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Gender Differences in Knowledge, Attitude and Practice towards Antibiotic Usage in Bangladesh

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ABSTRACT

Antibiotic resistance has become a serious concern for ensuring quality health care in the upcoming decades. The study's main objective was to explore knowledge, attitude, and practice (KAP) about rural people's antibiotic usage, primarily focusing on the gender perspective. A cross-sectional study design and quantitative approach were followed to carry out the study. Data collection was conducted through a survey method using a structured questionnaire from a random sample of 399 respondents. Descriptive statistical analysis, chi-square, and multivariate analysis of variance (MANOVA) tests were used to analyze the collected data. The result shows that the knowledge, attitude, and practice scores on antibiotic usage are below average. Especially rural women are significantly lagging behind their male counterparts. Due to the absence of doctors and the poor financial condition of the villagers, they frequently take antibiotics to speed up their recovery process without fulfilling the required dosage. The government should take immediate policy measures to accommodate more doctors in the rural areas, raise awareness on antibiotic resistance, and shut down the illegal drug shops as soon as possible.

Keywords: KAP, Antibiotic Usage, Gender perspective, Drug policy, Bangladesh.

INTRODUCTION

Antibiotics, known as magic bullets, a panacea for all treatment, effective and decisive weapons because of their effectiveness against bacterial diseases over the last six decades (Jairoun et al. 2019; Voidăzan et al. 2019; Sakr 2020). Though its discovery contributes to reducing the modality and morality, in recent years, its inappropriate and irrational use leading to the emergence of bacterial resistance has been a severe threat to public health globally (Agarwal et al. 2015). This increase of antibiotic resistance will endanger their therapeutic effectiveness, increase treatment failures and, as a result, lead to higher mortality rates (WHO 2001). A complex interaction of many factors such as knowledge of the doctors, availability of qualified doctors, economic and social factors may lead

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to inappropriate and excessive use of the antibiotics, which is the critical factor of this antibiotic resistance (Awad et al. 2015).

According to the World Health Organization (WHO), antibiotics average up to 2.0, where both Pakistan and Bangladesh have an average of 3.5 per prescription (Quan-Cheng et al. 2016; Guyon et al. 1994). In Bangladesh, to reduce this rampant and excessive use of antibiotics National Drug Policy of Bangladesh (NDPB) 1982 and National Health Policy 2014 have been introduced. Drug administration was suggested to be cautious in permitting an antibiotic in the market by the first principle of NDPB 1982 (Murshid et al. 2019).

However, after getting many policy recommendations regarding the capacity building of the Drug Administration by educational interventions, a National Action Plan (NAP), according to the WHO KAP guidelines, has recently been approved for containing Anti-Microbial Resistance (AMR) in Bangladesh (MoHFW 2017). For the implementation of NAP to reduce the misuse of antibiotics, it is necessary to know them and understand how and to whom they are being prescribed. A meta-analysis across primary care in nine high-income countries showed that women received more antibiotics than male (Schroder et al. 2016). Another study revealed that females were prescribed (39%) higher antibiotics than males (29%) in English and Welsh primary care (Majeed & Moser 1999). So, it is evident that gender plays a vital role in antibiotic use. Thus, this study focuses on analyzing the KAP and understanding the causes of gender differences in antibiotic use among Bangladesh's rural people.

LITERATURE REVIEW

The term antibiotics, which means "against life," is derived from the fact that an antibacterial drug is extracted from living creatures and used to kill or attenuate bacteria. The use and misuse of antibiotics induced selection pressure, resulting in the development of resistance traits in bacterial populations (Fischbach & Walsh 2009). Anti-microbial resistance has become a significant public health concern worldwide, and unfortunately, the majority of the public remains ignorant of this distressing problem (Emslie & Bond 2003; Spellberg et al. 2008).

According to the World Health Organization (WHO), surveillance and mechanistic studies of bacterial resistance are the most critical measures for controlling the spread of resistant bacteria (WHO 2001). Several countries have undertaken national campaigns to modify the public's misconceptions regarding antibiotics' effectiveness, promote the appropriate use of them, and prevent antibiotic resistance development. Therapeutic failures like this are not rare at all. Furthermore, multiple studies have demonstrated irrational antibiotic prescribing by physicians, a habit of self-medication among patients, and the indiscriminate use of antibiotics in agriculture and farming in different parts of the country (Biswas et al. 2014).

