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Research Article

A Statistical Survey on the Socioeconomic and Demographic Livelihood of Brick Kiln Workers: A Case Study of Bahawalpur District, Punjab, Pakistan

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Abstract: The working population at the brick kilns is considered as the people living under poverty line. This study aims to investigate the socioeconomic and demographic characteristics and housing and living conditions of the brick kiln workers in Bahawalpur district. Total 20 kilns were visited in 5 tehsils of the district as sample sites. A questionnaire was designed and a field survey was conducted by using simple random sampling techniques to collect the data of 400 workers from 20 brick kilns. The quantitative analysis was performed in Statistical Package for Social Sciences (SPSS) v. 21 by applying descriptive and inferential statistics. Findings showed that majority of the workers and heads of working households were male (85.75% and 97.5% in rural and urban kilns respectively) and Saraiki speaking (70%) belonged to Muhajir, Ranagr and Khokhar castes. The early age (14-18 years) marriages were common among the workers especially among the females. Dependency ratio of the kiln workers was 37.6% including mostly the children and aged. Dominant share of the kiln workers (70-80%) were illiterate and very few were literate from primary to intermediate level. The workers' income varied between PKR 11,000 to 15,000 which was lower than the average wage (PKR 25,000) as per the government rules. Brick moulders and soil suppliers were the main occupants at kilns. Most of the workers were resided in their own houses (1 or 2 rooms) made with *kacha* (mud made) material. Although various facilities were available to the workers at brick kilns but they have limited or no proper access to safe drinking water (20%), first aid and medicare (18%) and accident risk prevention (0%) crucial for their health. Thus, these facts demonstrated that kiln workers led a meagre life style. This work will serve as a reminder to authorities, planners and Non-Governmental Organizations (NGOs) to take action to improve the living conditions of kiln workers. Lastly, few suggestions were proposed to uplift the lives of the kiln workers.

Keywords: Socioeconomic factors, Dependency ratio, Literacy rate, Kiln workers, Bahawalpur.

1. INTRODUCTION

The brick kiln industry produces 21% of the world bricks. Globally, Asia alone produces 1,300 billion bricks, which accounts for 86.67% of the world's brick production [1]. It is estimated that over 16 million people are the working labour in this industry. China and India are the leading producers of bricks in the world with over 200 billion bricks annually [2]. It is one of the most challenging works for workers. The most problematic task in brick making workers for improvement of working method and working place is to save the environment from pollution [3]. At world level, building bricks are the part of the ceramic industry that produces most bricks. Bricks are made from vide range of clay and shale with excellent particle sizes. This clay contains many different minerals that influence in final colour of the fire bricks. South Asia is producing over 21% of the entire world's bricks [4]. Bricks construction in south Asian countries is the major source of building material in construction sector. It is one of the oldest unorganized labour intensive informal sectors in South and South East Asia [5]. Therefore, the brick kiln production has been dominated by few Asian countries such as China, India, Pakistan, Bangladesh, Nepal and Vietnam. China has occupied the first place with

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54% of the total production, India is the second with the 11%, Pakistan is placed in third place with 8% and Bangladesh is placed at the fourth place in total production. The brick industry is an expletive industry on the world level and bricks are used as main construction material all over the world in every kind of building purpose. Yet the developing countries populations are still struggling to come up with sustainable solution to combat the problem of kilns impact and poverty [6]. Especially, in Pakistan, the environmental and health impacts of brick kilns have been researched by conducting various surveys from field professionals and investigators [7]. In brick industry, huge amount of wood and waste are used as a fuel which is highly inefficient and tends to air pollution and cause damage to vegetation and human health [8]. The kiln industry has been perceived as the main stationary source of environmental pollution as various pollutants like CO, SO, Nitrogen, Nitric Acid are also affecting the ozone layer as well [9].

Brick is one of the main components of construction industry, and mud brick kiln in particular, have made significant contribution to human development throughout history. However, the brick kiln industry products were not entirely absorbed by the real estate industry fast growth which caused shift in the conventional bricks kiln products network chain [10]. The process of brick kiln production is based on manual labour and brick kiln units are expected to give employment to around 10 million workers. But majority of them are hand to mouth and thus take advance loan from the kiln owners for their perusals. Hence, they are bound to work at kilns for an extended period of time longer than the time limit worldwide [11]. It is estimated that about 4.5 million people (including 1 million children), are working in slave-like conditions at around 20,000 brick kilns in Pakistan where almost 50% are women [12]. Mitchell et al., [13] argued that most brick kiln workers migrated with their families from the backward and poor areas of country. Gosal [14] stated that families, including young children, work in harsh condition and low wages situations. Brick production is season based work, as brick kiln units do not operate during the period of the rainy season, hence brick kiln workers returned to their localities and get employed in other works like agriculture for livelihood or remains unemployed. Kumari [15] highlighted the economic sustainability of the seasonal migration of the brick workers. The brick kiln system is mainly based on a manual labour. Kainth [16] studied the phenomena of kiln labour migration which is a permanent feature by pull and push factors that constitute a large population engaged in this industry in Punjab (India). Atangana [17] explained the typically push factors that initiate migration. Due to these factors, the workers in rural and urban areas did work to earn their livelihood. If they earn less, they migrate from one place to another in kiln areas.

