

Physical and Mental Health of Tannery Workers and Residential People of Hazaribag Area in Dhaka City

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Abstract

The present study was designed to investigate the effect of industrial pollution on the physical and mental health of the tannery workers as well as the related residential area's people of Hagaribag in Dhaka city. One hundred and sixty (80 tannery workers and 80 residential area's people) respondents were selected by purposive sampling method as samples for the present study. Three hypotheses were formulated to test the present study: i) Physical and mental health is positively related. ii) The physical health of Tannery area's residential people would be better than that of tannery workers. iii) The mental health of Tannery area's residential people would be better than that of tannery workers. For collecting data physical and mental health questionnaires were applied on the respondents of the present research. In order to analyze data, correlation co-efficient and z-test were applied on the scores obtained from both the questionnaires. The result presented in table-1 suggests that physical health is directly related to mental health. Table-2 suggests that physical health of related residential area's people is better than that of tannery workers. Mental health of the related residential area's people is better than that of tannery workers (Table-3). These results confirm the hypotheses. In fine it can be concluded that the physical health and the mental health are positively related. In addition, physical and mental health of related residential area's people are better than those of tannery workers.

Key Words: Physical health, Mental health, Industrial pollution, Environmental pollution, Tannery industry.

Introduction

Industrial pollution is pollution which is directly linked with industry. Different elements of environment such as soil, water, air etc. are polluted by industrial pollution. This pollution acts as a threat for the workers as well as for the general people who are living in this area. As a result some physical and mental health problems may be seen among them after working and living here for a long time. Many industries have been established step by step in our country after independence. According to Census of Manufacturing Industries (CMI, 2001-2002) there are 28065 manufacturing industries in our country of which 138 are public, 27833 are private and 94 are join ventures. However, tannery industry is an old one in our country that earns a great deal of foreign currency every year. Although this industry is now facing various problems, yet our

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country is earning about 1900 crore foreign currency from this industry. At present there are 65000 manpower engaged in it. So it contributes in the development of our national economy.

There are 220 big, middle and small tanneries in our country of which 194 are situated at Hazaribag in Dhaka. Tannery industry spreads chemical, bad smell and garbage that pollute air, soil and water. On the other hand the industry makes loud sound that also creates sound pollution. According to Schifferdecker (2010), chemical pollution occurs when chemicals resulting from human activities enter the environment contaminating air, water or soil. Acid rain, greenhouse gases and ozone are all examples of chemical pollution. Pesticides and fertilizers that contain nitrates and phosphates are a source of chemicals that cause water pollution. These chemicals seep into the groundwater and mix with runoff moving to lakes and rivers. Industrial emissions can also cause water pollution. An example is mercury which we find in waste water from paper manufacturers. Instead of remaining inert as expected, the mercury reacts to bacteria in the water and changes to methyl mercury. Now mercury levels in fish such as swordfish can pose dangers to people who eat it. A major source of chemical pollution in the air is fossil fuels burned by utilities, industries and motor vehicles. Sulfur dioxide is produced when coal is burned. It is an ingredient of acid rain and can cause lung damage to people who breathe large amounts of it. Nitrogen oxides are a byproduct of motor vehicles such as cars, trucks and airplanes. These oxides are also an ingredient of acid rain and can cause lung damage to people over time. Other chemicals that cause air pollution include ozone, carbon monoxide and lead.

However, many kinds of microbes enter our bodies in different ways that bring various waterborne (diarrhea, dysentery, jaundice, typhoid etc.) and airborne (tuberculosis, scabies, eczema, leprosy etc.) diseases. Physician Chowdhury, A. (2011) mentions that some chemicals such as sodium sulfide, sodium meta sulfide, formic acid etc are used in tannery industry. He also mentions that these chemicals are harmful to both the workers and the surrounding residential people. A group of experts said that emitted wastages from tannery industry make a threat for both environment and human beings. These physical diseases weaken their mental health (Goldberg, 1978). Many physicians and psychologists believe that individuals are physical, mental and spiritual beings and that these aspects are interrelated. Consequently, mental health is not possible without both physical and spiritual health. A large number of researchers have found that mental health is related to subjective well-being (Beiser, 1974; Bradburn, 1977; Bradburn and Caplovitz, 1965; Moriwaki, 1974; Veroff et al., 1962). Moriwaki (1974) reported that a nine-item mental health scale was significantly related to negative affect scale (NAS), but not to positive scale (PAS). Bradburn (1977) recommended that positive affect exclusively was related to social interest, sociability, and activity and negative affect only was associated with psychosomatic symptoms, anxiety, poor role adjustment and worries. Veroff et al., (1962) also reported worry, anxiety, and psychosomatic concerns among the correlates of unhappiness. Bradburn and Caplovitz (1965) had also similar findings. Beiser (1974) further found that reports of psychophysiological disorders were associated with a negative affect factor but not with a positive affect factor in his instruments.

