

## RESEARCH PAPER

# Antibiotic Consumption Behaviour of Dental Patients Attending in Tertiary Hospital

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## Abstract

**Background:** The consumption of antibiotics is increasing globally and in dentistry, it is increasing day by day at an alarming rate. The irrational consumption of antibiotics results not only in the emergence of antibiotic resistance but also in various adverse reactions and imposes financial burden on health system.

**Objective:** The aim of the study was to assess the antibiotic consumption behaviour of dental patients attending in tertiary hospital.

**Methods:** This cross-sectional study was conducted at Dhaka Dental College Hospital from July 2020 to June 2021 among 195 dental patients. After obtaining informed written consent, data were collected by face to face interview using a pretested semi-structured questionnaire and checklist. Data were analyzed using SPSS 26 version. Pearson's Chi-square test and Likelihood Ratio were done to assess the association with 5% level of significance.

**Results:** In this study, mean ( $\pm$ SD) age of the dental patients was 41.11 ( $\pm$ 14.09) years. Majority of the patients were male (52.8%). More than half (52.8%) of the patients' monthly family income was  $\leq$ 20000 BDT with predominant urban dwellers (72.8%). Mean ( $\pm$ SD) antibiotic consumption behaviour score of the patients were 10.96 ( $\pm$ 3.879) and behaviour categories were good behaviour (35.9%), average behaviour (32.8%) and poor behaviour (31.8%) respectively. More than half of the patients (56.4%) sometimes forgot or missed any of their antibiotics and about one-fourth (26.7%) of the patients were not aware that they were prescribed antibiotics for their dental conditions. Antibiotic consumption behaviour showed significant association with educational status ( $p < 0.001$ ), occupation ( $p < 0.010$ ), residence ( $p < 0.002$ ), family income ( $p < 0.001$ ) and awareness about antibiotics ( $p < 0.001$ ).

**Conclusion:** This study revealed improper antibiotic consumption behaviour among a large number of dental patients. Behaviour change communication measures focusing on both prescribers and dental patients is recommended to reduce inappropriate consumption of antibiotics and to promote rational usage.

**Keywords:** antibiotic, consumption, behaviour, dental patient, tertiary hospital

## Introduction

Antibiotics have saved and still saving a huge number of lives. But, the problem of antibiotic resistance emerged as a public health issue. It is a serious and one of the most threatening healthcare problems around the world.<sup>1</sup> Antibiotic overuse leads to the establishment of Antimicrobial Resistance (AMR) as well as a variety of adverse responses, putting a huge financial burden on the global health system.<sup>2</sup>

Antibiotics are the most common drugs which are used and also misused in many developing countries and dental practice, these are commonly utilized. According to a study, oral and dental illnesses account for around 10% of all antibiotic prescriptions. Antibiotic prescription in dentistry is almost always empirical, and it is occasionally based on assumptions.<sup>3-4</sup>

More than 35,000 people die each year in the United States as a result of antibiotic resistance, with more than 2.8 million antibiotic-resistant cases. Antibiotic-resistant infections may become more difficult to cure in the future, and they may be impossible to treat altogether.<sup>5</sup> The World Health Organization surveillance data revealed high levels of resistance to

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a variety of dangerous bacterial illnesses in both low and high-income countries. Antibiotic resistance was found in 500000 persons with suspected bacterial illnesses across 22 countries.<sup>6</sup>

Bangladesh is a developing country with a substantial proportion of the population living in poverty and many Bangladeshis rely on traditional healthcare practitioners who are not competent to provide people with adequate healthcare. Drugs, both prescribed and non-prescribed, including antibiotics, are available here, and people can buy when they need it. Antibiotic resistance is widespread in Bangladesh, and many first-line drugs have been shown to be ineffective. Here, both antibiotic abuse and antibiotic misunderstandings are highly frequent.<sup>7</sup>

