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Self-medication Practice and its Potential Determinants among Riverine-Island's People in Sirajganj, Bangladesh: A Cross-Sectional Study

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Abstract

The objective of this study was to investigate the prevalence of self-medication practice and associated risk factors among riverine-island's people in Sirajganj, Bangladesh. This study was done by following cross-sectional method with close-ended questionnaire. Data were collected from a total of 459 respondents *via* face-to-face interview. Frequency analysis was done to identify the prevalence of self-medication practice, and chi-square test and logistic regression analysis were conducted for identifying the associated factors with self-medication practice. Total 83% participants were self-medicated. Notably, 62% people were self-medicated with antibiotics. More than 30% people practiced with self-medication due to high cost of doctor consultation. Age, gender, marital status, educational status, occupation, monthly family income, and suffering from illness were correlated with self-medication practice in chi-square (χ^2) analysis. Gender (male vs. female, odds ratio [OR]: 0.49, 95% confidence interval (CI): 0.25-0.95, p=0.031) and marital status (married vs. unmarried, OR: 0.43, 95% CI: 0.23-0.83, p=0.011) were significantly associated with self-medication practice in logistic regression analysis. The rate at which persons living on riverine islands engage in self-medication is alarmingly high, and the consequence of this behavior is concerning. The inappropriate use of antibiotics is a source of concern. In order to reduce the practice of self-medication among people living on riverine islands in Sirajganj, Bangladesh, there is an immediate need to raise public awareness about the harmful effects of the practice as well as to implement appropriate legislation and activities.

Key words: Self-medication, self-administration, antibiotic misuse, drug abuse, Bangladesh.

Introduction

Self-medication (SM) is a worldwide occurrence that may contribute to disease resistance in humans. Constantly underline to the community the negative repercussions of such actions and the efforts are required to stop them. We engage ourselves in daily SM in the form of self-care for our health (Kayalvizhi and Senapathi, 2010). During the 1960s in the Western world, self-care and SM were viewed as superfluous and maybe even harmful behaviors. This paternalistic attitude to medicine, reinforced by health systems designed to treat illness (rather than prevent disease), remains a common element of health care in many nations today (Hughes *et al.*, 2001).

The widespread irrational use of antimicrobials in the absence of medical direction may raise the chance of improper, inaccurate, or unnecessary medication, missing diagnosis, delays in effective treatment, pathogen resistance, and increased

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morbidity (Bennadi, 2013). According to reports, many drugs have been utilized for many activities. This included antibiotics, analgesics, and vitamins among primary care patients, while the most often requested over-the-counter (OTC) medicines were for nervous system, cough or cold remedies (Maddock, 2012).

Self-medication is defined by the World Health Organization (1998) as the selection and use of over-the-counter medications without the supervision of a medical professional, such as a dentist or doctor. Self-medication is a worldwide phenomenon. On a self-medication basis, in Germany (Knopf and Grams, 2013), the prevalence for medication use was 27.7%; in Portugal (Mendes *et al.*, 2004), this was 26.2%; in Spain (Figueiras and Caamano, 2000), 12.7% ; in Cuba (García Milián *et al.*, 2009), 7.3%; in Athens-Greece (Athanasopoulos *et al.*, 2013), 23.4%; in the Catalonia region of Spain (Sans *et al.*, 2002), 34.0% among men and 25.0% among women; and in Pondicherry-India (Selvaraj *et al.*, 2014), this was equal to 11.9%.

Most people who self-medicate get their ideas from people they know, whether it be their family, friends, neighbors, the pharmacy, a previously prescribed substance, or even advertisements in newspapers and publications. In today's society, self-medication is characterized as the "desire and capacity of people/patients to play an intelligent, autonomous and informed role, not only in terms of decision-making but also in the administration of those preventative, diagnostic, and therapeutic activities which concern them" (Hernandez-Juyol and Job-Quesada, 2002; Laporte, 1997; Laporte and Castel, 1992).

There have been few community-based studies in Bangladesh that have examined the pattern of medicine usage throughout the whole Bangladesh (Jakaria *et al.*,2017). According to new research report, students use very high rate of self-medication (Seam *et al.*, 2018). Besides Idris *et al.* (2016) reported that analgesics/antipyretics were the most often utilized medication (52.75%), followed by antiulcerants (40.17%), antibiotics (18.17%), antihistamines (10.58%), and antitussive (9.33%).

