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Full Length Research Paper

A study on the prevalence of infectious disease amongst patients in Bangladesh

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A survey on infectious disease is a qualitative study that used framework study to examine comprehensive interviews amongst patients. A pre-coded survey was developed to obtain relevant information regarding socio-demographic status such as age, weight, family size, income per month, education, disease, health condition, dietary pattern, housing etc. The questionnaire was pre-tested before finalization. We visited hospitals, which are located in the Jhenaidah and Kushtia district in Bangladesh for the collection of data from the patient. We used statistical program for social science (SPSS) software for data analysis. During the recruitment period (from February to March, 2009), there were 540 individuals in the hospital studied both indoor and outdoor. Among them 364 were infectious disease patients. The subjects were randomly chosen. All participants were interviewed by using standard questionnaires that evaluated infectious disease. Among the infectious disease, 11.3% were pneumonia and 6.9% asthma. Among the gastrointestinal infections, 2.7% were diarrhea not otherwise specified and 2.7% jaundice. We can also determine correlations between two variables, such as age and disease, income and disease, weight and disease, education and disease etc. From this study, it is concluded that the people of Kushtia and Jhenaidah suffering from some infectious disease such as asthma, pneumonia, diarrhea etc., suffer from heart disease, fever, jaundice and skin disease. We have found injury, delivery patients and also suicide patients (psychiatric). Data shows that there is not much difference in food habit among the patients. We have found in our study that the occurrence of disease is less frequent in male than the female. However, the prevalence of food and water born disease is grater among the patients in Bangladesh.

Key words: Infectious disease, systolic blood pressure, waist to hip ratio, body mass index.

INTRODUCTION

An infectious disease is a clinically evident disease resulting from the presence of pathogenic microbial agents, including pathogenic viruses, pathogenic bacteria, fungi, protozoa, multicellular parasites and aberrant proteins known as prions. These pathogens are able to cause disease in animals and/or plants. Infectious pathologies are usually qualified as contagious diseases (also called communicable diseases) due to their potentiality of transmission from one person or species to another (Dorland's Illustrated Medical Dictionary, 2004).

Transmission of an infectious disease may occur through one or more of diverse pathways including physical contact with infected individuals. These infecting agents may also be transmitted through liquids, food, body fluids, contaminated objects, airborne inhalation, or through vector-borne spread (Hill, 2005).

The term infectivity describes the ability of an organism to enter, survive and multiply in the host, while the infectiousness of a disease indicates the comparative ease with which the disease is transmitted to other hosts. An infection however, is not synonymous with an infectious disease, as an infection may not cause important clinical symptoms or impair host function (Hill, 2005).

List of infectious diseases

Human infectious diseases grouped by causative agent and alphabetically arranged.

1. Viral infectious diseases.
2. Bacterial infectious diseases
3. Parasitic infectious diseases.
4. Fungal infectious diseases.
5. Prion infectious diseases.

Viral infectious diseases

AIDS, AIDS related complex, chickenpox (varicella), common cold, cytomegalovirus infection, colorado tick fever, dengue fever, ebola hemorrhagic fever, hand, foot and mouth disease, hepatitis, herpes simplex, herpes zoster, hpv, influenza (Flu), lassa fever, measles, marburg hemorrhagic fever, infectious mononucleosis, mumps, norovirus, poliomyelitis, progressive multifocal leukencephalopathy, rabies, rubella, sars, smallpox (variola), viral encephalitis, viral gastroenteritis, viral meningitis, viral pneumonia, west nile disease and yellow fever.

Bacterial infectious diseases

Anthrax, bacterial meningitis, botulism, brucellosis, campylobacteriosis, cat scratch disease, cholera, diphtheria, epidemic typhus, gonorrhea, impetigo, legionellosis, leprosy (hansen's disease), leptospirosis, listeriosis,lyme disease,melioidosis, rheumatic fever; mrsa infection, nocardiosis, pertussis (whooping cough), plague, pneumococcal pneumonia, psittacosis, q fever, rocky mountain spotted fever (RMSF), salmonellosis, scarlet fever, shigellosis, syphilis, tetanus, trachoma, tuberculosis, tularemia, typhoid fever, typhus and urinary tract infections.

Parasitic infectious diseases

African trypanosomiasis, amebiasis, ascariasis, babesiosis, chagas disease, clonorchiasis, cryptosporidiosis, cysticercosis, diphyllobothriasis, dracunculiasis, echinococcosis, enterobiasis, fascioliasis, fasciolopsiasis, filariasis, free-living amebic infection, giardiasis, gnathostomiasis, hymenolepiasis, isosporiasis, kala-azar, leishmaniasis, malaria, metagonimiasis, myiasis ,onchocerciasis, pediculosis, pinworm infection, scabies, schistosomiasis, taeniasis, toxocariasis, toxoplasmosis, trichinellosis, trichinosis, trichuriasis, trichomoniasis and trypanosomiasis.

Fungal infectious diseases

Aspergillosis, blastomycosis, candidiasis, coccidioidomycosis, cryptococcosis, histoplasmosis and *Tinea pedis* (Athelete's foot).

Prion infectious diseases

Alpers' disease, Fatal familial insomnia, gerstman, sträussler-scheinker syndrome, kuru, variant creutzfeldt and jakob disease.

Infectious disease is the cause of death worldwide. Infection is the invasion or colonization of the body by pathogenic microorganism. Disease occurs when an infection results in any change from a state of health. An infection may exist in the absence of detectable disease. For example, the body may be infected with the virus that cause AIDS, but there may be no symptoms of diseases (Tortora et al., 2004).