Although, brick kiln sector all over the world is in a very unregulated and uncoordinated state, but it is responsible for 1.5% of gross domestic production (GDP) to meet the requirements of population of Pakistan [11]. Pakistan is 3rd largest brick producer (after China and India) with the production of over 45 billion bricks annually [7]. There are more than 16,000 brick kilns with over 0.5 million workers making 6 billion USD revenue annually [18]. Above 99% of the brick kilns in Pakistan are nearly a millennium old Fixed Chimney Bull's Trench Kiln (FCBTK) and many are of these are located in rural and peri-urban areas [19, 20]. These kilns contribute significantly in backing bricks to fulfil the basic need of shelter for humans. Basically, in Pakistan, the most widely used method of bricks is handmade, which are made with the help of moulders by workers and then dried in sun light and backed in a FCBTK. The use of heating material did not cause a wide spread pollution because these people use kuttal, wood, bora and coal for heating. The kiln trench chimneys are used to reduce the smoke and thermally insulated chamber is used to produce temperature like oven they provide heat to bricks for backing like a cake. But the sufficient temperature is required to complete this process.
Brick kiln workers are considered among the most susceptible and excluded in society. Therefore, there is a dire need for social concern to delineate measures to improve the working and living conditions of brick kiln workers overall. In November 2020, there were around 450 brick kilns in Bahawalpur [21]. Additionally, the brick industry is an unorganized sector where most of the workers are illiterate and working in meagre and vulnerable conditions. The health of brick kiln workers is highly affected due to working in unhealthy environment for an extended period and whole of family gives their skills yet they scarcely have enough to eat. Nevertheless,

this informal sector generates a large number of employments. Thus, this research investigates the socioeconomic characteristics and disparities of the working population in the brick kiln industry in five tehsils of Bahawalpur district. A clear strategy or action plan to solve their issues and eliminate the anticipated risk with alternative chances their slandered of living and welfare will be suggested to the concerned authorities and community for their awareness and action.

2. METHODOLOGY

Present study was an exploratory study in which socioeconomic and demographic conditions of working population at brick kilns of Bahawalpur district was investigated. The nature of this study is quantitative because it quantified the data variables.

2.1 Study Area

The study area Bahawalpur district is situated in southern Punjab between 27°48′ to 29°50′ North latitudes and 70°54′ to 72°50′ East longitudes. The district has covered a land area of 24,830 km^2 with a population of 4,284,964 souls in 2023 [22]. Administratively, there are six tehsils, i.e., Ahmadpur East, Hasilpur, Bahawalpur City, Bahawalpur Saddar, (both City and Saddar considered Bahawalpur tehsil as a whole in this research), Khairpur Tamewali and Yazman (Figure 1).

2.2 Data Collection

A self-administrative questionnaire was developed

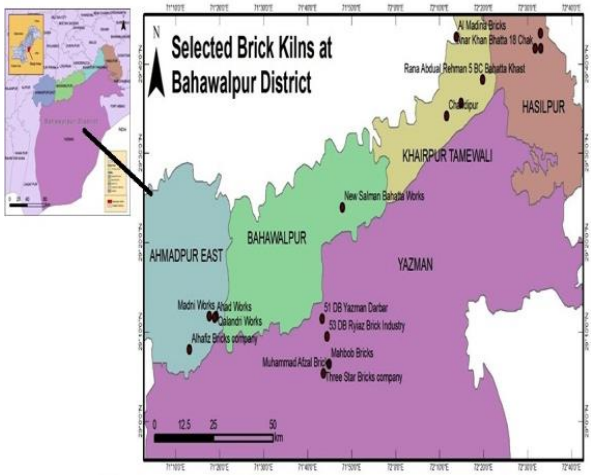

Fig. 1. Location of brick kilns in study area

to get data from the working labour to measure the variables of proposed study. Total 20 brick kilns were selected in overall district as study sites and visited. The questionnaire was divided into four parts viz. information about the head of the kiln, the socioeconomic conditions of the workers, the demographic characteristics of the interviewed labour and staff and the living facilities available for the labour and staff. The independent variables in this study were socioeconomic and demographic conditions, while the dependent variables were the workers and heads of the kiln.