The current situation in Bangladesh demonstrates that the vast majority of people, when they become ill, do not go to the hospital or the doctor; rather, they take medicines on their own accord, which are typically influenced by some common factors such as the advice of family members or friends, prior treatment experience with the same symptoms, readily available drugs, restricted access to healthcare facilities, socio-cultural or religious values, relatively high hospital treatment rates (Nasir *et al.*, 2020), ignorance behavior, and poverty (Arrais *et al*., 2016).

Within the scope of this research project, an effort was made to evaluate the level of familiarity the people in Bangladesh have with a selection of commonly utilized medications, including non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics, antihistamines, gastric medicines, and cough syrups. Riverine island's people in Bangladesh were chosen to be the population segment whose perceptions and attitudes regarding commonly used medicines were evaluated. This was done because riverine island's people represent the intellectual portion of our village population. If the situation in this population segment is unsatisfactory, it presents an alarming circumstance for the rest of the population. The aim of this study was to determine the prevalence of self-medication practices and its associated potential factors among riverine-island's people in Sirajganj, Bangladesh.

Materials and Methods

Study design and setting: This study was a cross-sectional survey following quantitative method. This study was conducted from August 15 to September 25, 2022. The objective of this study was described in the first page of the questionnaire. The inclusion criteria included; a) people who were resident in riverine-island, b) who were willing to participate. The exclusion criteria included a) people who were not permanent residents in riverine-island, b) who gave incomplete answer, c) who were mentally sick.

Study population, sampling technique and sample size: This study was conducted in a riverine island in Sirajganj named Chauhali Upazila. Based on formula described in the studies (Hossain *et al*., 2021a; Hossain *et al*., 2022), our required sample size was 384, 95% CI and margin of error was 5%. To reduce the margin of error, we included extra 75 sample. Total 459 respondent's data were collected.

Questionnaire development and data collection: Questionnaire had 12 close ended questions. The questionnaire had two section including demographic characteristics and self-medication practice related question. This research was done to determine the prevalence of self-medication practice and risk factors. All questions were adopted from some published research articles by doing literature review (Moonajilin *et al*., 2020; Saha *et al.*, 2022; Kabir *et al*., 2022). For content validity, the questionnaire was checked by two experts. After their checking, questions were moderated. Initially questionnaire was pretested among 25 respondents, then those responses were removed in the final study. Questionnaire was designed in English language. After a little bit moderation, final data collection was started by face-to-face. By using the questionnaire, data was collected based on random sampling (Hossain *et al.*, 2021b; Hossain *et al*., 2021c). For data collection, total five research assistants were appointed. Then they were trained about the system of data collection for two days. Firstly, they explained the aim of this research to the respondents and collected answers from them who were willing to participate. Also, all the rules and procedures were set out and followed according to the World Medical Declaration of Helsinki (Akhter *et al.*, 2022; Jamil *et al*., 2022). Finally, data were collected from the participants *via* face-to-face interview. For some incomplete responses, we used total 459 samples to conduct the statistical analysis.

Data analysis and software: SPSS 16.0 version was used to analyze. Frequency analysis was used for getting the percentage of all demographic variables and types of illness, measures taken during treatment, sources of information on self-medication, reasons of conducting self-medication, and types of medication. Chi-square test and logistic regression analysis were conducted for finding the risk factors of self-medication practice among riverine-island people in Sirajganj, Bangladesh.

Results and Discussion

This study identified the prevalence of self-medication practices and associated risk factors among riverine-island's people in Sirajganj, Bangladesh. Among 459 respondents, 83% practiced self-medications. Age, marital status, gender, educational status, occupation, monthly family income and suffering from acute and chronic illness were determined as significantly associated factors with self-medication. The frequency of respondent's demographic profile and associated risk factors of self-medication are shown in Table 1. According to our study, 69.7% respondents were married, and 30.3% respondents were unmarried. 12.6% were less than 18 years old, 26.6% were 19-29 years old, 29.6% were 30-39 years old, 27% were 40-49 years old and 4.1% were more than 50 years old. Male respondents were 77.8% and female respondents were 22.2%. Most of the respondents were illiterate, that was 42.9%. 21.6% respondents took their primary education, 17.4% respondents took their secondary education and 9.8% and 8.3% respondents took higher secondary education and graduation degree, respectively. 13.5% respondents were businessman in their profession, 13.7% respondents were day labor, 12.9% were farmer, 4.1% were healthcare worker, 8.7% were fisherman, 17.6% were housewife, 9.8% were service holder, 4.1% respondents were student, 3.7% were teacher and 11.8% respondents were van or rickshaw puller. More than half of the respondents' (52.5%) monthly income were 11,000 BDT to 20,000 BDT. 20% and 23.3% respondents' income were less than 10 thousand taka and 21,000 BDT to 30,000 BDT, respectively. Only 4.1% of respondents' monthly income was more than 30 thousand BDT. According to this research, 60.3% of respondents were suffering from acute or chronic disease in the last two months.