Infectious diseases are often classified in terms of how they be have within a host and within a given population. Any disease that spread from one host to another either directly or indirectly is said to be a communicable disease. Chickenpox, genital herpes, typhoid fever and tuberculosis are examples. A non-communicable disease is not spread from one host to another. An example is tetanus: *Clostridium tetani* produces disease only when it is introduced into the body via abrasions or wound (Tortora et al., 2004).

Other diseases

There are many diseases without infectious disease like diabetes, different types of heart disease like hypertention, injury, general weakness etc are also included in this survey. Age, sex, systolic blood pressure (BP), and waist to hip ratio (WHR) for men showed to be important risk factors for the occurrence of type 2 diabetes. Feeding habit also affect the onset of diabetes. Analysis showed that red meat consumption was positively correlated with insulin levels and insulin resistance, but not blood glucose (Panagiotakos et al., 2005).

The findings were also evident in the multivariate model adjusted for age, sex, body mass index (BMI), diastolic, and systolic BP. The risk for diabetes was almost 2-fold higher in subjects aged > 40 compared with the age group 20 to 30, systolic BP > 140 mm Hg, and WHR for men. Significant association of BMI and type 2 diabetes was also observed for females. BMI > 30 showed to be exceedingly risky state for the occurrence of diabetes (Hussain et al., 2006).

The relationship between feeding patterns and body mass index (BMI) is stronger in the elderly and working age groups as compared to adolescents and middle-age groups. Greater energy consumption at breakfast is associated with a lower BMI for adolescents and middle aged people (Geissler et al., 1996).

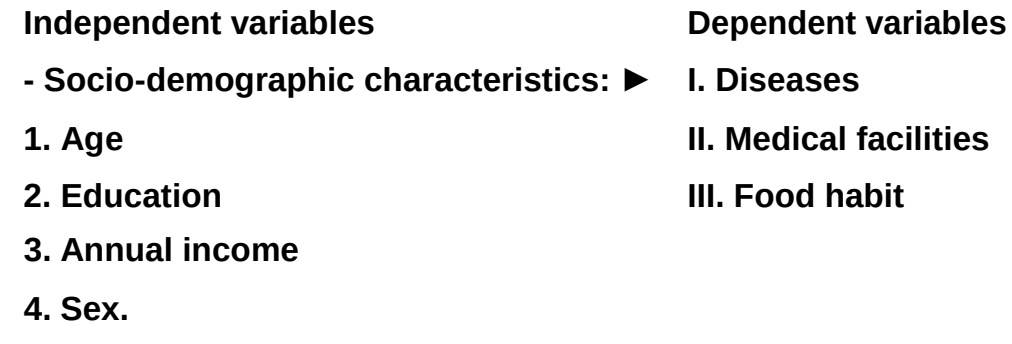

Figure 1. Conceptual framework of the study.

There is a relationship between food habits, body mass index and serum cholesterol. Researchers found that raw vegetables are inversely related with serum cholesterol and body mass index and are useful for lowering serum cholesterol and body weight (Kassaian et al., 2003). The percentage of people consuming less than the recommended amount of fruits and vegetables has been observed that the population is at increased risk of cardiovascular diseases, obesity and other non-communicable diseases (Nasreddine et al., 2006).

On the other hand, if adults fail to meet their food requirements they loose weight. This may lead to reduced ability to work, to resist infection and to enjoy the normal status of life. This underlies the need for an adequate intake of food that is the source of all energy.

Food habits could also be responsible for specific types of nutritional disorders in a group of people. For example most of the food prepared on commercial basis in Pakistan does not match the declared hygienic standards (Sohail et al., 2002) and they could contain pathogenic organism. Food habit alone can be the cause of some disorder, for example prevalence of temporomandibular disorder (TMD) is related to prolonged consumption of hard food items (Akhter et al., 2004). Malnutrition and cell-mediated immune deficiency were important inde-pendent risk factors for the occurrence of diarrhea (Baqui et al., 1993).

Researches suggest that nutritional interventions alone are unlikely to reduce the high incidence of diarrhea, but that efforts to improve nutritional status may have a beneficial effect on the duration of diarrhea and its unfavorable nutritional consequences (Black et al., 1984). Duration of diarrhea was found to be related consistently to nutritional status measured by weight-for-age and weight-for-height. Diarrhea in the short term affected weight increment in the short term, but not in the long term and did not affect height increment for any of these periods. Diarrhea in the long term affected both weight increment and height increment in the long term (Bairagi et al., 1987).

Smoking is a part of life style and non-smokers had healthier eating habits and higher levels of physical activity than smokers; whereas the prevalence of obesity was lower in smokers (Kvaavik et al., 2003). There is a deep relationship between heart disease and smoking.

In Bangladesh, this types of survey (a questionnaire survey on infectious disease and medicine ward disease among hospital patients) ever not been done by any organization or any researchers. We the first time begin this type of questionnaire survey among different hospitals in Kushtia and Jhenaidah district in Bangladesh.

Conceptual framework

In keeping with the objectives, the study determined the relationship between diseases with socio-demographic and economical factors, including age, sex, education, income, food habit etc. Using appropriate statistical tests (Chi-square test and Spearman's rank correlation), variables with significant relationships were determined. The conceptual framework of this study is summed up in Figure 1.

In Figure 1, we aimed to achieve the following specific objectives:

1. To determine the prevalence of infectious disease among hospital patients.
2. To study the disease pattern among hospital patients.
3. To correlate the heart disease with income or occupation and smoking.
4. To find out the risk factors related with the infectious disease.
5. To correlate the related factors with onset and progression of various diseases (for example, age, sex, bp etc., with infectious diseases, for example, {Pneumonia}).
6. To study the food habit of patients.
7. To make suggestions to overcome the problem.
8. To determined the sex of patients.
9. To find out their age and marital status.
10. To observed co-relation between their characteristics and disease.
11. To observed the medical facilities and doctors' behavior.

