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RESEARCH ARTICLE

ASSESSMENT OF NUTRITIONAL STATUS, SOCIO-ECONOMIC CONDITIONS AND OCCUPATIONAL HEALTH HAZARDS OF CONCH SHELL WORKERS OF BANKURA, WEST BENGAL

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ABSTRACT

Handicrafts are the art of creating decorative products using raw indigenous materials. Bankura has a rich cultural heritage of handloom industry and handicraft. It is world famous for terracotta temples, hand-woven textiles and exquisite craft of conch shell. The Conch is the shell of large sea snail *Turbinella pyrum* which lives in the Indian Ocean. Shankha is the finished product of conch shell which bears ritual and religious significance in Hindu mythology. This paper attempts to explore the nutritional status, socio-economic background and occupational health hazards of conch shell workers of Bankura. Conch shell workers numbering 88 in the age group of 19-76 years who were willing to co-operate for the study were selected by convenient sampling method. The assessment of nutritional status revealed presence of malnutrition (27.27 %) among workers. The mean height, weight, BMI and Waist/ Heap ratio of the population were 1.57 m, 52.77 Kg, 21.32 & 0.95 respectively. The age-wise distribution of the workers divulged that majority (40 %) of the males belonged to the age group of 36-45 years while most (44.45%) of the female were in the upper-age group of above 45 years. This Conch shell industry was mostly dominated by males (79.55 %). Joint family (52.27%) type still prevails in the community in which 45.46 % were medium in size. The literacy rate among conch shell artisans was 97.73 %. The economic profile disclosed that the average monthly household income (Rs. 6700) and standard of living of the workers are substandard. Common cold, musculoskeletal pain, asthma and respiratory trouble have been found to be more prevalent.

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INTRODUCTION

Shanka & other conch shell products are praised as a giver of fame, longevity and prosperity in Hindu mythology. Bankura, with a treasure of an extreme passion for beauty and elegance, holds a distinct position in conch shell crafting among all over India (Chitrolekha, August, 2011). The craft of conch shell engraving in Bankura flourished mostly under the patronage of Malla kings of Bishnupur. It was then gradually spread from Bishnupur to other places crossing the territorial boundary (Dasgupta, Biswas and Mallik, 2009). The Conch shell carving is labour intensive, tradition oriented, having a legacy of unique craftsmanship with a decentralized set-up. It is estimated that around 1.06 % of the total population are involved in this sector (Government of West Bengal, 2015). The sector is presently beset with several problems, such as rising prices of the manufacturing products, transport of raw material from outside, inadequate working capital, covetous middleman, weak marketing strategy, low wages of the hard working artisans and above all, competitive global market. Nutritional deficiency is another common concern of this community. The rigorous workload further worsens the situation. The underdeveloped socio-economic circumstance and lack of public health concern make their situation more vulnerable. Occupational health hazards also possess threat to conch shell industry. Stomach ache, eye irritation was found to be prevalent among conch shell artisans (Banerjee, 2012). There were extremely limited work on the socio economic and nutritional status of the conch shell workers of Bankura and hence the study was undertaken with the following objectives to

- Assess the nutritional status of the artisans
- Study the socioeconomic condition of the workers
- Evaluate the health status of the workers

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Table 1. The International Classification of adult underweight, overweight and obesity according to BMI

S.No.	Classification	BMI (Kg/m^2) Principal cut-off points	Number of Respondents	Percentage
1.	Underweight	<18.50	24	27.27
	Severe thinness	<16.00	06	25.00
	Moderate thinness	16.00 - 16.99	08	33.33
	Mild thinness	17.00 - 18.49	10	41.67
2.	Normal range	18.50 - 24.99	44	50.00
3.	Overweight	≥25.00		
	Pre-obese	25.00 - 29.99	16	18.18
4.	Obese	≥30.00	4	4.55
	Obese class I	30.00 - 34.99	2	
	Obese class II	35.00 - 39.99	2	
	Obese class III	≥40.00		
Total			88	100