Table 1. Demographic characteristics and associated risk factors with self-medication practice (N=459).

Variable	Frequency	Percentage	Self-medication practice, N (%)	χ^2	df	p-value
Age						
Below 18 years old	58	12.6	58 (12.6)	2.081E2	8	**0.001**
19-29 years	122	26.6	100 (21.8)			
30-39 years	136	29.6	117 (25.5)			
40-49 years	124	27.0	104 (22.7)			
Above 50 years old	19	4.1	0 (0.0)			
Marital status						
Married	320	69.7	262 (57.1)	9.907	2	**0.007**
Unmarried	139	30.3	117 (25.5)			
Gender						
Male	357	77.8	297 (64.7)	87.218	2	**0.001**
Female	102	22.2	82 (17.9)			
Educational status						
Illiterate (no formal education)	197	42.9	158 (34.4)	1.526E2	8	**0.001**
Primary	99	21.6	99 (21.6)			
Secondary	80	17.4	80 (21.1)			
Higher secondary	45	9.8	23 (5.0)			
Graduate	38	8.3	19 (4.1)			
Occupation						
Business	62	13.5	62 (13.5)	3.369E2	18	**0.001**
Day labor	63	13.7	63 (13.7)			
Farmer	59	12.9	59 (12.9)			
Fisher man	40	8.7	40 (8.7)			
Healthcare worker	19	4.1	0 (0.0)			
Housewife	81	17.6	42 (9.2)			
Service holder	45	9.8	23 (5.0)			
Student	19	4.1	19 (4.1)			
Teacher	17	3.7	17 (3.7)			
Van or rickshaw puller	54	11.8	54 (11.8)			
Monthly family income						
< 10,000 BDT	92	20.0	92 (20.0)	99.517	6	**0.001**
11,000-20,000 BDT	241	52.5	202 (44.0)			
21,000-30,000 BDT	107	23.3	66 (14.4)			
> 30,000 BDT	19	4.1	19 (4.1)			
Suffering from illness of any acute and chronic diseases in last two month						
Yes	277	60.3	239 (52.1)	31.828	2	**0.001**
No	182	39.7	140 (30.5)			

Note: As of January 19, 2023, 1 USD = 106 BDT

We determined the associated factors of self-medication practice with socio-demographic characteristics. The high prevalence of self-medication was observed in 30-39 aged people (25.5%, p=0.001), married vs. unmarried (57.1% vs. 25.5%, p=0.007), male vs female (64.7% vs. 17.9%, p=0.001), illiterate people (34.4%, p=0.001), day labor in profession (13.7%, p=0.001), family income status with 11,000 BDT-20,000 BDT (44.0%, p=0.001), people who suffering from illness (52.1%, p=0.001). Table 2 presented that gender (male vs. female, OR: 0.49, 95% CI: 0.25-0.95, p=0.031) and marital status (married vs. unmarried, OR: 0.43, 95% CI: 0.23-0.83, p=0.011) were significantly associated factors with self-medication practices. Figure 1 showed that among 459 respondents 31% people were suffering in diabetes, 22% people were suffering in hypertension, 13% people were in anxiety disorder, 14% were suffering in liver disease, 12% were suffering in heart disease, and 8% were suffering in respiratory disease. In figure 2, among all participants, 83% respondents were self-medicated while taking treatment, 13% respondents took treatment from healthcare institution, and 4% took rest and waited for relief. Figure 3 showed that drug stores were the main source of information on self-administration of 45% respondents. Friends/relatives and previous knowledge/prescriptions were the main source of information on self-administration of 23% and 22% participants, respectively. Internet was the source of information on self-administration for 10% respondents.

Table 2. Logistic regression analysis for finding the potential associated factors with self-medication practice.

