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An Exploration of Poor Female Understanding about Health Hazards of Indoor Air Pollution in Bangladesh

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Abstract

This paper will identify health hazards associated with indoor air pollution (IAP) in Bangladesh. Research into IAP in Bangladesh has been neglected for many decades. This neglect may reflect aspect of the marginalization of women in Bangladeshi society, especially as cooking is considered a social responsibility of women. The main purposes of the paper are to examine types of the IAP-related health threats female domestic cook experienced and to understand their level of awareness about the link between IAP exposure and poor health outcomes. Two hundred female domestic cook in Rajshahi City, Bangladesh, were interviewed by using a semi-structured questionnaire interview method. Levels of monthly household income and of education, oven and fuel types are used as proxy determinants of class. Based on educational level, respondents were categorized into three classes: illiterate, primary (1-5 level) and secondary (6-10 level). It found that the higher the educational level the respondents had, the more they were likely to be aware of health effects associated with IAP. The author draws a conclusion that women with less monthly household income (below 5000 BD Taka) and minimum level of education, using solid fuels and mud-ovens in poor ventilated environment, are more likely to be exposed to IAP and, as a consequence, have greater health risks than others. Finally, as recommended, if the Bangladesh Government is able to supply green and clean fuel sources with subsidies for poor women, it would be easier for Bangladesh to achieve the 3rd Sustainable Development Goal—ensuring healthy lives and promoting well-being for all at all ages—at the right time (2030).

Smoke in the home, the fourth greatest cause of death and diseases in the world's poorest countries, kills more people than malaria does, and almost as many as unsafe water and sanitation. It kills 1.6 million people annually, nearly a million of them are children. Most of the rest are women (Smith et al., 2005).

Keywords: Health hazards, Indoor air pollution, Women, Bangladesh.

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Contents

1. Introduction

Indoor air pollution (IAP) is one of the greatest health hazards in the developing countries and causes 180 fatalities in an hour (Smith *et al*., 2005). Nonetheless, wood fires are important resources in food preparation. To fuel wood fires, people in developing countries generally use both bio-mass fuels[1] such as, animal dung, crop residues, wood, and fossil fuels[2] like electricity, gas, kerosene. About one-third population in the world relies on traditional biomass, mainly for cooking and heating. It was estimated that 14% people used biomass fuel energy (Ahsan and Afrin, 2007). In addition, according to Bruce *et al.* (2002) approximately half of the world's households cook daily with unprocessed solid fuels i.e., bio-fuels.

However, biomass fuel users usually cook indoors, using open fires or poorly functioning stoves with inadequate ventilation facilities. The smoke generating from biomass fuels contains a large number of pollutants[3](Bruce *et al*., 2000) which are dangerous for the cook and her associates and render indoor environment unlivable. Several studies on households in Asia, Africa and the Americas reported that IAP level at homes is much higher than the limit set by different environment—related organizations (WHO, 2000; Smith *et al*., 2004; Ahsan and Afrin, 2007). For instance, Bruce *et al.* (2000) noted that indoor concentrations of particles usually exceed guideline levels by a large margin: average PM10 level in 24 hours should be in the range 300—3,000 ug/m3, but 30,000 ug/m3 or more was reported during cooking periods.

Recently, numerous studies have reported that IAP has adverse effects on health of women and children[4]. As argued, risks of Acute Lower Respiratory Infections (ALRI) in children, Chronic Obstructive Pulmonary Disease (COPD) in adults and lung cancer are increasing in the environment with high exposure to IAP from the extensive use of coal. In addition, evidence has now emerged showing a link of IAP with a number of other conditions, including asthma, cancer of the upper airway, cataracts, low birth weight, otitis media, preinatal mortality (stillbirth and deaths in the first week of life), and tuberculosis (WHO, 2000). Besides these, a plethora of studies in both developed and developing countries have found the same associated relationship between IAP and certain diseases. For instance, the association of IAP with ALRI[5], asthma (Smith *et al*., 2004) COPD[6], lung cancer (WHO, 2000; Duflo *et al*., 2007) low birth weight (WHO, 2000; Donna and Harding, 2005) and tuberculosis (WHO, 2000; Bruce *et al*., 2002) was found.