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004

Table 2. The Statistical Assessment of Anthropometric Measurements

Height (m)		Weight (Kg)		BMI		W/H Ratio	
Mean	1.57113636	Mean	52.7727273	Mean	21.31840909	Mean	0.954545455
Standard Error	0.00776219	Standard Error	1.33141129	Standard Error	0.48454133	Standard Error	0.007218976
Median	1.575	Median	51.5	Median	20.74	Median	0.95
Mode	1.6	Mode	45	Mode	25.19	Mode	0.95
Standard Deviation	0.07281581	Standard Deviation	12.489745	Standard Deviation	4.545400577	Standard Deviation	0.067719996
Sample Variance	0.00530214	Sample Variance	155.99373	Sample Variance	20.66066641	Sample Variance	0.004585998
Kurtosis	-0.1584264	Kurtosis	1.46353097	Kurtosis	2.65680903	Kurtosis	-0.26748242
Skewness	-0.1989516	Skewness	0.85085964	Skewness	1.032782925	Skewness	0.253704978
Range	0.32	Range	66	Range	25.11	Range	0.28
Minimum	1.41	Minimum	29	Minimum	12.89	Minimum	0.82
Maximum	1.73	Maximum	95	Maximum	38	Maximum	1.1
Sum	138.26	Sum	4644	Sum	1876.02	Sum	84
Count	88	Count	88	Count	88	Count	88
Confidence Level (95.0%)	0.0154282	Confidence Level (95.0%)	2.64632406	Confidence Level (95.0%)	0.96307834	Confidence Level (95.0%)	0.014348496

Source: Microsoft Office Excel Worksheet

Table 3. The Age-wise distribution of Conch shell workers of Bankura

S. No.	Age Group	Number of Respondents				
		Male	Percentage	Female	Percentage	Total Percentage
1.	Less than 18 years	--	--	--	--	--
2.	18-35 years	18	25.71	04	22.22	25.00
3.	36-45 years	28	40.00	06	33.33	38.64
4.	Above 45 years	24	34.29	08	44.45	36.36
	Total	70	100	18	100	100

Table 4. Gender-wise distribution of Conch shell workers of Bankura

Sl. No.	Gender	Number of Respondents	Percentage
1.	Male	70	79.55
2.	Female	18	20.45
Total		88	100

Source: Primary data

Table 5. Family Status of Respondents

Sl. No.	Family Type	Number of Respondents	Percentage
1.	Nuclear	42	47.73
2.	Joint	46	52.27
	Total	88	100
	Family Size		
1.	Small (Up to 3)	30	34.09
2.	Medium (4-6)	40	45.46
3.	Large (More than 6)	18	20.45
	Total	88	100

Source: Primary data

Table 6. Economic Status of the families of the conch shell workers of Bankura

Sl. No.	Monthly Income Range	Number of Respondents	Percentage
1.	Below 2000	02	02.27
2.	2001-4000	22	25.00
3.	4001-6000	20	22.72
4.	6001-8000	18	20.46
5.	Above 8000	26	29.55
	Total	88	100