Variables	OR[1]	95% CI[1]	p-value
Gender			
Male	—		
Female	0.49	0.25, 0.95	**0.031**
Marital status			
Married	—		
Unmarried	0.43	0.23, 0.83	**0.011**

[1]OR= Odds Ratio, CI= Confidence Interval

Figure 4 showed the reasons for conducting self-medication of participants. 31% respondents conducted self-medication for the high cost of consultation with doctors. 25% respondents conducted self-medication for inadequate medical service near residence. 22%, 12% and 10% respondents conducted self-medication for thought of illness as simple, urgency of illness and dissatisfaction with healthcare service, respectively. According to figure 5, most of the respondents (62.01%) took antibiotic as self-medication. 21.64% and 16.36% of participants took antacids and vitamins, respectively, as self-medication.

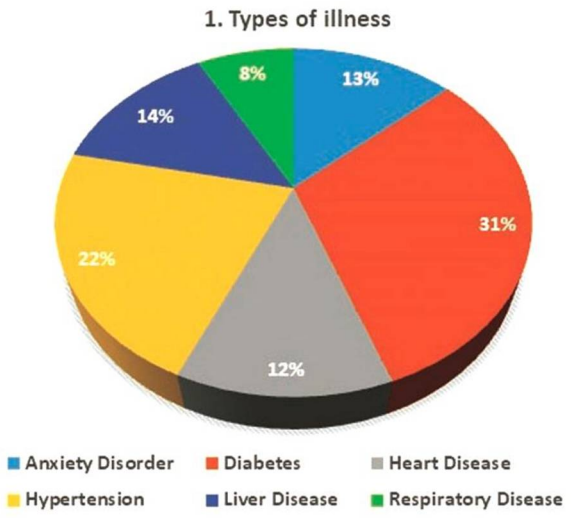

Figure 1. Types of illness.

People self-medicate every day in order to take care of their health. We investigated that 83% people were self-medicated. In south India, Badiger *et al*, reported that 92% medical students were self-medicated and main reason was lack of time (Badiger *et al.*, 2012). In northern India, Ahmed *et al*, conducted research and revealed that half of the respondents were seeking self-medication practice (Ahmed *et al.*, 2014). Aqeel *et al*, reported in their study that 61.2% participants were self-medicated in Pakistan (Aqeel *et al.*, 2014). According to the findings of an investigation, 81.25% of people living

in rural areas of Sindh are engaged in the practice of self-medicating with antibiotics. Self-medication for financial reasons was the most common cause (88.0% of cases), according to research (Bilal *et al.*, 2016).

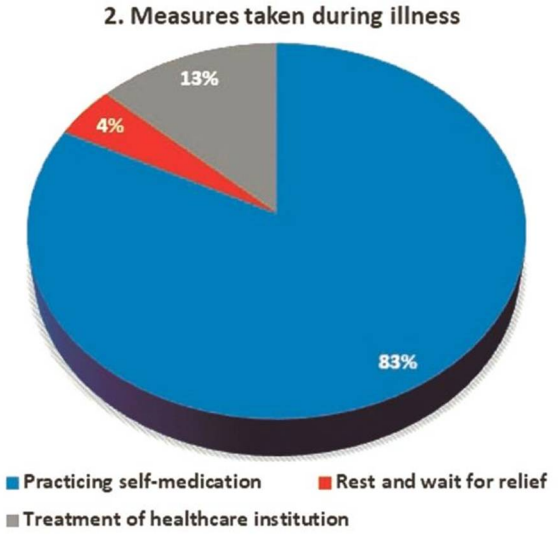

Figure 2. Measures taken for managing illness.

According to our study, male (64.7%) were mostly self-medicated where 76% female were self-medicated in Iran (Karimy *et al.*, 2019). Similarly, 51.6% women practiced self-medication in Spain which was reported by Figueiras *et al.* (2000), and mostly were living alone. On the other hand, 81% male were practicing self-medication in Barabanki, Uttar Pradesh (Keshari *et al.*, 2014). In our study we investigated that higher prevalence of self-medication practice was among middle aged people (30-39 years old). Moonajilin *et al.* (2020) conducted research among Savar residence, Bangladesh and reported that people (85%) who were more than 35 years old, conducted self-medication practice. Moreover, 54.7% middle aged (18-35 years) indigenous people were self-medicated in Chittagong hill tracts (Saha *et al.*, 2022).