Despite the substantial research into the behavior of self-medication and irrational antibiotic consumption, there is little information concerning its mode among dental patients in underdeveloped nations. According to the findings of a study, in a tertiary dental hospital in Bangladesh, 80% of respondents stopped their scheduled dosage after they became well.<sup>8</sup>

It has been proven that dental diseases are caused primarily by local factors. As a result, removing the local causes reduces the requirement for antibiotics dramatically.<sup>9</sup> Antibiotic abuse is linked to a variety of socioeconomic and behavioral factors, which can lead to antibiotic resistance in underdeveloped nations. This study was therefore conducted in a selected tertiary dental hospital of Dhaka city to determine the antibiotic consumption behaviour of the patients attending for dental treatment.

Tertiary dental hospitals are those which provide more advanced and speciality health care.<sup>10</sup> Patients from all over the country including all socio-demographic characteristics visit the tertiary dental hospitals for their oral and dental problems. So, it was a great opportunity to identify the behaviour of dental patients regarding antibiotic consumption attending a tertiary hospital that may represent all classes of people.

Patients' behavior may influence antibiotic consumption and the behaviour are closely related to their knowledge, attitudes and beliefs. So, it was very important to identify the perceptions of dental patients on antibiotic therapy, their pattern of antibiotic usage with underlying factors. From the findings of the study, behavior of dental patients regarding antibiotic

consumption, pattern of antibiotic usage and relevant factors were determined. So, strategies could be taken for controlling antibiotic resistance, such as guidelines, policies and educational programs, focusing on both prescribers and dental patients to promote appropriate antibiotic usage consumption.

## Materials and Methods

It was a descriptive type of cross-sectional study to assess the antibiotic consumption behaviour of dental patients. The study was conducted for one year of duration from July 1, 2020 to June 30, 2021. The study was carried out at the Oral and Maxillofacial Surgery and Conservative Dentistry department of Dhaka Dental College Hospital, Bangladesh.

The study was conducted among the dental patients who were  $\geq 19$  years of age attending for dental treatment at Dhaka Dental College Hospital and consumed antibiotics for dental problems and also reported for follow-up treatment. Severely ill patients such as post-operative dental patients or who were unable to talk due to oral and dental problems even taking antibiotics and psychologically abnormal patients were excluded from this study.

Sample was calculated using the formula:  $n = z^2pq/d^2$  ( $p =$  proportion, 0.846), the final sample size was 195.<sup>11</sup>

During data collection, participants of the study were included by purposive type of non-probability sampling technique. Before data collection, informed written consent was taken from each respondent. Then data were collected by means of face-to-face interview.

A pretested semi-structured questionnaire was used to collect data from the patients by face-to-face interviewing which was developed both in English and local Bengali language. The contents of the questionnaire divided into five sections- such as: particulars of the respondents and administrative information, socio-demographic characteristics of the respondents, antibiotic consumption behaviour related information, dental problem related information and information related to dental treatment and factors associated with the behaviour. A checklist was also used to collect the antibiotic treatment related information of the dental patients and the information was collected by reviewing medical records of the patients. The questionnaire was pretested before data collection. Pretesting of questionnaire was done at Bangabandhu Sheikh Mujib Medical University

(BSMMU) and Shaheed Suhrawardy Medical College Dental Unit among 20 respondents.

Ethical clearance was obtained from the Institutional Review Board of National Institute of Preventive and Social Medicine (NIPSOM), Dhaka. Privacy was maintained during data collection and the dental patients were assured about the maintaining of confidentiality of the information they provided

Data were checked for consistency, relevancy and quality control and were compiled, coded, cleared, categorized and analyzed by SPSS version 26. Pearson's Chi-square test and Likelihood Ratio were done to see the association with 5% level of significance.