MATERIALS AND METHODS

Methods and materials are necessary for assessment, analysis, and determination of causes of the infectious diseases. A pre-coded questionnaire was developed to obtain relevant information regarding socio-demographic status such as age, weight, family size, income per month, education, disease, health condition, dietary pattern, housing etc. The questionnaire was pre-tested before finalization. We visited hospitals, which are located in the Jhenaidah and Kushtia district for the collection of data from the patient. We used SPSS software for data analysis.

This is a qualitative study that used framework analysis to examine in-depth interviews among hospitalized patients. There are many hospital and clinic present in Kushtia and Jhenidah and Campus region. From these the survey was accomplished in Kushtia General Hospital, Sono Hospital, Mirpur Hospital, Dar-Us-Shefa Clinic, Addin Hospital, Alamin Clinic, Tofazzol Clinic, Kushtia Shishu Hospital, Jhenaidha General Hospital, Ibnasena Hospital, Shaba Clinic, Islamic University Medical Center , Shailokupa Health complex, Jonoseba Clinic, Hasan Clinic and Alhira Clinic.

During the recruitment period (from February to March, 2009), there were 540 individuals in the hospital studied both indoor and outdoor.

Field selection

Field selection is the major part of a research. To do a good research, field selection is very much necessary. We are the student of Islamic University (IU) Kushtia, for that the patients of these hospitals and clinics of kushtia, Jinaidah is selected. Those hospitals were selected because it was deemed that it will very much favorable for the research object. The criteria for choosing those hospitals were as follows:

1. These hospitals have well established and full set up for diagnosis and treatment.
2. The patients of those hospitals come from various reginos and represent different socioeconomic status for that there was a greater possibility to get good variation diseases among them.
3. Patients are familiar with or have basic knowledge of diseases. Based on the foregoing criteria, the identified project sites include those hospitals.

Population

The study comprised 540 subjects (Infectious and medicine, pediatric, surgery, gynecology patients and psychiatric problem). At first a data collection sheet (questionnaire) was prepared. The questionnaire consisted of personal health practice, age material status, religion, information about present, past and childhood physical complication etc., (Appendix 1).

The subjects were randomly chosen. All participants were interviewed by using standard questionnaires that evaluated infectious disease and medicine, pediatric, surgery, gynecology disease and psychiatric problem.

Population is the entire set of relevant unit of analysis or data. In this research, all of the patients of hospitals and clinics are the population. The population of this census study consists of 540 patients.

Sampling

Sampling is the process of selecting sample. The non- probability purposive sampling was used to collect the data from respondent.

Sample selection

The total number of patients of those hospitals and clinics is about 1500 and it is difficult to collect data from all of patients. A total of 540 responses were collected, however incomplete data reduce the accuracy of result .The missing data was 0.2%.

Data collection technique

Data collection is the important part of research. The primary data was collected from field. To collect the data, the interview schedule techniques were used. The advantages of these techniques are given bellow:

1. A face to face data collection.
2. Less time and money consumer.
3. More scientific.
4. Less factual error.

Content question was used to collect the data that is factual question (deals with background that is, sex, father occupation, family income, age etc). Structural question was also used to collect the data. There are three types of structural question. They are given as follows:

1. Open-ended question,
2. Close -ended question,
3. Multiple choice question and
4. Contingency question.

It also avoids the leading question, threading question and double-barred question.

Analysis of variables

Sex variables

In this work, we included 33.7% female and 49.8% male patients and 90 smoker and 446 nonsmoker and 4 drug addicted. Females are included mostly in gynecology ward patients.

Food intake variables

The patient's usual dietary intake was assessed by a validated, semi-quantitative food frequency questionnaire. All food was broadly categorized in 6 groups and patients are grouped according to these 6 groups. We asked all participants to report the daily intake of food items that they consumed at breakfast, lunch and supper. The questionnaire on the frequency of consumption also included questions on the following nutritional practices, when and where the participants take food and how much money they spend for food. The list of the foods investigated contained 7 items; those with similar composition were combined in a single item, totaling 6 food items distributed among the following groups: meat; vegetables, fruits, meat and vegetables; fish and mix. Then, the frequency of consumption was quantified in terms of the number this food was consumed.

Socio-demographic variables

Socio-demographic variables sex, age, parity (number of children); presence of spouse/partner (yes/no); income (yearly per capita income); and information on healthy eating ware collected. Smoking, food intake, and physical activity were evaluated on the

Table 1. Illustration of the number of indoor and outdoor patients.

Parameter	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Indoor	426	78.9	78.9	78.9
Outdoor	114	21.1	21.1	100.0
Total	540	100.0	100.0	

basis of a group of questions standardized. Concerning smoking, participants were classified into 2 groups: nonsmokers and smokers (current or having stopped less than six months, previously).

Weight variables

The participant's standing height and weight were recorded, and the body mass index (BMI) was calculated as weight (in kilograms) divided by standing height (in meters squared). According to standard guidelines, those with a BMI greater that 24.9 kg/m^2 were defined as overweight, and those with a BMI greater than 29.9 kg/m^2 were defined as obese. Obese is correlated with diabetes.

Age variables

Our total patients are 540. Among them most of the patients are female and adult. We got 4-month to 100 year patients, as our age variables.

Occupation variables

There are many income variables among our 540 patients. Among them some are farmer, some are service holder, some are housewife, some are businessman and others. Most of them are housewife.

Statistical analysis

Analysis showed that the number of enrolled participants is adequate to evaluate two-sided standardized differences between the subgroups of the study. Categorical variables are presented as absolute and relative frequencies. Associations between categorical variables were evaluated by means Pearson's correlation test, while differences between categorical and several biochemical, clinical and nutritional variables were evaluated, that is, standardized residuals against fitted values.

