

First Contact Healthcare Providers of Patients before Presenting to a Tertiary-Level Hospital in Bangladesh

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Abstract

Background: In Bangladesh, many patients seek care from informal healthcare providers before accessing tertiary hospitals due to the limited availability and utilization of formal primary healthcare services. This study aimed to identify the healthcare providers who serve as the first point of contact and to evaluate prescribing patterns at that initial level of care.

Methods: A cross-sectional study was conducted at Prime Medical College in Rangpur, Bangladesh, from 1 January 2024 to 30 June 2024. A total of 197 admitted patients were selected using a simple random sampling technique. Data on socio-demographic characteristics, presenting complaints, first-contact healthcare providers, and medications received prior to hospital presentation were collected and analyzed using SPSS version 26.0.

Results: Among the 197 patients, 61.4% were male, and 74.6% resided in rural areas. Informal healthcare providers were the

most common first point of contact (46.2%), followed by registered doctors (42.1%). Fever was the most common presenting complaint (38.1%). Regarding medication use, paracetamol (32.5%) and antibiotics (26.4%) were the most frequently prescribed drugs. Among patients who received antibiotics, 42.3% were prescribed by registered doctors, 40.4% by informal healthcare providers, and 13.5% by pharmacy owners.

Conclusion: Informal healthcare providers remain the primary point of first contact for many patients, particularly in rural areas. Their substantial involvement in antibiotic prescribing highlights the need for stronger regulatory oversight and improved accessibility of formal primary healthcare services to promote rational use of medicines.

Keywords: Informal healthcare providers, antibiotic use, primary care, Bangladesh.

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Introduction

Bangladesh's healthcare system continues to face significant challenges in accessibility and equity, particularly in rural areas where more than 75% of the population resides^{1,2}. Access to basic healthcare services remains limited, and a large proportion of the population relies on alternative sources of care due to shortages of trained health professionals and inadequate healthcare infrastructure. In many developing countries, including Bangladesh, the number of qualified healthcare providers is insufficient to meet the needs of the entire population, especially in rural settings³.

Primary healthcare services in rural Bangladesh are mainly provided through Union Health and Family Welfare Centers (UH&FWCs) and other government health facilities. These centers typically include trained personnel such as Medical Assistants and Family Welfare Visitors, who provide basic preventive and curative services. However, despite the existence of these facilities, their utilization remains relatively low; studies have reported that only about 8% of rural residents access these services^[4]. Several factors contribute to this situation, including vacant professional posts (approximately 26%) and high absenteeism among healthcare staff (around 40%), which

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further limit the availability of formal healthcare services in rural areas⁵.

As a result, many patients seek treatment from informal healthcare providers (IPs), including village doctors, drug sellers, medicine vendors, and traditional healers. These providers often serve as the first point of contact for healthcare, particularly in rural communities. However, most of these practitioners operate outside formal regulatory frameworks and lack standardized medical qualifications⁶⁻⁸. Their clinical practices frequently involve symptomatic treatment and empirical drug prescribing, often without proper diagnosis or adherence to standard treatment guidelines.

The use of medicines, particularly antibiotics, is common in such settings. While medicines play a crucial role in disease management, their irrational use may lead to adverse health outcomes, increased treatment costs, and the emergence of antimicrobial resistance. Studies in Bangladesh and other developing countries have highlighted concerns regarding inappropriate antibiotic prescribing, over-the-counter availability of medicines, and improper dosing and duration of therapy^{9,10}.

In many developed countries, primary healthcare systems are structured around general practitioners (GPs) or family physicians, who act as gatekeepers to specialized medical care. In contrast, the healthcare-seeking pathway in Bangladesh is often fragmented, with patients consulting different types of providers before reaching tertiary-level hospitals. Understanding the first point of healthcare contact and the pattern of drug use at that level is important for identifying gaps in healthcare delivery and promoting rational use of medicines.

Therefore, the present study was conducted to identify the first healthcare providers consulted by patients before presenting to a tertiary-level hospital and to evaluate the prescribing patterns, particularly the use of antibiotics, at the first point of contact.

