

## Prescription Writing Errors of Midwifery Students in Common Gynecological problems

Parang Serveh (MSc)<sup>1,2</sup>, Nahid Golmakani (MSc)<sup>3\*</sup>, Gebreil Movaffaq (PhD)<sup>4</sup>, Hossein Ja'fari Sani (MSc)<sup>5</sup>

<sup>1</sup> Graduate, MSc in Midwifery, School of Nursing and Midwifery, Kordestan University of Medical Sciences, Kordestan, Iran

<sup>2</sup> Lecturer, Department of Midwifery, School of Nursing and Midwifery, Kordestan University of Medical Sciences, Kordestan, Iran

<sup>3</sup> Lecturer, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>4</sup> Assistant Professor, Department of Pharmaceutics, School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>5</sup> Associate Professor, Department of Education, Faculty of Education and Psychology, Ferdowsi University of Mashhad, Mashhad, Iran

### ARTICLE INFO

*Article type:*  
Original article

*Article History:*  
Received: 25-Oct-2013  
Accepted: 20-Dec-2013

*Key words:*  
Error  
Gynecological disease  
Midwifery student  
Prescription  
Proper medication order

### ABSTRACT

**Background & aim:** Giving improper prescriptions is common among medical practitioners, mostly graduates, in most communities even developed countries. So far, to our knowledge, no study has been conducted on prescription writing of graduate midwifery students. Therefore, this study aimed to detect prescription writing errors of midwifery students in common gynecological problems.

**Methods:** In this descriptive cross-sectional study, 56 bachelor midwifery students, who had passed the theoretical and clinical courses of gynecology, were evaluated by Objective Structured Clinical Examination (OSCE). A demographic questionnaire and a standard checklist for writing the prescriptions and medications were used for data collection. SPSS Version 16 was used to carry out descriptive statistics.

**Results:** Most of the students were single, with the mean age of  $23.0 \pm 1.7$  years. Most errors were related to not recording the patients' age and sex, diagnosis, chief complaint, and the prescriber's name (observed in less than 10% of the prescriptions). The complete dosage schedule and drug name were stated only in  $1.8 \pm 4.8$  and  $14 \pm 18.6$  of prescriptions, respectively. In more than 93% of the cases, route of use and treatment duration were not recorded.

**Conclusion:** According to the results, the number of prescription errors of midwifery students was high. Therefore, it is recommended to run educational courses on prescription writing skills (e.g. writing prescriptions based on World Health Organization (WHO) guidelines) for the midwifery students.

► Please cite this paper as:

Serveh P, Golmakani N, Movaffaq G, Ja'fari Sani H. The Study of Prescription-writing Errors of Midwifery Students in Common Gynecological Treatments. Journal of Midwifery and Reproductive Health. 2014; 2(2):105-111.

## Introduction

Significant efforts have been invested in organizing advanced pharmaceutical systems by health care systems across the world. World Health Organization (WHO) by introducing safe medication usage protocols has facilitated the development of communities with safe, efficient, and high-quality medication use (1).

Prescription writing is one of the most important activities in the health care system of every country. Most of the physicians demonstrate their skills by writing a prescrip-

tion, which is considered as the first step of medical intervention (2). Prescription writing is a complex and challenging skill which depends on the physician's diagnostic skills, comprehensive pharmacological knowledge, communication skills, understanding of the principles of clinical pharmacology, the ability to make decisions regarding the potential risks vs. benefits, and clinical experiences (3).

The errors of prescription writing have been reported in numerous studies (4, 5). These

\* Corresponding author: Nahid Golmakani, School of Nursing and Midwifery, Mashhad, Iran. Email: GolmakaniN@mums.ac.ir

errors include over- and under-prescription (prescription more or less than the effective amount), polypharmacy, and improper prescription writing. WHO studies indicate that immethodical prescription writing and drug administration are common worldwide (6, 7).

Rational prescription writing means prescribing the most effective and proper medications (in terms of dosage, frequency, duration of therapy, availability, and pricing) for a disease regarding the patient's characteristics (8, 9). Prolonging or intensifying the disease, incomplete and ineffective treatment (10, 11), psychological damage (10-13), patient's dissatisfaction, terminating physician-patient relationship (13), causing drug interactions and toxicity (8), diminishing pharmaceutical resources, increasing expenditure, and creating misconceptions in the general public are among the disadvantages of improper prescription writing (6).