Furthermore, as documented in many reports, IAP is one of the four most critical global environmental problems and contributes to nearly 4% of the global burden of disease (WHO, 2000;2007). Global estimates also document that approximately 2.5 million deaths (4-5% of the 50-60 million global deaths) in rural and urban areas of developing countries occur every year from indoor exposures to particulate matter (Bruce *et al*., 2002).

As women are primary cooks and caregivers for children in nearly all cultures and spend maximum time in kitchen (Meyers and Gray, 2001; Smith, 2003; Spitzer *et al*., 2003; Katbamna *et al*., 2004; Balakrishnan, 2005; Banik, 2010) they with their children are prone to receive the greatest exposure to the smoke from solid fuel combustion. This exposure ultimately leads to higher risks for women and children (WHO, 2000; Dasgupta *et al*., 2004a; Smith *et al*., 2005). As reported in observational research on developing countries, young children in households using solid biomass fuels are 2-3 times more likely to suffer ALRI than children in households that use alternative fuels. Similarly, women exposed to biomass fires for 15 years or more are 2-4 times more likely to develop COPD compared with others (Larson and Rosen, 2002).

In Bangladesh, Ahsan and Afrin (2007); Dasgupta *et al.* (2004a); Tobassum (2007) and Pitt *et al.* (2006) found possible negative health effects of indoor smoke exposure on women and children. Although women are the principal cook and care givers in Bangladesh, few studies have investigated their self-assessed understanding of health risks associated with IAP. It is highly likely that millions of people are unaware of the threats in their homes, just as millions of smokers were unaware of the hazards of tobacco until the 1960s (Donna and Harding, 2005). Accordingly, the main objectives of this endeavor were to examine types of IAP-related health problems female domestic cook had experience and to understand the level of awareness about the health effects of IAP. As 89% of Bangladeshis use solid fuels which causes 46,000 deaths and creates 3.6 percent burden of disease (WHO, 2007) the study helps reduce disease burden, resultantly slowing down death rates attributable to solid fuel use. The study is also of importance that it helps to achieve the 3rd Sustainable Development Goal (SDG): ensuring healthy lives and promoting well-being for all at all ages.

2. Data and Methods

The main source of data in the study is primary. In order to collect primary data smoothly, a research team consisting of one Principal Investigator (myself) and two Research Assistants (the 3rd year female students of the Department of Sociology, Rajshahi University, Rajshahi, Bangladesh) was formulated. Interviewing female household members and facilitating me in the data collection process were the main reasons for the inclusion of two females in the research team.

Primary data was collected by using questionnaire interview. The oldest female members of the household of different slums were the main targets. This interview was administered for two months (June and July) in 2008. 'Multistage sampling' and 'purposive sampling' were used for site selection and conducting household survey respectively. First, I dictated how many wards the Rajshahi City[7] had. Then I selected four wards from 30. The main reasons for selecting these wards are that they are nearer to my working place and people with different socio-economic backgrounds, such as educational, households, and income levels, live here. Afterwards, I identified how many slums these selected wards had. Among them, eight slums were selected purposively for saving money

[1] Organic matter convertible into heat, directly by burning or indirectly by bio-gasification

[2] A hydrocarbon deposit derived from living matter of a previous geologic time and used for fuel

[3] Including carbon monoxide, carcinogens such as benzo[a] pyrene and beneze, formaldehyde, nitrogen dioxide, small particles, and sulphur dioxide

[4] Smith, Sumi and Mirjam (2004;2005). Bruce, Padilla and Albalak (2002). Dasgupta, Huq, Khaliquzzaman, Pandey and Wheeler (2004a;2004b). Donna and Harding (2005). Ahsan and Afrin (2007). Duflo, Greenstone and Hanna (2007). Tobassum (2007).

[5] Bruce, Padilla and Albalak (2000). WHO (2000). Smith, Sumi and Mirjam (2004;2005). Donna and Harding (2005). Duflo, Greenstone and Hanna (2007).