About half a million residents of the Bangladesh capital, Dhaka, are at a risk of serious illness due to chemical pollution from tanneries near their homes, according to a report released last year by the Bangladesh Society for Environment and Human Development (SEHD, 2001). The report says large numbers of the 8000-12000 workers at the tanneries suffer from gastrointestinal, dermatological and other diseases that could be related to the pollution. The affected area is

Hazaribagh, a community in the southeast corner of Dhaka city, where 240 tanneries are located on 25 hectares of land, the report notes. Most of the tanneries are 30-35 years old and use mineral tanning processes that discharge about 6000 cubic meters of liquid effluent and 10 tons of solid waste every day.

Chromium, the SEHD report says, is one of the most harmful chemicals found in the tannery waste because of its carcinogenic potential. Acidic effluents, it adds, can cause severe respiratory problems. Gaseous emissions from the tanneries contain sulfur dioxide that is converted into sulfuric acid on contact with moisture and can damage lungs. The SEHD report indicates that 58% of the tannery workers suffer from gastrointestinal disease (vs 24% for the country as a whole), 31% from dermatological diseases (vs 9%), 12% from hypertension (vs 0.9%) and 19% from jaundice (vs 0.07%). A recent article in a Bangladeshi newspaper, *The Independent*, says that "residents in the Hazaribagh area have been complaining for a long time that the tanneries emit bad odor and pollute the air beyond tolerable limits".

In 2008, the United Nations Industrial Development Organization recommended that tannery industrial pollution is a serious threat for the environment. Shikder (2009) conducted a study regarding the effect of tannery pollution on workers and dwellers' physical health. The findings indicate that Hazaribagh tanneries have a negative impact on workers and the dwellers' physical health. He explained that the factories are exposing huge amount of toxic substances and heavy metals that lead to many health problems including cancer, allergy, asthma etc.

Tannery workers have been suffering from severe skin diseases, allergy and chest pain. In most of the cases, medicines do not work on them anymore. They process animal hides with toxic chemicals. Before tanning they work with chemical-mixed water, liming and de-liming, scrapping off meat and fat. They do it with bare hands chromium, sulfur, manganese, copper compound, lead and others are used to tan which are very toxic for their health. Chemical mixtures, acids and dyes used in the tanneries are very toxic for human health.

Coming from different sources about 20,000 tannery workers are forced to work for tanning in this hazardous situation though they are paid a little. About 90 percent tanneries of the country are located at Hazaribagh of the Dhaka city. Covered by high walls which have no proper ventilation system, the air inside the factories is with fumes and heat. Very bad smells are also emitted from nearby Hazaribagh like Rayerbazar, Jhigatola and parts of Dhanmondi. Nobody wants to go to Hazaribagh due to bad effect of tanneries. Even the tanneries' owners don't live in those areas. Reused chemicals from the large factories are being used by the small factories which are more dangerous and vulnerable for the workers as well as for the environment. About 40 heavy metals and acids are used for processing raw hides.

The above literature indicates that industrial pollution especially tannery industrial pollution has negative impact on the health of the workers and the tenants. Although many researchers have conducted the studies to investigate the tannery workers' physical health, yet no study was conducted to find out the mental health of tannery workers as well as the residential people at Hazaribagh area in Dhaka city. The present authors would like to conduct the study to investigate the effect of industrial pollution on physical and mental health of tannery personnel and related residential people of Hazaribagh area in Dhaka city.

Objectives

The main objective of the present study was to investigate the effect of tannery pollution on the workers as well as related residential people's physical and mental health. The specific objectives were:

- (i) To investigate whether there is any relationship between physical and mental health of the workers as well as residential people of Hazaribag area.
- (ii) To examine whether there is any difference of physical health between tannery workers and people of the related residential areas.
- (iii) To investigate whether there is any difference of mental health between tannery workers and people of the related residential areas.

Hypotheses of the study

In the light of the above literature and the objectives, the following hypotheses were formulated to test in the present study:

- i. Physical health is positively related to mental health in case of both tannery workers and related residential area's people.
- ii. Physical health of tannery area's residential people would be better than that of tannery workers.
- iii. Mental health of tannery area's residential people would be better than that of tannery workers.

Method

Sample

A total of 160 (80 workers and 80 residential people) respondents was selected by purposive sampling method as subject for the present study. All the respondents were married and their educational background was class V- HSC. All participants came from middle class family and monthly income was TK.6000- TK. 20000. Their age range was 25 to 45 years.

