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Full Length Research Paper

An Assessment of Nutritional status, Socio-economic Conditions and Occupational Health Hazards of Terracotta artisans of Bishnupur, West Bengal, India

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Abstract
The terracotta temples of Bishnupur are the best specimen of the classical style of Bengal architecture. The ethnicity, emblematic design depicting mythological folk-tales, rural life styles represents a culmination of artistic expressions. Though this craft is enjoying a ready market both at home and abroad, there are some grey areas demanding immediate attention. This paper attempts to explore the nutritional status, socio-economic background and occupational health hazards of terracotta artisans of Bishnupur. The assessment of nutritional status among terracotta artisans revealed presence of malnutrition. The mean height, weight, BMI, W/H Ratio and WHtR of the population were 1.57 ± 0.09 m, 53.03 ± 9.03 Kg, 21.35 ± 3.04, 0.93 ± 0.05 & 0.42 ± 0.07 respectively. The age-wise distribution of the workers disclosed that majority of the males and females belonged to upper-age group of above 45 years. Joint family (51.61 %) type still prevails in the community. The literacy rate (93.55 %) among terracotta artisans was quiet encouraging. The average monthly household income (Rs. 5968) is miserable which reflects the poor standard of living of terracotta workers. Musculoskeletal pain, respiratory trouble and dimness of vision were more prevalent among workers.

Key words: *Handicrafts, Terracotta, Body mass index, Socio economic status.*

Introduction

The terracotta art bears an ancient lineage in India starting from pre-Harappan civilization and continuing up to Post-Gupta period. People have relied on terracotta throughout the ages as the manifestation of their aesthetic sense and imagination. Bishnupur was the capital of Malla dynasty in medieval period and terracotta craft flourished during this era under the royal patronage of Malla kings (Ganguly and Ganguly, 2015). It then gradually spread from Bishnupur to other places crossing the territorial boundary (Anthropological Survey of India, 2009). The terracotta temples represent a culmination of different types and forms of artistic expressions (Biswas, 1981). The plaques bearing scenes of mythological folk-tale and pastoral life styles give us a glimpse of the early culture of the people of Bengal.

One of the earlier studies on terracotta was made by G. S. Dutt (1938) that gave a comprehensive description of terracotta temples of West Bengal. A study on the artistic and architectural part of terracotta was done by S. P. Ghosh (1986) which dealt with the history of the art, their antiquity and thematic range. Another researcher P. K. Mandal (1987) evaluated the terracotta specimens which were preserved in the Tamralipta Museum and Research Centre, Tamluk. Rita Datta (1991) made a descriptive report of certain male and female terracotta figures from State Archaeological Museum, Kolkata. Sengupta (1993-1994) has made a descriptive study on a unique plaque with two heavily ornamented female figures from Mangalkot. Perhaps one of the most brilliant attempts to explore historical advancement of terracotta art was performed by Arundhati Banerji (1994) which began with pre-Harappa continued through Harappa, Post Harappa and up to urban Iron Age culture in Indian subcontinent. Sharmi Chakraborty (2000), in her doctoral thesis gave a detailed description of the terracotta figurines and plaques yielded from Chandraketugarh. Arputha Rani Sengupta (2005) has dealt with the terracotta temples of Bishnupur of West Bengal. She demonstrated the cult and religious value of the terracotta art in ancient times and in present scenario. Sengupta et al. (2007) published a comprehensive study with detailed photographic demonstration of terracotta materials preserved in State Archaeological Museum, West Bengal. Priyanka Mangaonkar (2011) has investigated the transformation of terracotta art through time and technology. Amar Nath Shaw (2011) documented on terracotta horse of Bankura which is often regarded as a symbol of the artistic excellence of Indian rural handicrafts. Dr. Milan Kanti Satpathi (2011) explored the problems and prospects of terracotta craft of Panchmura. Anwita Dutta (2013) in her doctoral thesis gave a detailed presentation on the cultural significance of early historic terracotta art of West Bengal. It is estimated that around 1 % of the total