All reported p-values are based on two-sided tests and compared to a significance level of 0.05 and 0.01 on SPSS 10 (SPSS Inc., Chicago, IL, USA) software was used for all the statistical calculations.

After collection of data, the researcher duty is to process and analyze the data. So the data was processed and analyzed through field editing, coding, categorization and tabulation. Then the statistical program for social science (SPSS) was used.

By SPSS, the unvaried (that is, mean, median, mode, frequency distribution, standard deviation) was analyzed. Pie-chart and histogram was also used to analyze the data. Correlation cross tabulation and Chi-square tests was use to test the hypothesis by SPSS. From this test, a finding will be gotten.

Descriptive analyses were performed, evaluating respiratory and gastrointestinal infection outcomes separately. We chose not to combine these into a single outcome measure because we hypothesized that there could be differences in the factors associated significantly with each, given the differences in the causative pathogens and the associated differences in modes of transmission.

RESULTS

A total of 540 patients met the inclusion criteria for the study. Overall, 49.8% of the included patients were male, 33.7% were female. Among them were, smoker (16.7%), nonsmoker (82.6%) and drug addicted (0.7%).

Analysis of indoor and outdoor patients

From the survey study, we concluded that the indoor patients are 78.9% and outdoor patients are 21.1%. Table 1 and Figure 2 illustrate the frequency of indoor and outdoor patients.

Analysis of sex (percentage of male and female patients)

From this study, it is concluded that among the 540 patients, the male patients is 49.8%, female is 33.9%, female pregnant is 0.2% and female non pregnant is 16.1% (Table 2 and Figure 3).

Analysis of marital status (married and unmarried patients)

From the survey study, we concluded that the married patients are 67.8% and unmarried patients are 32.2%. Table 3 and Figure 4 illustrate the frequency of married and unmarried patients.

Disease pattern analysis

Among the 540 patients, 364 patients are with infectious disease (Table 4). The frequency table (Table 4) shows that among the infectious disease, 11.3% were pneumonia and 6.9% asthma. Among the gastrointestinal infections, 2.7% were diarrhea not otherwise specified and 2.7% jaundice. The frequency of patients being diagnosed with respiratory or gastrointestinal infections varied considerably among the hospitals.

Other infectious and medicine ward disease are mild, such as bleeding 1.4%, cold 4.1%, diabetes 1.4%,

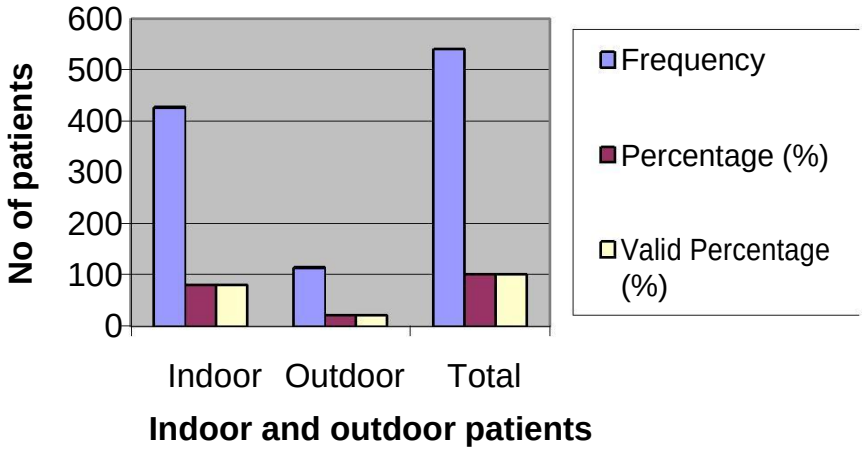

Figure 2. The frequency of indoor and outdoor patients.

Table 2. Illustration of the number of male and female patients.

Parameter	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Male	269	49.8	49.8	49.8
Female	183	33.9	33.9	83.7
Female and pregnant	1	.2	.2	83.9
Female non pregnant	87	16.1	16.1	100.0
Total	540	100.0	100.0	

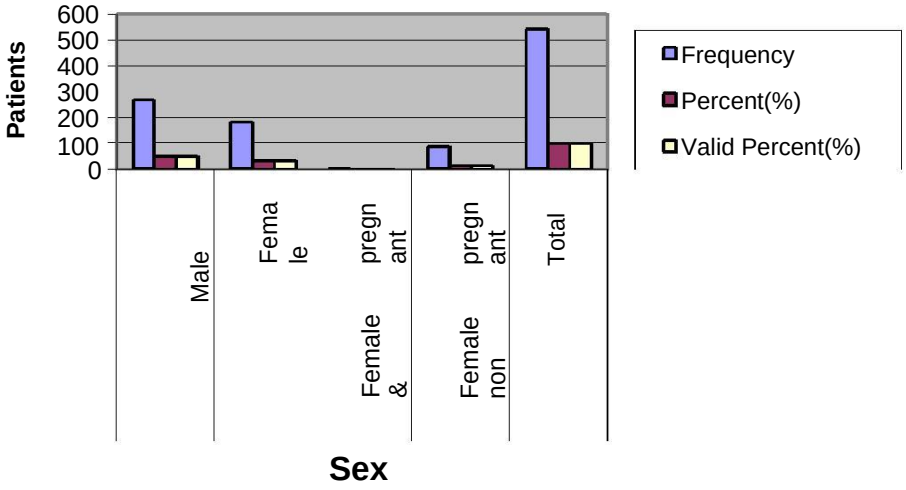

Figure 3. The frequency of male and female patients.

Table 3. Illustration of the number of married and unmarried patients.

