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Prescription Illegibility and Incompleteness Errors in Benghazi Ophthalmology Clinics: A Comparison of Handwritten and Computerized Prescriptions

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Abstract: *Medication error is the second cause of patient safety incidents that could lead to morbidity and mortality. The incompleteness and illegibility of medication prescription are high in developing countries. Most developed countries adopted electronic prescribing that has led to a reduction of incompleteness and illegibility of medication prescription errors. This study aimed to compare the illegibility and incompleteness rate in handwritten and computerized prescriptions in two ophthalmology clinics in Benghazi. A cross-sectional descriptive study was performed in outpatient ophthalmology clinics. Data were collected from Al-Kish public ophthalmology polyclinic, and advanced ophthalmology private center. The handwritten and computerized prescriptions were assessed for incompleteness by the checklist based on the Al-Kish polyclinic prescription format and WHO's guide to good prescribing. The handwritten prescriptions were evaluated for illegibility by two pharmacists. The patient and prescriber identification incompleteness rate in the handwritten prescriptions was 61.4% while it was 10.6% in the computerized prescriptions. In the handwritten prescriptions, the rate of medication identification incompleteness was 42.6% compared to 5.6% in the computerized prescriptions. There was no agreement between the experienced and less experienced pharmacists regarding prescription legibility. In conclusion, incompleteness was higher in handwritten prescriptions than computerized prescriptions. This study emphasizes electronic prescription use.*

Keywords: *incompleteness, illegibility, handwritten prescription, computerized prescription, Ophthalmology.*

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I. Introduction

Medication errors have received considerable attention as a public health issue worldwide, it is the second cause of patient safety incidents that could lead to morbidity and mortality in the healthcare settings [1,2]. As was cited in WHO technical series (2016), the National Coordinating Council for Medication Errors Reporting and Prevention (NCCMERP) has defined Medication Errors (MEs) as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer" [3:4].

The most essential component in medication errors is prescribing errors which account for about 70% of medication errors [2,4]. These errors can be preventable therefore it becomes the most significant goal for enhancement [5]. Illegible and incomplete prescribing information is a common problem especially in developing countries [6,7].

Globally no one standard was adopted for prescription; WHO recommended sets of information that should be included on the prescription format [8,9]. Therefore, the prescription format may differ slightly from one country to another [10]. However, most countries agree on the basic components of a good prescription should include prescriber's information (name, address, contact number, signature and date), patient's information (name, age and gender), and medication information (medication's name, dose, duration of use, frequency of medication administration, and route of administration). The non-official abbreviation should not be used for medication's name; instruction and warning for the patient should be included in the prescription [9,11].

Electronic prescribing is widely used and available in developed countries such as the United Kingdom[12]. Computer-generated prescriptions contain 100% information on prescriber details and the patient details. It also reduces medication identification errors such as dose and frequency of use; and solves the problem of legibility of prescriptions [4].

However, the handwritten prescription is still widely used in developing countries [13]. Therefore developing countries still suffer the consequences of the illegible and incomplete writing of prescription which means more medication errors [4,14].

Many studies suggested that an overall rate of illegibility and incompleteness above 20% is unacceptably high [15,16]. Handwritten prescription studies from Ethiopia, Sri Lanka, Bahrain, Pakistan and Vietnam reported a high incidence of illegibility and incompleteness errors in the prescription that range from 30.2% to 60.2% of all medication errors [6,17,18,19,20]. Some studies have revealed that illegible handwriting is the highest prevalence of medication errors [21].

Some hospitals in developing countries tried to solve the problem of illegibility and incompleteness errors by adopting computer printout prescriptions (computerized prescriptions) [4,17]. Indeed this adoption led to a reduction of incompleteness in prescription errors and made prescriptions legible [4,17].

Prescription errors are too high and patients' life is at risk; many detailed studies throughout the world attended to this problem to find solutions. Sadly, very few studies highlighted the consequences of prescribing errors in the Arab countries particularly in Libya. Therefore, this study's aim is to compare the illegibility and incompleteness rate in handwritten and computerized prescriptions in two ophthalmology clinics in Benghazi.