population of Bankura district are involved in this sector (Government of West Bengal, 2015). The craft is mainly practiced by the people of the Kumor caste. The sector is presently beset with several problems, such as rising prices of the manufacturing products, inadequate working capital, transport of raw material from outside, lack of proper training, weak marketing strategy, low wages of the hard working artisans and above all, competitive global market (Satpathi, 2011). Nutritional deficiency is another common concern of this community. The underdeveloped socio-economic condition and lack of public health concern make their situation more vulnerable. However, there is no such work on the socio economic and nutritional status of the terracotta workers of Bankura and hence the study was undertaken to assess the nutritional status, socioeconomic condition of the artisans and to evaluate the occupational health hazard of the workers.

Materials and Methods

Study Area

Temple town Bishnupur (Figure 1) is situated at 23°05′N Latitude and 87°19′E Longitude and at an average elevation of 59 m above mean sea level (Archaeological Survey of India). The town, with a population of 67,783 has a glorious past, being also tentative site of UNESCO world heritage (UNESCO). The literacy rate of Bishnupur is higher (82.63 %) compared to 76.26 % of West Bengal (Census, 2011). Terracotta workers numbering 31 in the age group of 17-62 years who were willing to co-operate for the study were selected from this place by random sampling. The Kumbhokar people of this area mainly practice the craft and they also train other people.

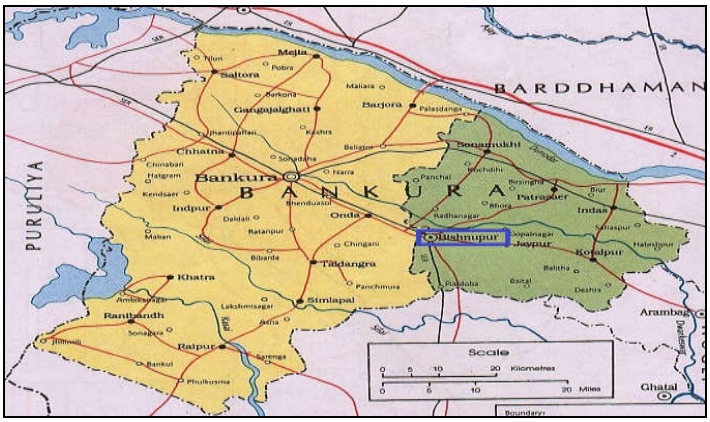

Fig 1: Map showing the location of Study area (Bishnupur)

Collection of Data

Bright atmosphere and moderate temperature are considered to be the most suitable condition of terracotta craft production. The present study was conducted through a field survey during Oct-Nov, 2015 which was the most appropriate time for this craft cultivation. Terracotta workers numbering 31 were screened as respondents by random sampling. Secondary data was collected from different research journals, books and publications of various government agencies. The statistical analysis of data was executed by using Microsoft Office Excel software.

Anthropometric assessment of nutritional status

Anthropometry is the science which deals with the measurement of size, weight and proportions of the human body (Ganguly and Ganguly, 2015). Height is often affected by long-term nutritional deficiency and is considered as an index of malnutrition (NIN, 2009). Height was calculated using a vertical measuring rod with headpiece without wearing footwear. The workers 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 evaluate the growth and development of a person (NIN, 2009). Digital weighing balance was used to measure the body weight of the workers. Zero error of the scale was checked, the scale was then calibrated and measurements were taken under basic 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 ascertained to the nearest of 0.50 kg.

Body Mass Index (BMI)

Body Mass Index (BMI) or Quetelet`s Index is 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 evaluation of the nutritional status of the population. The BMI 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. Researchers discovered that people with apple-shaped bodies face more health risks than those with pear-shaped bodies. W/H ratio above 0.90 for males and above 0.85 for females is used as a parameter of abdominal obesity (WHO, 2000).

Waist-to-Height Ratio (WHtR)
A person's waist-to-height ratio (WHtR), also called waist-to-stature ratio (WSR) is a measure of the distribution of body fat. It is defined as the waist circumference (cm) divided by the height (cm). The high WHtR values indicate greater risk of obesity-related cardiovascular diseases (Lee et al., 2008).