	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Married	366	67.8	67.8	67.8
Unmarried	174	32.2	32.2	100.0
Total	540	100.0	100.0	

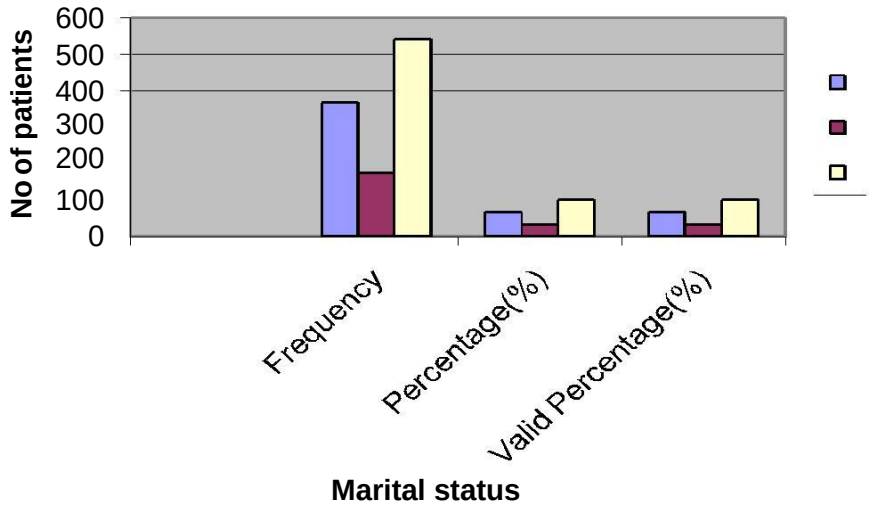

Figure 4. The frequency of marital status.

dysentery 0.5%, fever 4.4%, gastric 12.6%, heart disease 5.2%, injury 20.3%, kidney disease 1.4%, pain 4.9%, skin disease 2.5%, strock 1.9% and Urinary problem 1.4%.

From this analysis we concluded that maximum people of kushtia and Jhenaidah district come to hospital for treatment of pneumonia, asthma, diarrhea, fever, jaundice, injury (accident, political crash etc), heart disease and also kidney disease.

Smoker analysis

From this analysis, we concluded that among the 364 patients were, non-smoker (78.3%), smoker (21.2%) and drug addicted (0.5%). There is a relationship between heart disease and smoking (Table 5).

Correlation analysis

We can determine many correlations between two variables, such as age and disease, income and disease, weight and disease, education and disease etc. Some are given here:

Age and disease

From the statistical analysis we can determine the correlation between age and disease (Table 6).

Significant correlation present between age and disease at 0.01 level (0.238). So it can be said that there is good relationship between disease and age of patients.

Annual income and disease

From the statistical analysis we can determine the correlation between annual income and disease (Table 7). There is a significant correlation between annual income and disease at 0.05 level. So it can be said that there is good relationship between disease and age of patients.

Education and disease

From the statistical analysis we can determine the correlation between education and disease (Table 8). Significant correlation present between education and disease at 0.01 level (0.238). So it can be said that there is good relationship between disease and education of patients.

Weight and disease

From the statistical analysis we can determine the correlation between weight and disease (Table 9). Significant correlation present between weight and disease at 0.01 level (0.238). So it can be said that there is good relationship between disease and weight of patients.

Analysis of hospital facilities (satisfaction of treatment)

From the statistical analysis we concluded that most of the patients are satisfied with comfort of their hospital seat or bed. They also satisfied with medical facilities and doctors behavior (Table 10).

DISCUSSION

Among the almost infinite varieties of microorganisms,

Table 4. The pattern of infectious disease and medicine ward disease.

Parameter	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Allergy	1	0.3	0.3	0.3
Asthma	25	6.9	6.9	7.1
Bleeding	5	1.4	1.4	8.5
Brainstrock	2	0.5	0.5	9.1
Burn	1	0.3	0.3	9.3
Cholecy	1	0.3	0.3	9.6
Cold	15	4.1	4.1	13.7
Cough	3	0.8	0.8	14.6
Cyst	1	0.3	0.3	14.8
Dental	1	0.3	0.3	15.1
Diabetes	5	1.4	1.4	16.5
Diarrhea	10	2.7	2.7	19.2
Dysentery	4	1.1	1.1	20.3
Ear	2	0.5	0.5	20.9
Eye	6	1.6	1.6	22.5
Fever	16	4.4	4.4	26.9
Ganging	1	0.3	0.3	27.2
Gastric	46	12.6	12.6	39.8
HBV	2	0.5	0.5	40.4
Headache	3	0.8	0.8	41.2
Heart	19	5.2	5.2	46.4
Hypertension	3	.8	0.8	47.3
Injury	74	20.3	20.3	67.6
Jaundice	10	2.7	2.7	70.3
Kidney disease	6	1.6	1.6	72.0
Leukemia	2	0.5	0.5	72.5
Pain	18	4.9	4.9	77.5
Paralysis	1	0.3	0.3	77.7
Pneumonia	41	11.3	11.3	89.0
Rheumatic fever	1	0.3	0.3	89.3
Sinus	1	0.3	0.3	89.6
Skin disease	9	2.5	2.5	92.0
Stroke	7	1.9	1.9	94.0
Thairoiditis	1	0.3	0.3	94.2
Thalassemia	6	1.6	1.6	95.9
Tonsillitis	2	0.5	0.5	96.4
Typhoid	4	1.1	1.1	97.5
Ulcer	3	0.8	0.8	98.4
Urine problem	5	1.4	1.4	99.7
Weakness	1	0.3	0.3	100.0
Total	364	100.0	100.0	

Table 5. Analysis of smoker and non-smoker patients.

	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Non smoker	285	78.3	78.3	78.3
Smoker	77	21.2	21.2	99.5
Drug addicted	2	.5	.5	100.0
Total	364	100.0	100.0	

Table 6. Correlation present between age and disease.