[6] Bruce, Padilla and Albalak (2000). Smith, Sumi and Mirjam (2004). WHO (2000). Donna and Harding (2005).

[7] It is the biggest city in the northern division. Total area of Rajshahi city is 96.72 square kilometers. Total number of population in this city is 720,514 (male-396,283 and female-324,231). The city is divided into 30 wards.

and time. The selected slums are situated in either Motihar or Boalia police station. Total number of the respondents is 200. The composition of the respondents based on slums is given as follows.

Table-1. Different sites of the study

Name of the slum	Frequencies	Percentage
Dashmari	20	10
Char Dashmari	3	1.5
Dashmari Satbaria	26	13
Station Bazar	19	9.5
Line Para Maher-chandi	11	5.5
Char Kazla	33	16.5
Char Shyampur	57	29.5
Baze kazla	31	15.5
Total	**200**	**100**

Source: Field-work

After selecting eight slums, the oldest female household members were targeted to interview purposively in order to understand their perception on the health effects of IAP and to explore what types of health problems the respondents faced within the last year before the interview was done. Both open and close-ended questions were included in the questionnaire.

Before going to pre-test the questionnaire, we developed a draft questionnaire initially. Several discussions were held among the team members who found certain anomalies regarding ordering the questions and then felt the necessity of adding few more questions with changes and adjustments in the questionnaire. By doing this, questionnaire was finalized for the pre-test. Pre-testing was conducted on five households at *kazla* area. After completing the pre-testing, we realized that it was needed to reformulate the same questionnaire for getting information systematically in our convenient way.

After finishing the data collection, all the questionnaires were edited and some errors were detected and corrected accordingly. Data was coded and entered into computers. The SPSS (version 11.5) was used here. It is important to mention here that some parts of questionnaires were not pre-coded before finishing data collection. Frequency distributions were used to describe responses. Moreover, the cross table on different variables was done to make comparisons among responses.

3. Findings

Data on socio-economic characteristics of the respondents illustrated in Table 1 (in appendix) reveal that approximately 70 per cent were aged below 35 years. Of these, a large number (40 per cent) belonged to the 26-35 year age group. The sample was not homogeneous in terms of level of education and monthly family income. Only 38 per cent had no education, whereas 33 and 29 per cent of the respondents were educated up to primary and secondary respectively. Three in four respondents had monthly household income from 1000 to 5000 BD Taka (one USD is around 75 BD Taka). The sample was also heterogeneous in terms of sources of fuels, and length of time they usually spent daily in the kitchen. In addition, it was homogenous in the use of oven. All of the women questioned used mud-oven (the surroundings of the oven are covered by mud/clay). Moreover, the number of respondents using stick as a source of fuel was 119 followed by cow dung (96), wood (31) and leaf (17). Furthermore, 37% of the respondents spent four hours daily in the kitchen while the figure for three and two hours was 23 and 20 interchangeably.

Table 2 (in appendix) shows how level of education that the respondents had are appeared to affect people choices (types of kitchen, types and sources of fuels, and length of period spent daily in the kitchen). It was found that approximately 38 per cent (77 out of 200) using kitchen in open environment were illiterate. This does not mean that literate people use kitchen with closed space. The percentage of respondents with primary and secondary level of education using kitchen in open space was 28 and 26 respectively. Almost all of them (94%) reported that they used *pukka* type of fuel though, as guessed, they might have not clear idea about this type of fuel. No difference between sources of fuels used during the cooking period in terms of level of education found. The highest users of stick (81 of 119), cow dung (47 of 96) and leaf (11 of 17) were illiterate whereas the highest wood users (16 of 31) had primary level of education. Conversely, the inverse relationship between level of education and time spent in the kitchen found. The number of illiterate respondents spending four hours daily in the kitchen was 33 while the figure for primary and secondary level educated was 22 and 19 respectively.