Source: Primary data

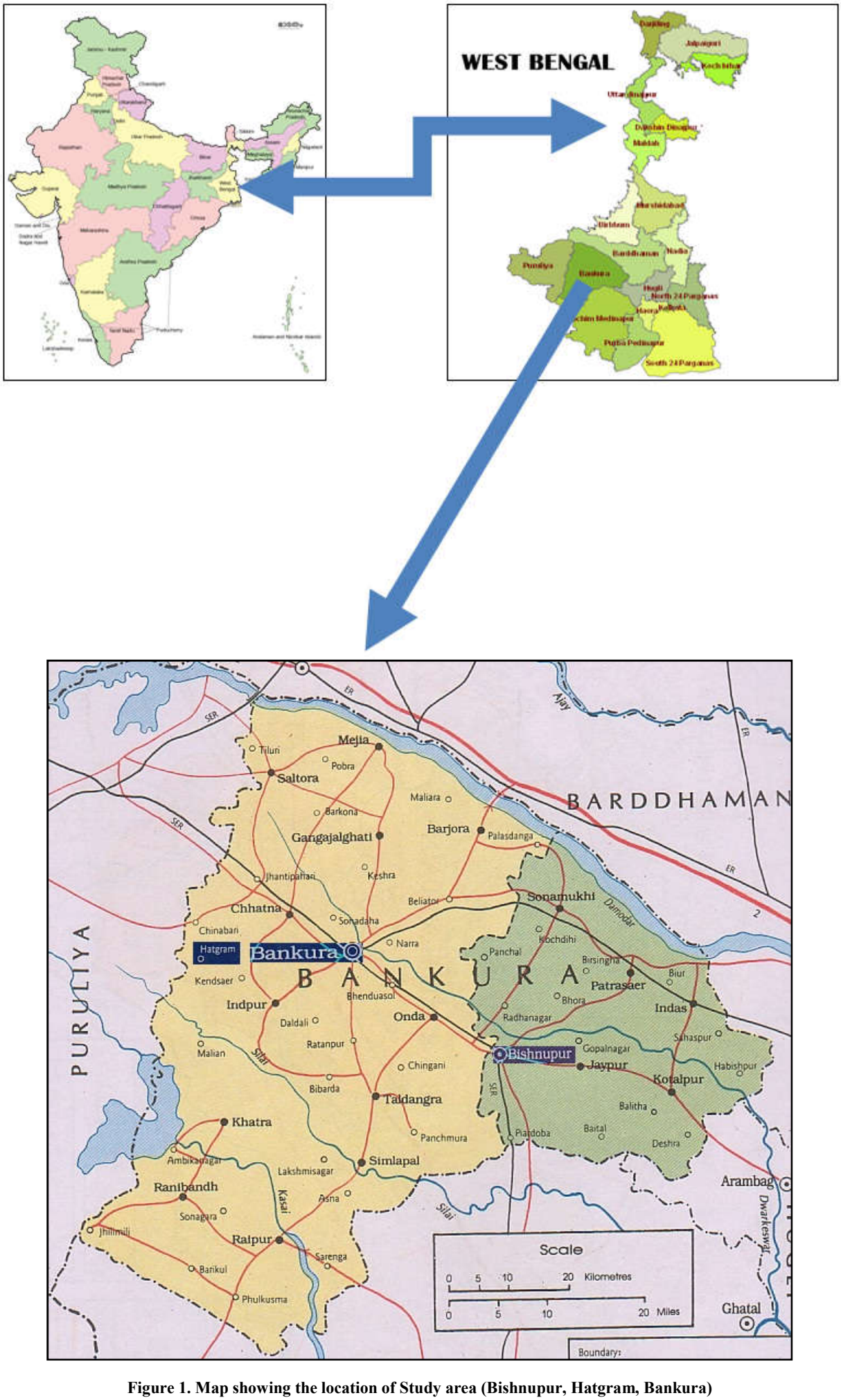
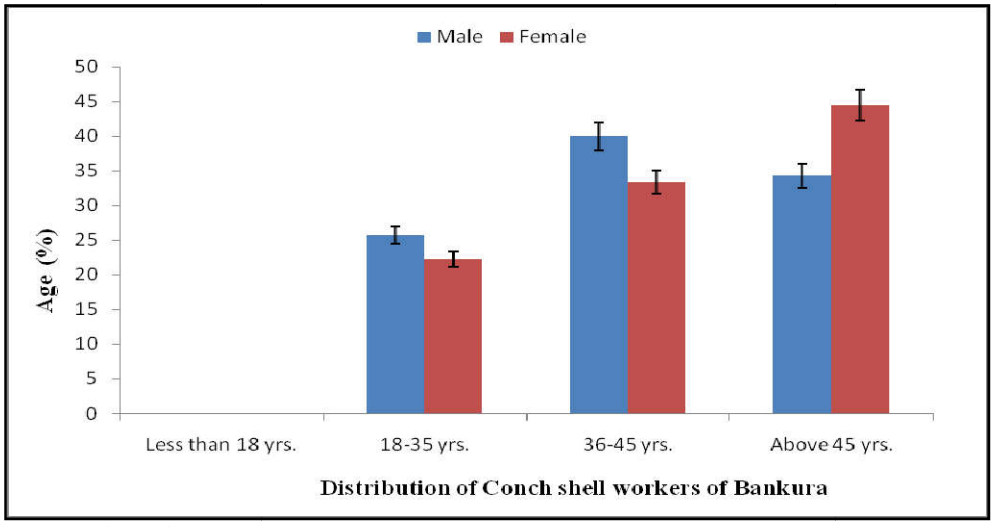


Figure 1. Map showing the location of Study area (Bishnupur, Hatgram, Bankura)