Socio economic survey
A schedule containing standardized questionnaire was developed by the researchers that have direct consequence to the society. The selected respondents were questioned to collect information on the socioeconomic back ground of the artisans.

Assessment of the occupational health hazards
Terracotta workers were questioned to know whether they suffer any health problems, including respiratory trouble, musculoskeletal pain, common cold or vision disorder.

Results and Discussion
Anthropometric Measurements
The workers were classified as per respective BMI. In the present study (Table 1 & Figure 2), out of the total 31 respondents, 22.58 % of the workers were in the underweight (BMI≤18.5) category. Among them, 14.29 % were severely thin, 28.57 % were moderately thin and 57.14 % were with mild thinness. 74.19 % of the terracotta workers were with normal nutritional status. 3.23 % artisans were overweight and none of them was found to be obese. The mean height, weight, BMI, W/H Ratio and WHtR of the population were 1.57 ± 0.09 m, 53.03 ± 9.03 Kg, 21.35 ± 3.04, 0.93 ± 0.05 & 0.42 ± 0.07 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 terracotta workers of Bishnupur, 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 (Figure 3) showed the mere presence (3.23 %) of under-age workers (< 18 years) among total workforce. The age-wise distribution of the workers disclosed that majority of the males (47.06 %) and females (42.86 %) belonged to upper-age category of above 45 years.

Gender
The terracotta engraving is one of such activities which provide scope for women participation. The gender-wise distribution (Figure 4) of the artisans revealed that slightly higher proportion (54.84 %) of the population was represented by males compared to females (45.16 %). It was observed that, male workers were mainly involved in strenuous terracotta crafting whereas women participated in intricate designing of miniature products such as ear-rings, chain, models etc.

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 income of family. The results (Table 3) of the present study indicated that joint family (51.61 %) still prevails in this community. 45.16 % of the population lived in medium size and 32.26 % in large size family system. Nuclear families tend to had small family size (22.58 %). The terracotta crafting is one of such profession which involves all family members who contribute their precious time in preparation and mixing of the clay, drying, designing, colouring and firing.

Educational Status of the terracotta workers
Education provides the strength, economic sustainability and social environment in a community (Ganguly et al., 2016). The present investigation (Figure 5) revealed that 6.45 % of terracotta workers had never attended school, 22.58 % have completed primary education and 35.49 % attended middle school. It also illustrated that 9.68 % of the artisans had completed secondary education and slightly upper percentage (12.90 %) of population studied up to higher secondary. 12.90 % of the artisans pursued higher study which is quiet admirable. The literacy rate among terracotta workers was 93.55 % which is much higher in comparison to the national average (74.04 %) (Census, 2011).

Socio-economic Status
Socio-economic condition plays a considerable role in determining the standard of living of people (Ganguly et al., 2016). The potters use a special coloured soil which has to be transported from remote villages that eventually increases the production cost. The

household economic profile (Figure 6) of the terracotta workers revealed that most of them (41.94 %) belonged to the monthly income category of Rs. 3001-5000. Master artisans, constituting 19.35 % of the community were earning more than 9000 per month. Women also were involved in the carving activity. The data shows that though majority of workers live in a large family system, the average monthly household income (Rs. 5968) are miserable which reflects the poor standard of living of terracotta workers.

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

Sl. No.	Classification	BMI (Kg/m^2) Principal cut-off points	Number of Respondents	Percentage
1.	**Underweight**	**<18.50**	**07**	**22.58**
	Severe thinness	<16.00	01	14.29
	Moderate thinness	16.00 - 16.99	02	28.57
	Mild thinness	17.00 - 18.49	04	57.14
2.	**Normal range**	**18.50 - 24.99**	**23**	**74.19**
3.	**Overweight**	**≥25.00**		
	Pre-obese	25.00 - 29.99	**01**	**3.23**
4.	**Obese**	**≥30.00**	--	--
	Obese class I	30.00 - 34.99		
	Obese class II	35.00 - 39.99		
	Obese class III	≥40.00		
	Total		**31**	**100**