Methods

This was a hospital-based cross-sectional study conducted in the Department of Medicine at Prime Medical College, Rangpur, Bangladesh, over a six-month period from 1 January 2024 to 30 June 2024 to assess healthcare-seeking behavior and prescribing patterns prior to tertiary hospital presentation. The study population consisted of patients admitted to the Department of Medicine during the study period who met predefined eligibility criteria. Patients were included

if they were aged 14 years and above, provided informed written consent, and were able to reliably recall their first healthcare contact following the onset of illness. Patients who were critically ill or unconscious, unwilling to participate, or unable to provide reliable information were excluded from the study.

The sample size was calculated using the single population proportion formula, $n = Z^2 p(1-p)/d^2$ where $Z = 1.96$ at 95% confidence level, $p = 0.50$ in the absence of prior prevalence data to maximize sample size, and $d = 0.07$ as the margin of error. The value of d was selected based on standard epidemiological guidelines recommending a precision range of 0.05–0.10, depending on feasibility and resource constraints¹¹⁻¹³. The calculated sample size was 196, which was rounded to 197 to account for potential non-response or incomplete data.

A simple random sampling technique was used to select participants. A daily list of eligible admitted patients was prepared, and each patient was assigned a unique identification number. Participants were selected using a computer-generated random number method until the required sample size was achieved. This procedure was repeated throughout the study period until 197 patients were enrolled.

Data were collected through structured face-to-face interviews using a predesigned questionnaire after admission. Information included socio-demographic characteristics, presenting complaints, first healthcare provider contacted after illness onset, medications received at first contact, and type of prescriber involved. Data were analyzed using SPSS version 26.0 using descriptive statistics including frequency, percentage, mean, and standard deviation.

Ethical approval was obtained from the Institutional Review Board of Prime Medical College. Written informed consent was obtained from all participants, and confidentiality was strictly maintained.

Operational definition

- Urban: District and Upazila (subdistrict) town areas
- Rural: All other areas
- Informal Healthcare Providers (IPs): village doctors, traditional healers and treatment outside formal regulatory frameworks.^[6-8]
- Pharmacy owners: Individuals who operate or manage retail drug shops and primarily provide

medicines through a dispensing role without performing formal clinical diagnosis or evidence-based prescribing [14].

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of Prime Medical College. Written informed *consent* was secured from all participants.

Statistical Analysis

Data were analyzed using SPSS version 26.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were employed to summarize the socio-demographic characteristics, healthcare-seeking behaviors, and prescribing patterns of the patients.

Results

In this study, we have studied a total of 197 patients irrespective of sexes. Table I shows that the respondents had a mean age of 53.23 ± 17.36 years (range: 14–100 years). The majority of participants were male at 61.4% and lived in rural areas at 74.6%. A large portion of the respondents were illiterate at 41.1%, while 25.9% had completed 10 or more grades of education. More than half of the participants, at 55.8%, had a monthly income below 5000 taka, indicating that most respondents belonged to a lower socioeconomic status group.

Table I

Socio-demographic characteristics of the study population (n=197)

Variables	Frequency	Percentage
Mean age	53.23 years SD ± 17.36 (age range 14-100 years)	
Sex		
Male	121	61.4%
Female	76	38.6%
Residence		
Rural	147	74.6%
Urban	50	25.4%
Level of education		
Illiterate	81	41.1%
<5 class	36	18.3%
5-<10 class	29	14.7%
>10	51	25.9%
Monthly income		
<5000 taka	110	55.8%
5001-10000 taka	24	12.2%
>10000 taka	63	32.00%

Table II shows that fever was the most common presenting complaint (38.1%), followed by cough (23.9%) and breathlessness (20.8%). Chest pain was reported by 10.2% of patients, while abdominal pain and headache were each reported by 3.5% of patients.

Table II

Details of the main presenting complaint (n=197)

Variables	Frequency (%)
Fever	75 (38.1%)
Cough	47 (23.9%)
Breathlessness	41 (20.8%)
Chest pain	20 (10.2%)
Abdominal pain	7 (3.5%)
Headache	7 (3.5%)

Table III displays that nearly half of the patients first sought care from informal healthcare providers (46.2%), followed by registered doctors (42.1%). A smaller proportion consulted pharmacy owners (10.2%), while only 1.5% visited government health facilities as their first contact.

