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M.F. HOQUE



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M.F. HOQUE

Joint Secretary, Ministry of Health & Family Welfare, Govt. of the People's Republic of Bangladesh.

Corresponding author & address: Dr. Md. Fazlul Hoque, E-mail: f.hoque5422@gmail.com
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ABSTRACT

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Researches were conducted with environmental impact on public health in Bangladesh from three Environmental zone- ENV-9, ENV-14, ENV-29 of Bangladesh Ecological Zones (AEZ) made by AMIN (1988). The samples were selected for technical purpose and collected with the help of structured interactive questionnaires. As per objectives of studies, the respondents were interviewed and discussed in stakeholder groups with five types of concern namely medical professionals, traditional physicians, NGO service providers, medical businessman and members of civil society. The results obtained from the research conducted on set environmental impact parameters revealed that all most entire medical professionals mention flu, asthma, skin diseases, cholera as a monsoon disease to be dominated in the study areas. Regarding summer disease infection intensity, the results revealed that all most all of the medical professionals found seasonal fever (80%), respiratory diseases (80%) and water borne diseases (76%) showing high intensity infections. More than half of the medical professionals believed heat strokes (52%), fungal skin diseases (52%) showing high intensity infection of summer disease. Near about all most of them believed soil borne parasites (88%) not showing high intensity infection of summer disease. As regards monthly awareness meeting of disease prevention beneficiary activities, the results revealed that all most all of the medical professionals (96%) said beneficiary activities of disease prevention was monthly awareness meeting. Based on the findings of this research the recommendations were focused on the policy regulations, environmental effects, public health preparedness activities, disaster medicine and environmental impact on public health.

Key words: environment, public health, health impact

INTRODUCTION

The environment affects public health in a variety of ways. The interaction between human health and the environment has been extensively studied and environmental risks have been proven to significantly impact human health, either directly by exposing people to harmful agents, or indirectly, by disrupting life-sustaining ecosystems (Amin 1989). Although the exact contribution of environmental factors to the development of death and disease cannot be precisely determined, the World Health Organization (WHO) has estimated that thirteen million deaths annually are attributable to preventable environmental causes. The report also estimates that 24% of the global disease burden (healthy life years lost) and 23% of all deaths (premature mortality) are attributable to environmental factors, with the environmental burden of diseases being 15 times higher in developing countries than in developed countries, due to differences in exposure to environmental risks and access to health care. According to recent estimates, about 5 to 10% of Disability-Adjusted Life Years (DALYs) lost are due to environmental causes in Europe. By far the most important factor is fine particulate matter pollution in urban air. Similarly, environmental exposures have been estimated to contribute to 4.9 million (8.7%) deaths and 86 million (5.7%) DALYs globally. Every minute, five children in developing countries die from malaria or diarrhea. Every hour, 100 children die as a result of exposure to indoor smoke from solid fuels. Every day, nearly 1,800 people in developing cities die as a result of exposure to urban air pollution. Every month, nearly 19,000 people in developing countries die from unintentional poisonings. However, huge economic development and population growth result in continuing environmental degradation. Intensification of agriculture, industrialization and increasing energy use are the most severe driving forces of environmental health problems. For countries in the early stages of development the major environmental hazards to health are associated with widespread poverty and severe lack of public infrastructure, such as access to drinking water, sanitation, and lack of health care as well as emerging problems of industrial pollution. However, environmental health hazards are not limited to the developing world. Although at a lesser extend, environmental risks are also present in wealthier countries and are primarily attributed to urban air and water pollution. Occurrences of Asthma are rising dramatically throughout the developed countries, and environmental factors appear to be at least partly to blame. The Millennium Ecosystem Assessment (Ahmed 2008; Amin *et al.* 1990a; GOB 2008) synthesis report warns that the erosion of ecosystems could lead to an increase in existing diseases such as malaria and cholera, as well as a rising risk of new diseases emerging.

Climate change is also posing risks to human population health and well-being and thus is emerging as a serious concern worldwide. In 2000 climate change was estimated to be responsible for approximately 2.4% of worldwide diarrhea and 6% of malaria. According to the IPCC third assessment report the world temperature is expected to further rise during the century, implying increased health threats for human populations, especially in low-income countries like Bangladesh. Reviewing the US literature addressing health impacts of climate variability and change conclude that climate change is expected to increase morbidity and mortality risks from climate-sensitive health outcomes such as extreme heat events, floods, droughts and fires. A spread in vector-borne diseases, like malaria, is also expected. A study in Mexico revealed that lower greenhouse gases emissions would result in avoidance of some 64,000 premature deaths over a twenty year period. Bangladesh has been identified as one of the countries to be most adversely affected by global climate change. Bangladesh is

a low-lying country with high population density and a large agricultural sector which is vulnerable to environmental changes. In recent years, the economy has grown and diversified though intensified agricultural production, a burgeoning ready-made garments sector, large-scale international labor migration, and effective small-scale business development supported by microfinance. The effects of climate change in Bangladesh are still being understood, but it is likely that changes include higher temperatures throughout the year and problems with rainfall predictability leading to greater shortages in some seasons and flooding in others (ADB 1994 and AEZRefDVDs, 2013).

