PDF version

Kashif Aziz 1, Hafiz M. Aeymon 2 and Saba Batool 3

ABSTRACT Sale of medicines is not rigorously controlled in Pakistan. Therefore, medical students start prescribing drugs and advising diagnostic tests before they graduate. This cross-sectional study investigated the frequency of independent medical prescription by 180 stratified, randomly selected final year medical students from 3 public medical colleges in Punjab, Pakistan. Data were obtained by self-administered questionnaire. One hundred and twelve students had prescribed medicines independently without any supervision; 38 had performed a physical examination before prescribing; and 74 had advised and 49 interpreted diagnostic tests independently. Forty-four students had administered injectable drugs and one third of these were administered without seeing expiry dates. The most frequently prescribed drugs were nonsteroidal anti-inflammatory drugs (92%) and antibiotics (73%). The most

frequently advised tests were complete blood cell count, chest X-ray and urine detailed reports. One hundred and twenty-seven participants thought that medical students should not prescribe drugs. There was a significant relationship between gender and household income and prescription practices. Many final year medical students had prescribed drugs and advised diagnostic tests before graduation.

Prescription indépendante de médicaments et recommandation de tests diagnostiques par des étudiants en dernière année de médecine au Pendjab

RÉSUMÉ La vente de médicaments n’est pas rigoureusement contrôlée au Pakistan. Ainsi, les étudiants en médecine commencent à prescrire des médicaments et à recommander des tests diagnostiques avant l’obtention de leur diplôme. La présente étude transversale a examiné la fréquence de la prescription indépendante de médicaments auprès de 180 étudiants en dernière année de médecine sélectionnés de façon aléatoire et stratifiée dans trois écoles de médecine publiques au Pendjab. Les données ont été obtenues au moyen d’un questionnaire auto-administré. Cent douze étudiants avaient prescrit des médicaments de façon indépendante et sans aucun contrôle ; 38 avaient procédé à un examen physique en amont de la prescription ; 74 avaient recommandé des tests diagnostiques et 49 avaient interprété lesdits tests de façon indépendante. Quarante-quatre étudiants avaient administré des médicaments injectables et un tiers de ces médicaments avaient été administrés sans consultation des dates de péremption. Les anti-inflammatoires non stéroïdiens (92 %) et les antibiotiques (73 %) étaient les médicaments le plus souvent prescrits. Un hémogramme complet, une radiographie pulmonaire et des rapports urinaires détaillés étaient les examens le plus souvent recommandés. Cent vingt-sept participants étaient d’avis que les étudiants en médecine ne devraient pas prescrire de médicaments. Il existait une relation significative entre le sexe, le revenu du foyer et les pratiques de prescription. De nombreux étudiants en dernière année de médecine avaient prescrit des médicaments et recommandé des tests diagnostiques avant l’obtention de leur diplôme.

1Aga Khan University Hospital, Karachi, Pakistan (Correspondence to: K. Aziz: kashif.aziz@aku.edu); 2Nishter Hospital, Multan, Pakistan; 3Allied Hospital, Faisalabad, Pakistan.

Received: 16/06/16; accepted: 22/01/17

Introduction

Prescription of drugs is regulated worldwide and only physicians are allowed to prescribe. Unfortunately, in developing countries, there are other channels from which drugs can be acquired. In Pakistan, there is a statutory law called The Allopathic System (Prevention of Misuse) Rule 1968 that defines who can prescribe drugs, but informal drug distribution channels are still prevalent (1). After graduation medical students must undergo 1 year supervised training. This training period is termed a house job/internship. After this year of supervised training doctors are certified in Pakistan. The law requires that each prescription must be signed by a medical practitioner and their registration number must be mentioned on the prescription (2).

Some pharmacists in Pakistan dispense drugs even without asking for a prescription. Many pharmacists and allied healthcare workers like nurses and dispensers treat illnesses on their own and prescribe drugs (3,4). Due to this culture, medical students in Pakistan also start prescribing drugs before graduation (4). It can expose patients to unwanted drugs, create drug resistance, and even contagious diseases can remain undetectable if a person has been taking medication for symptomatic relief without proper evaluation (2).

Many studies have been done on self-medication among medical and nonmedical students. However, independent prescription practices of medical students are an unexplored area. Such practices cannot thrive in developed countries because of strict pharmacy regulations. However, in developing countries like Pakistan such practices can prevail due to loose legislation (5). Only one study has investigated the prescription practices of medical students in one city in Pakistan, which showed that medical students began prescribing before graduation (6).