Parameter		Disease	Age
Disease	Pearson correlation	1.000	0.190
	Sig. (2-tailed)	-	0.001
	N	286	285
Age	Pearson correlation	0.190	1.000
	Sig. (2-tailed)	0.001	-
	N	285	363

** Correlation is significant at the 0.01 level (2-tailed).

Table 7. Correlation between annual income and disease.

Parameter		Disease	Annual income
Disease	Pearson correlation	1.000	0.121
	Sig. (2-tailed)	-	0.041
	N	286	286
Annual income	Pearson correlation	0.121	1.000
	Sig. (2-tailed)	0.041	-
	N	286	364

** Correlation is significant at the 0.05 level (2-tailed).

Table 8. Correlation between education and disease.

Parameter		Disease	Education
Disease	Pearson correlation	1.000	0.200
	Sig. (2-tailed)	-	0.001
	N	286	285
Education	Pearson correlation	0.200	1.000
	Sig. (2-tailed)	0.001	-
	N	285	363

** Correlation is significant at the 0.01 level (2-tailed).

Table 9. Correlation between weight and disease.

Parameter		Disease	Weight
Disease	Pearson correlation	1.000	0.269
	Sig. (2-tailed)	-	0.000
	N	286	286
Weight	Pearson correlation	0.269	1.000
	Sig. (2-tailed)	0.000	-
	N	286	364

** Correlation is significant at the 0.01 level (2-tailed).

Table 10. Illustrates the hospital facilities.

Parameter	Frequency	Percent	Valid percent	Cumulative percent
Comfort of patient's seat				
Poor	60	16.5	16.7	16.7
Good	284	78.0	79.1	95.8
Very good	15	4.1	4.2	100.0
Total	359	98.6	100.0	
Missing system	5	1.4		
Total	364	100.0		
Medical facilities				
Satisfied	223	61.3	61.3	61.3
Unsatisfied	141	38.7	38.7	100.0
Total	364	100.0	100.0	
Doctor's behavior				
Satisfied	268	73.6	73.6	73.6
Unsatisfied	96	26.4	26.4	100.0
Total	364	100.0	100.0	

relatively few cause disease in otherwise healthy individuals. Infectious disease results from the interplay between those few pathogens and the defenses of the hosts they infect. The appearance and severity of disease resulting from any pathogen depends upon the ability of that pathogen to damage the host as well as the ability of the host to resist the pathogen. Infectious microorganisms or microbes are therefore classified as either primary pathogens or as opportunistic pathogens according to the status of host defenses (Baron et al., 1996).

Primary pathogens cause disease as a result of their presence or activity within the normal, healthy host and their intrinsic virulence (the severity of the disease they cause) is, in part, a necessary consequence of their need to reproduce and spread. Many of the most common primary pathogens of humans only infect humans, however many serious organisms cause diseases acquired from the environment or which infect non-human hosts.

Organisms, which cause an infectious disease in a host with depressed resistance, are classified as opportunistic pathogens. Opportunistic disease may be caused by microbes that are ordinarily in contact with the host, such as pathogenic bacteria or fungi in the gastrointestinal or the upper respiratory tract, and they may also result from (otherwise innocuous) microbes acquired from other hosts (as in clostridium difficile colitis) or from the environment as a result of traumatic introduction (as in surgical wound infections or compound fractures). An opportunistic disease requires impairment of host defenses, which may occur as a result of genetic defects(such as chronic granulomatous disease), exposure to antimicrobial drugs or immunosuppressive chemicals (as might occur following poisoning or cancer chemotherapy), exposure to ionizing radiation, or as a result of an infectious disease with immunosuppressive activity (such as with measles, malaria or HIV disease). Primary pathogens may also cause more severe disease in a host with depressed resistance than would normally occur in an immuno sufficient host.

One way of proving that a given disease is "infectious", is to satisfy Koch's postulates (first proposed by Robert Koch), which demands that the infectious agent be identified only in patients and not in healthy controls, and that patients who contract the agent also develop the disease. These postulates were first used in the discovery that *Mycobacteria* species cause tuberculosis. Koch's postulates cannot be met ethically for many human diseases because they require experimental infection of a healthy individual with a pathogen produced as a pure culture. Often, even diseases that are quite clearly infectious do not meet the infectious criteria. For example, *Treponema pallidum*, the causative spirochete of syphilis, cannot be cultured *in vitro* - however the organism can be cultured in rabbit testes. It is less clear that a pure culture comes from an animal source serving as host than it is when derived from microbes derived from plate culture. Epidemiology is another important tool used to study disease in a population. For infectious diseases it helps to determine if a disease outbreak is sporadic (occasional occurrence), endemic (regular cases often occurring in a region), epidemic (an unusually high number of cases in a region), or pandemic

(a global epidemic).

Transmission of infectious disease

An infectious disease is transmitted from some source. Defining the means of transmission plays an important part in understanding the biology of an infectious agent, and in addressing the disease it causes (Kenneth and George, 2004).

Transmission may occur through several different mechanisms. Respiratory diseases and meningitis are commonly acquired by contact with aerosolized droplets, spread by sneezing, coughing, talking, kissing or even singing. Gastrointestinal diseases are often acquired by ingesting contaminated food and water. Sexually transmitted diseases are acquired through contact with bodily fluids, generally as a result of sexual activity. Some infectious agents may be spread as a result of contact with a contaminated, inanimate object (known as a fomite), such as a coin passed from one person to another, while other diseases penetrate the skin directly (Kenneth and George, 2004).

Transmission of infectious diseases may also involve a "vector". Vectors may be mechanical or biological. A mechanical vector picks up an infectious agent on the outside of its body and transmits it in a passive manner. An example of a mechanical vector is a housefly, which lands on cow dung, contaminating its appendages with bacteria from the feces, and then lands on food prior to consumption. The pathogen never enters the body of the fly.