2.3 Sampling Procedure

A random sampling technique was selected, where the individuals are chosen randomly, giving each member of the population an equal chance of being selected as the sample. While random stratified sampling method was used for the selection of the brick kilns in the district. The selected kilns were chosen from all over the district with the division of four kilns (two urban and two rural clusters) each from Ahmadpur East, Hasilpur, Khairpur Tamewali, Yazman and Bahawalpur (City and Saddar) tehsils. The sample size (n) calculated for this study was total of 400 (20×20 = 400). The population of this study was working people at brick kilns including labour, manager, supervisor and heads.

2.4 Data Analysis

The reliability index (Cronbach's alpha value) of questionnaire was 0.846, which shows a high score of reliability [23]. Data analysis was carried out using SPSS version 21. Both descriptive (frequency and percentages) and inferential statistics (chi-square) were used in this analysis. For the primary findings, followings formulae were used;

Proportion of Male (%) = Male population/total population

Proportion of female (%) = Female population/total population

Literacy ratio (%) = Total literate population/total population (above 10 years)

Marital status/Married population (%) = married population/total population

Study area map was developed in ArcGIS 10.5 software by using GPS to point out the kilns on map. Results were displayed in the form of charts, text, tables, and figures. These statistical results

were then compared and discussed with supporting theoretical literature. Lastly, few preventive suggestions were proposed to facilitate the working labour and save the environment.

3. RESULTS AND DISCUSSION

3.1 Gender of Working Households

Table 1 reveals that in Bahawalpur tehsil, 54.4% were active male kiln workers and 45.6% were female. In Khairpur Tamewali tehsil 65.5% kiln workers were male and 34.4% were female working in kilns. In Yazman tehsil, 78.7% kiln workers were male and 21.3% were female workers active in work place. In rural areas, females were working more than in urban areas. In Ahmadpur East tehsil, among the active working kiln workers, 61% were male and 38.8% were female. The female population ratio was less because the workers were not living in the surrounding of kilns. Mostly population was illiterate and they were hesitant to give proper information. Majority of them (70%) were Saraiki speaking and belonged to Muhajir, Rangar and Khokhar castes, which is more than half of the kiln working population. Atangana [17] explained the long term relocation of an individual, household or group of new location outside the community of origin for finding employment opportunities.

3.2 Gender of Households Heads

In the current study, gender differential on the basis of household head has been studied. In a typical Pakistani society, primarily male people are head of the household because of social customs and traditions developed to accept male in this role. Since the human race discovered fire a million years ago, they have continually sought to control and utilized it to their advantage to create diverse construction materials that would satisfy their fundamental need for shelter [24].

Results of the current study indicate that 85.75% and 97.5% of males were the heads of the households in rural and urban areas, respectively. Only 14.25% and 2.5% of females were playing the role of household heads in rural and urban areas, respectively (Table 2).

Hence, notable inequalities of household headships were observed in rural and urban localities in Bahawalpur district.

3.3 Marital Status of Brick Kiln Workers

Marital status has practically nothing to do with biological characteristics, but even then, the study is quite helpful in studying imputation structure. Marriage is an essential factor in fertility because marriage increases population structure. In the study area, analysis of marital status suggests that women have lower status than men because the age of marriage of females can be argued to be an indicator of relative status. Generally speaking, women who marry early, soon after puberty, are likely to belong to more conservative families, have less chance to acquire education, to under employed and are more likely to depend on spouses than the women who marry at more mature age. In kiln sector, women marry generally at the early twenties, and they are not educated. In rural areas mostly females marry at an early age of 15-19. These results depict that 75% females and only 7% males were married; this shows the apparent gender differences. These differences are not only shown in rural area, but are found in all societies.

Table 1. Gender of households working in brick kilns (n=400)

Tehsil	Bahawalpur		Khairpur Tam.		Yazman		Hasilpur		Ahmadpur East	
Gender	M	F	M	F	M	F	M	F	M	F
Percentage	54.40	45.60	65.80	34.20	78.70	21.30	52.50	37.50	61	39

Table 2. Gender of households heads working at brick kilns (n=400)

Area	Total Housing Units	Housing Units (Male)	Percentage	Housing Units (Female)	Percentage
Rural	200	143	85.75	57	14.25
Urban	200	195	97.5	5	2.5