To explore this issue further and establish the factors leading to such practices, we studied final year medical students at 3 medical colleges in Punjab Province, Pakistan. We postulated that medical students start prescribing drugs after they have studied pharmacology in the 3rd year of their MBBS degree.

Methods

Study population

This was a cross-sectional study from June 2013 to June 2014. In 2013 there were 12 registered public sector medical colleges in Punjab. Three of these, Quaid E. Azam Medical College (QMC), Bahawalpur, Nishter Medical College (NMC), Multan, and Punjab Medical College (PMC), Faisalabad, were randomly selected. We selected final year medical students who had already studied pharmacology and pathology. There was no previous reference study for sample size estimation. Therefore, to calculate the sample size, a pilot study was done on 30 randomly selected medical students who were asked about independent drug prescription.

Twenty-four of them had prescribed independently. We used these pilot study data (80% prescription rate) to estimate sample size, taking 5% as margin of error and 95% confidence interval and 600 was our population under study. Sample size came out to be 175 and we decided to study 180 students. There were 600 final year medical students in all 3 medical colleges, thus, we decided to take 30% of these. Weighted samples were taken from each medical college according to enrolment. We selected 30% of the enrolled final year medical students from each institute. Overall ratio of male to female students was 2:3. A stratified random sampling technique was used and stratification was based on gender. Random numbers were generated using Microsoft Excel version 10. One hundred and seventy-two of 180 students agreed to participate. The sole exclusion criterion was non-Pakistani nationality but no students met this criterion. Among the 172 students, 109 (63%) were female and 63 (37%) were male; 47 were from PMC, 69 from NMC and 56 from QMC.

Data collection

Data were collected through a self-reported questionnaire that was developed by the authors for an unpublished pilot study. Initially, 5 medical students were interviewed on prescription and diagnostic test advice practices, and the questionnaire was developed after content analysis of these interviews. Then, the aforementioned medical students were given the questionnaire and internal consistency was evaluated. Test–retest reliability was also checked by again administering the questionnaire after 20 days. After this pilot study, the questionnaire was finalized for inclusion in the present study.

The questionnaire included general demographic data (age, gender, rural or urban residence and monthly income). Urban areas were defined according to the Pakistan National Statistical Office. Large cities of Lahore, Gujranwala, Faisalabad, Rawalpindi, Multan, Sialkot, Sargodha, Bahawalpur, district headquarters and tehsil headquarters were classified as urban areas. All remaining areas were classified as rural. Monthly income was recorded in Pakistani Rupees and classified into 4 groups: < 10 000, 10 000–25 000, 25 000–50 000 and > 50 000. Drugs were categorized into the following groups: analgesics, antibiotics, diuretics, vitamin supplements, steroids, antipyretics, sleeping pills, antiemetics, contraceptives, homeopathic medicines, antihistamines, H2 blockers and proton pump inhibitors. The following diagnostic tests were studied: X-rays, sputum culture, computed tomography, pregnancy tests, blood cultures, complete blood count, lipid profile, magnetic resonance imaging, renal function tests, urine detailed reports, electrocardiograms, ultrasonography and liver function tests. If the participants had prescribed other than the above-mentioned drugs/tests, they were asked to name them. We asked the students about the number of times annually that each drug was prescribed. Seven structured questions were asked to inquire about attitude and perception of medical students toward prescription practices.

Data analysis

Data were doubled entered in and analysed by SPSS version 17. Descriptive analyses were performed. Data were stratified based on gender of participant, their household income and their residence. The $\chi 2$ test was applied for significance, and $P < 0.05$ was taken as significant. The pilot study data were not included in the final analysis.

Ethics

Informed consent was obtained from each participant before administering the questionnaire. Confidentiality was maintained. Ethical approval was obtained from each institute.

