International Journal of Biological Research (IJBR)

Ravi Y et.al 2016 ISSN-2321-0524

Research paper

# Anthropometry and dietary intake of Stone-cutters: A study in Davanagere District of Karnataka State*

*[1]Ravi Y.,[2]M. L, Revanna and [3]Usha Ravindra*
*[123]Department of Food Science and Nutrition, UAS, GKVK, Bangalore*
*Corresponding author: 9845571733, raviraj2219@gmail.com*

**Abstract**

The present study aimed for assessing the anthropometry and dietary intake of the stone cutters. The study was conducted at Davanagere district of Karnataka state. One hundred and twenty subjects of both genders were divided into male (n=60) and female (n=60) groups. A well-structured questionnaire was framed to gather the information. Anthropometry was assessed by calculating BMI (Body Mass Index), WHR (Waist and Hip Ratio) and dietary intake of the subjects was assessed by 24– hour diet recall method. In the present investigation, Stone cutters were categorized into normal, underweight and overweight according to their BMI. About 60.0 per cent and 56.67 per cent male and female subjects were having normal BMI. With respect to WHR nearly 43 per cent of the stone cutters were found to be obese with higher percentage in females (61.67%) as per WHR classification. The mean nutrient intake of energy (2756kcl), protein (50.5g), fat (33.28g), fibre (19.69), iron (16.55), β-carotene (1812µg) and vitamin C (29.43mg) were below the RDA except calcium (1307.8mg) among the male stone cutters. Whereas in case of female the mean intake of energy (2503kcl), protein (45.38g), fat (22.46g), fibre (18.06), iron (14.34), β-carotene (1770µg) and vitamin C (24.13mg) were below the RDA except calcium (1247.61mg). With respect to nutrition adequacy, calcium was found to be higher than recommended in both male and female subjects whereas remaining all other nutrients consumption was found inadequate.

**Keywords:** Anthropometry, dietary intake stone-cutters

## INTRODUCTION

According to an International labor organization (1919), Stone cutter is defined as “Crude stone into masses and blocks (by cutting, shaping, breaking, processing, polishing, removal of sections, etc.) into desirable sizes, patterns and degrees of finishing”. This is done by using manual and mechanical work tools, for the purpose of building, decoration, creation of statues and similar goals.

The physical wellbeing and maintenance of normal health of an individual is closely related to the status of nutrition. Proper nutrition keeps man healthy and fit where as inadequate or improper nutrition reduces fitness and causes susceptibility to disease. Nutritional status refers to the health of an individual as it is determined by the intake of nutrients and their utilization. The need for assessment of the nutritional status is to identify individuals or the community at risk due to malnutrition and to provide nutritional aid referred by [6].

Stone cutters grouped as heavy workers group as per Indian Council of Medical Research (ICMR) classification of activities based on occupation, hence they need more and a wide range of nutrients to

perform various functions in the body and to lead a healthy life. It has been possible to determine whether diets in common use by stone cutters are adequate or inadequate to meet their nutritional needs. Such information has helped to determine which foods are not consumed in enough amounts and how the present diets can be improved by including certain food stuffs. Hence the present study was conducted with the objective to assess the anthropometry and dietary intake of the stone cutters.

## MATERIAL AND MEHODS

The study was carried out in Bangarkkanagudda village Davanagere district of Karnataka state. One hundred and twenty subjects of both genders were divided into male (n=60) and female (n=60) groups, who were engaged in stone cutting were considered for the study. A detailed interview schedule was formulated to elicit the information on various aspects related to stone cutters. The interview schedule included the information regarding anthropometry (height and weight), WHR (Waist to Hip Ratio) and diet intake was also done.

Weight of the subjects was taken to the nearest 0.1 kg on a calibrated portable weighing balance. Height was measured accurately to the nearest 0.1 cm using vertical rod. BMI was classified as per the WHO guidelines. Waist circumference was measured to the nearest 0.1 cm at the mid-point between the coastal margin and iliac crest using a non-stretchable measuring tape at the end of normal expiration with the subject standing erect in relaxed position feet 25-30 cm apart [1]. Hip circumference was measured at the level of greater trochanters (widest position of the hip to the nearest 0.01 cm with a measuring tape, while the subject was standing with arms by side and feet together. Waist-Hip ratio was calculated as the ratio of waist circumference and hip circumference [8]. The subjects were classified based on standard WHR [5]. The intake of food was assessed by 24 hour recall method (Information on the type of preparation, actual ingredients used and amount consumed) using a set of pre standardized vessels. The nutrients such as protein, fat, fiber and energy value of the diet consumed by each subject were calculated by using food composition tables (2).

**Statistical Analysis:** Descriptive statistics was used to assess the frequency distribution. Chi-square test was used to know the difference between male and female subjects with regard to anthropometric measurements. The student ‘t’ test was used to test the significance of mean nutrients intake. Statistical analysis was performed using statistical analysis package for Social Sciences (SPSS) version 16.0. P –value <0.05 was considered significant.