Table 3 shows the age at marriage of brick kilns population in district Bahawalpur. The 80 workers of age group of 14-18 were married in Bahawalpur, 40 working population in Khairpur Tamewali, 30 in Yazman tehsil, 40 in Hasilpur and 32 in Ahmadpur East. In the age group of 18-22, the married working population of the kilns was 22 in Bahawalpur, 27 in Khairpur Tamewali, 19 in Yazman, 20 in Hasilpur and 14 in Ahmadpur East tehsils. In the age group of 22-26, the married working population of the kilns was 7 in Bahawalpur, 15 in Khairpur Tamewali, 7 in Yazman, 15 in Hasilpur and 9 in Ahmadpur East tehsils. In the age group 26-30, the married working population of the kilns was 1 person only in Bahawalpur, 5 in Khairpur Tamewali, 5 in Yazman, 5 in Hasilpur and 7 in Ahmadpur East tehsils. Susan Golombok [25] examined the process involved women survival and behaves differently in different ways they bear in kilns for their survival. Likewise, Sadiq [26] studied the kiln population differences by social class, age at marriage in Pakistan and found the noteworthy differences in ages particularly the marriage at early age. Khan and More [27] studied the socioeconomic status of female workers in some selected kilns of India that is ranked second in brick manufacturing in the world. It is found that half of the workers at brick kilns were women working to earn money and as well as do the job of bearing and rearing of children. Due to poverty most of them were uneducated.

3.4 Dependency Ratio of Brick Kilns Workers

An active population of any country or city may comprise the working population, disabled persons, retirees and students. In Pakistan the dependency ratio is very high; however, in the kiln population dependency ratio is low because every child or adult in kiln family members works at the work place, i.e., men, women and children. Dessy and Pallage [28] concluded that child labour is common at kilns, which is the employment of children energy and potential at work. Generally, workers in brick industry are from deprived sectors of life and whole family works as a unit. Many recessive, illiterate and poor populations of backward communities are involved in this sector. Even the head of the kiln or labour in Asian countries is usually illiterate.

Table 4 shows the dependency ratio of the kiln population at kilns. According to the results 22% of kiln population in tehsil Bahawalpur was dependent and 78% was independent. In Ahmadpur East tehsil 29% of the population was dependent and 71% population was independent. In Hasilpur tehsil 29% population was dependent and 71% was independent. In Khairpur Tamewali tehsil, the majority of the 67% population was dependent (children and aged) and 33% population was independent, and in Yazman tehsil, 36% population was dependent and 64% was independent. Generally at kilns, the working population is thought to be ever working population and they do their work from childhood to old age. Ali [29] conducted a study in district Swabi (Pakistan) and asserted that existing resources exert pressure on the people and they need to improve their income, so they are forced to ask their children to work.

Table 3. Age at marriage of working population in brick kilns (n=400)

Age Group	Bahawalpur	Khairpur Tam.	Yazman	Hasilpur	Ahmadpur East
14-18	80	40	30	40	32
18-22	22	27	19	20	14
22-26	7	15	7	15	9
26-30	1	5	5	5	7

Table 4. Dependency ratio of working population of brick kilns (n-400)

Tehsil	Working Population	Dependent (%)	Independent (%)
Bahawalpur	110	20 (22)	90 (78)
Ahmadpur	90	20 (29)	70 (71)
Hasilpur	80	18 (29)	62 (71)
Khairpur Tamewali	67	27 (67)	40 (33)
Yazman	53	14 (36)	39 (64)
Total	400	109 (37.4)	291 (62.6)

3.5 Literacy Ratio of Brick Kilns Workers

A person is treated as literate if he could read a newspaper or any journal of the same standard and could write a simple letter. But in kiln area majority of the working population is ranked as illiterate. Figure 2 shows that the education division or levels of grades divided into in five groups' primary, middle, matric, intermediate and above. The percentage shown in graph displayed that dominant share of population was illiterate i.e. 62% in Bahawalpur, 50% in Ahmadpur East, 95% in Khairpur Tamewali, 93% in Hasilpur and 91% in Yazman. The working population at kiln attained Primary education was 25% in Bahawalpur, 17% in Ahmadpur East, 4% in Khairpur Tamewali, 6% in Hasilpur and 5% in Yazman. The share of Middle passed population among working population at kilns was 13% each in Bahawalpur and Ahmadpur East, and 1% each in Khairpur Tamewali, Hasilpur and Yazman. The working population share having Matric was highest (10%) in Ahmadpur East and 1% each in Khairpur Tamewali and Yazman. While in Bahawalpur and Hasilpur the share of Matric passed working population was zero. Likewise, Intermediate level in education attainment was very low (10% in Ahmadpur East and 1% in Yazman) and no single worker in whole working population attained above Intermediate education. Though, there is no gender discrimination in the attainment of education. These results show that the workers living nearby villages and towns of Bahawalpur and Ahmadpur East were primary passed due to the availability of schooling facilities. These children were treated as literate because they were primary passed but in three tehsils those were not more than 15%. Khan and Shahzadi [11] also found that lack of education is a major cause of kiln workers backwardness.

It is estimated that in Pakistan, there were more than 12 million child labourers working in various sectors of life including brick kilns [30]. Gosal [14] in his work on spatial pattern and progress of literacy at kilns in India contends that children are a work force for their parents no matter whether they are educated or not. The increase in children means increase in the workforce for the parents. They only know to work on kilns and learnt that their requirement is not an education. They make and mould the bricks in the kilns.