Studies conducted in different world regions indicated lack of competence in prescription-writing skills of recently graduated medical students and medical students in general (14-17). In a study carried out in the UK, more than 80% of medical graduates failed the prescription-writing test (18), and pharmaceutical errors were common among them (3, 16, 17, 19). In the mentioned study, the errors were multi-factorial and insufficient pharmaceutical knowledge (a combination of scientific and clinical knowledge) and inadequate previous education were the most important causes (3, 20, 21). In a British study, the number of medication errors during a week was 135, of which 25% induced high risks for the patients, and 89% of the errors were made by the recently graduated students (22).

According to the act of supreme council of Iranian Medical Association and The Ministry of Health and Medical Education, midwives, as health care providers, should provide reproductive health care services for patients of all ages, females, families, and communities.

Midwives can provide various medical services including: maternal screening before/during pregnancy and before/after marriage; screening for breast diseases and common gynecologic malignancies; treatment of female genitourinary infections, menstrual

disorders, and mastitis; and prescribing proper medications (23).

So far, in Iran, no study has been conducted for the evaluation of midwifery students in different programs (at associate, baccalaureate, and master's degree levels). Therefore, this study aimed to study the prescription-writing errors of midwifery students of Mashhad University of Medical Sciences, School of Nursing and Midwifery, in 2010.

## Materials and Methods

In the present descriptive cross-sectional study, 56 senior students (continuous and discontinuous BSc students) of midwifery were selected.

The students who met the following criteria were included in the study: 1) Iranian nationality, 2) a student of midwifery in The Faculty of Nursing & Midwifery of Mashhad, 3) having passed the theoretical and clinical units of obstetrics (units 1&2) and theoretical and clinical units of gynecology, and 4) willingness to participate in the study.

The exclusion criteria were as follows: 1) a guest student, 2) previous clinical experiences, 3) employed in the midwifery units of clinical centers, 4) previous training on prescription writing before participation in the study, and 5) overstressed or experiencing a terrible event in the last six months prior to the study.

The senior students of midwifery were evaluated by objective structured clinical examination (OSCE). This test covers three common diseases: candida vaginitis, abnormal bleeding control, and pelvic inflammatory disease.

In term of OSCE evaluation, stations 1, 2 and 3 were set up similarly, in a way that students were first given the patients' illness description, and then were asked to order a prescription suitable for each case. In each station, 94, 96, and 123 scores were obtained, respectively.

The prescriptions were analyzed using a checklist containing two sections of prescription standard structure and medication order. The standard structure section included demographic/personal data of the patients (name, age, and sex) and the structure of prescription writing, i.e., writing the patient's chief complaint (CC), diagnosis (Dx), symbol (Rx), number of the

**Table 1.** Mean and standard deviation of standard structural components of prescriptions

Standard structural components of prescriptions		Results
		Mean $\pm$ SD
Demographic data of patients	Patient's name	36.3 $\pm$ 43.2
	Age	2.9 $\pm$ 14.6
	Sex	1.8 $\pm$ 7.6
	Total	20.5 $\pm$ 25.2
	Date of prescription	34.5 $\pm$ 41.7
	Chief complaint (CC)	7.7 $\pm$ 25.4
	Diagnosis(DX)	3.0 $\pm$ 16.0
Total structure of prescriptions	Writing (RX) symbol	33.33 $\pm$ 41.1
	Writing (N)	81.5 $\pm$ 27.6
	Prescriber's signature	28.0 $\pm$ 38.5
	Prescriber's name	7.7 $\pm$ 21.0
	Lack of cross-outs	53.0 $\pm$ 30.3
	Legible handwriting <sup>1</sup>	68.2 $\pm$ 27.7
	Numbering	79.8 $\pm$ 27.2
Standard structure of prescriptions	Generic name	100 $\pm$ 0
	Total	41.2 $\pm$ 13.4
		36.6 $\pm$ 13.0

<sup>1</sup> being readable and identifiable by the investigator

**Table 2.** Mean and standard deviation of medication order components

Medication order	Mean $\pm$ SD
Full name of the drug	14.0 $\pm$ 18.6
Correct spelling of the drug name	26.5 $\pm$ 21.0
Correct medication prescription	23.3 $\pm$ 53.8
Strength of the medication	40.3 $\pm$ 22.6
Dosage form	42.6 $\pm$ 21.2
The number or dose of the medications	20.1 $\pm$ 17.0
Complete written instructions	1.8 $\pm$ 4.8
Total of medication orders	28.4 $\pm$ 16.5

drugs (N), prescriber's signature and name, date of prescription, numbering the prescribed drugs (in English), use of generic drugs, and legible prescriptions without cross-outs. The medication order section contained subscales including: the full name of the drug, correct spelling, prescription of proper medications, along with the dosage form, strength, quantity, and proper written instructions for the patients.