## RESULTS AND DISCUSSION

### Anthropometry

According to Body Mass Index (BMI) stone cutters was categorized into normal, underweight and overweight as presented in **Table I.** About 60.0 per cent and 56.67 per cent male and female subjects were having normal BMI, followed by overweight 23.33 per cent among the male subjects whereas female subjects 18.33 per cent. About 6.66 percent of the female subjects belongs to the underweight and remaining 8.33 percent of the subjects comes under obesity category.

According to WHR, stone cutters were categorized into normal and obese as presented in **Table I.** The subjects classified on the basis of the WHR with respect higher percentage of male workers (76.6%) were having normal waist to hip ratio, remaining 23.3 per cent were having obesity, among female workers 38.3 per cent were having normal waist to hip ratio, among them 61.6 per cent of them had abdominal obesity.

The mean nutrient intake of male and female stone cutters in comparison with recommended dietary allowance is depicted in **Table II**. The mean nutrient intake of energy (2756kcl), protein (50.5g), fat (33.28g), fibre (19.69g), iron (16.55mg), carotene (1812µg) and vitamin C (29.43mg) which were found to be below the RDA except for calcium (1307.8mg).

TABLE I. GENDER WISE DISTRIBUTION OF STONE CUTTERS ACCORDING TO ANTHROPOMETRIC INDICES (N=120)

| **Indices** | **Categories** | **Ranges** | **Male (n=60)** | | **Female (n=60)** | | **$X^2$** |
|---|---|---|---|---|---|---|---|
| | | . | No | % | No | % | |
| BMI | Under weight | <18.5 | 7 | 11.67 | 10 | 16.66 | $1.447^{NS}$ |
| | Normal | 18.5-22.9 | 36 | 60.0 | 34 | 56.67 | |
| | Over weight | 23-27.4 | 14 | 23.33 | 11 | 18.33 | |
| | Obesity | >27.4 | 3 | 5.0 | 05 | 8.33 | |
| WHR | Normal | (Male : < 0.95) (Female : < 0.85) | 46 | 76.67 | 23 | 38.33 | 18.03* |
| | Obesity | (Male: > 0.95) (Female : > 0.85) | 14 | 23.33 | 37 | 61.67 | |

NS-non- Significant, Significant at the 5% level

The percentage adequacy of nutrients of the male and female stone cutters was depicted in **Table II.** The mean per cent adequacy of the male stone cutters for calcium was 217g. Whereas the adequacy of other nutrients namely energy, protein, fat, fibre, iron, carotene and vitamin C was 79, 83, 82, 65, 97, 37 and 73 respectively. Calculated 't' value for the nutrient intake showed significant results among the study population at 5 per cent level.

The mean nutrient intake of the female stone cutters in comparison with recommended dietary allowance is presented in **Table III.** The mean intake of energy (2503kcl), protein (45.38g), fat (22.46g), fibre (18.06), iron (14.34), carotene (1770µg) and vitamin C (24.13mg) which were below the RDA except calcium (1247.61mg). The percentage adequacy of nutrients of female stone cutters was depicted in **Table III.** The mean per cent adequacy of the female stone cutters for calcium was 207 per cent. whereas the adequacy for energy, protein, fat, fibre, iron, carotene and vitamin C was 87, 82, 74, 60, 68, 36 and 60 respectively, which were found to be below the RDA. The statistical analysis showed a significant difference in 't' value at 5 per cent level among the male and female subjects.

Nutrient intake

The mean intake of nutrients by stone cutters namely energy, protein, fat, calcium, iron, vitamin C and β- carotene are presented in **Table II and III.** The mean nutrient intake of energy (2756kcl), protein (50.5g), fat (33.28g), fibre (19.69), iron (16.55), β-carotene (1812µg) and vitamin C (29.43mg) were below the RDA except calcium (1307.8mg) among the male and female (1247.6mg). Whereas in case of female

(Table 6.) the mean intake of energy (2503kcl), protein (45.38g), fat (22.46g), fibre (18.06), iron (14.34), carotene (1770μg) and vitamin C (24.13mg) were below the RDA except calcium (1247.61mg).

The percentage adequacy of nutrients of male and female stone cutters was also depicted in the same **Table II and III.** With respect to nutrition adequacy calcium was found to be higher than recommended in both male and female subjects whereas remaining all other nutrients consumption was found inadequate.

On the other hand the entire male and female workers met 217 per cent and 207 per cent adequacy of calcium intake. This may be due to the consumption of ragi millet which is a staple food and liked by majority of the respondents and also rich in calcium. The above results are in line with findings of **[4]** and [**6].** Who studied by the mean intake of calcium (539.01mg) was high than the RDA.

