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SPATIAL ANALYSIS ON HEALTH PROBLEMS AMONG UNORGANIZED INDUSTRIAL WORKERS IN AMBEDKARNAGAR DISTRICT, INDIA

ABSTRACT. Health status is one of the important indicators for the welfare of people. People working in unorganized sector are exploited in terms of working hours, low and irregular income, unsatisfactory work conditions, no legal protection and exposed to occupational health hazards. Present study aims to analyze a spatial dimension of occupational health outcomes among the cottage industry workers and their socio-economic conditions. Based on field survey, the result shows that there is an association between different categories of industries and various health problems which leads respiratory and muscular problem, skin disease, and stress and sleep disturbances. There should be a strong provision for occupational health services, carrying out activities in the work place in the aim of protecting and promoting worker's safety, health and well-being.

KEY WORDS: cottage industry, health status, work environment, socio-economic conditions, labour

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INTRODUCTION

Industrial labors constitute a significant proportion of the total population of any industrial area. Health of these workers is not seen as the absence of disease rather it depends upon a complex web of physical, biological, environmental, economic, social, cultural and possibly even spiritual factors (Hussain 2007). If, as the U.N. Universal Declaration of Human Right declares, all people have a right to a highest level of health attainable, then surely the health of those who produce all valued products used by society is of basic concern (Barten, et al. 1996; Anjum 2012). In developing countries, like India great efforts are directed towards the advancement of cottage industries as these are considered the engine for their economic growth. It is an unorganised sector, mostly run by private establishment. It provides employment for both men and women, mainly those from the lower socio-economic status. People working in unorganised sector are exploited in term of working hours, low and irregular income,

unsatisfactory work conditions, no legal protection and exposed to occupational health hazards (Anjum 2012). Health status is one of the important indicators of the welfare of the people. The World Health Organisation says 'enjoyment of high standard of health is one of the fundamental right of every human being'. According to World Health Organisation, over 1000 million people world over are employed in small-scale industries (Saha & et al. 2010). The primary concern regarding labour in the unorganised sector is that most of them live below poverty line. Their access to the basic amenities of life such as food clothing, health, education and other form of security is extremely poor (Papola 1980; Banerji 1985).

Studies show that musculoskeletal problem, diseases of the respiratory system and eye, accident, injuries, skin disease, stress and insomnia etc. are all common among the cottage industry workers (Chamila 2013; Jadab 2012; Saha et al 2010; Baiq et.al. 2005; Rongo et al 2004; John 1919; James et al. 1979).

Despite growing prosperity and spectacular technological advances, the task of ensuring health and well-being for the world is becoming more difficult and expressive and complicated then even before.

An important factor which influenced the health of the people in unorganized sector is the insecurity of the working situation. In Ambedkarnagar district, major source of employment for the rural people is cottage industry after agriculture sector. The cottage industry workers exposed simultaneously to workplace hazards to an unsafe housing environment and a polluted general environment in these areas. Additionally, numerous non-occupational factors such as parasitic and infectious disease, poor hygiene and sanitation, poor nutrition, poverty and illiteracy aggravate these occupational health problems. In the absence of proper occupational health and safety provision the employees are suffered adverse health impacts.

Occupational health is essentially preventive medicine. Both have the same aim of prevention of diseases and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. Occupational health therefore is the application of preventive medicine in all places of employment (Nalini 2009). International Labour Organisation (ILO 2013) reported that in the United State, skin diseases, hearing loss, respiratory condition were the three leading diseases among the 224,500 reported cases of non-fatal occupational illness in 2009. The WHO estimates occupational health risks as the tenth leading cause of mortality and morbidity.

In the present work an attempt has been made to explore conditions of work and work environment in unorganized sector, and spatial pattern of the health status of workers in Ambedkarnagar district. Current study also aims to establish a relationship between the health status and socio-economic status of the workers employed in cottage industry sector.

Although, different studies reveal various aspects of health in small-scale and cottage industry sector in different areas, no study yet has been made in search of spatial variation in health problems among cottage industry workers in Ambedkarnagar district.