II. Material and Methods

A cross-sectional descriptive study was conducted in the outpatient ophthalmology clinics in both Al-Kish polyclinic and the Advanced Ophthalmology Center; during the period from 15th May 2017 to 15th June 2017.

To conduct a comparison, the Advanced Ophthalmology Center was chosen on account of its computerized prescriptions (computer printout prescriptions) which provided a unique opportunity to investigate the effects of information technology on patient safety. Al-Kish polyclinic from which the handwritten prescriptions were obtained, was the only public ophthalmology clinic operating in Benghazi during the study time.

Subjects & selection method

Regarding the outpatient pharmacy at the Al-Kish public polyclinic, the total of handwritten prescriptions from 15th May 2017 to 15th June 2017 was 564. 30% of prescriptions (188 handwritten prescriptions) were selected using a systematic random sample technique.

While computerized prescriptions (computer printout prescriptions) were collected from the Advanced Ophthalmology Private Center. Because of the small numbers of monthly prescriptions issued, all of the orders from 15th May 2017 to 15th June 2017 were included in the study which was 96 computerized prescriptions.

Procedure methodology

A three-step review process was used in the study. The first and second reviews were done by researchers who checked completeness and incompleteness of prescriptions' information. In the first review, the researchers checked for the patient and prescriber identification using a checklist based on the Al-Kish polyclinic prescription form (e.g., patient's name and prescriber's signature). In the second review, the researchers reviewed all prescriptions for medications' information based on "Guide to Good Prescribing" issued by WHO [9].

The third review was concerned with legibility evaluation of handwritten prescriptions. This was conducted by two pharmacists in accordance with a 3-point legibility scoring Likert scale, as used in previous studies [16,22,23]. On the Likert scale, 3 represents legibility (can read the medications order without consulting other health care professional or reference), 2 represents legibility with effort (can read the medications order after consulting with one or more healthcare professional and/or references), and 1 represents illegibility (cannot read the medications order, despite consultation with one or more healthcare professional and/or references).

Each evaluating pharmacist was chosen based on terms of experience (the experienced pharmacist had more than 5 years of experience, and the less experienced pharmacist had less than two years of experience). Each pharmacist independently gave a score to all handwritten prescriptions. After completing prescription evaluation, interviews were conducted with the two pharmacists on how the evaluation evolved.

Statistical analysis

Data analysis was executed using the SPSS program (Statistical Package for Social Sciences) version 18. The cross tabulation and column charts were used to describe and compare completeness and incompleteness across all prescription elements. The chi-square test was applied for comparing prescribing errors in handwritten and computerized prescriptions. Kappa test was used to measure the agreement between the evaluations of the two pharmacists' rating for legibility.

III. Results

A total of 188 handwritten prescriptions and 96 computerized prescriptions were analyzed. With regard to patient and prescriber identification completeness in the handwritten and the computerized prescriptions, all prescriptions had doctors' signatures. There was statistical significance difference between the handwritten and the computerized prescriptions regarding the percentage of missed elements *(P<0.05).* In the handwritten prescriptions, patient name was found in 78.7% of the prescriptions; while, age, gender, date, and doctor name were found in only 14.1%, 2.1%, 14.9% and 21.3% of the prescriptions respectively; as shows in Table 1. On the other hand, in the computerized prescriptions, the patient name and doctor name were found in all computerized prescriptions; while, age, gender and date were found in 75.0%, 63.0% and 95.8% of the prescriptions respectively; as shows in Table 1. Moreover, the rate of incompleteness in the handwritten prescriptions was 61.4% compared to 10.6% in the computerized prescriptions; as shows in Figure 1.