As per our study, most of the married people practiced self-medication. 53.5% married indigenous people also self-medicated in Chittagong, Bangladesh (Saha *et al.*, 2022). In Sri lanka, 60% married rural people perceived self-medication (Wijesinghe *et al.*, 2012). Similarly, 54.8% rural married participants were self-medicated in Sindh Province (Bilal *et al.*, 2016). According to our research, 34.4% riverine-island's people were self-medicated who were illiterate. In Barabanki, Uttar Pradesh, 38.7% self-medicated people were illiterate. Practically, illiterate people don't know about the proper use of medication and they don't know about the side effects of drug resistance. Therefore, they are not concern about medication system and their health effect. But adversely, higher educated people perceived self-medication in Iran which was very surprising information (Karimy *et al.*, 2019). We identified in our study that 52.1% participants were suffering from acute or chronic illness. Besides, 32.5% urban and 22.1% rural people were suffering from chronic diseases (Wijesinghe *et al.*, 2012).

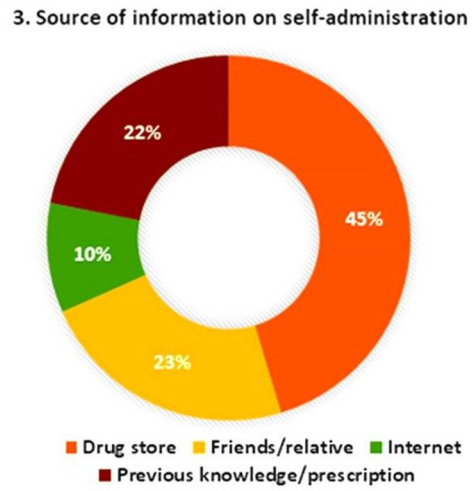

Figure 3. Source of information on self-administration.

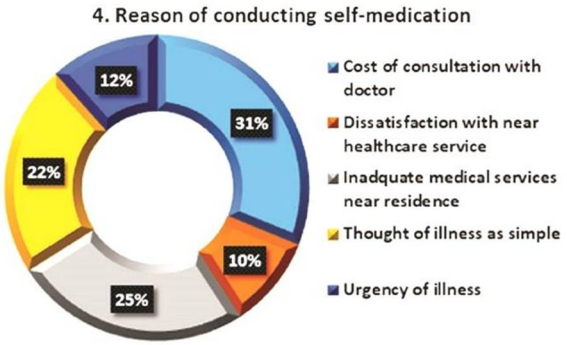

Figure 4. Reasons of conducting self-medication.

In our study, we revealed that 45% people got the information on self-medication from drug stores. In northern India, Ahmed *et al*, reported that 33% people got information from friends, neighbors, and family (Ahmed *et al*., 2014). In Pakistan, 60.8% participants were taking medication for their own initiate (Aqeel *et al*., 2014). In our study, 31% people conducted self-medication for high cost of consultation with doctor. Keshari *et al*, reported that 45.2% people were self-medicated for time saving (Keshari *et al.,* 2014). 58.5% rural residence people in Savar were self-medicated because they perceived the disease as simple (Moonajilin *et al*., 2020). In Pakistan, 41.8% people practiced self-medication for their mild illness (Aqeel *et al*., 2014).

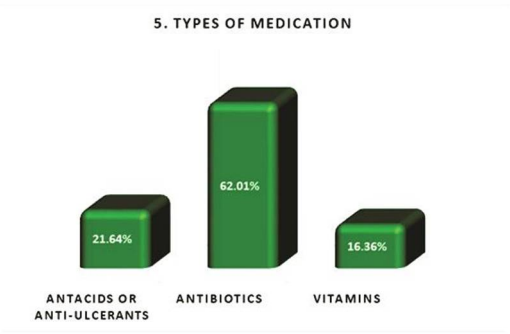

Figure 5. Types of medication as self-administration.

According to our study, 62.01% riverine-island's people took antibiotics as self-administration. In Sindh, 52% rural people practiced antibiotic self-medication (Bilal *et al*., 2016). In Bangladesh, 17.97% people were self-medicated with antibiotics (Kabir *et al.,* 2022). In Southeast region of Romania, 78.7% people took antibiotic as self-administration (Topor *et al*., 2017). In Afghanistan, a research revealed that 73.2% general people practiced self-medication with antibiotics (Roien *et al.,* 2021). Self-medication with antibiotics raises the risk of adverse drug reactions, hides symptoms of underlying conditions, and promotes the growth of microorganisms that are resistant to antibiotics (Uddin *et al*., 2021).