Table III

First contact site of the patients (n=197)

Variables	Frequency (%)
Informal healthcare providers (IPs)	91 (46.2%)
Registered doctor	83 (42.1%)
Pharmacy owner	20 (10.2%)
OPD of health complex/Govt. hospital (via registered physician)	3 (1.5%)

Table IV illustrates the pattern of initial healthcare contact among patients from urban and rural areas. Registered medical practitioners constituted the most common first point of contact in both groups; however, the proportion was higher among urban patients (52%) compared to rural patients (38.8%). Informal healthcare providers (IPs) were frequently consulted, particularly in rural areas (48.3%) compared to urban areas (40%). A small percentage of patients initially visited government hospital outpatient departments (OPDs) or pharmacy owners, with pharmacy consultations being relatively more prevalent in rural regions. Nonetheless, the difference between urban and rural first-contact providers was not statistically significant ($p = 0.063$).

Table IV

Distribution of patients according to the first healthcare provider contacted after onset of illness in urban and rural areas (n=197)

First contact physician	Urban (N=50)	Rural (N=147)	p-value
Registered doctor	26 (52%)	57 (38.8%)	0.063
Informal healthcare providers (IPs)	20 (40%)	71 (48.3%)	
OPD of health complex/Govt. hospital (Resident doctor)	2 (4%)	1 (0.7%)	
Pharmacy owner	2 (4%)	18 (12.2%)	

Table V shows the distribution of medications received by patients before presenting to the tertiary hospital. Paracetamol was the most frequently prescribed drug (32.5%), followed by antibiotics (26.4%) and proton pump inhibitors (19.8%). Smaller proportions of patients received antihypertensives (10.7%), NSAIDs (6.6%), and oral antidiabetic drugs (4.6%).

Table V

Pattern of medications received by patients prior to tertiary level hospital admission (n = 197)

Medication category	Frequency	Percentage
Paracetamol	64	32.5%
Antibiotics	52	26.4%
Proton pump inhibitors (PPIs)	39	19.8%
Antihypertensive drugs	21	10.7%
NSAIDs	13	6.6%
Oral antidiabetic drugs (OADs)	9	4.6%

Table VI illustrates that most antibiotics were prescribed by registered doctors (42.3%), followed closely by informal healthcare providers (40.4%). A smaller proportion were prescribed by pharmacy owners (13.5%), while government hospital OPD doctors accounted for only 3.8% of antibiotic prescriptions.

Table VI

Distribution of antibiotic prescribers among patients who received antibiotics prior to hospital presentation (n = 52)

Antibiotic Prescriber	Frequency	Percentage
Registered doctor	22	42.3%
Informal healthcare providers (IPs)	21	40.4%
Pharmacy owner	7	13.5%
OPD of health complex/Govt. hospital (Resident doctor)	2	3.8%

Discussion

Bangladesh has a hierarchical healthcare delivery system designed to provide services at different administrative levels across the country. Satellite Clinics (SCs) at the village level and Community Clinics (CCs) at the ward level provide basic healthcare services with an emphasis on preventive care and health education for local residents [15-20] [11-16]. At the union level, Union Health and Family Welfare Centers (UHFWCs), union sub-centers, and rural health centers provide outpatient services to a larger community. Furthermore, Upazila Health Complexes at the sub-district level offer a broader range of healthcare services and act as an important entry point for formal healthcare [21] [17]. Despite this structured healthcare delivery system, many patients in Bangladesh still bypass primary healthcare facilities and seek care directly from higher-level hospitals[22],¹⁸.

In many low- and middle-income countries (LMICs), informal healthcare providers (IPs) often serve as the first point of contact for individuals seeking medical care. Previous studies have reported that IPs provide a substantial proportion of primary healthcare services, with estimates ranging from 9% to 90% depending on the setting, particularly in underserved and economically disadvantaged communities [23-27] [19-23]. In the present study, informal healthcare providers were the most common first healthcare contact (46.2%), followed by registered doctors (42.1%), while 10.2% of patients consulted pharmacy owners and only 1.5% visited government health facility OPDs as their first point of care. These findings indicate the continued reliance on informal providers in the healthcare-seeking pathway of patients.

