the body. [1] At the Central Military Clinic Hospital, anthropometry and immunological analysis evaluated the nutritional status index and indicators of long-term military service personnel hospitalized with respiratory diseases, specifically pneumonia, and their resistance to diseases.

**Keywords** Anthropometry, Caliperometry, Body Mass Index (BMI), Immunological indicators

## 1. Introduction

The study of respiratory diseases among military personnel is an important area of medical research, as military personnel may be exposed to various risk factors associated with their service that may affect the health of the respiratory system. These factors may include exposure to harmful substances, as military personnel may be exposed to harmful substances such as toxic chemicals, smoke, aerosols and other air pollutants, especially during combat operations or while performing official duties in certain territories. [2,3] In addition, military personnel cause damage to the respiratory system, that is, military conflicts can lead to physical injuries that can damage the respiratory system, such as damage to the lungs, respiratory tract or pleura. As well as psychological factors, in particular stress associated with military service, can also affect the health of the respiratory system, as stress can worsen chronic diseases such as asthma or chronic obstructive pulmonary disease. [3]

To study diseases of the respiratory system among military personnel, medical studies are conducted that analyze the impact of various risk factors on the health of the respiratory system, develop prevention and treatment strategies, and evaluate the effectiveness of programs to protect the respiratory system of military personnel.

In the realm of preventive healthcare for respiratory diseases among military personnel worldwide, particularly among long-term military service members, the importance

of nutritional status is paramount. The increased susceptibility of the respiratory organs to damage in modern warfare and local conflicts, and the higher frequency of systematic reactions, including traumatic injuries associated with inadequate nutrition, all contribute to this vulnerability. The prolonged catabolic reactions of metabolism induced by the diseases are described as fundamental pathogenetic mechanisms of diseases that evolve due to respiratory organ illnesses. Ensuring the provision of the most important physiological parameters of the body during nutrition, such as strength, tissue construction, and constant renewal, as well as energy supply to replenish the body's energy expenditure, is crucial. The consumption of food leads to the production of enzymes, hormones, metabolic processes, and other regulators of vital functions in the body. [5] The metabolism, activity, and structure of all organs, tissues, and systems depend on the nature of nutrition, that is, food composition. Healthy nutrition and proper attitudes toward nutrition contribute to maintaining health, improving physical abilities, and optimizing the physiological functions of the body. However, scholarly publications indicate that effective evaluation of nutritional status and prevention of diseases related to respiratory organ illnesses among long-term military personnel in Uzbekistan has not been sufficiently addressed. Therefore, the assessment and prevention of nutritional status in respiratory diseases among long-term military personnel in Uzbekistan are a significant issue in ensuring the health of the servicemen guarding the borders of our Republic and are considered one of the pressing challenges awaiting solutions in military medicine.

It was found that harmful habits before military service and state of physical development are also important in studying the level of respiratory diseases among conscripts. [4] It is known that harmful habits increase the tendency to develop respiratory diseases. The level of physical development of military personnel is also important. Calipyrometry was used in our research along with the use of laboratory and instrumental examination methods. Anthropometric measurements were performed on a scale and a centimeter measuring column. According to the general blood analysis, the number of leukocytes and the leukocyte formula were evaluated.

Calipyrometry method involves measuring the thickness of skin and fat layers in certain areas of the body using special instruments called calipers. Calipyrometry was one of the first methods used to study body composition in vivo, and based on it, predictive formulas for determining body composition have proven themselves well in solving a number of practical problems in sports, health and clinical medicine. Anthropometry provides professionals with simple, inexpensive, and relatively reliable methods of determining body fat and muscle mass. [6]

## 2. Results

Out of the 50 patients hospitalized with pneumonia, 18 showed a Body Mass Index (BMI) of  $18.6 \text{ kg/m}^2$  and skinfold thickness of 8.5 mm (based on the Caliperometry table). Blood analysis showed leukocytes at  $10-12 \cdot 10^9 / \text{l}$ , and lymphocytes at 19%. [7] In 23 patients, BMI was  $19-20 \text{ kg/m}^2$ , skinfold thickness was 10-12 mm. Blood analysis

showed leukocytes at  $9-10-11 \cdot 10^9 / \text{l}$ , and lymphocytes at 25%. In 9 patients, BMI was  $22-25 \text{ kg/m}^2$ , skinfold thickness was 16-18 mm. Blood analysis showed leukocytes at  $9-10 \cdot 10^9 / \text{l}$ , and lymphocytes at 30-35%.

In the study, triceps, shoulder blades, waist area were measured using a caliper. Measurement in the area of triceps - the thickness of the skin folds is measured from the back, between the joint of the wrist and the elbow area. When measuring with a caliper in the sub scapular area - the caliper tool is placed at 45 degrees in the sub scapular area and the thickness of the skin folds is measured. [8] Measuring with a caliper in the waist area - the skin fold is held horizontally just above the edge of the pelvis. The results were evaluated using a caliper chart.

According to the chart of calipyrometry, the characteristic of numbers depicted in orange means low nutrition, in green - a healthy organism, in yellow - increased nutrition, and images in red - a high level of nutrition, that is, a dangerous group.

## 3. Conclusions

The results of these indicators indicate a decrease in body weight, a decrease in skinfold thickness, and a decrease in the immune response (increased leukocyte count, decreased lymphocyte count) in 36% of patients.

The findings of scientific research will form the basis for developing a complex of measures aimed at preventing the advancement of respiratory diseases among long-term military personnel and ensuring the prompt recovery of the organisms of these patients in the short term.

**Table 1.** Department-wise patient indicators

No.	Anthropometry Index (BMI)	Caliperometry Index	Leukocyte Count in Blood	Lymphocyte Count in Blood
1st type patients	Patients with a BMI up to $18.6 \text{ kg/m}^2$	Skin fold thickness of 8.5mm	Leukocytes: $10-12 \cdot 10^9 / \text{l}$	Lymphocytes: up to 19%
2nd type patients	Patients with a BMI of $19-20 \text{ kg/m}^2$	Skin fold thickness of 10-12 mm	Leukocytes: $9-10-11 \cdot 10^9 / \text{l}$	Lymphocytes: up to 25%
3rd type patients	Patients with a BMI of $22-25 \text{ kg/m}^2$	Skin fold thickness of 16-18 mm	Leukocytes: $9-10 \cdot 10^9 / \text{l}$	Lymphocytes: up to 30-35%

Calipirometry table

Age	Percentage of body fat																																												
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
9	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
10	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
11	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
13	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
14	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
16	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
17	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
20-39	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
40-59	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
60+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

Fat percentage:

reduced

healthy

elvated

high

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