Results

Demographic details of the participants are shown in Table 1. One hundred and twelve (65%) students prescribed drugs independently without any supervision from a certified medical practitioner. Prescription rates at the different medical colleges are shown in Table 2. Twenty-two students prescribed voluntarily, 74 were asked for a prescription and 16 prescribed as a result of family expectations. When we asked about the rationale behind independent prescription, 44 (40%) students did not give any reason and 28 (25%) said that they prescribed because, in their opinion, the patient's condition was trivial and did not need any expert opinion. Six of 112 (5%) students prescribed as part of first aid advice and then referred the patient to a hospital. Among the 112 students who had prescribed, 14 (13%) had prescribed on only 1 occasion, 47 (42%) had prescribed twice a year, 39 (35%) had prescribed once monthly and 5 (4%) had prescribed every week. Forty-five (26%) students had administered injectable drugs in response to a patient's request (Table 2), and 30 of these students did not see the expiry dates of the drug preparations. Analgesics and antibiotics were the most frequently prescribed drugs (Table 3).

Seventy-four (43%) students advised diagnostic tests independently (details of tests are shown in Table 4), and 44 did not perform any physical examination before advising tests. Fifty (29%) students had interpreted the diagnostic tests independently and informed their patients that the results were normal. The most common tests interpreted were complete blood count, urine detailed report, lipid profile, chest X-ray and liver function test in descending order.

We asked several questions to determine the attitude of the students toward independent medication. Forty-three (25%) thought that medical students can prescribe medication; 108 (62%) thought that medical students could advise diagnostic tests; 36 (21%) thought it right that medical students could treat patients if certified medical practitioners were not available; 144 (84%) knew about antibiotic resistance; 92 (53%) did not know about the dangers of self-medication; 140 (81%) thought it better for lay people to consult a medical student instead of self-medicating themselves; and 78 (45%) thought if a medical student refused to prescribe

medication to lay people on their request, they would be considered an incompetent doctor.

There was no significant difference in prescription rates among the 3 medical colleges (P = 0.077). Male students were significantly more likely to prescribe independently than female students were (P = 0.001). There was no significant relationship between students' rural/urban residence and prescription practices (P = 0.444). Students with low monthly household income (< 10 000 Pakistani Rupees) had significantly higher prescription rates (P = 0.03). There was also a significant relationship between student household income and diagnostic test advice (P = 0.008): the higher the student's household income, the fewer tests were advised (Table 5).

Post-stratification analysis revealed that there was a significant association of gender with the perception that medical students could prescribe after passing pharmacology (P = 0.03) Female students thought that just passing pharmacology did not qualify a student to prescribe medication. There was significant association between gender and perception that medical students should diagnose a disease in the absence of a certified doctor (P = 0.004). Male students were more inclined toward diagnosis of disease by students in the absence of a certified doctor. There was a significant association of residence with perception of disease diagnosis in the absence of a certified doctor (P = 0.01). Urban students thought that they should not diagnose a disease in the absence of a certified doctor. There was no significant association between monthly income of students and their attitude toward medical prescription.

Discussion

Our study was a multicentre cross-sectional study on unique topic on the frequency of drug prescription by medical students before graduation. We found that many students (112; 65%) were involved in this practice. About half of the students were unable to specify a reason for this practice. When asked about frequency of annual prescription, most of the students had prescribed only once or twice a year and only 4% of them were prescribing almost weekly. It was found that male students and students from low-income households were more likely to prescribe.

There has been much research on self-medication but research on independent prescription by medical students has not been done. Prescription by medical students is more dangerous than self-medication because of the potential dangers. This can result in antibiotic resistance, masking of diagnoses, unnecessary exposure to medication and incorrect diagnoses.

The study of Zafar et al. investigated independent prescription by medical and nonmedical

students in Karachi (6). Our study differed in that we studied only medical students and only in their final year. We studied 3 different medical colleges that were ~200 km apart. Zafar et al. found that 53% of medical students had prescribed, while our finding was 65%. The most frequently prescribed medications were the same in both studies: antibiotics, antiallergics, antipyretics and analgesics.

Prescription by medical students is prevalent in Pakistan because of loose regulation. Pharmacies dispense medication without prescription. A study by Hussain et al. in Sindh Province evaluated 371 community pharmacies and none of them completely followed all the regulations established by the Pharmacy Act 1967 (5). A survey by Haseeb and Bilal in rural Karachi revealed that 85% of participants were using informal ways of taking medication (7). The most common reasons evaluated were cost of consultation (90.3%) and availability of transport (81.0%) from rural areas to healthcare facilities (8). Prescription by medical students is more dangerous than self-medication because patients are consulting students rather than qualified practitioners. One reason for such practice is economics. Certified doctors cost a lot of money, while seeking help from a neighbouring medical student comes free of charge. Similar practices have been documented in Kerala, India, where interns who are supposed to work under supervision, run independent practices to make extra money. (9).