3.6 Occupational Structure of Brick Kilns Workers

Both male and female workers in these kilns were either too old or too young to do this work equally. Women and children worked to make the clay lumps, brick mouldings, bricks makings and transport bricks to other places using donkeys. This is done by all the members of the family of kiln workers. They are classified as Supervisor, Manager, Mud Maker, Brick Moulder, Soil Supplier, Sand Spreader, Rubbish Man and Fire Man having different functions they perform (Table 5). It is noted that 60% supervisors lived in the work place and other 40% lived in nearby village or town. While Managers, Mud Makers, Brick Moulders, Soil Suppliers, Sand Spreaders, Rubbish Men and Fire Men all belonged to one family. They work

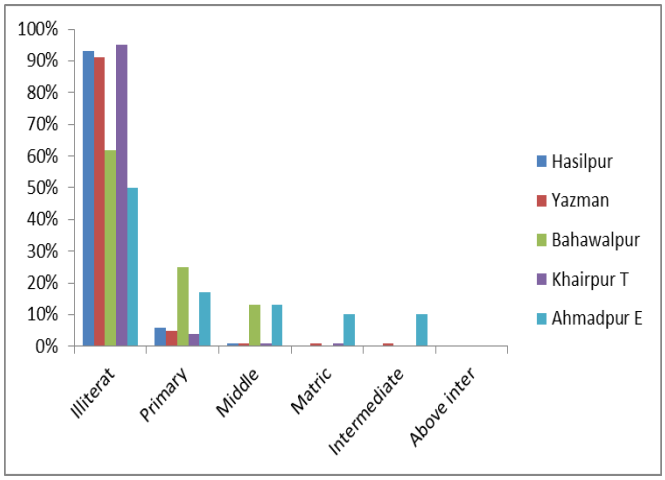

Fig. 2. Literacy rate of workers at brick kilns in Bahawalpur district (n=400)

Table 5. Classification of brick kiln workers occupation at kiln

Occupation	Definition
Supervisor	A person who directs and oversees the work of kiln workers.
Manager	A person responsible for controlling or administrating of staff members.
Mud Maker	A person who mixes mud with water.
Brick Moulder	A person who uses a structured frame (*sanchi*) to mould mud in the shape of bricks.
Soil Supplier	A person who takes the supply the mud in a hand cart or donkey cart.
Sand Spreader	A person who spreads sand.
Rubbish Man	A person who collects waste material.
Fire Man	A person who makes the fire in underground oven or furnace.

together with their family members. Mostly every family has separate work from the other family or household.

Table 6 showed that there were different kinds of workers working at the selected kilns. In tehsil Bahawalpur there were 400 soil suppliers, 200 brick moulders, 72 mud makers, 20 fire men, 11 rubbish men and 39 sand spreaders, 5 mangers and 4 supervisors. In Ahmadpur East tehsil, there were 400 soil suppliers, 150 mud makers, 100 brick moulders, 10 fire men, 10 rubbish men, 10 sand spreaders, 6 mangers and 4 supervisors. In tehsil Hasilpur, there were 400 brick moulders, 385 soil suppliers, 200 mud makers, 10 fire men, 8 rubbish men, 10 sand spreaders, 4 mangers and 4 supervisors. In Khairpur Tamewali tehsil, there were 300 soil suppliers, 110 brick moulders, 100 mud makers, 10 fire men, 2 rubbish men, 11 sand spreaders, 4 mangers and 4 supervisors. In tehsil Yazman there were 200 brick moulders, 100 each soil suppliers and mud makers, 30 fire men who have backed bricks in the underground baking oven, 10 rubbish men and 19 sand spreaders were working at the sampled kilns. Sain and Meena [31] analyzed the occupational structure of kilns in Rajasthan (India) and found that kiln workers work in adverse working conditions, having poor pastures with substantial loadings and traditionally designed hand tool results in occupational health problems. Owing to lack of proper training and absence of personal protection equipment have a potential of causing adverse impacts on the workers' health as 79.23% were found suffering with respiratory and skin diseases.

3.7 Income Level of Brick Kiln Workers

The income of kiln workers depends upon the job of their resources as they perform at the kilns so far. Income is an economic term that is generally defined in terms of consumption and earning of wealth. In the preparation of bricks, the whole family of men, women and children are involved. However, the wages are given to a single person only. The brick kiln generally is situated in a desolate place away from the main cities and towns in a few tehsils. The kiln working days are hardly 240-260 in a year. On rainy days, there is no work. As such, during the monsoon months in summer, their work is stopped and if rain comes suddenly then the loss of many unbaked bricks might be faced. In a few kilns on the rainy days, the loss of bricks is born by the kiln head. They depend upon the kiln owners entirely.