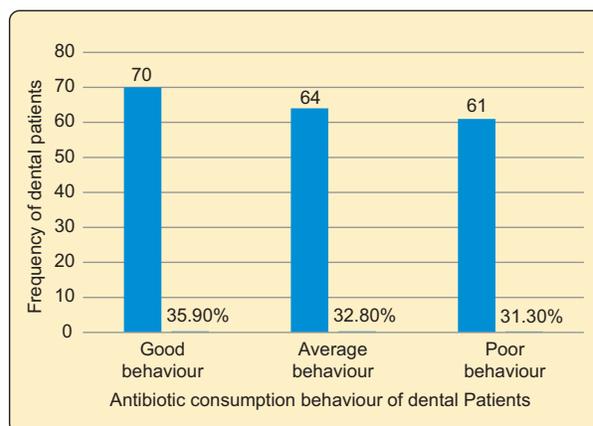
In this study, patients' antibiotic consumption behaviour was distributed in three categories: good behaviour, average behaviour and poor behaviour. To determine the antibiotic consumption behaviour, patients were asked 8 different questions having response categories always, sometimes and never. The questions related to behavior were assessed with score of 0, 1 and 2 for always, sometimes and never responses, respectively where maximum possible score of 16 and a minimum score of zero. For quantitative representation, a score 80% or above of the possible maximum score was considered as good, between 60-79% as average and less than 60% as poor behaviour.<sup>12</sup>

## Results

In this study among the 195 dental patients, mean( $\pm$ SD) age was 41.11( $\pm$ 14.095) and age range

were 19 to 75 years. Majority of the patients (52.8%) were male and rest (47.2%) were female. Majority of the patients (40%) were homemakers, married (80.5%) and Muslim (94.9%) religious. Most of the patients (72.8%) of the study came from urban residence and only 16.4% came from rural area. Majority (65.6%) were from nuclear family and more than half of the respondents' (52.8%) monthly family income were  $\leq$ 20000 BDT (Table I).

Regarding antibiotic consumption behaviour, 35.9% dental patients showed good behaviour, 32.8% average behaviour and rest (31.3%) had poor behaviour. Mean ( $\pm$ SD) behaviour score of the patients were 10.96 ( $\pm$ 3.879), where minimum behaviour score was 0 and maximum score were 16 (Figure 1).



**Figure 1:** Distribution of the patients by their antibiotic consumption behaviour (n=195)

**Table I:** Socio-demographic characteristics of dental patients (n=195)

Attributes	Findings
Age (in years)	19-30: 28.7%, 31-45: 33.8%, 46-60: 29.2%, > 60: 8.2%, Mean( $\pm$ SD): 41.11 $\pm$ 14.095
Gender	Male: 52.8%, Female: 47.2%
Education	No formal education: 16.4%, primary (Up to class five): 23.1%, Secondary (SSC or equivalent): 20%, Higher Secondary (HSC or equivalent): 15.9%, graduate and above: 24.6%
Occupation	Unemployed: 6.7%, Service holder: 20%, Student: 10.8%, Business: 6.7%, Day laborer: 4.6%, Retired: 6.2%, Home maker: 40%
Residence	Rural: 16.4%, Urban: 72.8%
Monthly family income (BDT)	$\leq$ 20000: 52.8%, 20001-40000: 28.2%, 40001-60000: 19%

Among the 195 patients, 56.4% sometimes forgot or missed any of their antibiotic. About one-third of the patients (30.3%) sometimes and 17.4% always stopped antibiotic when feeling good. At the same time, 12.3% patients always and 32.3% sometimes stopped taking antibiotics if symptoms did not improve (Table II).

According to awareness about antibiotic prescribed for current treatment, majority of the patients (73.3%) were aware that they were prescribed antibiotic for their current treatment but at the same time a large number of the patients (26.7%) were not aware about prescribing antibiotic for their current problems.

Majority of the patients (65.6%) used antibiotics indiscriminately due to the severity of oral disease. Considering easy availability of antibiotics without prescription, 72.3% were able to buy required antibiotics easily without prescription.