There have many adverse effects of self-medication practice. The practice of self-medication, especially for relatively minor ailments, can increase the risk of serious adverse effects (Rasu *et al*.,2022). An increasing number of individuals are turning to self-medication with antibiotics, which can result in an increase in drug resistance (bacteria can develop resistance to antibiotics and stop responding to therapy), which will be an increasing risk for people in the coming years (Bilal *et al*., 2016). It is possible that a patient has been provided an insufficient amount of medication for one or more of their conditions, and that attempting to self-medicate could result in harmful effects (Alam *et al*.,2015). It is possible for self-medication to reduce symptoms while also delaying the diagnosis of the underlying illness. People often resort to self-medication since it provides rapid relief and, of course, saves their money on medical bills (Lei *et al*.,2015). However, when they eventually start having serious health problems, their expenses for medical care soar by a factor of two. When self-medication becomes a habit, it can damage a person's health in a way that cannot be fixed. This can lead to disability or even death before its time (Bennadi, 2014).

Conclusion

Self-medication is bad for public health because it can cause a number of problems, such as an increase in drug resistance, a rise in the amount of drug use per person, and life-threatening side effects. This study findings indicated the high prevalence of self-medication practice among riverine-island's people in Sirajganj, Bangladesh. Marital status and gender were the associated factors with practicing self-medication. As a result, the government may need to move quickly to implement measures that will make it illegal for pharmacies to dispense pharmaceuticals, particularly antibiotics, without doctor's prescription. The professionals who work in health care, particularly physicians, have a responsibility to fulfill their duty by guiding and counseling their patients about the correct way to utilize their medications. People have to be made aware of the dangers of self-medicating without proper understanding. Awareness and educational programs aimed at the general community are also required. Finally, low-cost treatment from the public

sector and good infrastructure from the government sector should make it easier for people living on riverine islands to get medical care, which should reduce the number of people on riverine islands who try to treat themselves.

Conflict of interest

There is no conflict of interest disclosed by the authors.

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References

Ahmad, A., Patel, I., Mohanta, G. and Balkrishnan, R. 2014. Evaluation of self-medication practices in rural area of town Sahaswan at Northern India. *Ann. Med. Health Sci. Res.* **4**, 73.

Akhter, A., Jamil, S., Hossain, M.J., Islam, M.M., Bari, Q.I. and Sultana, M.A. 2022. Hospital pharmacy practice and drug management system of Khulna division, Bangladesh: results from a cross-sectional study. *Bangladesh Pharma. J.* **25**, 44-53.

Alam, N., Saffoon, N. and Uddin, R. 2015. Self-medication among medical and pharmacy students in Bangladesh. *BMC Res. Notes* **8**, 763.

Aqeel, T., Shabbir, A., Basharat, H., Bukhari, M., Mobin, S., Shahid, H. and Waqar, S. 2014. Prevalence of self-medication among urban and rural population of Islamabad, Pakistan. *Trop. J. Pharm. Res.* **13**, 627.

Arrais, P.S.D., Fernandes, M.E.P., Pizzol, T. da S.D., Ramos, L.R., Mengue, S.S., Luiza, V.L., Tavares, N.U.L., Farias, M.R., Oliveira, M.A. and Bertoldi, A.D. 2016. Prevalence of self-medication in Brazil and associated factors. *Rev. Saúde. Pública.* **50**, 13s.

Athanasopoulos, C., Pitychoutis, P. M., Messari, I., Lionis, C., and Papadopoulou-Daifoti, Z. 2013. Is drug utilization in Greece sex dependent? a population-based study. *Basic Clin. Pharmacol. Toxicol.* **112**, 55-62.

Badiger, S. 2012. Self-medication patterns among medical students in South India. *Autralas Med. J.* **5**, 217-220.

Bennadi, D. 2014. Self-medication: a current challenge. *J. Basic Clin. Pharm.* **5**, 19.

Bilal, M., Haseeb, A., Khan, M.H., Arshad, M.H., Ladak, A.A., Niazi, S.K., Musharraf, M.D. and Manji, A.A.K. 2016. Self-medication with antibiotics among people dwelling in rural areas of Sindh. *J. Clin. Diagnost. Res.* **10**, OC08.