Measuring Instruments:

- i) Personal Information Sheet
- ii) The General Health Questionnaire (GHQ-12)
- iii) Physical Health Questionnaire

The General Health Questionnaire (GHQ-12): The Bengali version of the General Health Questionnaire (GHQ-12 item version) developed by Goldberg (1978) was used to measure mental health of the participants (Ilyas and Aeysha, 2001). It has been widely used in a variety of settings. Bengali version of the GHQ-12 used to measure mental health of participants (translated by, Ilyas 2002). GHQ is a self-administered screening test designed for detecting people with a

disnogsable psychiatric disorder (Goldberg, 1972). Significant correlation, $r(28) = 0.625$, ($p < 0.005$) between scores of English and Bengali version indicate that the English and the Bengali version measured the same thing. Two week test-retest reliability of Bengali version scale was 0.565. The alpha coefficient of internal consistency of Bengali version was 0.8136. The scale used Likert method of scoring. Each of the 12 items asks whether the respondent has experienced a particular symptom of behaviour recently using a four point scale from 0 to 3. The items of the GHQ-12 were consistent with 6 positive and 6 negative items. For positive items, score 0 indicates 'strongly agree' score 1, 'agree', score 2, 'somewhat agree' and score 3 indicates 'not at all agree'. For negative items, scoring was in reverse order. The sum of scores of all items was the total score of the scale for an individual. A high GHQ score indicates reports of more symptoms, i.e., lower mental health.

Physical Health Questionnaire: Physical health questionnaire was developed by the present investigators. There are eleven items in this scale. At the initial phase of the scale there were 33 items. After judging all the items, only 11 items were selected finally by the judges for measuring the physical health of the respondents. There were five judges; including university teachers and a physician. So the content validity of the questionnaire was measured by the judges. Answering pattern of this questionnaire is Yes for 1 score, No for 0 score. The sum of scores of all items was the total score of the questionnaire for an individual. A high score indicates reports of more symptoms, i.e., lower physical health.

Procedure

For collecting data, the second author went to the tannery industry and before applying the questionnaire he introduced the authority and took formal permission. Then he gave them the questionnaire and the workers were asked to read the instruction printed in the first page of the questionnaire. They were instructed to complete it without wasting time. After completing their task, according to the instruction, the booklet and answer sheets were collected from them. In this way data were collected from other workers. Finally, the data were collected from related residential area's people in the same process.

Results

In order to analyze the effect of tannery pollution on workers and related area's people, physical as well as mental health, Pearson's Product Moment correlation and z-test were applied on the scores of physical and mental health of the respondents. The results have been presented in table 1, 2 & 3 respectively.

Table1: Correlation co-efficient between physical and mental health of the workers as well as inhabitants of Hazaribagh area

Respondents	Compared variables	Value of r	Sig. Level
Workers	Physical & Mental health	0.64	0.01
Inhabitants	Physical & Mental health	0.59	0.01

Table-1 indicates that correlation co-efficient between physical and mental health of the tannery workers is 0.64, which is significant at 0.01 level. The result presented in table-1 also indicates that correlation co-efficient between physical and mental health of the inhabitants of Hazaribagh area is 0.59, which is significant at 0.01 level. So, it can be said from table-1 that tannery workers' as well as inhabitants' of Hazaribagh area, physical health impairs their mental health.

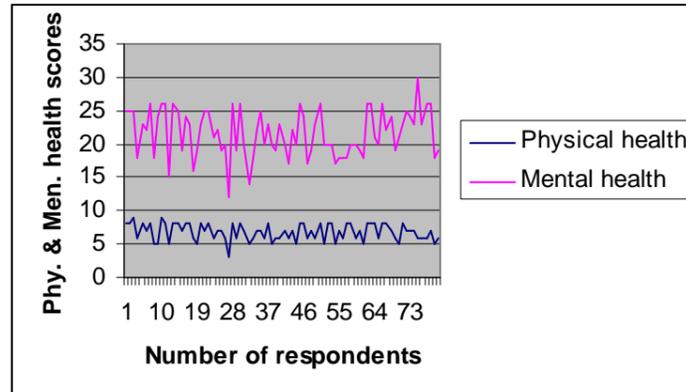
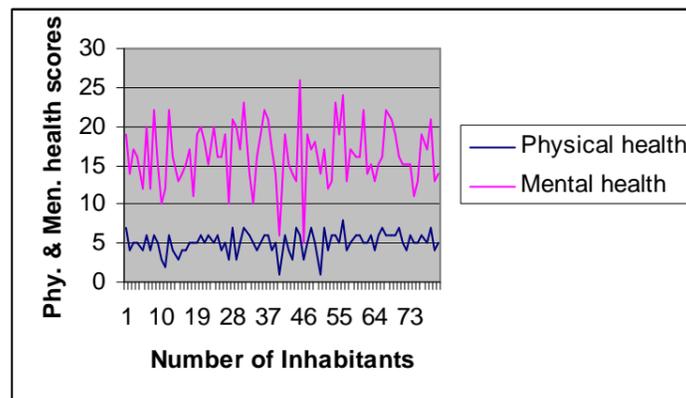
**Figure-1:** Relations between physical and mental health of the tannery workers**Figure-2:** Relations between physical and mental health of the inhabitants of Hazaribagh area