A systematic review found that people across developing countries tend to use antibiotics from informal providers due to lack of knowledge, affordability, and social

and convenience (Sudhinaraset et al. 2013). A recent study found that 33.7% of low and middle-income countries did not have enough knowledge regarding antibiotics (Gualano et al. 2015). Insufficient knowledge (52.8%) and bellow standard practices (47%) regarding antibiotic use have been reported on a study in Bhutan (Tshokey et al. 2017). Critical reasons for antibiotic resistance, not completing the full course (36%), and self-medication (28%) have been evident in a similar study conducted among the general public of Kuwait (Awad et al. 2015). Another study revealed that only 20% of the antibiotics in developing countries are prescribed in hospitals, where the rest (80%) are used without registered doctors' prescriptions (Kotwani et al. 2011).

Bangladesh is still primarily a rural country, with more than 70 percent of the population currently living in rural areas. A study shows that, in Bangladesh, 97.5% have never heard of the term antibiotics resistance. (Yasmin, Gyeltshen & Islam 2018). Moreover, there are considerable disparities in health service providers' distribution-doctors, nurses, medical staff, and technicians between urban and rural areas, with only 16 percent of qualified doctors practicing in rural areas. The absence of a doctor negatively impacts the health status of rural people (Chaudhury et al. 2006). Antibiotic prescriptions were most often issued for children aged 0–15 years (35%), followed by adults aged over 60 years (23%) (Biswas et al. 2014). Within retail drug shops, the majority of antibiotics are purchased without a prescription (SIAPS 2015). Antibiotics provided to patients without a prescription are likely to be a less appropriate drug, taken for an incorrect duration, or of the wrong dose. (Morgan, Okeke & Laxminarayan 2011).

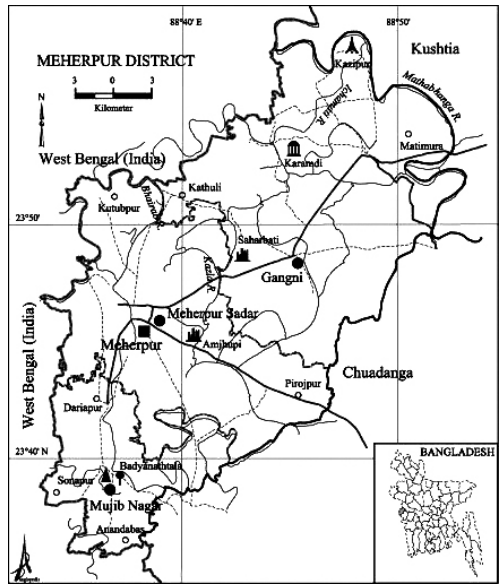
Several studies have been conducted on knowledge, attitude, and practice regarding antibiotic usage of medical students in foreign countries. Nevertheless, no specific and concentrated prior research has been conducted on the village dwellers' KAP on antibiotic usage in Bangladesh. Although it is generally known that there is a misuse of antibiotics in Bangladesh, especially in rural areas, it has never been documented. This research targeted those people and tried to measure their perception of antibiotic usage, which has become an essential issue in medical science research. The knowledge component assesses what people know, while the attitude component assesses what they feel, and practice assesses their behavior.

DATA AND METHODOLOGY

Respondents: Sample Design and Study Location

To measure KAP of antibiotic use some study has been conducted in Bangladesh. However, among 46 published studies, only eight have been conducted in the country's rural area (Ahmed et al. 2019). Most importantly, these studies did not reflect and gendered differences towards antibiotic use among the people. For this study, the researchers' main focus was to reveal the KAP of rural people's antibiotic use. Therefore,

the Meherpur district was chosen, situated in the western part of the country (see figure 1) (Islam et al. 2003).



Source: Banglapedia (2020)

Figure 1: Meherpur District Map

Research Approach

To measure the KAP of the people, many researchers relied on using a quantitative method approach (Saha & Saha 2018; Yasmin et al. 2018). Moreover, according to Creswell quantitative approach is the widely accepted approach to address problems as it gives a numeric description of the trends, opinions, and attitudes of the population (Clark & Creswell 2008). That is why the researchers chose a quantitative approach for this study.

Research Method

Researchers conducted the study based on a household survey in the study area to identify the socio-economic factors that influenced KAP and gender differences towards antibiotic usage among the rural people in Bangladesh.