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

Table 2: The Statistical Assessment of Anthropometric Measurements

Parameter	Height (m)	Weight (Kg)	BMI	W/H ratio	WHtR
Mean	1.574193548	53.03225806	21.35129032	0.929354839	0.419354839
Standard Error	0.015357911	1.622081413	0.54663757	0.009027264	0.012859334
Median	1.6	52	21.02	0.93	0.41
Mode	1.6	45	19.47	0.9	0.38
Standard Deviation	0.085509227	9.031367084	3.04354918	0.050261681	0.071597741
Sample Variance	0.007311828	81.5655914	9.263191613	0.002526237	0.005126237
Kurtosis	-0.995570398	-0.178490353	0.063022902	0.882280896	2.296942457
kewness	-0.042452982	-0.201792905	0.303237702	0.315059401	1.136618201
Range	0.29	39	13.56	0.22	0.35
Minimum	1.43	32	15.43	0.83	0.29
Maximum	1.72	71	28.99	1.05	0.64
Sum	48.8	1644	661.89	28.81	13
Count	31	31	31	31	31
Confidence Level (95.0%)	0.031365038	3.31273218	1.116382849	0.018436133	0.026262263

Source: Microsoft Office Excel Worksheet

Table 3: Family Status of the respondents

Sl. No.	Family Type	Number of Respondents	Percentage
1.	Nuclear	15	48.39
2.	Joint	16	51.61
	Family Size		
1.	Small (Up to 3)	07	22.58
2.	Medium (4-6)	14	45.16
3.	Large (More than 6)	10	32.26

Source: Primary data

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 this sector. Generally, crafting communities have poorly ventilated and inadequately lighted rooms. Workers have to work under unhygienic conditions leading to health problems. The major health ailment (Figure 7) of terracotta workers was musculoskeletal pain (31.25 %) including back pain, knee pain and joint pain. 18.75 % of workers suffer from respiratory trouble due to dust allergy. Among the

clinical symptoms dimness of vision was reported in 25 % of cases. 6.25 % of the workers were suffering with hypotension and 12.50 % with hypertension. The majorities of the problems were due to poor ergonomics, intense workload, nature of work, dust and inadequate rest of the workers.

Fig 2: Assesing anthropometric measurements of terracotta workers

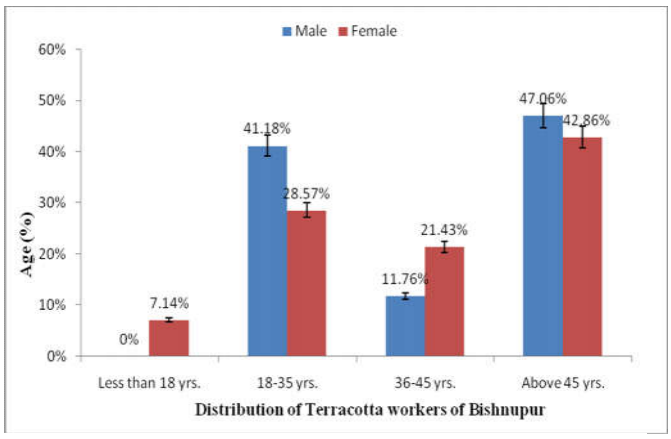

Fig 3: The Age-wise (%) distribution of Terracotta workers *(Source: Primary data)*

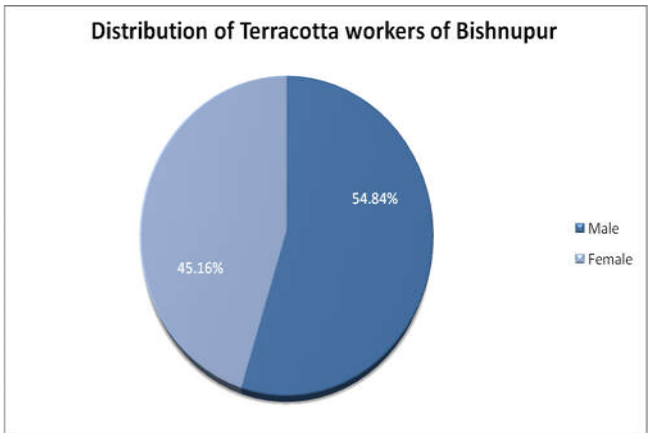

Fig 4: The Gender-wise (%) distribution of Terracotta workers of Bishnupur *(Source: Primary data)*