Table 3 (in appendix) demonstrates the respondents' opinion about the symptoms of cooking-related physical troubles. Six in 10 had eye sight problem causing by IAP followed by burning (47.5%), digestion problem (33.5%), lung problem (26%) and pneumonia (24.5%). All symptoms of problems may be related with cooking environment, including IAP. But it does not mean that they are directly related with IAP. Without medical investigation and close observation, it is difficult to exactly identify effects of IAP on human, woman in particular, lives. However, it is noteworthy mentioning here that most of the respondents had less knowledge about the linkage of IAP with different physical problems. For instance, near about nine in 10 had no knowledge about lung cancer, low birth weight and heart problem each. Illiteracy, lack of awareness and knowledge about physical troubles, less access to proper information may be the contributing factors for this worrisome situation.

Table 4 (in appendix) shows the associational relationship between level of education and of knowledge about the linkage between IAP and exposure to various diseases. Here, as found everywhere, the more level of education people have the more level of knowledge they have about the linkage between different health problems and IAP. It was revealed that the highest respondents with secondary level of education easily identified the IAP-related different diseases that they faced before the field work began. Among the identifiers, more than a half of the women mentioned pneumonia, lung problem, tuberculosis, asthmatic troubles, burning and digestion problem caused by IAP. Conversely, most of the illiterate and less educated (primary level of education) had less knowledge about this linkage. As education creates awareness of different issues and educated women have more access to

print and electronic media and move outside home more, it may be easier for them to gather knowledge about this link.

Table 5 (in appendix) reveals the nexus between level of income and level of knowledge about different IAP-related health exposures. Unlike the usual rule, the more level of income people have, the less likely they are to identify the linkage. Here, most of the respondents having below 5000 BD Taka monthly family income mentioned different health problems. One of the possible reasons is that almost all families earned the same amount in a month. It is thus not reasonable to further explore differences in level of knowledge based on monthly family income.

In Table 6 (in appendix), it was attempted to find out the effects of different sources and types of fuels and types of kitchen on AIP-related health exposures. It found that respondents using either cow dung or stick reported many health hazards. The number of stick users having pneumonia, eye problem, burning, digestion and heart problem is 22 of 49, 52 of 121, 43 of 95, 32 of 67 and 10 of 21 respectively whereas the figure for cow dung users with lung problem, tuberculosis, asthmatic trouble, lung cancer and low birth weight is 21 of 52, 15 of 34, 16 of 26, 6 of 17 and 7 of 19 interchangeably. It should be mentioned here that wood and leaf users reported few health troubles. This suggests that cow dung and stick expose more pollutants inside the kitchen which ultimately causes different health troubles. In other words, *kutchha* type of fuel is more dangerous for health. Moreover, most of the health risk exposures were users of *kutchha* type fuel and open kitchen. One of the possible reasons is that both *kutchha* type fuel and open kitchen emit more smoke inside and surrounding cooking environment that pushes women and their associate, particularly children, lives at greater risks.

4. Discussion

4.1. Producing High IAP from the Use of Biomass Fuels

Bangladesh is a country where people use minimum level of refined energy for cooking purpose—electricity and natural gas use rate is 30 and four per cent respectively. Almost nine in ten households entirely or partially depend on biomass fuels for cooking (Akhter, 2002 in (Ahsan and Afrin, 2007; WHO, 2007; BBS and UNICEF, 2015)) although the use of wood and straw or leaf or dried cow dung has been decreasing. As estimated, the use rate of the former in Bangladesh reduced from 44.27% (1991) to 34.8% (2011) while that of the latter reduced at 51.2% in 2011 from 55.91% in 2004 (http://energypedia.info). Even in Rajshahi division, the current rate for wood and straw is 32.6% and 2.9% respectively (BBS and UNICEF, 2015). All these figures suggest that Bangladesh is seemingly going to lead to a better physical quality of life. It has been found that almost all of the women used mud-oven. The percentage of the women using wood, stick, cow dung and leaf for cooking purpose was 11.8, 45.2, 36.5 and 6.5 respectively.