DATABASE AND METHODOLOGY

The study is mainly based on primary sources of data which were collected through field survey from the different blocks of Ambedkarnagar district with the help of questionnaire interview. The field work was conducted during the year 2012 and 2013. For the selection of sample 'stratified random sampling' was adopted. There were a total of 1279 cottage industrial units registered with the District Industries Office, which is spread unevenly across the nine blocks. Out of these units a total of 444 units have been selected purposively for sampling process. These 444 units have been grouped into nine categories on the basis of product type. About 15 per cent units have been selected from each group on random basis. The entire nine blocks have been included in the sample according to the relative strength

of their existing industrial units. Altogether, 77 units were selected for the present study and 257 workers were surveyed in these units. The health problems divided into three sections: ergonomic, systemic and psychological problem. Ergonomics is a physiological link between the worker and his environment. The various systemic problems included respiratory and skin diseases. The psychological problems are examined in term of stress and sleep. After the completion of data collection, the data was processed after necessary checking and editing. The data have been analysed both quantitatively and qualitatively. In analysing data, statistical techniques such as simple percentage, Z-score, Composite Z-score have been used to deduce the association among variables, in order to reach conclusion. For showing a clear picture the percentage value of all the relevant variables is presented through choropleth maps prepared by GIS Arc-View (3.2)

Z-SCORE AND COMPOSITE Z-SCORE TECHNIQUE

In order to reach standardisation, the raw data for each variable has been computed into standard score. It is commonly known as Z value or Z-score. The scores measure the departure of individual observation from the arithmetic mean of all observations; expressed in comparable form. The formula is:

$$Z_{ij} = \frac{X_{ij} - \bar{X}_i}{\delta_i}$$

Where,
Zij= Standardised value of the variable i in block j.
Xij = Actual value of variable i in block j.
Xi= Mean value of variable i in all blocks.

In the second step, average value of Z-score of all the variable (28 variables of socio-economic status) have been calculated block-wise which may be called as Composite Z-score (CS) for each block and may be expressed as:

$$CS = \frac{\sum Z_{ij}}{N}$$

Where,
CS is composite score,
N refers to the number of indicators (variables),
∑Zij indicates Z-score of all variables i in block j.

STUDY AREA

Ambedkarnagar is located at 26.02oN latitude and 79.7oE longitudes and one of the district of Uttar Pradesh state of India. Total area of Ambedkarnagar district is 2520 sq. km. Its total population is 2026876 of which 50.57 per cent are male and 49.43 per cent are females. Its 90 per cent population lives in small farming villages. There are 3955 villages. Because of the disperse nature of this hamlets and small village, the distribution is divided into 9 blocks: Akbarpur, Tanda, Bhiti, Katehri, Jalalpur, Jahangirganj, Baskhari, Bhiyaun and Ramnagar (Census of India 2001).

RESULTS AND DISCUSSION

GENERAL PROFILE OF THE WORKERS

The paramount reason for the need to preserve and encourage the cottage industry sector is the human factor involved in it. As far as, an industry is concerned, its workforce is an important factor in determining the productivity of the unit. Present study reveals that majority of the workers (87.55 per cent) in the cottage industry are male while female workers contribute only 12.45 per cent. On an average, female participation is low in the cottage industry due to technological advancement, educational level and social attitude. Mechanisation of cottage industry replaces the female workers due to lack of technical skills. In rural areas of the district female faces restriction to work outside the households, this tends to be viewed as degrading the family status. An analysis on the age of workers reveals that the average age of the workers is 29 years. It is observed from the table 1 that more than 66 per cent workers in cottage industry belong to the age-group of 15-35 years. A little over 8 per cent of the workers under study are above 45

years. As far as the religion-wise distribution of workers is concerned the information shows that majority (69.65 per cent) of workers in sampled cottage industries are Hindus and only 30.35 per cent are Muslim workers in the sampled units. Caste has been an important determiner of the process of social stratification in our country. Table.1 gives an idea about caste-wise distribution of cottage industry workers. Almost 81 per cent workers working in the sampled cottage industries belong to the castes other than the higher castes. Education is the basic necessity of the people at present. The sampled data from field survey shows that 77.04 per cent of the workers are educated. Table 1 further depicts that about 33.85 per cent have primary and middle level education, 19.07 per cent high school pass, 14.40 per cent intermediate level, 9.73 per cent are graduate and above.