In contrast, biological vectors harbor pathogens within their bodies and deliver pathogens to new hosts in an active manner, usually a bite. Biological vectors are often responsible for serious blood-borne diseases, such as malaria, viral encephalitis, Chagas disease, Lyme disease and African sleeping sickness. Biological vectors are usually, though not exclusively, arthropods, such as mosquitoes, ticks, fleas and lice. Vectors are often required in the life cycle of a pathogen. A common strategy used to control vector borne infectious diseases is to interrupt the life cycle of a pathogen by killing the vector (Krauss et al., 2003).

The relationship between virulence and transmission is complex, and has important consequences for the long-term evolution of a pathogen. Since it takes many generations for a microbe and a new host species to co-evolve, an emerging pathogen may hit its earliest victims especially hard. It is usually in the first wave of a new disease that death rates are highest. If a disease is rapidly fatal, the host may die before the microbe can get passed along to another host. However, this cost may be overwhelmed by the short term benefit of higher infectiousness if transmission is linked to virulence, as it is for instance in the case of cholera (the explosive diarrhea aids the bacterium in finding new hosts) or many respiratory infections (sneezing and coughing create infectious aerosols).

Diagnosis and therapy

Diagnosis of infectious disease sometimes involves identifying an infectious agent either directly or indirectly. In practice, most minor infectious diseases such as warts, cutaneous abscesses, respiratory system infections and diarrheal diseases are diagnosed by their clinical presentation. Conclusions about the cause of the disease are based upon the likelihood that a patient came in contact with a particular agent, the presence of a microbe in a community, and other epidemiological considerations. Given sufficient effort, all known infectious agents can be specifically identified. The benefits of identification, however, are often greatly outweighed by the cost, as often there is no specific treatment, the cause is obvious, or the outcome of an infection is benign.

Specific identification of an infectious agent is usually only determined when such identification can aid in the treatment or prevention of the disease, or to advance knowledge of the course of an illness prior to the development of effective therapeutic or preventative measures. For example, in the early 1980s, prior to the appearance of AZT for the treatment of AIDS, the course of the disease was closely followed by monitoring the composition of patient blood samples, even though the outcome would not offer the patient any further treatment options. In part, these studies on the appearance of HIV in specific communities permitted the advancement of hypotheses as to the route of transmission of the virus (Owens, 2003). By understanding how the disease was transmitted, resources could be targeted to the communities at greatest risk in campaigns aimed at reducing the number of new infections. The specific serological diagnostic identification, and later genotypic or molecular identification, of HIV also enabled the development of hypotheses as to the temporal and geographical origins of the virus, as well as a myriad of other hypothesis.

The development of molecular diagnostic tools has enabled physicians and researchers to monitor the efficacy of treatment with anti-retroviral drugs. Molecular diagnostics are now commonly used to identify HIV in healthy people long before the onset of illness and have been used to demonstrate the existence of people who are genetically resistant to HIV infection (Kimerling et al., 1999). Thus, while there still is no cure for AIDS, there is great therapeutic and predictive benefit to identifying the virus and monitoring the virus levels within the blood of infected individuals, both for the patient and for the community at large.

Methods of diagnosis

Diagnosis of infectious disease is nearly always initiated

by medical history and physical examination. More detailed identification techniques involve the culture of infectious agents isolated from a patient. Culture allows identification of infectious organisms by examining their microscopic features, by detecting the presence of substances produced by pathogens, and by directly identifying an organism by its genotype. Other techniques (such as X-rays, CAT scans, PET scans or NMR) are used to produce images of internal abnormalities resulting from the growth of an infectious agent. The images are useful in detection of, for example, a bone abscess or a spongiform encephalopathy produced by a prion.

The study of infectious disease

History

Abū Alī ibn Sīnā (Avicenna) discovered the contagious nature of infectious diseases in the early 11th century. He introduced quarantine as a means of limiting the spread of contagious and infectious diseases in The Canon of Medicine, circa 1020 (David et al., 2003)."Arab Roots of European Medicine", Heart views 4 (2). He also stated that bodily secretion is contaminated by foul foreign earthly bodies before being infected, but he did not view them as primary causes of disease (Ibrahim, 2002).

When the Black Death bubonic plague reached al-Andalus in the 14th century, Ibn Khatima and Ibn al-Khatib hypothesized that infectious diseases are caused by "contagious entities" which enter the human body (Ibrahim, 2002). Such ideas became more popular in Europe during the renaissance, particularly through the writing of the Italian monk Girolamo Fracastoro (Beretta, 2003).

Anton van Leeuwenhoek (1632 to 1723) advanced the science of microscopy by being the first to observe microorganisms, allowing for easy visualization of bacteria. Louis Pasteur proved beyond doubt that certain diseases are caused by infectious agents, and developed a vaccine for rabies. Robert Koch, provided the study of infectious diseases with a scientific basis known as Koch's postulates. Edward Jenner, Jonas Salk and Albert Sabin developed effective vaccines for smallpox and polio, which would later result in the eradication and near-eradication of these diseases, respectively. Alexander Fleming discovered the world's first antibiotic Penicillin.

Gerhard Domagk developed Sulphonamides, the first broad-spectrum synthetic antibacterial drugs.

Medical specialists

The medical treatment of infectious diseases falls into the medical field of Infectiology and in some cases the study of propagation pertains to the field of Epidemiology.

Generally, infections are initially diagnosed by primary care physicians or internal medicine specialists. For example, an "uncomplicated" pneumonia will generally be treated by the internist or the pulmonologist (lung physician). The work of the infectiologist therefore entails working with both patients and general practitioners, as well as laboratory scientists, immunologists, bacteriologists and other specialists.