The availability of and the lower costs of all these fuels are main reasons for preferring inefficient to modern and environment friendly fuel sources. However, the poor women actually collect these fuels at the expenses of their valuable time which they can use for the productive purpose. In addition, cylinder and natural gas is costlier than others which dissuades poor households from switching to modern fuels. As far concerned with the energy ladder, the ladder progression from the lowest to highest is animal dung to crop residues, wood, charcoal, kerosene, gas and electricity. In addition, Dasgupta *et al.* (2004b) shows the dryness of the fuels—the driest fuel is animal dung (291ug/m3), followed by firewood (263), sawdust (237), straw (197), jute (190), and twigs and branches (173). The improvement in socioeconomic condition leads to the upper energy ladder and less dried fuels (WHO, 2000; Bruce *et al.*, 2002; Smith *et al.*, 2005; Duflo *et al.*, 2007). As most of the households of this study were poor in terms of economic and level of education, they, in most cases, used unprocessed fuels in mud-oven which are not burnt completely and ultimately emit a large amount of toxic air pollutants. This is corroborated by other studies (Bruce *et al.*, 2000; WHO, 2000; Dasgupta *et al.*, 2004b; Ahsan and Afrin, 2007; Duflo *et al.*, 2007) which found the mean PM10 concentration in poor households using solid fuel higher (2000ug/m3 in India and 600ug/m3 in Bangladesh) than the EPA accepted guidelines of 50ug/m3.

All these facts indicate that one of the main barriers to the transition to modern from traditional fuel is poverty. The loss of time and opportunities for economic development in the collection and use of solid fuels pushes poor family lives at greater risks (WHO, 2000; Suk *et al.*, 2003; WHO, 2007; Schlag and Zuzarte, 2008; Barnes *et al.*, 2011; Jan *et al.*, 2012; Kaygusuz, 2012; Sovacool, 2012).

4.2. Knowledge of IAP-Related Health Hazards

It is a well-known fact that the IAP from both biomass and fossil fuels has seemingly adverse effects on the health of people, particularly women and their associates, who usually spend a large amount of time daily in the kitchen. The present study found that a half of the women studied spent four or more hours daily in the kitchen. However, as mentioned earlier, the IAP causes many health problems, such as tuberculosis, eye irritation and contact, low birth weight, lung cancer. The present study also reveals the same scenario. For instance, it has been found that six in ten, around five in ten and about three in ten had eye problem, burning and digestion problem respectively. More than one quarter had the experience of pneumonia and lung problem each. In addition, the respondents claimed that the IAP could be one of the possible reasons for burden of all these diseases. Moreover, a number of reports claim that Bangladeshi women and children are more likely to exhibit greater symptoms of respiratory illness as they are more attached with the kitchen (Pitt *et al.*, 2006).

4.3. All Women, Disadvantage in Particular, are Affected More

The principal responsibility for the preparation of daily domestic foods accrues to women in every culture which causes women spending a large amount of time in the kitchen. Bangladesh is not the exception to this world phenomenon. Women are therefore more likely to be affected by the smoke generating from the use of unprocessed fuels in closed and less ventilated indoor environment compared with men. For example, several researchers (Saleh *et al.*, 1986; Gupta and Srivastava, 1988; WHO, 2000; O'Neill *et al.*, 2003; Smith *et al.*, 2004;2005; Dasgupta *et al.*, 2004a; Smith, 2006; Tobassum, 2007; Rouse, n.d) draw a conclusion that females ages 15 or more years old experienced asthma, blindness, COPD, lung cancer, and tuberculosis from IAP. However, all females in Bangladesh

are not affected in the same manner. It is well known fact that poor women may have more bad experience than others in any natural and man-created calamities.