This checklist was prepared based on the standard structure of prescriptions introduced by WHO. To determine the validity of demographic data and also to evaluate the registered records, the "content validity" method was implemented which was revised and amended by ten tutors of Mashhad Faculty of Nursing & Midwifery. The internal consistency reliability of OSCE test was assessed by using Cronbach's alpha test ( $\alpha=0.806$ ). Demographic and checklist data (by conversion

to the basis of one hundred) were analyzed using descriptive analysis.

## Results

Most of the students were single (64.3% and 23.9% were single and married, respectively), within the age range of 21-28 years (mean=23.0 $\pm$ 1.7 years). Of all participants, 69.6% and 30.4% were studying in 4- and 2-year programs, respectively. In addition, the grade point average (GPA) of clinical gynecology course (1) was sixteen.

According to the results, demographic data (including age and sex) were included in less than 3% of the prescriptions; patient's name was recorded more frequently in comparison with other components (36.3%). All the prescribed drugs were generic and almost half of the prescriptions showed cross-outs. Chief complaint, diagnosis, and prescriber's name were recorded in less than 9% of the prescriptions. Overall, 20.5%, 41.2%, and 36.6% of the demographic data, the prescription structure, and the total standard structure of the prescriptions were recorded, respectively (Table 1).

Regarding the medication order, drug strength and dosage form were most frequently included in the prescriptions. The rest of the components were stated in less than 27% of the prescriptions. The minimum and maximum

**Table 3.** Mean and standard deviation of the components of written instructions for each condition

Medication written instructions	Pelvic inflammatory disease	Abnormal bleeding control	Candida vaginitis	Total
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Quantity	41.29±7.3	16.0±23.6	5.7±49.9	35.7±22.3
Frequency	55.3±37.7	13.4±22.3	29.5±29.8	32.7±19.6
Usage conditions	26.8±27.3	0.89±6.7	14.3±35.3	16.0±15.2
Route of administration	8.9±16.2	1.8±9.4	18.7±31.0	6.4±10.4
Duration of therapy	7.1±22.2	2.7±11.4	9.8±20.0	6.5±10.4
Total	60.6±17.4	7.0±10.8	25.9±21.8	31.1±12.0

The maximum and minimum scores of OSCE test were 0 and 313, respectively.

scores were related to writing the complete instruction to the patients (1.8%) and the full name of the drug (14%), respectively. The total score of appropriate medication orders was 28.4% (Table 2).

The least considered component in most of the prescriptions was the route and duration of therapy (less than 6.5%). The other components were stated in less than 36% of the prescriptions. The maximum and minimum components considered in candida vaginitis, abnormal bleeding control, and pelvic inflammatory disease, were quantity and duration, quantity and condition, and frequency and duration, respectively. The best and worse medication orders were allocated to pelvic inflammatory disease (60.6%) and abnormal bleeding control (less than 7%) (Table 3).

## Discussion

Prescription writing is a skill used by clinical practitioners to achieve therapeutic goals. Therefore, prescriptions should be clearly written and have no deletions, integration errors, and non-standard/non-official abbreviations. They should also be in agreement with the ethical considerations of prescription writing (4).

In this study, the subjects obtained less than 35% of the scores of standard prescription-writing components (except for legibility, lack of cross-outs, writing N, numbering, and prescribing by generic drug names). On the other hand, Ranial et al. reported that most medical students of Nepal Medical and Dentistry School were able to obtain more than 60% of the scores of standard structural components (14).

Motamed's study (2006) showed that cross-outs and legibility were observed in 76.9% and 90% of prescriptions, respectively (compared with 53% and 68.2% in the present study,

respectively) (10). In Nobel Medical Teaching Hospital in Nepal, Ansari (2009) found no errors regarding the age and sex of the patients (24); however, in the present study, they were recorded in less than 3% of the prescriptions.

In Motamed's study, data gathered during patients' visits were included in 61.5% of the prescriptions, and 75.5% of them had the prescriber's signature (2); however, in the present study, both components were less frequently considered compared with the mentioned study (36.5% and 28%, respectively).

Regarding the extensive educational content of the courses of pharmacology and gynecological diseases, and the limited time of the clinical course of gynecological diseases, the focus of education is on pharmaceutical knowledge, indications, contraindications, side effects, signs and symptoms, and diagnosis; on the other hand, less time is allocated to the principles of pharmaceutical treatments. The presence of different students (residents, and medical and midwifery students) in gynecological clinics, lack of prescription writing by midwifery students as independent prescribers, students' lack of experience in clinical settings, and finally ignoring the standard components of prescription structure result in improper prescription writing by the students.