Figueiras, A., Caamano, F. and Gestal-Otero, J.J. 2000. Sociodemographic factors related to self-medication in Spain. *European J. Epidemiol.* **16**, 19-26.

García Milián, A.J., Alonso Carbonell, L., López Puig, P., Yera Alós, I., Ruiz Salvador, A.K. and Blanco Hernández, N. 2009. Consumo de medicamentos referidos por la población adulta de Cuba, año 2007. *Revista Cubana de Med. Gen. Integral*. **4**, 25.

Hernandez-Juyol, M., and Job-Quesada, J. R. 2002. Dentistry and self-medication: a current challenge. *Med. Oral*. **7**, 344-347.

Hossain, M.J., Ahmmed, F., Rahman, S.A., Sanam, S., Emran, T.B. and Mitra, S. 2021a. Impact of online education on fear of academic delay and psychological distress among university students following one year of COVID-19 outbreak in Bangladesh. *Heliyon*, **7**, e07388.

Hossain, M.J., Kuddus, M.R. and Rahman, S.M.A. 2021b. Knowledge, attitudes and behavioral responses toward COVID-19 during early phase in Bangladesh: a questionnaire-based study. *Asia Pac. J. Public Health.* **33**, 141-144.

Hossain, M.J., Ahmmed, F., Kuddus, M.R., Alam, S. and Rahman, S.A. 2021c. Exploring public awareness and spreading pattern analysis of COVID-19 outbreak in Bangladesh. *Bangladesh J. Med. Sci.* **20**, 108–117.

Hossain, M.J., Ahmmed, F., Khan, M.R., Rashid, P.T., Hossain, S., Rafi, M.O., Islam, M.R., Mitra, S. Emran, T.B., Islam, F. and Alam, M. 2022. Impact of prolonged covid-19 lockdown on body mass index, eating habits and physical activity of university students in Bangladesh: a web-based cross-sectional study. *Front. Nutr.* **9**, 873105

Hughes, C.M., McElnay, J.C. and Fleming, G.F. 2001. Benefits and risks of self-medication. *Drug Safety* **24**, 1027-1037.

Idris, T., Khanum, S., Uddin, M., Asaduzzaman, M., Islam, M., Nasrin, F. and Haider, S. 2016. Study on self-medication practices among university students of Bangladesh. *British J. Med. Med. Res.* **14**, 1-8.

Jakaria, M., Hasant, A., Tarek, M., Islam, M., Zaman, R., Parvez, M., Chowdhury, T., Hasan, M., Sayeed, M. and Ali, M. 2017. Evaluation of self-medication among students from different universities in Chittagong. *Bangladesh. J. Med*. **18**, 15-20.

Jamil, S., Mukul, M.E.H., Bari, Q.I., Akhter, A., Hasan, M., Islam, M.M., Saha, T. and Hossain, M.J. 2022. Prevalence and factors associated with musculoskeletal pain among rural handloom weavers in Sirajganj, Bangladesh. *Bangladesh Pharma. J.* **25**, 188-198.

Kabir, H., Hasan, M.K., Tutul, A.H., Islam, M.S., Jamil, S., Das, B.C., Islam, M.F., Jannat, H., Ara, R., Akter, O., Biswas, L., Miah, M.E. and Mitra, D.K. 2022. Prevalence and determinants of antibiotic self-administration among adult antibiotic users: a cross-sectional study. *Patient Prefer. Ad*herence **16**, 2409-2421.

Karimy, M., Rezaee-Momtaz, M., Tavousi, M., Montazeri, A. and Araban, M. 2019. Risk factors associated with self-medication among women in Iran. *BMC Pub. Health* **19**, 1033.

Kayalvizhi, S., and Senapathi, R. 2010. Evaluation of the perception, attitude and practice of self-medication among business students in 3 select cities, South India. *Int. J. Enter. Innov. Manage. Studies* **1**, 40-44

Keshari, S.S., Kesarwani, P. and Mishra, M. 2014. Prevalence and pattern of self-medication practices in rural area of Barabanki. *Indian J. Clin. Pract*. **7**, 25.

Knopf, H. and Grams, D., 2013. Medication use of adults in Germany: results of the German health interview and examination survey for adults (DEGS1). *Bundesgesundheitsbl* **56**, 868-877.

Laporte, J. R. 1997. Self-medication: Does information to users increase at the same rate as consumption. *Medicina Clinica*, **109**, 795-796.