Table 6. Occupational structure of workers at brick kilns in Bahawalpur district

Occupation	Bahawalpur	Ahmadpur East	Hasilpur	Khairpur Tamewali	Yazman
Supervisor	4	4	4	4	6
Manager	5	6	4	4	6
Mud Maker	72	150	200	100	100
Brick Moulder	200	100	400	110	200
Soil Supplier	400	400	385	300	100
Sand Spreader	39	10	10	11	19
Rubbish Man	11	10	8	2	10
Fire Man	20	10	10	10	30

Table 7 shows the monthly average income of the households' kiln workers in Bahawalpur district. Kiln workers earn the highest income of PKR 21,000-25,000 per month of Khairpur Tamewali (10) followed by 8 in Hasilpur, 6 in Ahmadpur East, 5 in Bahawalpur and 2 in Yazman. The per month income of PKR 16,000-20,000 is earned by 39 kiln workers of Ahmadpur East, followed by 30 in Bahawalpur, 10 in Khairpur Tamewali, 8 in Yazman and 4 in Hasilpur. The per month income of PKR 11,000-15,000 is earned by the 50 kiln workers in Khairpur Tamewali followed by 48 in Hasilpur, 40 in Yazman, 30 in Bahawalpur and 20 kiln workers in Ahmadpur East. The kiln workers earned the per month income of PKR 6,000-10,000 were earned by 20 in Yazman, 17 in Hasilpur, 10 in Bahawalpur and 5 each in Khairpur Tamewali and Ahmadpur East. The least income per month of PKR 1,000-5,000 is earned by the 10 kiln workers each in Yazman and Ahmadpur East, 5 each in Bahawalpur and Khairpur Tamewali and 3 in Hasilpur. These results justify that income levels of the kiln workers households were not very much high as compared to their needs and inflation rates. Niaz et al., [20] conducted a study at the brick kilns of Faisalabad district (Pakistan) and found that majority of the workers (52.72%) have a monthly income of PKR 6,000-9,000 and most of the workers (87%) haven't any kind of agricultural or residential property. Thaheem et al. [30] also noted that the incomes of the brick kiln workers in Pakistan are less than the international levels. Thirupathi and Anthonisamy [32] conducted a study in Salem district (India) and found a significant difference between the workers satisfaction and level of wages.

3.8 Expenditure of Brick Kiln Workers

Expenditure depends on the income level of kiln population. Therefore, they are compromising the inequity by working hard but didn't earn enough to be economically strong. They need more income to meet their daily based necessities and improve the socioeconomic conditions on a local level. Table 8 presents the average monthly expenses of kiln workers family in all tehsils of district Bahawalpur. Kiln workers households of Khairpur Tamewali (20) made the highest expenses of PKR 16,000-20,000 per month followed by 15 in Hasilpur, 10 each in Yazman and Bahawalpur and 5 in Ahmadpur East. The expenses of PKR 11,000-15,000 were made by the 50 kiln workers households of Bahawalpur, followed by 45 each in Ahmadpur East and Hasilpur, 40 in Khairpur Tamewali and 20 in Yazman. Likewise, the highest expenses of PKR 6,000-10,000 were made by the 40 kiln workers households of Yazman followed by 22 in Ahmadpur East, 17 in Bahawalpur, 15 in Hasilpur and 12 in Khairpur Tamewali. The least expenses of PKR 1,000-5,000 were made by the 12 kiln workers households of Ahmadpur East, 10 in Yazman, 8 in Khairpur Tamewali, 5 in Hasilpur and 3 in Bahawalpur. These results suggest that the expenditures of the kiln workers households were almost even to their income levels and they hardly meet their daily based necessities.

3.9 Housing Condition and Living Facilities

The condition of the houses is a significant factor in analyzing the social and economic state of an area.

Table 7. Average monthly income of households working at brick kilns in Bahawalpur district

Income (PKR)	Bahawalpur	Ahmadpur East	Hasilpur	Khairpur Tamewali	Yazman
1,000-5,000	5	10	3	5	10
6,000-10,000	10	5	17	5	20
11,000-15,000	30	20	48	50	40
16,000-20,000	30	39	4	10	8
21,000-25,000	5	6	8	10	2

Table 8. Average monthly expenditure of households working at brick kilns in Bahawalpur district

Expenditure (PKR)	Bahawalpur	Ahmadpur East	Hasilpur	Khairpur Tamewali	Yazman
1,000-5,000	3	12	5	8	10
6,000-10,000	17	22	15	12	40
11,000-15,000	50	45	45	40	20
16,000-20,000	10	5	15	20	10

The shelter is the basic need of every human being. In the kiln, all family members work to make bricks for others, but they do not have their own house. In a civilized society, all persons should have their own house or shelter. The housing condition depends on constructional material. In the study area, three types of houses were present depending on the construction materials, *Kacha* (mud made), *Semi-kacha* (mud and brick made) and *Pakka* (brick and cemented).