Some studies predict that rainfall will increase in the wet monsoon season and decrease in the dry winter and spring months, while other studies vary in predicting which months will be most affected by erratic rainfall. Also, there is concern that reduction in melt water in the Brahmaputra Basin will further reduce river water available for irrigation. In coastal areas, it is likely that sea level rises will lead to increased salinity of groundwater. Moreover, greater frequency of cyclones and storm surges is likely. These complex changes interact with other trends not directly caused by climate change particularly the impact of increased water extraction and potential adverse water availability impacts from diversion of rivers upstream in India in depleting river flow and replenishment of ground water aquifers in Bangladesh. Public Health refers to "the science and art of preventing disease, prolonging life and promoting health through organized efforts and informed choices of society, organizations, public and private, communities and individuals. It is concerned with threats to health based on population health analysis. The population in question can be as small as a handful of people, or as large as all the inhabitants of several continents (for instance, in the case of a pandemic. The dimensions of health can encompass a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, as defined by the United Nations' World Health Public health incorporates the interdisciplinary approaches of epidemiology, biostatistics and health services. Environmental health, community health, behavioral health, health economics, public policy, insurance medicine, mental health and occupational safety and health are other important subfields. The focus of public health intervention is to improve health and quality of life through prevention and treatment of disease and other physical and mental health conditions. This is done through surveillance of cases and health indicators, and through promotion of healthy behaviors. Examples of common public health measures include promotion of hand washing, breastfeeding, delivery of vaccinations, and distribution of condoms to control the spread of sexually transmitted diseases. Many public health programs are increasingly dedicating attention and resources to the issue of obesity, with objectives to address the underlying causes including healthy diet and physical exercise.

MATERIALS AND METHODS

The methods and materials used in the study were formulated as per recommendations given by researchers on the issues and impacts of disasters in the south coastal areas (Amin and Anwar, 1990; Amin *et al.* 1990b). The covered heading points were Research Design, Study Period, Study Areas, Study Population, Selection Criteria, Sample size and Sampling Method.

Research design: A descriptive cross sectional study/research was conducted in assessing the environmental impact on Public Health in Bangladesh. The participants were who fulfill the inclusion criteria and completed a structured questionnaire.

Study period: The study was conducted for a period from January 2014 to June 2016.

Study areas: Env Zone-9: Old Brahmaputra Floodplain: Mymensingh and Jamalpur Districts. Env Zone -14: Gopalganj Khulna Peat Basin: Gopalganj and Madaripur Districts. Env Zone -29: Brown Hills: Sylhet, Cox's Bazar Districts.

Study population: The target populations of the study were medical professionals (medical doctors/medical officers, medical teachers), traditional physicians (homeopath & allopath and village doctors), medical businessman (pharmacist, MR/SMO), NGO service providers and civil society members of the study areas of Bangladesh.

Selection criteria: Medical professionals (medical teachers, medical doctors/medical officers) (public or private) who works and live in Bangladesh. Traditional (homeopath & allopath) physicians (public or private) who works and live in Bangladesh. NGO service providers who works and live in Bangladesh. Medical businessman (Pharmacist and medical representative) who works and live in Bangladesh. Civil society members who lived in Bangladesh Respondents who were voluntarily willing to participate in the study.

Sample size: Calculation of sample size by using the following formula:

$$n = Z^2 \frac{1-\alpha}{2} P (1-P), d^2$$

Here: n= the desired sample size

z= standard normal deviation, usually set 1.96. which corresponds to 95% CL

Since there is no ready reference on the environmental impact, we can assume p = 10% to be adequate.

$$\text{So, } p = 10\% = 0.1, q = (1-p) = (1 - 0.1) = 0.9$$

d= Degree of precision and in this study it will set at 5%, So sample size

$$n = (1.96)^2 \times (0.1) (0.9) / (.05)^2 = 138.29$$

Due to allocation of data collection time, the feasible sample size was 150.

Sampling method: The sample was selected through purposive manner. For the purpose of the study we interviewed and group discussed five (05) types of concern-

Medical professionals (medical teachers, medical doctors/medical officers) -50 from different (public or private) organization; Traditional (homeopath & allopath) physicians-50 from different (public or private) organization; NGO service providers-50 from different organization; Medical businessman (Pharmacist and medical representative)-50 and 50 from members of civil society in Bangladesh. Data was collected by environmental and Public Health Survey, Interactive Group Discussion (IGD) and Case Studies by the researcher at their consent and convenience.