Laporte, J. R. and Castel, J. M. 1992. The physician and self-medication. *Medicina Clinica* **99**, 414-416.

Lei, X., Jiang, H., Liu, C., Ferrier, A. and Mugavin, J., 2018. Self-medication practice and associated factors among residents in Wuhan, China. *Int. J. Environ. Res. Public Health*, **15**, 68.

Maddock, J. 2012. Public Health: Social and Behavioral Health. IntechOpen, Rejika, Crotia.

Mendes, Z., Martins, A. P., Miranda, A. da C., Soares, M. A., Ferreira, A. P. and Nogueira, A. 2004. Prevalência da automedicação na população urbana portuguesa. *Revista Brasileira de Ciências Farma*. **40**, 21-25.

Moonajilin, M.S., Mamun, M.A., Rahman, M.E., Mahmud, M.F., Al Mamun, A.S., Rana, M.S. and Gozal, D. 2020. Prevalence and drivers of self-medication practices among savar residents in Bangladesh: a cross-sectional study. *Risk Manage. Healthcare Policy* **13**, 743-752.

Nasir, M., Chowdhury, A. and Zahan, T. 2020. Self-medication during COVID-19 outbreak: a cross sectional online survey in Dhaka city. *Int. J. Basic Clin. Pharmacol*. **9**, 1325-1330.

Roien, R., Bhandari, D., Hosseini, S.M.R., Mosawi, S.H., Ataie, M.A., Ozaki, A., Martellucci, C.A., Kotera, Y., Delshad, M.H., Sawano, T., Qaderi, S., Sah, R., Tanimoto, T., Pourhaji, F., Ramoozi, A.A., Arif, S., Mehtarkhel, S., Madadi, S. and Mousavi, S.H. 2022. Prevalence and determinants of self-medication with antibiotics among general population in Afghanistan. *Exp. Rev. Anti-inf. Ther.* **20**, 315-321.

Rusu, R.N., Ababei, D.C., Bild, W., Stoian, I., Macadan, I., Stanciu, G.D., Ciobica, A. and Bild, V. 2022. Self-medication in rural northeastern Romania: patients' attitudes and habits. *Int. J. Environ. Res. Public Health* **19**, 14949.

Saha, A., Marma, K.K.S., Rashid, A., Tarannum, N., Das, S., Chowdhury, T., Afrin, N., Chakraborty, P., Emran, M., Mehedi, H.M.H., Hussain, M.I., Barua, A. and Mistry, S.K. 2022. Risk factors associated with self-medication among the indigenous communities of Chittagong Hill Tracts, Bangladesh. *PLoS ONE* **17**, e0269622.

Sans, S., Paluzie, G., Puig, T., Balañá, L. and Balaguer-Vintró, I. 2002. Prevalencia del consumo de medicamentos en la población adulta de Cataluña. *Gaceta Sanitaria*. **16**, 121-130.

Seam, M., Bhatta, R., Saha, B., Das, A., Hossain, M., Uddin, S., Karmakar, P., Choudhuri, M. and Sattar, M. 2018. Assessing the perceptions and practice of self-medication among Bangladeshi undergraduate pharmacy students. *Pharmacy* **6**, 6.

Selvaraj, K., Kumar, S. G. and Ramalingam, A. 2014. Prevalence of self-medication practices and its associated factors in Urban Puducherry, India. *Perspectives in Cli. Res.* **5**, 32.

Topor, G., Petrescu, D., Damian, L., Ghiciuc, C.M. and Lupusoru, C.E. 2017. Prevalence of self-medication with antimicrobial drugs in the southeast region of Romania. *Med. Surg. J.* **12,** 12.

Uddin, T.M., Chakraborty, A.J., Khusro, A., Zidan, B.R.M., Mitra, S., Emran, T.B., Dhama, K., Ripon, M.K.H., Gajdács, M., Sahibzada, M.U.K., Hossain, M.J. and Koirala, N. 2021. Antibiotic resistance in microbes: history, mechanisms, therapeutic strategies and future prospects. *J. Infect. Public Health* **14**, 1750-1766.

Wijesinghe, P.R., Jayakody, R.L. and Seneviratne, R.de A. 2012. Prevalence and predictors of self-medication in a selected urban and rural district of Sri Lanka. *WHO South-East Asia J. Public Health* **1**, 28.