Prescription is a challenge for graduated midwives; therefore, a separate course/unit for teaching the principles of prescription writing is necessary. As it was demonstrated by Navabi Rigi (2011), holding prescription-writing training workshops for midwifery students results in the improvement of students' ability in prescription writing; it also increases the efficiency and satisfaction of graduated students, employed in midwifery clinics (25).

In this study, all prescribed medications had

generic names, which was a positive point in the prescription writing of the students; writing generic names is more economic, and facilitates access to medications and pharmaceutical distribution (16). However, in Oshikoya's study (2007), only 48.39% of the medications were prescribed by their generic names (16).

Every prescription is a legal document, in which considering all medication characteristics is necessary; therefore, error-free spelling of the full name of drugs, legibility, dosage form, strength, quantity, and proper instructions are of high significance (26-28).

In the present study, the least considered component was writing complete instructions for the patients (1.8%). Perhaps, this is due to the prescribers' lack of attention to patients' role in the treatment or patients' lack of education, since it is believed that providing instructions is part of the pharmacists' responsibilities. In Shama's study (2008), this component was recorded only in 15.38% of the prescriptions (29).

Generally, the instructions should be clearly written in Farsi, without any Latin abbreviations; They should include the frequency, quantity, route, and conditions of medication consumption (27, 28).

In this study, the least considered components of proper instructions were the duration and route of drug administration (less than 6.5%); the rest of the components accounted for less than 36% of the errors. In Motamed's study (2004), 44% of the prescriptions included the proper duration of therapy, and in Ansari's study, the route of administration was not recorded in 63% of the prescriptions (2).

Most students (60.6%) wrote proper medication orders for pelvic inflammatory disease, while it was less than 7% for controlling abnormal bleeding. This difference could be due to variations in students' level of knowledge regarding the mentioned diseases. Probably, the students were less familiar with the medications for controlling abnormal bleeding, thus resulting in incomplete prescription writing.

Since many medications are different in terms of their dosage form and strength, they should be mentioned in prescriptions. According to Ansari (2009), the dosage form and strength

of medications were not recorded in 12% and 40% of the prescriptions, respectively (24); whereas in the present study, less than 42% of the prescriptions included the correct dosage form and strength of the medications; this can be related to students' insufficient knowledge about the dosage form and strength of medications.

In Ansari's (2009) and Sharma's (2008) studies, the quantity of medications was written in 40% and 73.30% of the prescriptions, respectively (24, 29); however, in this study, less than 20% included the proper dose, which is mostly due to insufficient knowledge regarding the treatment duration. Less than 37% of the students obtained the total score related to the structure of prescription writing, medication order, and proper instructions.

## Conclusion

As to the results, prescription-writing errors were highly evident in midwifery students; therefore, it seems that academic units on pharmacology, gynecological diseases, and clinical gynecology do not improve the prescription-writing skills of midwifery students to an acceptable level. This problem could be resolved by running particular educational courses on standard prescription writing (e.g. writing prescriptions based on WHO guidelines).

## Conflict of Interest

No conflict of interest exists.

## References

1. Dinarvand R, Nikzad A. Check the condition of prescribe and use of medication in Tehran. *Hakim Journal*. 1999; 3(3):224-230. [Persian]
2. Chaturvedi SK, Sinha P, Chandra PS, Desai G. Improving quality of prescription with clinical audit. *Indian Journal of Medical Sciences*. 2008;62(11):461-464.
3. Likic R, Maxwell SR. Prevention of medication errors: teaching and training. *British Journal of Clinical Pharmacology*. 2009;67(6):656-661.
4. Khaja KAJA, Sequeira RP, Al-Ansari TM, Damanhori AHH. Prescription writing skills of residents in a family practice residency programme in Bahrain. *Postgraduate Medical Journal*. 2008;84:198-204.