An infectious disease team may be alerted when:

1. The disease has not been definitively diagnosed after an initial workup;
2. The patient is immunocompromised (for example, in AIDS or after chemotherapy);
3. The infectious agent is of an uncommon nature (for example, tropical diseases);
4. The disease has not responded to first line antibiotics;
5. The disease might be dangerous to other patients, and the patient might have to be isolated.

Mortality from infectious diseases

The World Health Organization collects information on global deaths by International classification of disease (ICD) code categories. Table 11 lists the top infectious disease killers, which caused more than 100,000 deaths in 2002 (estimated). 1993 data is included for comparison.

The top three single agent/disease killers are HIV/AIDS, TB and malaria. While the numbers of deaths due to nearly every disease have decreased, deaths due to HIV/AIDS have increased fourfold. Childhood diseases include pertussis, poliomyelitis, diphtheria, measles and tetanus. Children also make up a large percentage of lower respiratory and diarrheal deaths.

Stresses and infectious disease

Infectious diseases result from the growth and action of microorganisms or parasites in the body and may or may not be contagious. Standard research criteria for diagnosis of clinical infectious disease require both biologic evidence of infection and manifestation of related symptomatology (Beare and Reed, 1977; Kasl et al., 1979).

Suggestions or preventing transmission of infectious disease

One of the ways to prevent or slow down the transmission of infectious diseases is to recognize the different characteristics of various diseases (Watts et al., 2006). Some critical disease characteristics that should be evaluated include virulence, distance traveled by

Table 11. Worldwide mortality due to infectious diseases (The World Health Report, 2004).

Rank	Cause of death	Deaths 2002	Percentage of all deaths (%)	Deaths 1993	1993 Rank
N/A	All infectious diseases	14.7 million	25.9	16.4 million	32.2%
1	Lower respiratory infections	3.9 million	6.9	4.1 million	1
2	HIV/AIDS	2.8 million	4.9	0.7 million	7
3	Diarrheal diseases	1.8 million	3.2	3.0 million	2
4	Tuberculosis (TB)	1.6 million	2.7	2.7 million	3
5	Malaria	1.3 million	2.2	2.0 million	4
6	Measles	0.6 million	1.1	1.1 million	5
7	Pertussis	0.29 million	0.5	0.36 million	7
8	Tetanus	0.21 million	0.4	0.15 million	12
9	Meningitis	0.17 million	0.3	0.25 million	8
10	Syphilis	0.16 million	0.3	0.19 million	11
11	Hepatitis B	0.10 million	0.2	0.93 million	6
12-17	Tropical diseases	0.13 million	0.2	0.53 million	9, 10, 16-18

victims, and level of contagiousness. The human strains of Ebola virus, for example, incapacitate its victims extremely quickly and kills them soon after. As a result, the victims of this disease do not have the opportunity to travel very far from the initial infection zone (Preston, 1994).

Also, this virus must spread through skin lesions or permeable membranes such as the eye. Thus, the initial stage of Ebola is not very contagious since its victims experience only internal hemorrhaging. As a result of the foregoing features, the spread of Ebola is very rapid and usually stays within a relatively confined geographical area. In contrast, human immunodeficiency virus (HIV) kills its victims very slowly by attacking their immune system. As a result, a lot of its victims transmit the virus to many others before even realizing that they are carrying the disease. Also, the relatively low virulence allows its victims to travel long distances, increasing the likelihood of an epidemic.

Another effective way to decrease the transmission rate of infectious diseases is to recognize the effects of small-world networks. In epidemics, there are often extensive interactions within hubs or groups of infected individuals and other interactions within discrete hubs of susceptible individuals. Despite the low interaction between discrete hubs, the disease can jump to and spread in a susceptible hub via a single or few interactions with an infected hub. Thus, infection rates in small-world networks can be reduced somewhat if interactions between individuals within infected hubs are eliminated. However, infection rates can be drastically reduced if the main focus is on the prevention of transmission jumps between hubs. The use of needle exchange programs in areas with a high density of drug users with HIV is an example of the successful implementation of this treatment method (Watts, 2006).

Another example is the use of ring culling or vaccination of potentially susceptible livestock in adjacent farms to prevent the spread of the foot-and-mouth virus in 2001 (Ferguson et al., 2001). General methods to prevent transmission of pathogens may include disinfection and pest control.

LIMITATIONS

This study has several limitations. First, our data regarding infectious disease were collected through a retrospective survey. Most of the patients were so weak that they could not speak clearly. It is also possible that some of the infections we included were actually community-acquired infections rather than hospital associated infections, despite our efforts to reduce misclassification.

We faced a lot of problems during the collection of data from diarrhea ward, tuberculosis ward, influenza and pneumonia ward because we have no sophisticated protecting elements from infectious agent.

This is a cross-sectional study that cannot provide causal relationships but only state hypotheses for future research. The evaluation was ascertained through a questionnaire. We cannot exclude the possibility of under-reporting or over-reporting, although subjects completed the questionnaires with the help and supervision of well-trained staff. Further evaluation could increase the accuracy of our findings. Also, because of a high degree of statistical co-linearity, our ability to distinguish the effects of our subjects was limited. In addition, a limited variation of intakes of meat, fish, milk, etc. in our subjects could lead to insufficient statistical power to detect significant association.

Despite these limitations, our study resulted in important findings with respect to infectious disease among hospital patients.

Conclusion

From this study it can be concluded that the people of kushtia and Jhenaidah are suffered by some infectious disease as like asthma, pneumonia, diarrhea etc and also suffered by heart disease, fever, jaundice and skin disease. We have found injury patients and also suicide patients (psychiatric). We found delivery patients. Data also shows that there is not much difference in food habit among the patients.

We also found in our study that the occurrence of disease is less frequent in male than the female. However, the prevalence of food and water born disease is grater among the patients.

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