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Assessment of nutritional status among coal mine workers

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Abstract

Coal miners are exposed to physically demanding work and harsh occupational conditions that increase their nutritional requirements. A dietary survey was conducted among coal miners. Dietary intake was assessed using the 24-hour recall method. The study highlights a significant gap between the dietary intake of coal miners and the recommended nutritional requirements. These findings emphasize the need for targeted nutritional interventions, regular dietary assessment, nutrition education, and workplace health programs to improve the nutritional well-being and occupational health of coal miners.

Keywords: Coal miners, nutritional status, dietary intake

Introduction

Food has always been an essential component of our lives. We learned a great deal over the ages about how to utilise food to promote children's and young people's development and to keep them healthy throughout their lives. Health, nutrition, and food are all closely linked parts of our lives. Food is what gives the body nourishment. Anything consumed that meets the body's demands for energy, building, regulation, and protection can also be referred to as food. To put it briefly, food is the raw ingredient that makes up our bodies. Good nutrition and health can be ensured by consuming the appropriate types and quantities of food, which may show up in our looks, productivity, and mental well-being (Mudambi and Rajagopal, 2006) ^[1].

As per Donoghue (2004) ^[2], mining continues to contribute significantly to the growth of the global industrial sector by generating jobs and essential resources. Even though there have been significant improvements in the management of occupational health concerns, such as better dust control and safety equipment, miners remain at risk for respiratory and musculoskeletal problems. To further minimise dangers and safeguard employees, more stringent legislation, ongoing innovation, and health monitoring are required.

Review of Literature

Nandi and associates (2009) ^[3], mentioned, only 42% of miners are literate. Pulmonary restrictive impairment was significantly higher amongst smokers as compared to nonsmokers in both miners and controls. The prevalent conditions among miners were musculoskeletal morbidity (8%), diabetes (8.8%), and hypertension (22.6%). Rajgamar the calorie intake is observed lowest in the region (2413.9 kcal) it is 36.4 percent lesser than standard requirement. Protein intake is highest in Surakachar area

43.71 gm while in Rajgamar the intake was lowest in the region (20.11 gm). Average fat Intake in all coal area is 18.14 gram which is 8 percent less than standard per day per person. Fat Intake is highest (25 gram) in Koba (Dabhadker *et al.*, 2013) ^[4].

Comparing to the general public, coal miners are more inclined to be diagnosed with diabetes, hypertension, and chronic respiratory problems. The literature on morbidity patterns in coal mines is scarce. One of the unique groups that have greater labour intensity than the general workforce is coal miners. Compared to regular workers, these workers are under greater pressure to survive and perform well. The main causes of sickness and mortality among coal mine workers are heavy physical labour, harsh working conditions, mishaps at work, and exposure to coal dust (Neelakanti and Sriramula, 2019) ^[5].

Research Methodology

The present study is based on survey research design, which was considered suitable for collecting detailed information regarding the nutritional status, and health condition of coal mine workers. The study was conducted in Dhanbad district, where two collieries, namely Moonidih Colliery and Modidih Colliery were selected randomly from the Dhanbad district. The random selection of collieries helped in reducing bias and ensured proper representation of the study area. The sample unit of the study consisted only of coal mine workers. A total sample size of 200 respondents was selected for the investigation, including 100 workers from Moonidih Colliery and 100 workers from Modidih Colliery. Primary data collection method was adopted for gathering information from the respondents. Data were collected through interview schedule and personal interaction with the workers. Nutritional and health assessment of respondents

was conducted through dietary assessment using 24-hour dietary recall method.

Results and Discussion

Diet plays an important role in maintaining the health and work efficiency of coal mineworkers.

Coal miners generally require high energy intake due to heavy physical labor strenuous working condition. In many cases, workers tend to consume carbohydrate rich foods such as rice and cereals more frequently than protein rich foods because of food habits, availability and economic conditions.

Table 1: Distribution of respondents according to calorie intake (Kcal)

Calories (Kcal)	Frequency	Percent
1900–2200	56	28
2201–2500	64	32
2501–2800	35	17.5
2801–3100	30	15
Above 3100	15	7.5
Total	200	100

This table shows that 17.5% of the respondents consume between 2501–2800 Kcal daily, while 15% consume between 2801–3100 Kcal. About 32.0% of the respondents consume between 2201–2500 Kcal, whereas 28.0% consume between 1900–2200 Kcal. Only 7.5% of the respondents consume above 3100 Kcal daily. The findings reveal that the majority of coal mine workers consume low levels of calories, while only a small proportion consume very high calorie diets.