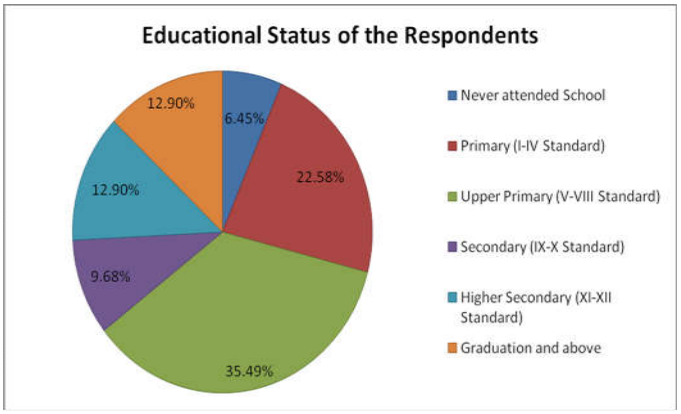

Fig 5: Educational Status of Terracotta workers of Bishnupur *(Source: Primary data)*

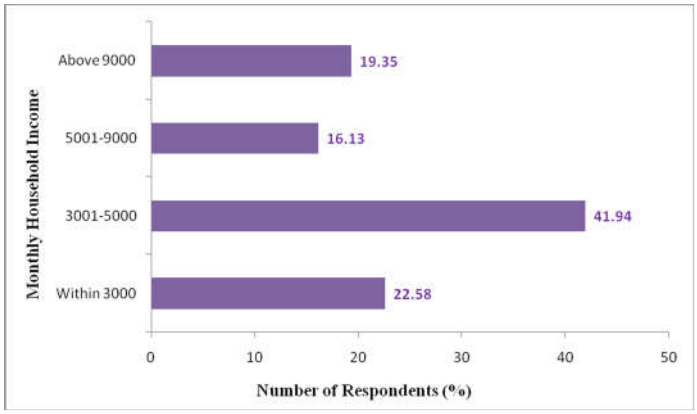

Fig 6: Economic Status of the Terracotta workers of Bishnupur *(Source: Primary data)*

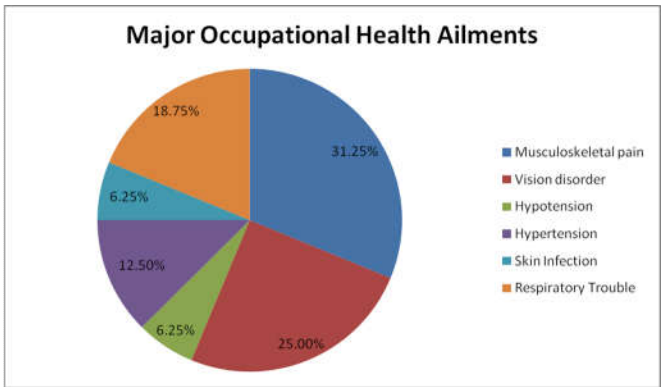

Fig 7: Occupational Health Hazards of the Terracotta workers of Bishnupur (*Source: Primary data).*

Conclusion

The study attempts to focus on aspects of the nutritional status of the community. In addition, the socio economic conditions of the artisans had also been thoroughly executed. The findings of this study have considerable relevance to evaluate the socioeconomic conditions and standard of living of terracotta workers. The educational status and literacy rate among the artisans was quiet encouraging. Inadequate space, high price of the natural colored soil, insufficient working capital, lack of training facility, poverty and occupational health hazards has made the situation more distressing. Provision of raw materials at reasonable price, financial assistance, skill development programs, outsourcing, regular health check-up are the demand of the society.

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