Calcium is an important nutrient for miners, as for powerful muscle contraction, bone structure maintenance, nerves signalling are calcium dependent physiological processes. All male and female stone cutter's intake of calcium was highly observed by dietary calculation as well as symptimically. Because, they used to take non vegetarian meal - fish food items more often and the consumption of ragi millet, the staple food, it was usually preferred by heavy working people because that release the sugar slowly.

Average iron intake in male and female stone cutters was 16.55 mg and 14.34 mg lowest iron intake was high in females. This may be due to the less consumption of green leafy vegetables.

Average β- Carotene intake in male and female workers was 1812 μg and 1770.61 μg low intake of β- Carotene was found in among male and female workers. This may be due to the less consumption of yellow and orange fruits and vegetables and milk/milk products.

Table II. Mean Nutrient intake of selected male stone cutters in comparison with RDA (n=15)

| **Nutrients** | **RDA** | **Mean ± SD** | **% adequacy** | **'t' value** |
|---|---|---|---|---|
| Protein (g) | 60 | 50.15 ± 6.18 | 83 | 31.427* |
| Fat (g) | 40 | 33.28 ± 4.50 | 82 | 28.624* |
| Fibre (g) | 30 | 19.69 ± 3.65 | 65 | 20.913* |
| Energy (Kcal) | 3490 | 2756.90 ± 263 | 79 | 40.465* |
| Calcium (mg) | 600 | 1307 ± 180 | 217 | 28.097* |
| Iron (mg) | 17 | 13.58 ± 2.60 | 79 | 26.230* |
| β-Carotene (μg) | 4800 | 1812 ± 582.94 | 37 | 12.039* |
| Vitamin C (mg) | 40 | 29.43 ± 9.98 | 73 | 11.427* |

Table III. Mean Nutrient intake of selected female stone cutters in comparison with RDA (n=15)

| **Nutrients** | **RDA** | **Mean ± SD** | **% adequacy** | **'t' value** |
|---|---|---|---|---|
| Protein (g) | 55 | 45.38 ± 4.10 | 82 | 42.893* |

| | | | | |
|---|---|---|---|---|
| Fat (g) | 30 | 22.46 ± 5.34 | 74 | 16.285* |
| Fibre (g) | 30 | 18.06 ± 2.41 | 60 | 29.025* |
| Energy (Kcal) | 2850 | 2503.25 ± 315 | 87 | 30.767* |
| Calcium (mg) | 600 | 1247 ± 235 | 207 | 20.538* |
| Iron (mg) | 21 | 14.34 ± 3.63 | 68 | 15.303* |
| β-Carotene (μg) | 4800 | 1770.61 ± 447 | 36 | 15.342* |
| Vitamin C (mg) | 40 | 24.13 ± 7.84 | 60 | 11.925* |

## CONCLUSION

Stone cutting is one of the hereditary occupations, which has been continued through generation and largely accepted as a traditional family occupation. Nearly half of the respondents showed normal nutritional status followed by 1/4$^{th}$ underweight, overweight or obese category according to BMI. With respect to nutrition adequacy calcium was found to be higher than recommended in both male and female subjects whereas remaining all other nutrients consumption was found inadequate. Hence, there is a need for specific nutritional programmes, initiated through government health care systems.

## REFERENCES


[1] M. S. BAMJI., K. KAMALA AND G. N. V. BRAHMAM. "Text book of human nutrition anthropometrical assessment of nutritional status". Oxford and IBH publishing Pvt. Ltd. New delhi. P-157, 1996.

[2] C.GOPALAN., B. V. RAMA SASTRI., S. BALASUBRAMANIAN., C. RAO., B. S. N. DEOSHALE AND K. C. PANT. "Nutritive value of Indian foods. National Institute of Nutrition, Hyderabad". 47-58. 2007.

[3] INTERNATIONAL LABOR ORGANIZATION REPORT, (1919).

[4] D. KAVERI., S. RENU AND S. ARADHANA. "Nutrition of coal mine workers (A case study of Korba coal mines, Chhattisgarh". *Int. J. Sci. Technol.. Res.,* **2**: 5, 2013.

[5] M. E. LEAN., T. S. HAN AND C. E. MORRISON. "Waist circumference as a measurement for indicating need for weight management". *Br. Med. J.,* **11**: 638-642. 1995.

[6] K. M. PRABIR., DEBASIS. AND G. DEBIDAS. "Nutritional status assessment of tea garden women workers (18-35 years) in Darjeeling District from point of nutrition parameters haemoglobin level and disease susceptibility : impact of nutritional awareness". *J. Community Nutr. Health,* **1:** 1. 2012.

[7] M. L. REVANNA. Impact of WYTEP on empowerment and nutritional status of farm women: A study in Mandya Distrit. Thesis submitted to University of Agricultural sciences, Bangalore. 2006.

[8] WHO, World Health Organization, International Health Conference, New York, **2:** 100. 2000.