Table 2: Distribution of respondents according to protein intake (gm)

Protein (gm)	Frequency	Percent
30–35.99	45	22.5
36–40.99	60	30
41–45.99	55	27.5
46–50.99	26	13
50 above	14	7
Total	200	100

This table shows that 27.5% of the respondents consume between 41–45.99 gm of protein daily, while 30% consume between 36–40.99 gm. About 22.5% of the respondents consume between 30–35.99 gm of protein, whereas 13.0% consume between 46–50.99 gm daily. The findings reveal that the majority of coal mine workers consume low amounts of protein in their daily diet.

Table 3: Distribution of respondents according to carbohydrate intake (gm)

Carbohydrates (gm)	Frequency	Percent
350 - 380	41	20.5
381 - 430	56	28
431- 480	68	34
481 - 530	23	11.5
Above 530	12	6

This table shows that 34.0% of the respondents consume between 431–480 gm and 28 of the respondents consume between 381–430 gm of carbohydrates daily. About 6.0% of the respondents consume above 530 gm of carbohydrates, whereas 11.5% consume between 481–530 gm. Only 34.0% of the respondents consume between 431–480 gm of carbohydrates daily. The findings reveal that the majority of coal mine workers consume low amounts of carbohydrates in their daily diet.

Table 4: Distribution of respondents according to fat intake (gm)

Fats (gm)	Frequency	Percent
11–13.99	17	8.5
14–15.99	31	15.5
16–17.99	79	39.5
18–19.99	54	27
Above 20	19	9.5
Total	200	100

This table shows that 39.5% of the respondents consume between 16–17.99 gm of fats daily, while 8.5% consume between 11–13.99 gm. About 27.0% of the respondents consume between 18–19.99 gm of fats, whereas 15.5% consume between 14–15.99 gm daily. The findings reveal that the majority of coal mine workers consume low amounts of fats in their daily diet.

Table No.5: One-sample t-test analysis of nutrient intake of coal mine workers in comparison with Recommended Dietary Allowance (RDA)

One-Sample Statistics (N = 200)									
Nutrition Intake	Mean	Std. Deviation	Std. Error Mean	Test Value = 3470 (RDA)					
Calories Consumption Coal Mining worker				t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
Calories	2242.00	339.96	24.04	-34.42	199.00	0.00	-1228.00	Lower	Upper
Protein Consumption Coal Mining worker				Test Value = 54 (RDA)					
Protein	40.73	4.96	0.35	-37.82	199.00	0.00	-13.27	-13.96	-12.58
Carbohydrates Consumption Coal Mining worker				Test Value = 768(RDA)					
Carbohydrates	480.40	68.19	4.82	-39.56	199.00	0.00	-287.60	-200.26	-181.24
Fats Consumption Coal Mining worker				Test Value = 20 (RDA)					
Fats	17.5	2.08300	.14729	-27.859	199	.000	-2.5	-4.3940	-3.8130

This table presents the results of the one-sample t-test comparing the nutrient intake of coal mine workers with the

Recommended Dietary Allowance (RDA). The findings revealed that the mean intake of calories (2242.00 kcal),

protein (40.73 g), carbohydrates (480.40 g), and fats (17.50 g) were significantly lower than their respective RDA values. The one-sample t-test showed statistically significant differences for all nutrients ($p < 0.001$). These findings indicate that coal mine workers were not meeting the recommended dietary requirements despite their physically demanding occupation. The inadequate intake of essential nutrients may adversely affect their nutritional status, work efficiency, and overall health, highlighting the need for improved dietary practices and nutritional intervention among coal mine workers.

Conclusion

The findings indicate that the average intake of carbohydrates, proteins, fats, and total calories among the coal miners were below the Recommended Dietary Allowance (RDA). This reflects an overall inadequacy in dietary intake among the study population. Such insufficient nutrient consumption may adversely affect their nutritional status, physical strength, and work productivity, especially considering the physically demanding nature of coal mining. Prolonged inadequate intake of energy and essential macronutrients may also increase the risk of malnutrition and other health-related problems. Therefore, there is a need for appropriate nutritional interventions, dietary awareness, and regular nutrition monitoring to improve the overall health and well-being of coal miners.

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