It has been found that three in four respondents had less than 5,000 BD Taka (around USD 70) monthly household incomes. The figure indicates that they live below the US two-dollar poverty line. Moreover, this finding does not support another study which noted that the urban poverty rate in Bangladesh was 55.8 per cent in 2000 (Hossain, 2008). Furthermore, as reported in this study, about a quarter of the respondents did not have any level of education which is similar to national data (NIPORT, 2009). Most of the women studied used mud-oven with wood and cow dung. All these variables (income, level of education, type of oven and sources of fuel) suggest that they have low economic and standard of living. In other words, most of the women studied lived below the poverty line. It has also been found that this poverty causes health problems related with IAP which is the result of the use of solid fuel in the kitchen with less ventilated and closed environment. For instance, most of the respondents having primary or below level of education, and BD Taka 5000 or below monthly household income, and using mud-oven with wood and cow dung had symptoms of physical troubles. In addition, Dasgupta *et al.* (2004a) and Smith *et al.* (2004) claim that women with low socioeconomic background are more likely to experience double pollution level compared with others having higher social background. Moreover, as found in the study, poor women are less aware about the health effects of IAP. More than a half of the illiterate respondents had less capacity to identify the connection between IAP and exposure to different diseases.

5. Conclusion

Like other developing countries, women's health issues in Bangladesh have long been neglected, though their contribution to cooking and managing domestic chores is immense. The solid fuels like biomass and fossil of cooking generate smoke that quickly pollutes the indoor environment than the modern and efficient fuels, such as gas. This polluted kitchen environment with less ventilation facilities brings about adverse effects on health of women who spend a large amount of time daily for preparing food. It reveals in the study that the lack of ability to avail refined fuels and environmentally sound indoor environment pushes poor women in greater health risks. Low level of education was also well associated with less awareness of the poor women about the health impacts of IAP. It could therefore be concluded that female domestic cook with less or no education using mud-oven are more likely than others to have health risks connected with exposure to IAP. The fact that the IAP causes health risks in some cases cannot be claimed without doing a rigorous scientific study on the clear-cut relationship between IAP and health hazards. If the Bangladesh Government, as recommended, is able to supply green and clean fuel sources with subsidies for poor women, it would be easier for Bangladesh to achieve the 3rd Sustainable Development Goal—ensuring healthy lives and promoting well-being for all at all ages—at the right time (2030).

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Appendix

Table-1. Socio-economic characteristics of the respondents

Socio-economic characteristics	**N**	**%**
Age (in year)		
15-25	60	30.0
26-35	79	39.5
36-45	35	17.5
46-55	14	7.0
55+	12	6.0
Total	**200**	**100**
Level of education		
Illiterate	76	38
Primary (1-5)	66	33
Secondary (6-10)	58	29
Total	**200**	**100**
Monthly family income (in BD Taka)		
1000—5000	150	75.0
5001—10000	45	22.5
10000+	5	2.5
Total	**200**	**100**
Types of ovens		
Mud-oven	**200**	**100**
Sources of fuels (multiple answers)		
Wood	31	**11.8**
cow dung	96	**36.5**
Stick	119	**45.2**
Leaf	17	**6.5**
Total	**263**	**100**
Time spent daily in the kitchen (in hour)		
1	15	7.5
2	40	20
3	46	23
4	74	37
5	15	7.5
6+	10	5
Total	**200**	**100**

(**Source:** field-work)

Table-2. Variation in use of kitchen, fuel type and sources and length of period spent daily in the kitchen according to the levels of education of the respondents

Level of education	Illiterate	Primary (1—5)	Secondary (6—10)	Total
Types of kitchen				
Open	77 (38.5)	56 (28.0)	52 (26.0)	185 (92.5)
Closed	8 (4.0)	6 (3.0)	1 (0.5)	15 (7.5)
Types of fuel				
Kutchha	5 (2.5)	7 (3.5)	0 (0.0)	12 (6.0)
Pukka	80 (40.0)	55 (27.5)	53 (26.5)	188 (94.0)
Sources of fuels				
Wood	9 (3.4)	16 (6.0)	6 (2.0)	31 (11.8)
Cow dung	47 (17.8)	30 (11.4)	19 (7.0)	96 (36.5)
Stick	81 (30.7)	14 (5.3)	24 (9.0)	119 (45.2)
Leaf	11 (4.1)	2 (0.8)	4 (1.5)	17 (6.5)
Length of time (in hour)				
1	9 (4.5)	4 (2.0)	2 (1.0)	15 (7.5)
2	11 (5.5)	14 (7.0)	13 (6.5)	38 (19.0)
3	25 (12.5)	12 (6.0)	9 (4.5)	46 (23.0)
4	33 (16.5)	22 (11.0)	19 (9.5)	74 (37.0)
5+	11 (5.5)	4 (2.0)	10 (5.0)	25 (12.5)

(**Source:** field work)
N.B: Figures in parenthesis indicate the percentage.