Figure 2. Assessing anthropometric measurements of Conch workers



Source: Primary data

Figure 3. The Age-wise (%) distribution of Conch shell workers

MATERIALS AND METHODS

Study Area

Bankura, a place of crafts and culture, is located at an average elevation of 78 m above mean sea level. It is situated between 22°38′ and 23°38′ N Latitude and between 86°36′to 87°46′ E Longitude. The district, with a population of 35,96,674 (Census, 2011) has a rich historical past with plentiful natural inheritance. Based on the maximum availability of Conch shell workers Bishnupur, Hatgram and Bankura town were selected as the study area (Figure 1). Bishnupur, the capital of Malla dynasty and a tentative site of UNESCO world heritage is situated at 23°05′N Latitude and 87°19′E Longitude with a population of 67,783 (Ganguly and Ganguly, 2015). Hatgram is situated in Indpur tehsil of Bankura district with a population of 3080 of which 1562 are males and 1518 are females. Bankura town, the headquarters of Bankura District with a population of 138,036 is a cultural heritage of West Bengal (Census, 2011). Conch shell workers numbering 88 in the age group of 19-76 years who were willing to co-operate for the study were selected from those places by convenient sampling method.

Collection of Data

The present study is mostly based on primary data sources. Primary data was collected through a field survey in those study areas during Sep-Oct, 2015. Conch shell workers numbering 88 were selected as respondents by convenient sampling method. Secondary data was collected from different books, journals and publications of various government agencies. The statistical analysis of data was carried out using Microsoft Office Excel software.

Assessment of nutritional status

Anthropometry is the science that defines physical measures of a person's size, form, and functional capacities (NIOSH, 2015). It is the most convenient, easily applicable, inexpensive method of assessing body composition that reflects both health and nutrition (Ismail et al., 1995). Measurement of nutritional status is valuable as it may indicate the health of the community. Anthropometric study of all the respondents was thoroughly executed. Height is often affected by long-term nutritional deprivation and is regarded as an index of malnutrition (NIN, 2009). Insufficient dietary uptake, irregular eating habits and certain diseases may result nutritional growth retardation (Usharani and Lakshmi, 2014). Height was measured using a vertical measuring rod with headpiece without wearing footwear. The respondents were made to stand on flat surface, heels together and head positioned so that the line of vision was at right angles to the body. The arms hang freely by the side where as buttocks and heels are in contact with vertical measuring rods. The individuals were asked to take breaths in deeply and maintain a fully erect position. The movable headpieces brought onto the topmost point on the head with sufficient pressure to compress the hair. An average of three successive measurements was taken, final measurement are recorded to the nearest of 0.1cm. Body weight is the most widely used method to assess the anthropometric measurements for the evaluation of nutritional status (NIN, 2009). Digital weighing machine was used to measure the body weight of the respondents. Zero error of the scale was checked, the scale was then calibrated and measurements were done under basal conditions. The respondents were made to stand on the platform of the balance without shoes, with normal clothing and without touching anything else. The measurement was observed to the nearest of 0.50 kg.

Body Mass Index (BMI)

Body Mass Index (BMI) or Quetelet`s Index is a widely used parameter for estimating body fat mass and an accurate reflection of body fat percentage (Umaito, 2006; Keys et. al, 1972). It provides a simple numeric measure of a person's thickness or thinness that is commonly used to classify underweight, overweight and obesity among adults (WHO, 2015). WHO Expert Committee recommended the use of BMI for the determination of the nutritional status of the population. The formula Weight (kg) / Height (m^2) was used to calculate Body Mass Index (BMI). BMI values of the selected respondent were calculated and precisely categorized.

Waist/ Heap Ratio (W/H Ratio)

The W/H Ratio has been used as an indicator of health or measure of developing serious health conditions. Research shows that people with apple-shaped bodies with more weight around the waist face more health risks than those with pear-shaped bodies who carry more weight around the hips. WHR is used as a measurement of obesity, which in turn is a possible indicator of other serious health conditions. The World Health Organization states that abdominal obesity is defined as a waist–hip ratio above 0.90 for males and above 0.85 for females (WHO, 2000).

Socio economic survey

Selection of sample & preparation of questionnaire are the most crucial part of the research. A schedule containing standardized questionnaire was developed by the researchers that have direct consequence to the society. The selected respondents were interviewed to collect information on the socioeconomic back ground of the conch shell workers relating to age, sex, education, number of family members, income of the family etc.

Assessment of the occupational health hazards

Conch shell workers were interrogated to know whether they suffer any health problems, including respiratory trouble, musculoskeletal pain, common cold or vision disorder.