The pattern of healthcare-seeking also differed between urban and rural populations. In this study, urban

patients were more likely to consult registered doctors as their first healthcare contact compared with rural patients (52% vs 38.8%), whereas informal healthcare providers were more frequently consulted in rural areas (48.3%) than in urban areas (40%). These findings may reflect disparities in the availability of qualified healthcare professionals, accessibility of healthcare services, and socioeconomic conditions between rural and urban populations.

Another important aspect of informal healthcare practice is the widespread use and dispensing of medications, particularly antibiotics. Previous studies conducted in several countries including Bangladesh, India, Zambia, and the Democratic Republic of Congo have documented substantial antibiotic dispensing by informal healthcare providers and drug sellers [28–35] [24–31]. Such practices are often carried out without appropriate diagnosis or adherence to standard treatment guidelines.

Regarding medication use in the present study, paracetamol was the most frequently prescribed medication (32.5%), followed by antibiotics (26.4%) and proton pump inhibitors (19.8%). Smaller proportions of patients received antihypertensive drugs (10.7%), NSAIDs (6.6%), and oral antidiabetic drugs (4.6%). Previous studies conducted in primary healthcare facilities in Bangladesh reported that approximately 25% of patients received antibiotics and 17% received metronidazole irrespective of diagnosis, indicating a relatively high level of antibiotic prescribing [36] [32].

Antibiotic use in primary healthcare settings has been widely reported in the literature. Studies have shown that 44% of consultations in Bangladesh [37] [33] and 70% of consultations in Pakistan [38] [34] result in antibiotic prescriptions. In addition, antibiotics are frequently purchased directly from retail drug shops without prescription [39] [35]. Such practices increase the likelihood of inappropriate drug selection, incorrect dosing, and incomplete treatment courses [40] [36].

In the present study, 26.4% of patients received antibiotics prior to hospital presentation. Among these prescriptions, 42.3% were prescribed by registered doctors, while 40.4% were prescribed by informal healthcare providers, 13.5% by pharmacy owners, and 3.8% by government health facility doctors. These findings indicate that although registered doctors

prescribed the largest proportion of antibiotics, informal providers and pharmacy owners also contributed substantially to antibiotic prescribing.

Despite their lack of formal medical qualifications, informal healthcare providers continue to play a significant role in healthcare delivery in many communities. Their widespread use can be attributed to several factors including their proximity to communities, affordability of services, availability at flexible hours, and the trust they have established within local populations over time [41–44] [37–40]. As a result, informal providers often serve as the first and preferred healthcare providers for many patients.

Another contributing factor to the reliance on informal providers is the uneven distribution of registered graduate doctors and the limited development of structured general practitioner (GP) systems in Bangladesh. Strengthening primary healthcare services and improving access to qualified medical professionals may help reduce the dependence on informal providers. The Bangladesh Society of General Physicians has introduced the “Daktarkhana” model, which aims to provide GP-based primary healthcare services across the country. Currently, 184 Daktarkhana centers are providing primary healthcare services. The long-term vision of this initiative is to establish one Daktarkhana for every 20,000 people and link these centers with higher-level facilities to create an effective GP-referral system [45] [41]. Strengthening such initiatives may help improve the rational use of medicines, reduce inappropriate drug use, and contribute to controlling antibiotic resistance in Bangladesh.

Limitation

Sample size was small and single center study.

Conclusion

In this study, the first contact site was mainly informal healthcare providers (IPs), with the least being OPD of the government hospital. Antibiotics were the second most prescribed drugs at the first contact site, with most of the antibiotics prescribed by registered doctors. Almost an equal amount of antibiotics was prescribed by the informal healthcare providers (IPs).

Recommendation

A multicenter study with a large sample size will be required.

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Conflict of interest

There was no conflict of interest.