Data Collection Methods and Instruments

November and December 2019 were the data collection period of this study when a cross-sectional survey was conducted. According to the WHO's guidelines on the KAP survey (WHO 2008), a structured questionnaire was designed by the researchers. There

were four sections in the questionnaire: socio-demographic characteristics, Knowledge, Attitude, and Practice regarding antibiotic use consisting of a total of 15 questions, which were mainly based on previous studies (Alumran et al. 2013; Andre et al. 2010; Panagakou et al. 2009; El Sherbiny et al. 2018). However, those questions were modified according to the research purpose and context of Bangladesh. For ensuring reliability and validity, a pilot study was conducted among 15 respondents, and minor modifications were adjusted accordingly.

Sample Size

The researchers used Godden's sample size formula for the infinite population to determine the representative number of the respondents for this study (Godden 2004):

$$SS = \frac{Z^2 \times P(1-P)}{M^2} \quad SS = \frac{(1.96)^2 \times 0.5(1-0.5)}{0.05^2}$$

SS = 384.16 ≈384

Where:

SS= Sample Size for infinite population (more than 50,000)

Z = Z value (e.g. 1.96 for 95 per cent confidence level)

P = Percentage of picking up a response (expressed as a decimal) (assumed to be 0.5 (50 per cent) since this would provide the maximum sample size).

M = Margin of Error at 5 per cent (0.05)

To reduce non-response error for this social survey additional 15 surveys with 384 followed by simple random sampling were taken.

Data Analysis Technique

For analyzing the collected data through a social survey, SPSS 24 version was used. To determine the KAP of the participants, a score has been calculated according to the number of correct answers. For every right answer, there was one point, and no point was allocated for the wrong answer to reach a maximum of 5 points for knowledge, attitude, and practice scores, respectively. Among the total 15 points, the scores were categorized into two categories poor KAP (0-8) and good KAP (9-15). Significant determinants that influence knowledge, attitude, and practices regarding antibiotic usage were identified using Pearson's chi-square tests. A significance level of 5% was set, and all the tests have been considered as two-tailed. The multivariate analysis of variance (MANOVA) is principally distinct between two or more discrete groups on a linear combination of numerical variables. In this study, MANOVA is used to examine the gender differences

among the three groups, like knowledge, attitude, and practice, by combining numerical variables under the groups. This comprehensive test is used to check for the exaggerated type I error in the test that may emerge from using a sequence of t-tests at a 5% level of significance.

Ethical Consideration

This study aimed to reveal the current scenario of antibiotic use so that it can contribute to the policymakers' decision regarding this issue. Considering Miles and Huberman's (Miles & Huberman 1994) guidelines, the study was conducted as the lack of established ethical body in Bangladesh (Islam et al. 2010). The researchers informed the participants about the study's purpose, and the confidentiality and safety of the participants were also ensured. The right to discontinue the survey was provided if the participants feel embraced. Verbal consent of the participants was also taken from the respondents.

RESULT

Table 1 shows that 54.6 per cent of the respondents were male, 34.3 per cent were between the ages of 16 to 25 years. The percentage of illiterate and higher educated is 30.1 per cent. However, the majority of the respondents (38.3 per cent) were from the lower class.

According to Table 1, the overall KAP score of the respondents was not satisfactory. However, among them, the male respondents of this study possess a better knowledge (2.88), attitude (1.9) as well as practice (1.55) than the female respondents. While age group of the respondents has a diverse result in the KAP score as respondents of 46 to 55 years had a better knowledge (3.24), who were more than 55 years had a better attitude (2.14), and respondents of 36 to 45 years had a better practice (1.46) regarding antibiotic usage. It is interesting that in the education dimension, respondents with secondary education had better knowledge (3.08), with primary education had a better attitude (1.84), but the respondents with higher education had a better practice (1.46) in using antibiotics.