Table 9 portrays the ownership and condition of houses at the brick kilns. In Bahawalpur, 800 houses were owned by the kiln workers while 300 were on rent, the housing material used was *Kacha* of 300 households, *Semi-kacha* of 405 households and *Pakka* of 395 households. The number of rooms of in a house was one or two throughout the brick kilns in the district. In Ahmadpur East, 335 houses were owned by the kiln workers while 280 were on rent, the housing material used was *Kacha* of 400 households, *Semi-kacha* of 115 households and *Pakka* of 100 households. In Hasilpur, 115 houses were owned by the kiln workers while 85 were on rent, the housing material used was *Kacha* of 115 households, *Semi-kacha* of 35 households and *Pakka* of 50 households. In Khairpur Tamewali, 400 houses were owned by the kiln workers while 147 were on rent, the housing material used was *Kacha* of 300 households, *Semi-kacha* of 200 households and *Pakka* of 47 households. In Yazman, 300 houses were owned by the kiln workers while 85 were on rent, the housing material used was *Kacha* of 35 households, *Semi-kacha* of 300 households and *Pakka* of 50 households. These results show that workers at the kilns resided in the houses constructed by different building materials made mostly by *Kacha*, *Semi-kacha* and *Pakka*. A study conducted in Jhang (Pakistan) also found that majority of the respondents (67%) resided in *Kacha* houses. They belonged to low income class and engaged in minor jobs, i.e., kiln workers [33]. A recent study undertaken in the Punjab, (Pakistan) also asserted that 62.5% workers at kilns were offered housing facility by the brick kiln owners in the surroundings of the kilns; of which, 23.8% were *Pakka* houses and 38.6% were *Kacha* houses [21].

Table 10 shows that the living facility check list at kilns workers of Bahawalpur does not have essential life needs and they are spending a poor and vulnerable life. The electricity facility is crucial in the modern day life as well as all kiln sites of Bahawalpur district therefore 89% workers were availing this facility and remaining 11% were not availing this facility. These results show that 78% workers had radio facility and remaining 22% workers do not have any radio facility. They were hand to mouth and cannot avail the luxuries of life. The 85% workers had the television facility and 15% did not have a TV. In the study area, the telephone facilities were shared. Cell phone facility was availed by 91% working population like simple Nokia mobiles and other 15% have no cell phone because they cannot afford it. The kiln workers

Table 10. Living facilities check list at kilns of Bahawalpur district

Living Facility Check List	Yes (%)	No (%)
Electricity Facility	89	11
Radio Facility	78	22
Telephone Facility	85	15
Cell Phone	91	9
Television Facility	76	34
Tape Recorder	90	10
Loan Availability from the Kiln Owner	80	20
Clean Drinking Water	20	80
Sanitation Facility	30	70
First Aid & Medicare Facility	18	82
Accident Risk Prevention	0	100

Table 9. Ownership status and housing condition of households working in brick kiln in Bahawalpur district

Tehsil	House Ownership		Housing Material			
	Owned	Rented	Kacha	Semi-kacha	Pakka	No. of Rooms
Bahawalpur	800	300	300	405	395	1-2
Ahmadpur East	335	280	400	115	100	1-2
Hasilpur	115	85	115	35	50	1-2
Khairpur Tamewali	400	147	300	200	47	1-2
Yazman	300	85	35	300	50	1-2

mostly enjoy by listening the songs while making the bricks as 76% had a tape recorder. The loan (*peshgi*) facility was also availed by the majority of the kiln workers (80%) in advance by agreeing a contract, and resultantly they are bound to work for specific time period agreed in contract usually giving over time of work. Normally, the loan facility for working household at kilns started with the amount of 500 USD or equal to nearly PKR 150,000 [34]. It is also found in previous studies that majority of the workers (70%) have taken the loan facility and were bound to work at kilns and there is extensive bonded labour at the kilns throughout Pakistan [20, 35]. Often this loan lasts for a long period of time and passes from one generation to another and hence this loan slavery is causing the breakdown of the poor workers in many developing countries (e.g., Pakistan) and ultimately increasing their clashes and casualties in such contexts [36, 37]. Alarmingly, the majority of the kiln population (80%) had a lack of access to safe drinking water and use hand pump water while 20% had access to nearby water canals and water channels for potable water. About 70% working population had no sanitation facility while remaining 30% had the sanitation facility. Similarly, in Bahawalpur the majority of the kiln population (82%) can't afford the first aid kit because of poorness and even chance to be suffered in accidents being present every time in the kiln area while baking bricks at a higher risk. A study conducted at the kilns of Faisalabad district (Pakistan) also found that majority of the kiln workers are facing lack of proper drinking water source and majority (94%) have no idea about water purity. Likewise, majority of them (76%) didn't have sanitation facility [20]. The brick kiln workers did not have access to the proper medical treatment because of unaffordability and the inaccessibility of health and Medicare facility. Moreover, the accident risk prevention facility was totally absent during the work of making and baking bricks at the kilns, as kiln workers have no awareness about this. . Hence, the lives of kiln workers were at serious risk in the case of an accident, especially the rubbish men and fire men.