References

- Islam MS. A review on the policy and practices of therapeutic drug use in Bangladesh. *Calicut Med J*. 2006;4(4):e2.
- World Health Organization. World health statistics 2006. Geneva: WHO; 2006. Available from: <http://www.who.int/entity/whosis/whostat2006/en/index.html>
- Pearson CA. The role of district hospitals and the action in international medicine network. *Infect Dis Clin North Am*. 1995;9:391–405.
- Perry HB. Health for all in Bangladesh. Dhaka: University Press Ltd; 2000.
- Ahmed SM. Exploring health-seeking behavior of disadvantaged populations in rural Bangladesh [dissertation]. Stockholm: Karolinska University Press; 2005. Available from: <http://diss.kib.ki.se/2005/91-7140-435-X/>
- Thapa P, Jayasuriya R, Hall JJ, et al. Role of informal healthcare providers in tuberculosis care in low- and middle-income countries: a systematic scoping review. *PLoS One*. 2021;16:e0256795.
- Sudhinaraset M, Ingram M, Lofthouse HK, et al. What is the role of informal healthcare providers in developing countries? A systematic review. *PLoS One*. 2013;8:e54978.
- Shah NM, Brieger WR, Peters DH. Can interventions improve health services from informal private providers in low and middle-income countries? A comprehensive review of the literature. *Health Policy Plan*. 2011;26:275–87.
- Chowdhury SAR. Prescribing a rational drug. *Bangladesh J Physiol Pharmacol*. 1991;7:000–000.
- Guyon AB, Barman A, Ahmed JU, Ahmed AU, Alam MS. A baseline survey on use of drugs at the primary health care level in Bangladesh. *Bull World Health Organ*. 1994;72:265–71.
- Lwanga SK, Lemeshow S, World Health Organization. Sample size determination in health studies: a practical manual. World Health Organization; 1991. <https://iris.who.int/handle/10665/40062>
- Cochran WG. Sampling techniques. 3rd ed. New York: John Wiley & Sons; 1977.
- Daniel WW, Cross CL. A foundation for analysis in the health sciences. Biostatistics Toronto, John Wiley & Sons. 1991:209–15.
- Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect Dis*. 2011;11(9):692–701. doi:10.1016/S1473-3099(11)70054-8
- Satellite clinics: collaboration between the Government of Bangladesh and ICDDR,B. *Glimpse*. 1987;9(6):1.
- Directorate General of Family Planning. Satellite clinic conduction guideline 2016. Dhaka: DGFP; 2016. Available from: <http://archive.dgfp.gov.bd/handle/123456789/187>
- Ministry of Health and Family Welfare. Policy guidelines for establishing community clinics. Dhaka: Government of Bangladesh; 1999.
- Ministry of Health and Family Welfare. History and background of community clinic. Dhaka: Government of Bangladesh; 2024. Available from: <https://communityclinic.portal.gov.bd/site/page/7e62c8c4-2d02-457a-878d-8eef9acef36e>
- Ministry of Health and Family Welfare. Health, Nutrition and Population Sector Program (HNPSPP). Dhaka: Government of Bangladesh; 2011.
- Ministry of Health and Family Welfare. Community clinic based primary health care services: a unique participatory approach to universal health coverage. Dhaka: Government of Bangladesh; 2014.
- Government of the People's Republic of Bangladesh. Bangladesh national strategy for community health workers. Dhaka; 2019. Available from: <https://www.healthynewbornnetwork.org/resource/bangladesh-national-strategy-for-community-health-workers/>
- Hasan MJ, Rafi MA, Nishat NH, et al. Patient self-referral patterns in a developing country: characteristics, prevalence, and predictors. *BMC Health Serv Res*. 2024;24:651.
- Thapa P, Jayasuriya R, Hall JJ, et al. Role of informal healthcare providers in tuberculosis care in low- and middle-income countries: a systematic scoping review. *PLoS One*. 2021;16:e0256795.
- Sudhinaraset M, Ingram M, Lofthouse HK, et al. What is the role of informal healthcare providers in developing countries? A systematic review. *PLoS One*. 2013;8:e54978.
- Mahmood SS, Iqbal M, Hanifi SMA, et al. Are village doctors in Bangladesh a curse or a blessing? *BMC Int Health Hum Rights*. 2010;10:18.
- Twebaze D. A literature review of care-seeking practices for major childhood illnesses in Uganda. 2001. Available from: https://pdf.usaid.gov/pdf_docs/Pnacq731.pdf