Table 1. General Profile of the Workers in Cottage Industry

General Characteristics		Percentage
Age	15-25	36.19
	26-35	30.74
	36-45	24.51
	More than 45	8.56
Sex	Male	87.55
	Female	12.45
Religion	Hindu	69.65
	Muslim	30.35
Caste	General	19.07
	OBC	66.15
	SC/ST	14.79
Educational Level	Uneducated	22.96
	Primary/ middle	33.85
	High school	19.07
	Intermediate	14.40
	Graduation	8.56
	Others	1.17

Source: Based on Field Survey, 2012

LINK BETWEEN WORK AND THE LIVING ENVIRONMENT

Work environment in developing countries are markedly different from those in highly industrialised nations, with the result that radically differing occupational health problems prevail in the developing countries. In developing countries where workers work under exploitive condition with low income and unhealthy environment, their working condition influence the socio-economic status, health status and living environment of their dependent. In the absence of adequate provision for the protection of workers, their health became serious issue now a day (Barten and et al. 1996).

The basic problem of the cottage industry workers lies in the environment in which they live. The matrix created by socio-economic and political factors in a given biological and physical context constitutes the environment (Qadeer 2011).

Benavides (1992) argues that most small scale industries do not have a significant impact on the environment. On the contrary it can be argued that these industries do, in fact make a significant contribution in environmental contamination at local level i.e. in the neighbourhood of small scale industries. Such contamination can have a serious impact upon the state of health of the people living in these neighbourhoods (Cited by Barten, 1996).

According to European Industrial Relation Dictionary (2011), working condition refers to the working environment and aspects of an employee's terms and conditions of employment. This covers such matters as: the organisation of work, work activities, training, skill, health safety and well-being; and work time and work life balance. The relevant information based on field survey about work condition of the workers like nature of work place, working hours, nature of work, mode of payment and seasonal allowance are discussed.

Field survey regarding the work conditions of worker reveals some astonishing facts. Data on the type of house reveals that

more than 60 percent workers live in the thatched and jhuggis. As far as handloom weavers are concerned, 100 percent are living in brick and concrete house because of having their ancestor's house. Majority of rice mill and flour grinding workers dwell in wood/jhuggis because they can afford to live in small houses only (Table.2).

whereas 24.46 percent use for residential and industrial purpose both. About 5.44 percent workers use their house for residential, industrial and commercial purpose together. Multipurpose houses create congestion and pollution which make the workers more vulnerable for various health hazards.

Table 2. Work Conditions of the Sampled Workers in Ambedkarnagar District

Work Conditions		Percentage
Type of House	Brick /concrete	36.19
	Mud/thatched	19.84
	Wood/jhuggis*	42.41
	Others	1.56
Use of House	Residential	70.10
	Residential &Industrial	24.46
	Residential, Industrial &Commercial	5.44
Nature of Work Place	Open space	18.67
	Congested	81.33
	Market	6.67
	Open Drainage	33.33
	Others	10.67
Working Hour (per day)	8-10	22.57
	10-12	77.43
Mode of Payment	Time Rate	41.48
	Piece Rate	58.52
Nature of Wages	Daily	35.8
	Weekly	36.36
	Monthly	27.84
Seasonal Allowances	Receiving	27.61
	Non-receiving	72.39

Source: Based on Field Survey, 2012
*Hut

Sometimes cottage industry workers use their house for multi-purpose i.e. residential and industrial, residential and commercial and residential, industrial and commercial together when production is done on household level. Table.2 explains that majority of the workers (70.10 percent) use their houses only for residential purpose

The work environment in all the industry is not very much suited to the workers. Majority of them work in congested area where garbage and open drainage are found. It is observed from field survey that majority of the workers work in unhealthy surroundings because of open drainage, which causes spreading of diseases (Table 2).