Regarding association between the educational status of the respondents and antibiotic consumption behaviour, 62.5% patients from graduate and above education group and 51.6% higher secondary education group showed good behaviour. On the other hand, 84.4% patients from no formal education group showed poor behaviour. It also revealed a statistically significant association ( $p < 0.001$ ) between educational status of the respondents and antibiotic consumption behaviour (Table III).

On the basis of the association between occupation of the patients and antibiotic consumption behaviour, 43.6% service holders showed good behaviour and 20.5% service holders showed poor behaviour, 47.6% students had good behaviour and only 14.3% had poor behaviour. On the other hand, none of the day laborer possessed good behaviour and majority (80%) of them possessed poor behaviour. The differences also revealed a statistically significant relation ( $p < 0.01$ ) (Table III).

Patients coming from urban areas showed comparatively good behaviour than those from rural and sub-urban areas where 43%, 15.6% and 19% urban, rural and sub-urban patients showed good behaviour respectively and it was statistically significant ( $p < 0.002$ ) (Table IV).

Regarding association between monthly family income and antibiotic consumption behaviour, more than half (50.9%) of the patients from 20001 to 40000 BDT monthly family income group showed good behaviour and in comparison to patients from  $\leq 20000$  BDT monthly family income group about one fourth (23.3%) showed good behaviour. The differences were also revealed a statistically significant relation ( $p < 0.001$ ). (Table IV)

About half (45.5%) of the patients who were aware of the antibiotics prescribed for their current treatment showed good behaviour. On the other hand, about 60% of the patients who were not aware of the antibiotic prescribed showed poor behaviour ( $p < 0.001$ ) (Table IV).

**Table II:** Distribution of the patients by the responses of antibiotic consumption behaviour related informations (n=195)

Statements	Always	Sometimes	Never
Forgot or missed any of the antibiotic	15.9%	56.4%	27.4%
Stopped taking antibiotics if symptoms did not improve	12.3%	32.3%	55.4%
Stopped antibiotic when feeling good	17.4%	30.3%	52.3%
Stopped antibiotic when feeling ill	16.9%	26.7%	56.4%
Increased or decreased daily antibiotic dosage	26.2%	47.2%	26.6%
Increased or decreased antibiotic duration	17.4%	51.8%	30.8%
Used left-over antibiotics	6.2%	18.5%	75.4%
Shared antibiotics with family members	2.1%	11.3%	86.7%

**Table III:** Association between educational status and occupation of the patients and antibiotic consumption behaviour (n=195)

Educational status	Antibiotic consumption behaviour			Significance
	Good behaviour %	Average behaviour %	Poor behaviour %	
Primary (Up to Class d!)	20	42.2	37.8	$p = 0.001$
Secondary (SSC or equivalent)	35.9	41	23.1	
Higher Secondary (HSC or equivalent)	51.6	32.3	16.1	
Graduate and above	62.5	31.3	6.3	
<b>Occupation</b>				
Unemployed	38.5	30.8	30.8	$p = 0.01$
Service holder	43.6	35.9	20.5	
Student	47.6	38.1	14.3	
Retired	33.3	41.7	25	
Home maker	35.9	26.9	37.2	

**Table IV:** Association between residence monthly family income of the patients and antibiotic consumption behaviour (n=195)

Residence	Antibiotic consumption behaviour			Significance
	Good behaviour %	Average behaviour %	Poor behaviour %	
Rural	15.6	28.1	56.3	$p = 0.002$
Urban	43	33.1	23.9	
Sub-urban	19	38.1	42.9	
<b>Monthly family income (BDT)</b>				
≤20000	23.3	30.1	46.6	$p = 0.001$
20001-40000	50.9	34.5	14.5	
40001-60000	48.6	37.8	13.5	
<b>Awareness about antibiotic prescribed</b>				
Aware about antibiotic prescribed	45.5	33.6	21	$p = 0.001$
Not aware about antibiotic prescribed	9.6	30.8	59.6	