RESULTS AND DISCUSSION

Anthropometric Measurements

The respondents were classified as underweight, normal, overweight and obese as per BMI. In the present study (Table 1 & Figure 2), Out of the total 88 respondents, 27.27 % of the workers were in the underweight (BMI≤18.5) category. Among

them, 25 % were severely thin, 33.33 % were moderately thin and 41.67 % were with mild thinness. 50 % of the conch shell workers were with normal nutritional status. 18.18 percent artisans were overweight and 4.55 % was found as obese. The mean height, weight, BMI and W/H Ratio of the population were 1.57 m, 52.77 Kg, 21.32 & 0.95 respectively (Table 2). The occurrence of malnutrition may be due to the inadequate diet, unhygienic working condition, rigorous workload and lack of public health concern.

Age

As a preface to an analytical study of the conch shell workers of Bankura, a survey on the age distribution of the sample was carried out. It is useful to determine the proportion of work force among workers. The present study (Table 3) showed the absence of under-age workers (< 18 years) among total workforce. The age-wise distribution of the workers revealed that majority (40 %) of the males belonged to the age group of 36-45 years while most (44.45 %) of the female were in the upper-age category (Figure 3). Among the 88 respondents surveyed, a majority (38.64 %) of the population corresponded to the age-group of 36-45 years as the efficiency is relatively higher at this age due to their agility & experience.

Gender

The Conch shell engraving is one of the activities which provide the scope of women participation. However, the gender-wise distribution (Table 4) of the artisans revealed that a majority (79.55 %) of the population was represented by males. This incongruity may be due to the intricate carving technique, strenuous workload and intense demand of production. Moreover, women had to accomplish household responsibilities except the professional demand of their job.

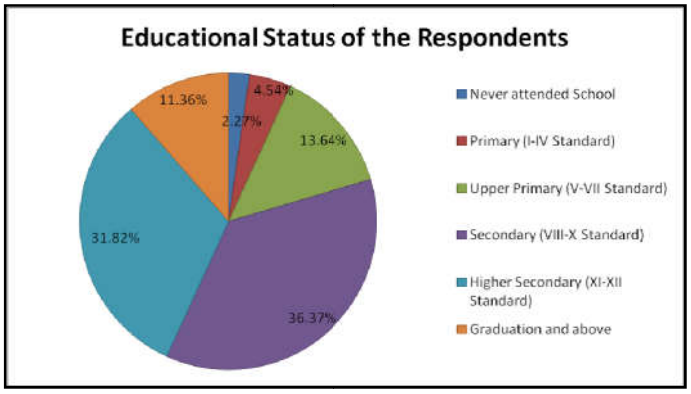
Table 7. Major Occupational Health Ailments

Sl. No.	Nature of Ailments	Number of Cases	Percentage of Cases
1.	Common Cold	34	28.81
2.	Asthma	11	9.32
3.	Eczema	06	5.09
4.	Respiratory Trouble	26	22.03
5.	Musculoskeletal pain	24	20.34
6.	Vision disorder	17	14.41
	Total	118	100

Source: Primary data

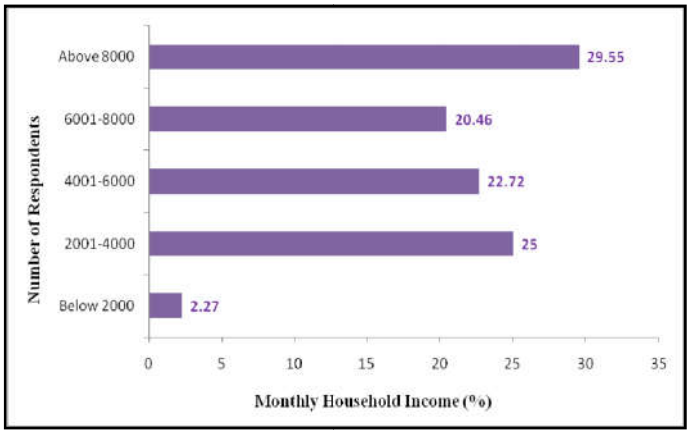
Family Type & Size

Nature of the family is one of the demographic indicators of a population. Family type and size contributes significantly to the gross family income. The results (Table 5) of the present study indicated that joint family (52.27 %) still prevails in this community in which 45.46 % were medium in size. 20.45 % of the population lived in a large family system. Nuclear families tend to had small family size (34.09 %). This finding was in discordance with the statement of the year book of India (2000) where 82 % of the families were reported to be of nuclear type. The Conch shell designing is one of such profession which involves all family members who contribute their precious time in cutting raw conch shell, rubbing, grinding, pasting and designing.