Table 11. Chi-square results of selected variables

Variable	Value	Df	Sig.
Monthly Income and Expenditures	11.4	3	0.029*
Available Facilities and Workers Satisfaction	7.81	1	0.000**

Note: *significant at 95% level of confidence
**significant at 99% level of confidence

3.10 Chi-square Results

Table 11 shows the results of Chi-square to test the association between the selected variables viz. Monthly Income (Independent) and Expenditures (Dependent) of the kiln workers and Available Facilities (Independent) and Workers Satisfaction (Dependent). The value of the chi-square of monthly income and expenditures is 11.4 with alpha value of 0.029 that is significant at 95% level of confidence. It exhibits a strong association between the monthly income and expenditures of the kiln workers. Moreover, there is also a strong positive association between available facilities and workers' satisfaction. The value of chi-square of available facilities and workers' satisfaction is 7.81 with degree of freedom (Df) value of 1 and shows a strong association between the workers' satisfaction and available facilities. The alpha value of 0.000 is also highly significant at 99% level of confidence. Hence, these results also justify the brick kiln workers miserable and deprived livelihood. Khan and Shahzadi [11] also highlighted the kiln workers clashes and limited livelihood opportunities due to the low wages.

4. CONCLUSIONS

The workers at brick kiln represent a class of individuals who live below the poverty line. The present study aimed to investigate the socioeconomic and demographic inequalities in Bahawalpur district. Based on quantitative analysis of socioeconomic and demographic livelihood of the workers, the study found wide disparities in various aspects of kiln workers' life. The study concludes that the majority of the household heads of workers at kilns were male. Early young age (14-18 years) marriages were common in working population at the kilns. Therefore, the dependency ratio was also considerable among kiln workers due to large family size. Most of the workers were Saraiki speakers, and belonged to Muhajir, Rangar and Khokhar castes. The education level of the kiln workers showed that majority of the workers (above 90%) were illiterate in overall district except Ahmadpur East and Bahawalpur tehsils having

comparatively lower number of illiterate than other tehsils. The socioeconomic indicators also showed the deteriorated conditions of the kiln workers. The income level of the workers per month varied between PKR 11,000 to 15,000, which is lower than the average wage of labourer as per the government rules. Similarly, the expenditures of the majority of the workers were also equal to their monthly income. Workers mostly involved in mud making, mud moulding and soil supplying works at the kilns. The housing conditions and living facilities showed that workers' houses were small and consisted of 1 or 2 rooms only. There were a lot of people living in rented houses and most of the houses were built with *kacha* material of unbaked mud bricks. Most of the workers were migrated and they had no proper facilities of daily life and most importantly lack of access to safe and clean drinking water and Medicare facility.

It is also found that due to the time constraints on the brick kiln production, the owners of kilns were having aggressive and harsh behavior with workers. Thus, Child labour, harassment, long working hours, violation of environmental law, labour law, human rights are common features of the kilns. The loan is also given to the majority of the workers by the owners which trapped the workers of kiln due to high interest rates and low wages during the working period. Therefore, the whole family is virtual prisoner of the kiln owner and need special permission to leave the premises. So the brick kiln workers in district Bahawalpur and its tehsils are living a meager life. This work will serve as a reminder for authorities, planners and Non-Governmental Organizations (NGOs) to take action to improve the living conditions of kiln workers. So, based on the findings the current study suggests;

1. The kiln workers must be aware of alternate works apart from brick making as hand making craft, stitching and embroidery into monsoon to fulfill their needs.

2. If they are not given the formal education than they must be given informal and islamic education so they can spend their lives as civilized persons.
3. Kiln workers must be given first aid facility as they get injured like using sharp instruments to carve out mud or from the hot oven hard to sustain the heat and work pressure.
4. The living conditions of kiln workers should be improved.
5. The clean drinking water with hand pumps should be made available.
6. Financial and medical advice should be provided to the kiln workers from NGOs, and healthcare professionals to sustain a better healthy life.
7. The owners should provide a safe and healthy environment for the workers because brick kilns are perceived as dirty, unsafe with a backing environment and poor infrastructure.
8. Development of the veterinary services should be initiated to support animals' projects for local community.
9. No interest based policies should be made by kiln heads/ owners for workers.
10. Provincial government must take tangible steps in the implementation of 1992 Bounded Labour System (Abolition) Act, regarding the elimination of bonded labour system and ensuring to stop this in practice.

5. CONFLICT OF INTEREST

The authors declare no conflict of interest.

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