Table-3. Distribution of physical troubles the respondents faced within the last year

Types of troubles	Yes	No	Don't know
Pneumonia	49 (24.5)	71 (35.5)	80 (40.0)
Lung problem	52 (26.0)	82 (41.0)	66 (33.0)
Tuberculosis	34 (17.0)	91 (45.5)	75 (37.5)
Asthmatic trouble	26 (13.0)	89 (44.5)	85 (42.5)
Lung cancer	17 (8.5)	64 (32.0)	119 (59.5)
Eye problem (sight)	121 (60.5)	46 (23.0)	33 (16.5)
Low birth weight	19 (9.5)	72 (36.0)	109 (54.5)
Burning	95 (47.5)	60 (30.0)	45 (22.5)
Digestion trouble	67 (33.5)	62 (31.0)	71 (35.5)
Heart problem	21 (10.5)	81 (40.5)	98 (49.0)

(**Source:** field work)
N.B: Figures in parenthesis indicate the percentage.

Table-4. Associational relationship between level of education and of knowledge about different health problems

Knowledge / Types Of troubles	Level of education								
	Illiterate			Primary (1—5)			Secondary (6—10)		
	Yes	No	DK	Yes	No	DK	Yes	No	DK
Pneumonia	18	28	39	7	29	26	24	14	15
Lung problem	13	34	36	13	33	16	26	13	14
Tuberculosis	6	43	36	6	33	23	22	15	16
Asthmatic trouble	10	40	35	2	31	29	14	18	21
Lung cancer	6	25	54	3	23	36	8	16	29
Eye problem (sight)	48	23	14	33	17	12	40	6	7
Low birth weight	5	31	50	4	24	33	10	17	26
Burning	35	25	25	25	24	13	35	11	7
Digestion trouble	36	23	36	13	27	22	28	12	13
Heart problem	7	30	48	2	30	30	12	21	20

(**Source:** Field Work) **N.B:** DK=Don't Know

Table-5. Associational relationship between level of income and of knowledge about different health problems

Knowledge / Types of troubles	Level of income (in BD Taka)								
	1000—5000			5001—10000			10000+		
	Yes	No	DK	Yes	No	DK	Yes	No	DK
Pneumonia	37	51	53	8	14	21	1	1	1
Lung problem	41	57	43	8	18	17	0	2	1
Tuberculosis	28	63	50	5	21	17	0	0	3
Asthmatic trouble	22	64	55	3	19	21	0	0	3
Lung cancer	15	51	75	1	10	32	0	0	3
Eye problem (sight)	92	27	21	17	16	10	1	1	1
Low birth weight	15	56	69	3	7	33	0	0	3
Burning	76	38	26	11	16	16	1	2	1
Digestion trouble	52	50	39	7	9	27	0	0	3
Heart problem	19	64	58	0	10	33	0	0	3

(**Source:** Field Work) **N.B:** DK=Don't Know, here total number of respondents is 187

Table-6. Relationship of different physical troubles with sources and types of fuels and types of kitchen

Types of troubles	Sources of fuels				Types of fuels		Type of kitchen	
	Wood	Cow dung	Stick	Leaf	Kutchha	Pukka	Open	Closed
Pneumonia	8	15	22	4	45	4	44	5
Lung problem	11	21	17	3	47	5	47	5
Tuberculosis	7	15	9	3	32	2	32	2
Asthmatic trouble	3	16	4	3	23	3	25	1
Lung cancer	3	6	5	3	17	0	16	1
Eye problem (sight)	21	40	52	8	112	9	112	9
Low birth weight	3	**7**	6	3	19	0	16	3
Burning	18	28	43	6	94	1	87	8
Digestion trouble	14	14	32	7	66	1	62	5
Heart problem	2	6	10	3	21	0	21	0

(**Source:** Field Work)

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