Source: Primary data

Figure 4. Educational Status of conch shell workers of Bankura



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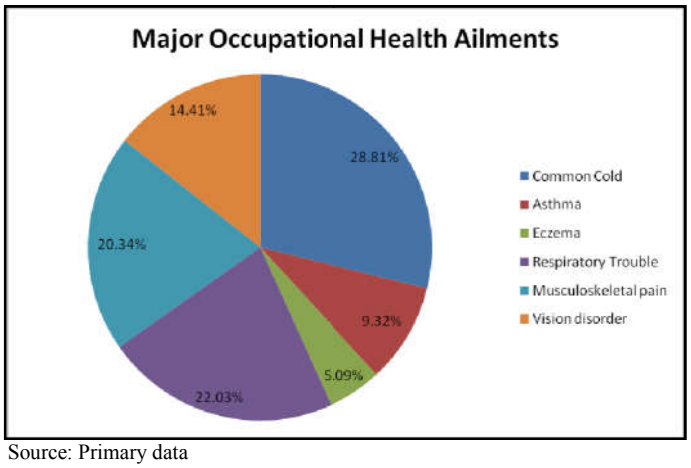

Source: Primary data

Figure 6. Major Health Ailments of the conch shell workers of Bankura

Educational Status of the conch shell workers

Education provides the strength, economic prosperity and social environment in a community. The present investigation (Figure 4) revealed that, only 2.27 % of conch shell workers had never attended school, 4.54 % have completed primary

education and 13.64 % attended middle school. It also illustrated that a majority (36.37 %) of the artisans had completed secondary education. A slightly lesser percentage (31.82 %) of population studied higher secondary and remaining 11.36 % workers pursued graduation. The literacy rate among conch shell artisans was 97.73 % which is much higher in comparison to the national average (74.04 %) (Census, 2011).

Socio-economic Status

Socio-economic condition plays a significant role in determining the standard of living of people. The conch shell carving involves high production cost as the conch is generally purchased from Chennai which are collected from the beach of Tuticorin (Chitrolekha, August, 2011). The household economic profile (Table 6 & Figure 5) of the conch shell workers revealed that most of them (29.55 %) belonged to the monthly income category of above Rs. 8000. This category was dominated by conch shell peddlers. Master artisans, constituting 25 % of the community were earning less than 4000 per month. Women also were involved in the carving activity. The data shows that the average monthly household income (Rs. 6700) and standard of living of the conch shell workers were miserable.

Occupational Health Hazards

An occupational disease is any chronic ailment contracted primarily as a result of an exposure to risk factors arising from work activity (WHO). It was estimated that each day an average of 137 persons die from occupational diseases and an additional 17 die from injuries throughout the world (CDC, 1996). Occupational health hazards are becoming a serious concern of Conch sector. Generally, carving communities have poorly ventilated and inadequately lighted rooms. Workers have to work under unhygienic conditions leading to health problems. The major health ailment (Table 7 & Figure 6) of conch shell workers was Common Cold. Musculoskeletal pain including back pain, knee pain and joint pain were also high in number due to odd squatting position & highly-intensive workload. 22.03 % of workers suffer from respiratory trouble due to dust of conch. Another serious complication of the workers was the prevalence of asthma (9.32 %) and Eczema (5.09 %). Among the clinical symptoms dimness of vision was reported in 14.41 percent of cases. The majorities of the problems were due to poor ergonomics, improper work station design, nature of work, conch dust and inadequate rest of the workers.

Conclusion

The age-old traditional conch shell carving has been kept alive by those professionally skilled household workers. The study presents an account of the Conch shell carving community with a view to identify the factors leading to its decline. It also attempts to focus on aspects of the socio economic conditions of the artisans. In addition, the nutritional status and occupational health issues of the community had also been dealt with. The findings of this study have considerable relevance to evaluate the socioeconomic conditions and standard of living of the conch shell workers. The educational status and literacy rate among the artisans was quiet encouraging. Provision of raw materials at reasonable price, financial assistance, outsourcing, regular health check-up, proper diet and increase of public health concern are the need of the demand of the society.

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