## Discussion

In this study, among the 195 dental patients more than half (52.8%) were male and rest were female which correlates with the health-seeking trend of our country. The findings were also similar to another study in Bangladesh.<sup>7</sup> Regarding age of the dental patients, mean ( $\pm$ SD) age of the respondents were 41.11( $\pm$ 14.09) years which coincide with other studies.<sup>11,13</sup>

In this study, regarding antibiotic consumption behaviour of the dental patients, 35.9%, 32.8% and 31.3% patients showed good, average and poor behaviour respectively. Mean ( $\pm$ SD) behaviour score

of the patients was 10.96 ( $\pm$ 3.879). A study in Egypt showed mean ( $\pm$ SD) behavior score of antibiotics consumption was 11.5 ( $\pm$  3.5) which was close to our study finding.<sup>13</sup> Another survey in Hong Kong revealed that 85% of the respondents showed good behavior which was far away as compared to this study.<sup>11</sup> It may be due to lack of awareness about rational antibiotic usage among study subjects and also for variation in behavioural scoring category with this study.

This study showed, more than 55% patients sometimes forgot or missed any of their antibiotics, about 47% sometimes increased or decreased daily

antibiotic dosage and more than half of the patients sometimes increased or decreased of their antibiotic duration. About 44% patients stopped taking antibiotics if symptoms did not improve after taking it and about half of the patients stopped taking antibiotics when feeling good. These findings coincide with different studies but not similar to some other studies.<sup>1,8,12-14,</sup>

In this study, majority of the patients (73.3%) were aware that they were prescribed antibiotic for their current treatment but near about 30% patients were not aware of the issue. Another study showed that more than two-thirds (67.4%) of participants were aware of antibiotics which is almost similar to our study.<sup>15</sup>

Regarding Association between educational status and antibiotic consumption behaviour revealed a statistically significant relation ( $p < 0.001$ ). Many other studies also showed significant association.<sup>11,12,16</sup> On the basis of the association between occupation of the dental patients and antibiotic consumption behaviour, it was also revealed a statistically significant relation ( $p < 0.010$ ) between the variables. Other studies in Oman ( $p < 0.047$ ) and Qatar also found a statistically significant relation but another study in India found no significant association in this respect.<sup>11,17,18</sup> The difference may be due to geographical variation of the study subjects.

In respect of the association between residence of the respondents and antibiotic consumption behaviour  $p < 0.007$  which indicates that there was a statistically significant relationship between the variables. Similar findings also showed in different studies ( $p < 0.001$ ) describing that respondents from rural areas were more likely to consume antibiotics inappropriately which also coincides with this study.<sup>16,19</sup>

In this study highly significant ( $p < 0.001$ ) relationship was found between monthly family income and antibiotic consumption behaviour of the participants. Similar statistically significant association was also found in other studies conducted in Egypt and Hong Kong.<sup>13,11</sup> In respect to awareness about antibiotic prescribed for current treatment and antibiotic consumption behaviour indicated that there was a highly significant relation ( $p < 0.001$ ). It means that patients who were not aware of prescribing antibiotic were more likely to consumed antibiotic inappropriately which correlates to our socio-cultural status.

## Conclusion

Patients are the end consumers of antibiotics and resistance is strongly associated with improper consumption of antibiotics. From the findings of the study, behavior of dental patients regarding antibiotic consumption was evaluated. As behaviour is closely related to their knowledge, attitudes and beliefs, attention should be given towards behaviour change communication. The study revealed that a large portion of the dental patients consuming antibiotics had bad or average behaviour. Further study is required in a large scale to evaluate the underlying factors and strategies should be taken focusing on both prescribers and dental patients to promote appropriate consumption of antibiotics. To reduce inappropriate consumption of antibiotic proper advice regarding dosage and duration of antibiotic should be provided by the prescribers during consultation and to improve antibiotic consumption behaviour of dental patients and subsequently decrease overall antibiotic consumption mass awareness program should be expanded by policymakers.

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