Present study also reveals the working hours of cottage industry workers per day which is shown by Table.2 It is apparent from the table that about 77.43 per cent cottage industry workers work for 10-12 hours per day followed by 22.57 per cent work for 8-10 hour per day. Data reveals that in all the industry, workers are forced to work for long working hours i.e. more than 10 hours per day.

Data from the field survey reveals that about 68.48 per cent cottage industry workers get payment in cash while about 31.52 per cent workers do not receive payment because these workers are either family member or relatives. It is evident from the Table.2 that both methods i.e. the time rate and piece rate, are used for wage payment in the cottage industries of Ambedkarnagar district. About 58.52 per cent workers get their wage on piece rate and 41.48 per cent of workers paid on time rate basis. It is normally perceived that where the quality of product matter most, time rate mode of payment is better option whereas in term of quantity, most preferred mode of payment is piece rated. There is tree type of wage system prevails in Ambedkarnagar district. Data shows that 35.8per cent workers are daily wagers, 36.36 per cent weekly wagers and 27.84 per cent receive wage as monthly basis. Data in the table further reveals percentage distribution of workers according to seasonal allowances. According to the response of workers regarding seasonal allowance about 72.39 percent are not receiving any seasonal allowances whereas only 27.61 percent workers are receiving seasonal allowances occasionally.

MAJOR HEALTH PROBLEMS OF UNORGANISED INDUSTRIAL SECTOR WORKERS: AN ANALYSIS

Health is a dynamic concept embracing biological and social dimensions of well being. Table.3 shows percentage distribution of workers according to their responses either having health problem or not. Data analysis on health issues reveals that about 75.72 per cent workers don't have any health problems while 24.28 per cent reported about various health problems. The major health problems have been reported by workers of rice mill, flour grinding, handloom weaving, carpentry and spice grinding only. The association between different categories of industries and various health problems shows that problem of respiratory and muscular are frequently reported in rice mill, flour grinding and spice grinding workers as these industries are associated with dust problem and long working hours. Poor ventilation is a basic problem in these industries. During the process of grinding, large amount of dust produce and accumulate in the work place environment because of poor ventilation, hence workers get exposed to excessive amount of dust which leads to respiratory problem due to long time continuous exposure. With reference to the weavers skin diseases are reported more due to use of dye in the weaving material which causes itching (Table.3).

The fact that the problems of stress and sleep pervade in all category of industrial workers, the consequence of industrial environment are brought into sharp focus. Psychological stress caused by time and work pressure, have been associated with sleep disturbances. Majority of the workers in the cottage industry are daily wagers and living in poor socio economic condition so they are compelled to work for more than 10 hours, this lead to adverse psychological effects.

The data in Table.3 shows that back pain and shoulder pain are major physical problems found in practically all the categories of industries. The problem may have arisen due to posture, since most industries required constant standing posture and long working hours.

SPATIAL PATTERN OF SOCIO-ECONOMIC STATUS AND HEALTH STATUS

The relationship between socio-economic status of individual and their health is well documented in the international epidemiological, economic and social literature and from a variety of perspectives (Cortinovis et al. 1993; Durkin et al. 1994; Krieger et al. 1997; Robert, 1999; Lynch and Kaplan 2000; Kawachi et al 2002;

Table 3. Industry-wise Percentage Distribution of Workers according to Health Problems

Health Status		Rice mill	Flour grinding	Handloom weaving	Carpentry	Spice grinding	Total
Health Problems	Yes	21.33	24.20	60.00	3.03	33.33	24.28
	No	78.67	75.80	40.00	96.97	66.67	75.72
Nature of Health Problems	Skin	–	5.56	11.11	–	–	16.67
	Respiratory	5.56	16.67	5.56	–	16.67	44.44
	Muscular	–	11.11	5.56	5.56	11.11	33.33
	Stress& sleep	5.56	27.78	33.33	5.56	22.11	94.44
Discomfort in Body Parts	Back	–	11.11	27.78	–	11.11	50.00
	Neck	–	16.67	11.11	5.56	11.11	44.44
	Shoulder	5.56	22.22	16.67	–	22.22	66.67
	Others	–	22.22	5.56	5.56	5.56	38.89