Apart from the ethical questions, there is a need to evaluate whether final year medical students have enough knowledge to prescribe safely. This question was addressed by a Nigerian study (10). Thirty-one final year students were interviewed and it was found that they all needed training to prescribe safely. Another study in the United Kingdom investigated the readiness of graduating students to prescribe safely (11). Many students felt underprepared to take responsibility for safe prescription. Therefore, a mandatory internship year or foundation year is necessary. A similar but more plausible concept in the United States of America (USA) is student-run health clinics, where medical students care for underprivileged patients who are poor and uninsured. This improves medical students' clinical experience and provides a medical service to a neglected stratum of society. One important factor is that the clinics are managed by a certified physician who shadows all medical students working in the clinic, which provides a safety net against any inadvertent medical errors. It is reported that the quality of services provided by such clinics has not been rigorously studied (12).

When we asked the medical students about the reason for prescribing, 16% revealed peer pressure and family expectation. There is a need to educate the population about the risk of prescription by medical students. They should counsel their family members to have a proper check-up by a certified doctor. Twenty-five percent of medical students prescribed because they thought that the patient's condition was not serious enough to refer to a doctor. However, as shown in previous studies11, medical students are not capable of identifying subtle clinical signs and they can miss a diagnosis.

Thirty percent of the students in our study, who had administered injectable drugs, did not confirm the expiry date. Medical students should be taught about safe pharmacy practices and there is lack of such training in medical schools. Medication errors should be included in the curriculum.

In our study, medical students not only prescribed drugs but also advised diagnostic tests and interpreted the results. Advice for a diagnostic test is a complicated task. Medical students are not capable of choosing the appropriate test. Before giving appropriate diagnostic advice there is a need to take a proper history and perform a physical examination (13). In our study, 73 students advised diagnostic tests but 44 of them did not perform a physical examination. A study by McGregor et al. also revealed that medical students are not capable of accurate clinical decision-making (14). The same applies to interpretation of test results. Half of medical students who interpreted test results had not undertaken physical examinations.

We hypothesized that prescription practice of medical students from rural areas would differ from that of urban areas but there were no significant differences. There is a need to implement the same model as the clinics led by medical students in the USA. The population in Pakistan is unable to afford health care, therefore, such student-led clinics could resolve this issue but they should be shadowed by certified medical practitioners. Such clinics have also been studied in Australia, with favourable outcomes (15).

Our post-stratification analyses revealed that male medical students prescribed more as compared to female students. Female students thought that medical students were not capable of prescribing medication after passing pharmacology. Gender and safety of doctors are controversial, with studies having conflicting results. A meta-analysis of 32 reports in 2015 revealed that male doctors had ~2.5 times the odds of being subject to medicolegal action than female doctors had. Female doctors seem to take less risk and therefore are less prone to medicolegal action (16).

Antibiotic resistance is on rise and much research is being done to curb this issue (17). Our study showed that antibiotics are among the most common drug prescribed, but alarmingly only 1 of the 112 students advised a culture and sensitivity test. Medical students are not equipped to guide adequate antibiotic therapy (18).

We found that 81% of all students who participated in our study thought that it was right to consult a medical student instead of self-medication. There is a need to correct this misconception. Universities should include the harm of independent prescription and self-medication in their curricula. Medical students should be advised to counsel people who approach them for a prescription instead of entertaining them.

In a country like Pakistan, where per capita income is low, it is tempting to adopt cheap illegal pathways to take medication. Although there is government legislation, and drug inspectors are there to oversee drug distribution channels, drugs can still be availed without a prescription from a certified doctor (1). There is a need for a strict monitoring system to eradicate this issue. Pharmacies should be registered and should not be allowed to sell medication without prescriptions. There are free hospitals established by the government throughout Pakistan that provide free medication but they are under-resourced. Free quality healthcare provision can also stop this problem.

There were several limitations to this study. We only included public sector medical colleges. There are many private sector medical colleges in Pakistan and students at these institutions should be investigated to establish any difference from the public sector. We assumed that final year medical students would prescribe more than nonmedical students. A comparative study should be done to see whether there is any difference in prescribing practice between first and final year medical students. Another limitation was that we only studied 1 province. The study should be replicated nationwide. We did not study the patient perspective on this issue. Another study could be done to determine whether patients would prefer to consult a nearby medical student or a certified doctor and the reasons for such health-seeking behaviour.