5. Hogerzeil HV. Promoting rational prescribing: an international perspective. *British Journal of Clinical Pharmacology*. 1995; 39(1):1-6.
6. Zare N, Razmjoo M, Ghaemina M, Zeighami B, Aghamaleki Z. Effectiveness of the Feedback and Recalling Education on Quality of Prescription by General Practitioners in Shiraz. *Journal of Zahedan University of Medical Sciences (Tabib-e-shargh)*. 2008;9(4):255-261. [Persian]
7. Akici A, Oktay S. Rational Pharmacotherapy and Pharmacovigilance. *Current Drug Safety*. 2007; 2(1):65-69.
8. Akici A, Kalaça S, Ümit Ugurlu M, Karaalp A, Çali S, Oktay U. Impact of a short postgraduate course in rational pharmacotherapy for general practitioners. *British Journal of Clinical Pharmacology*. 2003; 57(3):310-321.
9. Sharma R, Chopra VS, Verma U, Sawhney V. Clinical Case Studies: Novel Tools for Training Medical Students in Rational Prescribing Skills. *Journal of Clinical and Diagnostic Research*. 2008; 2:1175-1179. [Persian]
10. Motamed N, Kashi A, Safar M, Alian S, Khadem Loo M, Eslamiyan R. Prescription writing ability of interns for common illnesses, Sari Medical School, summer 2004. *Journal of Mazandaran University of Medical Sciences*. 2006;16(51):101-110. [Persian]
11. Akici A, Goren M, Aypak C, Terzioglu B, Oktay S. Prescription audit adjunct to rational pharmacotherapy education improves prescribing skills of medical students. *European Journal of Clinical Pharmacology*. 2005; 61(9):643-650.
12. Grissinger M, Kelly K. Reducing the risk of medication errors in women. *Journal of Women's Health*. 2005;14(1):61-67.
13. Sobhani A, ShojaeeTehrani H, Pasandideh M, Pourreza B. Evaluation of drug prescription in Guilan. *The Journal of Qazvin University of Medical Sciences & Health Services*. 1999;2(4):11-16. [Persian]
14. Rauniar G, Roy R, Das B, Bhandari G, Bhattacharya S. Prescription Writing Skills of Pre-Clinical Medical and Dental Undergraduate Students. *Journal of the Nepal Medical Association*. 2008;47(172):197-200.
15. Ross S, Loke Y. Do educational interventions improve prescribing by medical students and junior doctors? A systematic review. *British Journal of Clinical Pharmacology*. 2009;67(6):662-670.
16. Oshikoya KA, Bello JA, Ayorin EO. Prescribing knowledge and skills of final year medical students in Nigeria. *Indian Journal of Pharmacology*. 2008;40(6):251-255.
17. Sim S, Choo W, Ng C. Are our new medical graduates ready to prescribe. *Medical Education*. 2009;43(5):492.
18. Maxwell S, Walley T. Teaching safe and effective prescribing in UK medical schools: a core curriculum for tomorrow's doctors. *British Journal of Clinical Pharmacology*. 2003; 55(6): 496-503.
19. Ross S, Loke Y. Do educational interventions improve prescribing by medical students and junior doctors? A systematic review. *British Journal of Clinical Pharmacology*. 2009; 67(6):662-670.
20. Dean B, Schachter M, Vincent C, Barber N. Causes of prescribing errors in hospital inpatients: a prospective study. *The Lancet*. 2002; 359: 1373-1378.
21. Leape LL, Bates DW, Cullen DJ, Cooper J, Demonaco HJ, Gallivan T, et al. Systems analysis of adverse drug events. *The Journal of the American Medical Association*. 1995; 274: 35-43.
22. Heaton A, Webb DJ, Maxwell SR. Undergraduate preparation for prescribing: the views of 2413 UK medical students and recent graduates. *British Journal of Clinical Pharmacology*. 2008;66(1):128-134.
23. Ministry of Health and Medical Education. Qualification regulations of undergraduate and graduated midwives. Tehran. 2009. [Persian]
24. Ansari M, Neupane D. Study on determination of errors in prescription writing: A semi-electronic perspective. *Kathmandu University Medical Journal*. 2009; 7(27):238-241.
25. Navabi Rigi SH, Moody Z. Training to upgrade the prescribing skills of midwifery students of Zahedan. 12th National Conference on Medical Education, 2011; May 1-3; Mashhad, Iran. *Journal of Medical Education Development Horizons*. 2011; 4(2): 215. [Persian]
26. De Vries TP, Henning RH, Hogerzeil HV, Fresle DA. *Guide to Good Prescribing: a practical manual*. Geneva: World Health Organization; 1994.
27. Javadi M. *Principles of rational drug prescribing*. Qom: Mandegar; 2008. [Persian]

28. Harevardi SM. Guidance of rational drug prescribing and consuming. Esfahan: Kankash; 2006. [Persian]
29. Sharma R, Chopra VS, Verma U, Sawhney V. Clinical Case Studies: Novel Tools for Training Medical Students in Rational Prescribing Skills. *Journal of Clinical and Diagnostic Research*. 2008; 2:1175-1179. [Persian]