Source: Based on Field Survey, 2012

Note: Multi-response Table

Oakes and Rossi 2003) Figure.1 depicts the regional variation in health status of worker's population. The composite mean Z-score varies from -0.91 to 1.30 score. These ranges of variation may be grouped into three categories i.e. high (above 0.41 score), medium (-0.41 to 0.41 score) and low (below -0.41 score). High level of health condition is found in Tanda, Akbarpur and Jalalpur because the workers in these blocks have health facility and also have accessibility to health care services. Three blocks fall in the category of medium level. These blocks are Bhiti, Katehri and Baskhari. Low level (below -0.41 score) of health condition is observed in Jahangirganj, Baskhari and Ramnagar.

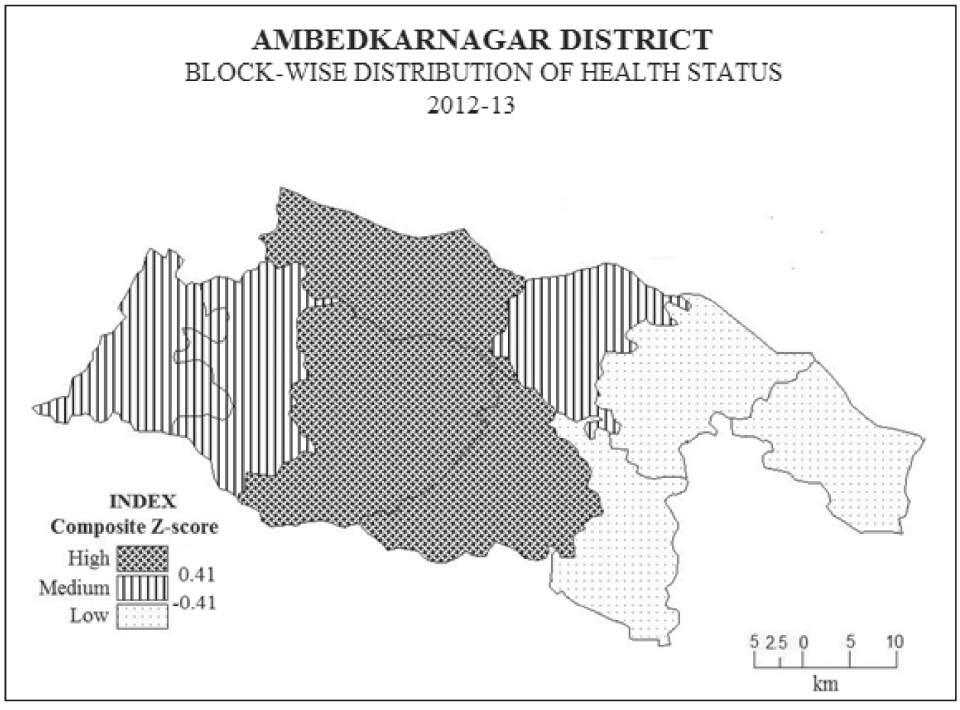

Fig. 1. Spatial variations in health status of worker's population

To measure socio-economic status, 28 variables have taken from different socio-economic parameter such as education, income, wealth, employment, health, demographic characteristics, and housing (Appendix I). These indicators depict more or less similar pattern of socio-economic condition in the district. It is decided to analyse the spatial pattern of socio-economic condition and therefore, all the concept are combined together. This means that an average index of socio-economic condition should be calculated with proper weightage of each index to give a composite index. The Z-score technique has been applied for this task. All data have been arranged in descending order and standardised to zero mean for interpretation. The positive value relating to the district's score show higher socio-economic status and negative value indicate low socio-economic condition. For this analysis, socio-economic conditions have been considered to be the function of 28 variables. Figure 2 reveals spatial pattern of socio-economic status related to worker's population. High grade of socio-economic condition is observed in Tanda, Akbarpur and Jalalpur (above 0.38 score) block because of development of cottage industry which leads to employment opportunity, high per capita income and high educational level. There are four blocks i.e. Katehri and Jahangirganj having composite mean Z-score between -0.38 to 0.38 score and come under the medium grade category of socio-economic status. Low grade is observed in Baskhari, Ramnagar and Bhiyaon and Bhiti (below -0.38 score).