Table 2: *Statistical comparison between tannery workers and residential area's people with reference to physical health*

Group	Mean	SD	z	Sig. level
Workers	6.79	1.20	7.945	0.001
Inhabitants	5.06	1.36		

It can be seen from table-2 that in case of physical health the mean scores of workers and related areas' people are 6.79 and 5.06 respectively. The value of z is 7.945, which is significant at 0.001 level. The result indicates that there is significant difference of physical health between tannery workers and related residential area's people.

Table 3: *Statistical comparison between tannery workers and residential area's people with reference to mental health*

Group	Mean	SD	z	Sig. level
Workers	21.64	3.46	8.706	0.001
Inhabitants	16.35	3.96		

From table-3 it can be seen that in case of mental health, the mean scores of workers and related residential areas' people are 21.64 and 16.35 respectively. The value of z is 8.706, which is significant at 0.001 level. The result suggests that there is significant difference of mental health between tannery workers and related area's people.

Discussion and Conclusion

The present study was designed to investigate the physical and mental health of the tannery workers as well as the related residential people. To measure physical health of the respondents the health measuring questionnaire, which was developed by the present investigator, was used. On the other hand, General Health Questionnaire (GHQ-12) was applied on the same respondents to measure their mental health.

In order to analyze the data of the present study, Pearson's Product Moment Method and z-test were applied on the scores of physical and mental health of the respondents.

Three hypotheses were formulated to test in this study. First hypothesis posits that physical health of the workers as well as the inhabitants is positively related to their mental health. The results presented in table-1 indicate that correlation co-efficient between physical and mental health of the workers is significant at 0.01 level. Result also indicates that correlation co-efficient between physical and mental health of the inhabitants is significant at 0.01 level. It can be seen, however, from table-1 that there is positive correlation between physical and mental health in both groups. Therefore, it is clear that industrial pollution has negative impact on tannery workers and inhabitants' physical and mental health respectively. The results confirm the first hypothesis. In

support of this finding it can be said that, generally, physically problematic persons always feel tension regarding their health issues. For this reason they can not fulfill their life provisions properly that may spoil their mental health. This finding is consistent with many researchers' (Beiser, 1974; Bradburn,1977; Bradburn and Caplovitz,1965; Moriwaki, 1974; Veroff et.al., 1962) findings.

Second hypothesis states that physical health of the tannery area's residential people would be better than that of tannery workers. The result presented in table-2 suggests that there is significant difference of physical health between tannery workers and related residential people. Here the average score of the related residential people have found fewer which means the physical health of related residential people is better than that of the tannery workers because high score indicates that his or her physical health is poor. As a result, the finding confirms our second hypothesis.

The result is supported by the findings of SHED results. To explain this finding it can be said that the workers are directly involved in the industry. When they work there some poisons exert their bodies that are harmful for workers. We mentioned earlier that tannery industries spread some chemical, toxic substances, bad smell that can affected their physical health. In addition, all the workers are very poor. They can not to take care of there physical health due to financial problem. Besides these their education level is very low; as a result they are not conscious about their physical health. That's why they are facing some troublesome physical health problem. On the other hand, related residential people also suffer some physical health problem. But their physical health problem is somewhat less. Because they do not work there, only they live around the tannery area. However, the result indicates that although the related people is suffering some physical problem like tannery workers, but the tannery workers suffering more physical health problem than that of the related people.

Now the third hypothesis of the present study was to find out whether the mental health of the tannery area's residential people would be better that that of the tannery workers of not. It was assumed that related residential people's mental score would be lower than that of tannery workers. The result reported in table-3 suggests that there is significant difference between related areas' people and tannery workers' with respect to mental health. The result also suggests that mean score of related residential people are lower than that of the workers. So, the finding supports our third hypothesis.

In explaining this finding it can be mentioned that tannery workers are suffering various troublesome physical problem that are responsible for lowering their mental health. Because previous findings indicate that physical and mental health of an individual is interrelated. As a result tannery workers can not cope with normal life, can not work productively and fruitfully and is not able to make a contribution to his or her family or community.

So, in the light of the above findings, it can be said that physical and mental health are positively correlated in case of tannery workers as well as the related residential area's people. Although both groups are sufferings from physical and mental health problems, yet it can be concluded that the intensity of health problems of the tannery workers are higher than that of related residential area's people.

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