RESULTS AND DISCUSSION

The results obtained from the present studies are sequentially and briefly mentioned here with interpretations and explanations.

Traditional physicians by environmental diseases

The results obtained on the present study on the traditional physicians and environmental diseases are given in the Table 1.

Table 1. Number and percent distribution of traditional physicians by environmental monsoon disease

Response	Environmental monsoon diseases											
	Seasonal flu		Asthma		Malaria		Cholera		Skin disease		Burns	
	No	%	No	%	No	%	No	%	No	%	No	%
Yes	44	88.0	46	92.0	24	48.0	39	78.0	46	92.0	00	00.0
No	06	12.0	04	08.0	26	52.0	11	22.0	04	08.0	50	100.0
Total	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0

Results on Table 1 show that out of 50 traditional physicians, regarding with environmental monsoon diseases, it was multiple response questions, the results revealed that all most of the traditional physicians said seasonal flu (88%), asthma (92%), skin diseases (92%) and cholera (78%) as environmental monsoon diseases; few of them said malaria (24%) as environmental monsoon diseases; all of the traditional physicians said burns (100%) not as an environmental monsoon diseases. Regarding non communicable diseases, believed heart disease, diabetics, cancers, arthritics, rheumatism as non communicable diseases.

The world is becoming increasingly urban. Multiple Factors such as overcrowding, air pollution, excessive noise, and lack of access to nature contribute to the emotional and physical stress on life. Humans interact with the environment constantly. These interactions have profound impacts on quality of life, years of healthy life lived, and health disparities. Globally, nearly 25 percent of all deaths and the total disease burden can be attributed to environmental factors.1 Poor environmental quality has its greatest impact on people health like prenatal disorders, infant mortality, respiratory disorders, allergy, malignancies, cardiovascular disorders, increase in stress oxidative, endothelial dysfunction, mental disorders, and various other harmful effects. The World Health Organization (WHO) estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution. Therefore, environmental health must address the societal and environmental factors that increase the likelihood of exposure and disease. The main purpose of this study was to assess the environmental impact on Public Health in Bangladesh. Regarding the environmental monsoon diseases like seasonal flu, asthma, skin disease, and cholera as environmental monsoon diseases.

Medical professionals by non-communicable diseases

The results obtained on the present study on the traditional physicians and environmental disease are given in the Table 2. Results show that out of 50 medical professionals, regarding with non communicable diseases, it was multiple response questions, the results revealed that all of the medical professionals said heart diseases (96%), diabetics (96%) and cancer (88%) as non communicable diseases; all most all of the medical professionals said arthritics (84%), rheumatism (96%) and gout (96%) not as non communicable diseases. Regarding the summer disease showing high intensity infection, summer disease of seasonal fever showing high intensity infection.

Table 2. Number and percent distribution of medical professionals by non communicable diseases

Response	Non communicable diseases											
	Heart diseases		Diabetics		Cancers		Arthritics		Rheumatism		Gout	
	#	%	#	%	#	%	#	%	#	%	#	%
Yes	48	96.0	48	96.0	44	88.0	08	16.0	02	04.0	02	04.0
No	02	04.0	02	04.0	06	12.0	42	84.0	48	96.0	48	96.0
Total	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0

Medical professionals by non-communicable diseases

The results obtained on the present study on the traditional physicians and environmental disease are given in the Table 3.

Table 3. Number and percent distribution of medical professionals by summer diseases showing high intensity infection

Response	Summer diseases showing high intensity infection											
	Seasonal fever		Respiratory diseases		Water borne diseases		Heat strokes		Fungal skin diseases		Soil borne parasites	
	#	%	#	%	#	%	#	%	#	%	#	%
Yes	40	80.0	40	80.0	38	76.0	26	52.0	26	52.0	06	12.0
No	10	20.0	10	20.0	12	24.0	24	48.0	24	48.0	44	88.0
Total	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0

The results on Table 3 show that out of 50 medical professionals, regarding with the summer disease showing high intensity infection, it was multiple response questions, the results revealed that all most all of the medical professionals believed seasonal fever (80%), respiratory diseases (80%) and water borne diseases (76%) showing high intensity infection of summer disease; more than half of the medical professionals believed heat strokes (52%), fungal skin diseases (52%) showing high intensity infection of summer disease. Near about all most of them believed soil borne parasites (88%) not showing high intensity infection of summer disease regarding with beneficiary activities of diseases prevention, the entire respondents 250 (100%) answered same that local comprehensive medication activities was beneficiary activities of diseases prevention.