In conclusion, many undergraduate medical students prescribe medication and advise diagnostic tests. Public health scientists should further investigate the causes of this issue and a holistic approach is needed to resolve it. Further research is needed to investigate this issue in other developing countries to see a global perspective. This practice can be transformed in a positive way by creating clinics led by medical students that are shadowed by physicians.

Acknowledgements

We are grateful to the students who participated in the study and their institutions.

Funding: None.

Competing interests: None declared.

References

1. Allopathic system (prevention of misuse) (West Pakistan) rules, 1968 (http://www.pmdc.org.pk/LinkClick.aspx?fileticket=cyh4G9XLyPs%3d&tabid=292&mid=850, accessed 31 May 2017).

2. Hu J, Wang Z. Non-prescribed antibiotic use and general practitioner service utilisation among Chinese migrants in Australia. Aust J Prim Health. 2015;22(5):434–9. PMID:26328599

3. Chang FR, Trivedi PK. Economics of self-medication: theory and evidence. Health Econ. 2003 Sep;12(9):721–39. PMID:12950092

4. Tomson G, Sterky G. Self-prescribing by way of pharmacies in three Asian developing countries. Lancet. 1986 Sep 13;2(8507):620–2. PMID:2875329

5. Gurwitz JH. Serious adverse drug effects–seeing the trees through the forest. N Engl J Med. 2006 Mar 30;354(13):1413–5. PMID:16510740

6. Zafar SN, Syed R, Waqar S, Irani F, Saleem S. Prescription of medicines by medical students of Karachi, Pakistan: A crosssectional study. BMC Public Health. 2008 May19;8:162. PMID:18485246

7. Hussain A, Ibrahim MI, Baber ZU. Compliance with legal requirements at community pharmacies: a cross sectional study from Pakistan. Int J Pharm Pract. 2012 Jun;20(3):183–90. PMID:22554161

8. Afridi MI, Rasool G, Tabassum R, Shaheen M. Siddiqullah, Shujauddin M. Prevalence and pattern of self-medication in Karachi: a community survey. Pak J Med Sci. 2015 Sep–Oct;31(5):1241–5. PMID:26649022

9. Pakistan Medical & Dental Council, Higher Education Commission Islamabad. Curriculum of M.B.B.S. (http://www.pmdc.org.pk/LinkClick.aspx?fileticket=EKfBIOSDTkE%3d&tabid=292&mid=849, accessed 1 June 2017).

10. Haseeb A, Bilal M. Prevalence of using non prescribed medications in economically deprived rural population of Pakistan. Arch Public Health. 2016 Jan 22;74:1. PMID:26807216

11. Sreejit EM. MBBS doctors working as quacks: private practice by interns in Kerala medical colleges. Indian J Med Ethics. 2009 Jan–Mar;6(1):38–9. PMID:19241955

12. Oshikoya KA, Bello JA, Ayorinde EO. Prescribing knowledge and skills of final year medical students in Nigeria. Indian J Pharmacol. 2008 Nov;40(6):251–5. PMID:21279180

13. Han WH, Maxwell SR. Are medical students adequately trained to prescribe at the point of graduation? Views of first year foundation doctors. Scott Med J. 2006 Nov;51(4):27–32. PMID:17137145

14. Simpson SA, Long JA. Medical student-run health clinics: important contributors to patient care and medical education. J Gen Intern Med. 2007 Mar;22(3):352–6. PMID:17356967

15. Noguchi Y, Matsui K, Imura H, Kiyota M, Fukui T. Quantitative evaluation of the

diagnostic thinking process in medical students. J Gen Intern Med. 2002 Nov;17(11):839–44. PMID:12406355

16. McGregor CA, Paton C, Thomson C, Chandratilake M, Scott H. Preparing medical students for clinical decision making: a pilot study exploring how students make decisions and the perceived impact of a clinical decision making teaching intervention. Med Teach. 2012;34(7):e508–17. PMID:22452752

17. Foucault C, Brouqui P. How to fight antimicrobial resistance. FEMS Immunol Med Microbiol. 2007 Mar;49(2):173–83. PMID:17181560

18. Ibia E, Sheridan M, Schwartz R. Knowledge of the principles of judicious antibiotic use for upper respiratory infections: a survey of senior medical students. South Med J. 2005 Sep;98(9):889–95. PMID:16217981

Thursday 11th of July 2024 01:40:52 AM