The present analysis thus established the existence of regional variation in the level of socio-economic conditions among the blocks of the Ambedkarnagar district. Level of socio-economic condition varies substantially across the blocks of the district such as a variation caused by the variation of social and economic factors like employment, wealth, income, housing, family structure, educational level, health status etc. Although the present study could be cover all the variable associated with the socio-economic status.

RELATIONSHIP BETWEEN HEALTH STATUS AND SOCIO-ECONOMIC STATUS

The interrelationship between health status of worker's population and socio-economic status is shown in Figure 3 and it reveals that three blocks of the district fall under the high grade (above 0.44 score) of health status and also have high level (above 0.38 score) of socio-economic status. Three blocks experienced medium level (-0.41 to 0.41 score) of health status out of which only one block (Katehri) comes under the medium level (-0.38 to 0.38 score) of socio-economic status and remaining two blocks (Bhiti and Baskhari) have low grade (below -0.38 score) socio-economic status. The grade of low level (below -0.41 score) of health status is observed in the blocks of Ramnagar, Jahangirganj and Bhiyaon out of which Ramnagar and Bhiyaon blocks come under the category of low socio-economic status (below -0.38 score) while Jahangirganj block observed medium level of socio-economic status.

CONCLUSION

Occupational health is comprised of measures for protecting the workers against any health hazards arising out their work or conditions under which it is carried on. The industrial environment, prevailing today is far from conducive to generate a sense of happiness among the people who work within this environment. The various industrial processes and workplace environment create conditions that led to varying health problems in different industries as reflected in the physical and mental disorders afflicting this population. Although the exact occupational diseases could not be identified during this study, the ailments described by the respondents give sufficient indication of the nature of health problems that are being encountered.

The foregoing analysis throws light on the fact that there is a strong positive link between the socio-economic conditions, work conditions and resultant health problems of workers in unorganized sector. The result shows that health status of the workers is unsatisfactory. The majority of

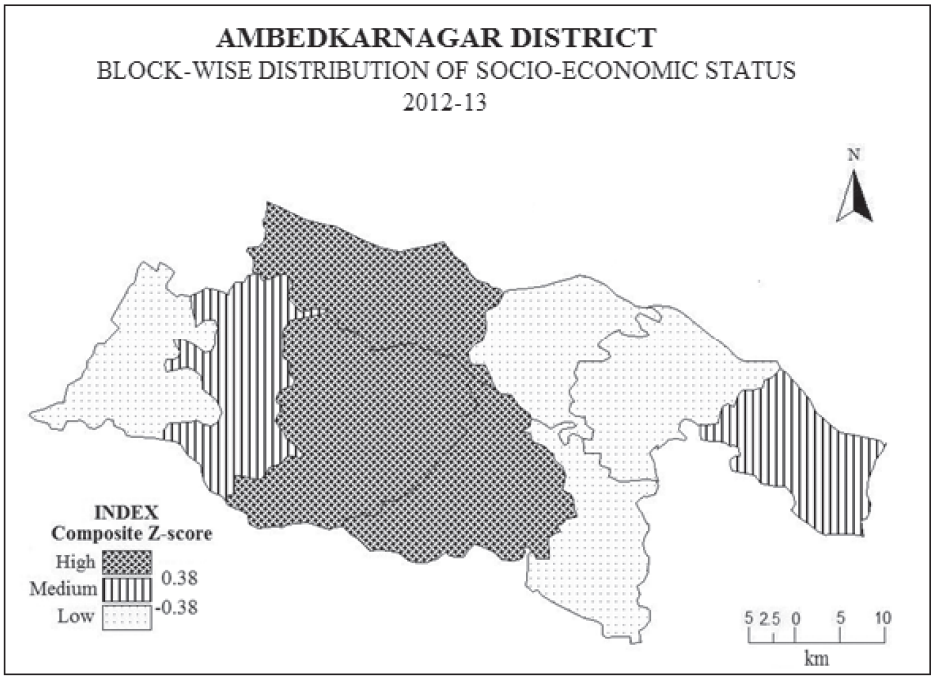

Fig. 2. Spatial pattern of socio-economic status related to worker's population

them were suffering from possible work related health problems i.e. respiratory, body discomfort and sleep disturbances.