Table 1: KAP score of the respondents based on their demographic profile

Characteristics of the Respondents		Frequency	Percentage	Knowledge score	Attitude score	Practice Score
Gender	**Male**	218	54.6	2.88	1.9	1.55
	Female	181	45.4	2.69	1.58	1.24

Characteristics of the Respondents		Frequency	Percentage	Knowledge score	Attitude score	Practice Score
Age	16 to 25	137	34.3	2.64	1.7	1.46
	26 to 35	111	27.8	2.6	1.8	1.42
	36 to 45	85	21.3	3.01	1.52	1.46
	46 to 55	51	12.8	3.24	1.84	1.41
	more than 55	15	3.8	2.67	2.14	1.2
Education Level	Illiterate	120	30.1	2.84	1.84	1.45
	Primary	82	23	2.49	1.62	1.32
	Secondary	67	16.8	3.08	1.65	1.4
	Higher education	120	30.1	2.8	1.73	1.46

Table 2: Chi-square Test Results for Knowledge, Attitude and Practice with KAP Score

Determinants		Frequency (Percentile)	KAP Score [Good (not good)]	χ2 value (P-value)
Knowledge				
Are antibiotics obtainable without a prescription?	Yes	208 (52.1%)	35.1% (64.9%)	18.389 (0.000***)
	No	191 (47.9%)	16.2% (83.8%)	
Do you think taking antibiotics to speed up recovery from colds, coughs, and other diseases?	Yes	273 (68.4%)	31.5% (68.5%)	13.259 (0.000***)
	No	126 (31.6%)	14.3% (85.7%)	
Do you think that frequent use of antibiotics will decrease their efficacy when used repeatedly?	Yes	232 (58.1%)	35.8% (64.2%)	27.123 (0.000***)
	No	167 (41.9%)	12.6% (87.3%)	
Have you heard about the other adverse effect(s) of antibiotic usage?	Yes	223 (55.9%)	42.2% (57.8%)	67.893 (0.000***)
	No	176 (44.1%)	5.7% (94.3%)	

Determinants		Frequency (Percentile)	KAP Score [Good (not good)]	χ2 value (P-value)
Have you ever heard of "antibiotic medicine resistance" in the human body?	Yes No	222 (55.6%) 177 (44.4%)	48.6% (51.4%) 8.1% (91.9%)	83.736 (0.000***)
Attitude				
What is the source behind your use of antibiotics?	Doctors Others	172 (43.1%) 227 (56.9%)	45.4% (54.6%) 11.45% (88.55%)	58.337 (0.000***)
Do you think doctors tend to prescribe antibiotics for minor diseases?	Yes No	138 (34.6%) 261 (65.4%)	42% (58%) 17.6% (82.4%)	27.898 (0.000***)
What is the general tendency of people to take antibiotics with doctors' prescription?	Prescribed Others	147 (36.8%) 252 (63.2%)	40.8% (59.2%) 17.5% (82.5%)	26.280 (0.000***)
Have you ever prescribed antibiotics for yourself based on your past experiences?	Yes No	159 (39.8%) 240 (60.2%)	34.6% (65.4%) 20.4% (79.6%)	9.971 (0.002**)
What is your reason for self-medication?	Know about drugs Others	66 (16.5%) 333 (83.5%)	37.9% (62.1%) 23.7% (76.3%)	5.727 (0.017**)
Practice				
Have you read the product information before using antibiotics?	Yes No	70 (17.5%) 329 (82.5%)	50% (50%) 21% (79%)	25.236 (0.000***)

Determinants		Frequency (Percentile)	KAP Score [Good (not good)]	χ2 value (P-value)
What is your approximate frequency of antibiotic use?	Time of major illness	156 (39.1%)	37.2% (62.6%)	16.419 (0.000***)
	Others	243 (60.9%)	18.9% (81.1%)	
Waiting time before starting an antibiotic.	≥4 days	48 (12%)	41.7% (58.3%)	6.892 (0.009**)
	Others	351 (88%)	24% (76%)	
When did you stop taking the antibiotics?	End of the treatment period	137 (34.3%)	35.8% (68.5%)	10.189 (0.001**)
	Others	262 (65.7%)	21% (79%)	
Have you ever reused the leftover antibiotics?	No	153 (38.3%)	31.4% (68.6%)	3.627 (0.057)
	Yes	246 (61.7%)	22.8% (77.2%)	

Note: *** (P<0.001), ** (P<0.01), * (P< 0.05)

About 52% of people can get antibiotics from the pharmacy without a doctor's prescription, with a 35.1% good KAP score which is a matter of concern. About 68.4% of people think taking the antibiotic speeds up recovery from cold, cough, and other diseases, with a 31.5% good KAP score. Only 55.9% of the people heard about antibiotic usage's adverse effect, with 42.2% good KAP score. The rest of the determinant's explanation will be found in Table 1.