27. Sheikh K, Josyula LK, Zhang X, et al. Governing the mixed health workforce: learning from Asian experiences. *BMJ Glob Health*. 2017;2:e000267.
28. Ingelbeen B, Phanzy DM, Phoba MF, et al. Antibiotic use from formal and informal healthcare providers in the Democratic Republic of Congo: a population-based study in two health zones. *Clin Microbiol Infect*. 2022;28:1272–7.
29. Khare S, Purohit M, Sharma M, et al. Antibiotic prescribing by informal healthcare providers for common illnesses: a repeated cross-sectional study in rural India. *Antibiotics*. 2019;8:139.
30. Nahar P, Unicomb L, Lucas PJ, et al. What contributes to inappropriate antibiotic dispensing among qualified and unqualified healthcare providers in Bangladesh? *BMC Health Serv Res*. 2020;20:656.
31. Nair M, Tripathi S, Mazumdar S, et al. Knowledge, attitudes, and practices related to antibiotic use in Paschim Bardhaman district: a survey of healthcare providers in West Bengal, India. *PLoS One*. 2019;14:e0217818.
32. Wildbret S, Stuck L, Luchen CC, et al. Drivers of informal sector and non-prescription medication use in pediatric populations in a low- and middle-income setting: a prospective cohort study in Zambia. *PLOS Glob Public Health*. 2023;3:e0002072.
33. Gautham M, Spicer N, Chatterjee S, et al. Challenges for antibiotic stewardship at the community level: drivers of antibiotic provision by informal healthcare providers in rural India. *Soc Sci Med*. 2021;275:113813.
34. Thapa P, Hall JJ, Jayasuriya R, et al. Tuberculosis care practices of informal healthcare providers: a cross-sectional study from eastern India. *Health Policy Plan*. 2022;37:1158–66.
35. Gautham M, Binnendijk E, Koren R, et al. First we go to the small doctor: first contact for curative health care sought by rural communities in Andhra Pradesh and Orissa, India. *Indian J Med Res*. 2011;134:627–38.
36. Guyon AB, Barman A, Ahmed JU, Ahmed AU, Alam MS. A baseline survey on use of drugs at the primary health care level in Bangladesh. *Bull World Health Organ*. 1994;72:265–71.
37. Ahmed SM, Islam QS. Availability and rational use of drugs in primary healthcare facilities following the national drug policy of 1982: is Bangladesh on the right track? *J Health Popul Nutr*. 2012;30:99–108.
38. Joseph HA, Agboatwalla M, Hurd J, et al. Perceptions of antimicrobial resistance in the context of diarrheal disease treatment among laypersons and healthcare providers in Karachi, Pakistan. *Am J Trop Med Hyg*. 2016;95:221–8.
39. Systems for Improved Access to Pharmaceuticals and Services (SIAPS). Baseline study of private drug shops in Bangladesh: findings and recommendations. 2015. Available from: <http://siapsprogram.org/publication/altview/baseline-study-of-private-drug-shops-in-bangladesh-findings-and-recommendations/english/>
40. Morgan DJ, Okeke IN, Laxminarayan R, et al. Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect Dis*. 2011;11:692–701.
41. Mahmood SS, Iqbal M, Hanifi SMA, et al. Are village doctors in Bangladesh a curse or a blessing? *BMC Int Health Hum Rights*. 2010;10:18.
42. Gautham M, Shyamprasad KM, Singh R, et al. Informal rural healthcare providers in North and South India. *Health Policy Plan*. 2014;29(Suppl 1):i20–9.
43. Sieverding M, Beyeler N. Integrating informal providers into a people-centered health systems approach: qualitative evidence from rural Nigeria. *BMC Health Serv Res*. 2016;16:526.
44. Kumah E. Informal healthcare providers and universal health coverage in low- and middle-income countries. *Global Health*. 2022;18:45.
45. Bangladesh Society of General Physicians. Background of Daktarkhana. Dhaka; 2024. Available from: <https://societyofgpbd.com/daktarkhana/>