The concept of general awareness about occupational safety and occupational and environmental hazards is not spread forward in the society towards the poor working conditions; it resulted in the deteriorating health conditions of Indian labour. There is an urgent need to introduce a legally binding mechanism for occupational health with the creation of an appropriate authority to supervise its implementation and enforcement at district level. This will help to ensure a uniform standard of occupational health care at all levels ensuring workers efficiency and well-being. There should be a strong provision of occupational health services, carrying out activities in the work place in the aim of protecting and promoting worker's safety, health and well-being as well as improving their working conditions and environment.

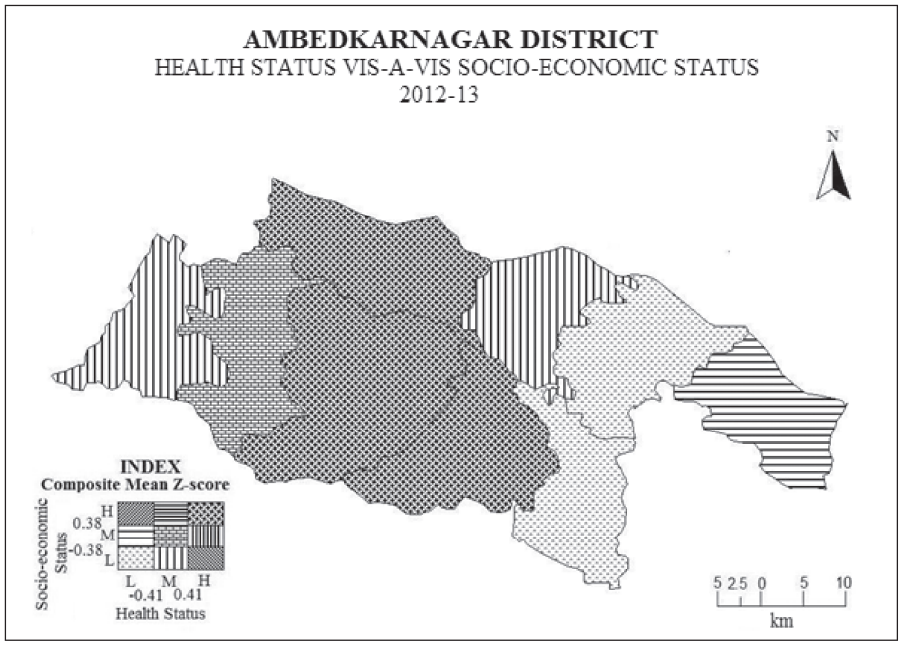

Fig. 3. The interrelationship between health status and socio-economic status of worker's population

Appendix I. Block-wise Distribution of Z-score of the Workers in Ambedkarnagar District

Name of Block	Demographic Characteristics	Educational Level	Economic Status	Housing Condition	Health Status	Socio-economic Status
Tanda	0.56	0.60	0.89	1.22	0.84	0.79
Akbarpur	0.78	1.81	1.09	1.10	1.30	1.23
Jalalpur	0.74	0.63	0.60	1.50	0.95	0.85
Baskhari	-0.97	-0.47	-0.72	-0.85	-0.35	-0.64
Ramnagar	-0.76	-0.66	-0.46	-0.92	-0.91	-0.69
Jahangirganj	-0.38	-0.21	0.21	-0.06	-0.43	-0.15
Katehri	0.18	-0.22	-0.08	-0.59	-0.16	-0.21
Bhiti	0.21	-0.48	-0.60	-0.67	-0.38	-0.42
Bhiyaon	-0.34	-1.00	-0.92	-0.71	-0.86	-0.77

Source: Based on Field Survey, 2012

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