Medical businessman and disease prevention

The results obtained on the present study on the traditional physicians and environmental disease are given in the Table 4.

Table 4. Number and percent distribution of Medical Businessman by disease prevention beneficiary activities

Response	Disease prevention beneficiary activities											
	Monthly awareness meeting		Weekly medi-care stock inventory		Monthly Staff orientation meeting		Fortnightly disease incidence documentation		Weekly disaster preparedness prog. review		Local comprehensive medication	
	#	%	#	%	#	%	#	%	#	%	#	%
Yes	35	70.0	25	50.0	35	70.0	25	50.0	23	46.0	36	72.0
No	15	30.0	25	50.0	15	30.0	25	50.0	27	54.0	14	28.0
Total	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0	50	100.0

Results (Table 4) show that out of 50 medical businessmen, regarding with disease prevention beneficiary activities, it was multiple response questions, the results revealed that majority of the medical businessmen said beneficiary activities of disease prevention was monthly awareness meeting (70%), monthly staff orientation meeting (70%) and local comprehensive medication (72%); half of the respondents said beneficiary activities of disease prevention was weekly medi-care stock inventory (50%) and fortnightly disease incidence documentation (50%) and less than half of the medical businessmen said beneficiary activities of disease prevention was weekly disaster preparedness program review (46%). Similar impacts were previously apprehended by many workers (Hasan 2008; Khan 2008).

In this study, during hazards priority family medication system, entire civil society members and medical professionals, traditional physicians, medical businessmen, NGO service providers gave priority family medication system as individual basis during hazards; regarding with priority of age basis like children, adolescent and old of family medication system, entire civil society members, traditional physicians and all most all of medical professionals, medical businessmen, NGO service providers gave priority family medication system as age basis during hazards; as mobile unit based (house to house, habitat to shelter) majority of medical professionals, 31 (62%) traditional physicians, 38 (76%) medical businessmen, 40 (80%) NGO service providers and 40 (80%) civil society members gave priority family medication system as mobile unit based during hazards; regarding with family welfare base (integrated medication system), more than half of 33 (66%) medical professionals, 33 (66%) traditional physicians, 34 (68%) medical businessmen, 25 (50%) NGO service providers and 25 (50%) civil society members gave priority family welfare based integrated medication system during hazards. Regarding with geographical based family medication system, half of 26 (52%) traditional physicians, 25 (50%) medical businessmen, 25 (50%) NGO service providers, 25 (50%) civil society members and only 18 (36%) medical professionals gave priority as geographical based family medication system during hazards. On the other hand few of the respondents gave priority gender based (male, female, combined) family medication system during hazards.

Regarding priority family welfare programs run by different agencies, the entire respondents gave priority health awareness programs run by different agencies. regarding with diversified medical education programs, all most all of respondents gave priority diversified medical education programs as family welfare program run by different agencies. EPI and disease prevention vaccination programs, respondents gave priority EPI and disease prevention vaccination programs as family welfare program run by different agencies; regarding with child nutrition programs, respondents gave priority child nutrition programs as family welfare program run by different agencies. As for general information, it is found that all most of the respondents are quite knowledgeable and very much concern about Environmental impact on public health. From study, local comprehensive medication activities are the important beneficiary activities then monthly awareness meeting and monthly staff orientation meeting are the beneficiary activities of diseases prevention. During hazards the impact of environment priority family medication system, entire civil society members, majority medical professional, traditional physicians, medical businessmen and NGO service providers gave priority normally as individual basis, age(children, adolescent and old) basis, family welfare based integrated medication system and house to house, habitat to shelter mobile unit based family medication system during hazards. Impact of environment it is also important to geographical basis family medication system.

CONCLUSION

Based on the strength of the scientific knowledge regarding the adverse health effects of environmental pollution and the magnitude of their public health impact, different kinds of interventions should be taken into account. Integrated and inter-sectoral measures should be taken to prevent, promote and cure disease due to environmental hazards on public health. Non communicable diseases are increasing day by day, so life style modification is necessary. Some infectious diseases are caused by environmental pollution like water pollution, air pollution, noise pollution, Sanitation problem so it should be controlled by population awareness & law implementation. Activities should be taken to improve awareness about seasonal fever, respiratory diseases, water born diseases & skin diseases among community. Some intervention should be taken at root level like health awareness programs, family planning programs, diversified medical education programs, diversified medical treatment systems, diseases prevention vaccination programs, child nutrition programs run by different agencies which will improve health condition in our country. The disaster medicine specialist should liaison between and partner to the medical contingency planner, the emergency management professional, the incident command system, and government and policy makers.

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