All five determinants of knowledge about antibiotic usage were found significant with the KAP score. All the determinants of attitude about antibiotic usage were found significant with the KAP score. Four determinants of practice out of five were found significant about antibiotic usage with KAP score. Only reusing the leftover antibiotics was found insignificant determinant of practice with KAP score.

Table 3: MANOVA Tests Results on Knowledge, Attitude and Practice on Antibiotic Usage among Respondents Based on their Gender Difference

Variables	Number of items	F-ratio	P-value	Group Means	
				Male	Female
Knowledge	5	12.947	**0.000*** **	2.876	2.685

Variables	Number of items	F-ratio	P-value	Group Means	
				Male	Female
Attitude	5	9.717	**0.002*** **	1.876	1.508
Practice	5	2.080	**0.150**	1.550	1.249

MANOVA test result shows that male respondents have a significant difference in antibiotic usage knowledge and attitude than females. Nevertheless, in practice, both of them are taking antibiotics arbitrarily. Statistics showed that male respondents possess more knowledge, a positive attitude, and cautious practice towards antibiotic usage than their female counterparts.

DISCUSSION

The study shows us a terrifying scene of arbitrary use of antibiotics in rural Bangladesh. According to the study result, the female respondents were comparatively more critical than their male counterparts. Because of their weak socio-economic position and absence in society's decision-making process, they are seldom asked before treatment of their physical health issues. Instead, they are forced to oblige what their husbands say. As a result, they did not know what medicine they are taking and the precautions of taking those medicines.

Nevertheless, males and females possess a terrible score in the practice dimension of the questionnaire. Still male is significantly ahead than female in knowledge and attitude dimension. Multiple actors are responsible for making our health sector fragile since our independence. Among them, the most influential factor is the weak economic status of rural people. Visiting a qualified doctor in a government health setting will cost them more time, money than taking medicine from the local pharmacies and village doctors. This local pharmacist and village doctors frequently suggest higher antibiotics without maintaining an accurate dose for quick recovery from the illness syndrome as absence from the work may cause starvation for the family for many low-paid jobholders. Scarcity of qualified doctor at the local level also force the rural people to take medicine from the local pharmacies and village doctors. Lack of incentives & infrastructure for work at the local level and many vacancies in the public hospitals for doctors are mainly responsible for this scarcity. Many unlicensed drug shops are frequently seen in remote areas that gave antibiotics without any prescriptions to take advantage of this situation. Lack of awareness of antibiotics resistance and its adverse effect also motivates the general people to use antibiotics even in minor illnesses. Discussion on health and hygiene issues is often seen as taboo in rural Bangladesh because of some social superstitions responsible in this regard.

CONCLUSION AND RECOMMENDATIONS

The Current status of KAP of the rural people of Bangladesh regarding antibiotic use has been presented in this paper, indicating an alarming factor that the knowledge level of the rural people in Bangladesh is shallow, leading to rampant and excessive use of antibiotics. They are also used to treat infectious diseases, for quick recovery from even simple diseases without concern about their misuse's severe negative impact. It is also evident from this study that unnecessary prescription, self-medication, experience, and lack of awareness are the key reasons behind this misuse of antibiotics in Bangladesh. Though these rural people are taking antibiotics rampantly, one thing is more concerned that they are not completing full dose rather than stop taking antibiotics after ending the symptoms of the disease. Unregistered pharmacies, village doctors, and medical staff also play a vital role in this misuse of antibiotics. The study revealed that unsatisfied knowledge of the rural people regarding antibiotics leads to bad attitudes and practices. In the rural area, most of the female patients had to go to local clinics and doctors for their treatment, and they are the most sufferer of antibiotic misuse as they lack knowledge regarding the proper use of their male counterparts. Various reasons like socio-economic conditions, rigid and patriotic social structure, male-female power dimension, and less accessibility to the standard healthcare system make them more vulnerable. This study was conducted in a particular area with a small number of samples, which can be one of this study's limitations. Still, it has a more significant policy implication for curing this country's ill health care system. Community and gender-based intervention, promotion of proper and less use of antibiotics, TV and social media broadcasting, proper training of the local health service providers, strict measures against illegal drug shops, antibiotic sell only with a prescription, community-based meeting and training especially for female, enough supply of antibiotic and surety of its proper use in the local government health cares may bring a positive change in the use of antibiotics of rural people.

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CONFLICT OF INTEREST

The authors have no conflicts of interest associate with the materials presented in this paper.

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