Table (1): Assessment of patient and prescriber identification in the handwritten and computerized prescriptions

Variables	Handwritten prescriptions (n=188)		Computerized prescriptions (n=96)	
	completeness No. (%)	**incompleteness No. (%)**	**completeness No. (%)**	**incompleteness No. (%)**
Patient name	148 (78.7%)	40 (21.3%)	96 (100.0%)	0 (0.0%)
Chi-square test = 23.7, df=1 , *P=0.000**				
Age	28 (14.9%)	160 (85.1%)	72 (75.0%)	24 (25.0%)
Chi-square test = 100.6, df=1 , *P=0.000**				
Gender	4 (2.1%)	184 (97.9%)	63 (65.6%)	33 (34.4%)
Chi-square test =142.1, df=1 , *P=0.000**				
Date	28 (14.9%)	160 (85.1%)	92 (95.8%)	4 (4.2%)
Chi-square test =170.6, df=1 , *P=0.000**				
Doctor name	40 (21.3%)	148 (78.7%)	96 (100.0%)	0 (0.0%)
Chi-square test =157.8, df=1 , *P=0.000**				
signature	188 (100.0%)	0 (0.0%)	96 (100.0%)	0 (0.0%)

* *P<0.05* is statistically significant

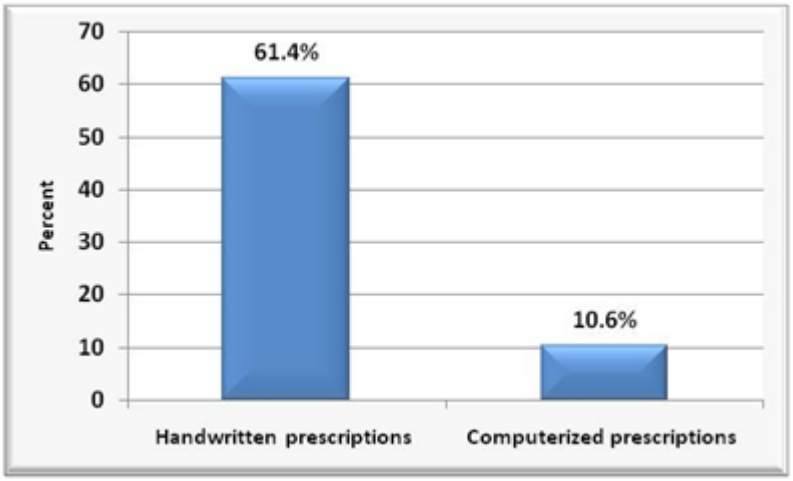

Figure (1): The rate of patient and prescriber identification incompleteness in handwritten and computerized prescriptions

However, all handwritten and the computerized prescriptions had recorded medication name and frequency of use; with no use of abbreviation for medication name in both type of prescriptions. There was a statistical significance difference between the handwritten and the computerized prescriptions regarding the dose *(P<0.05)*; which was missed in 10.6% of handwritten prescriptions compared to 0.0% in computerized prescriptions; as shows in Table 2.

The "duration of a medication" and "route of administration" variables were missed in 76.6% and 78.7% respectively in the handwritten prescriptions; compared to 4.2% and 0% respectively in the computerized prescriptions *(P<0.05).* Moreover, the "which-eye" variable was missed in 89.4% of the handwritten prescriptions compared to 29.2% in the computerized prescriptions; as shows in Table 2.

Moreover, in the handwritten prescriptions, the rate of medication identification incompleteness was 42.6% compared to 5.6% in the computerized prescriptions; as shows in Figure 2.

Table (2): Assessment of medications identification prescription completeness

Variables	Handwritten prescriptions (n=188)		Computerized prescriptions (n=96)	
	completeness No. (%)	incompleteness No. (%)	completeness No. (%)	incompleteness No. (%)
Medication name	188 (100.0%)	0 (0.0%)	96 (100.0%)	0 (0.0%)
Dose	168 (89.4%)	20 (10.6%)	96 (100.0%)	0 (0.0%)
Chi-square test =10.9, df=1 , *P=0.001**				
Frequency	188 (100.0%)	0 (0.0%)	96 (100.0%)	0 (0.0%)
Duration	44 (23.4%)	144 (76.6%)	92 (95.8%)	4 (4.2%)
Chi-square test =133.5, df=1 , *P=0.000**				
Route	40 (21.3%)	148 (78.7%)	96 (100.0%)	0 (0.0%)
Chi-square test =157.8, df=1 , P=0.000*				
Which eye	20 (10.6%)	168 (89.4%)	68 (70.8%)	28 (29.2%)
Chi-square test =15.5, df=1 , *P=0.000**				

* *P<0.05* is statistically significant

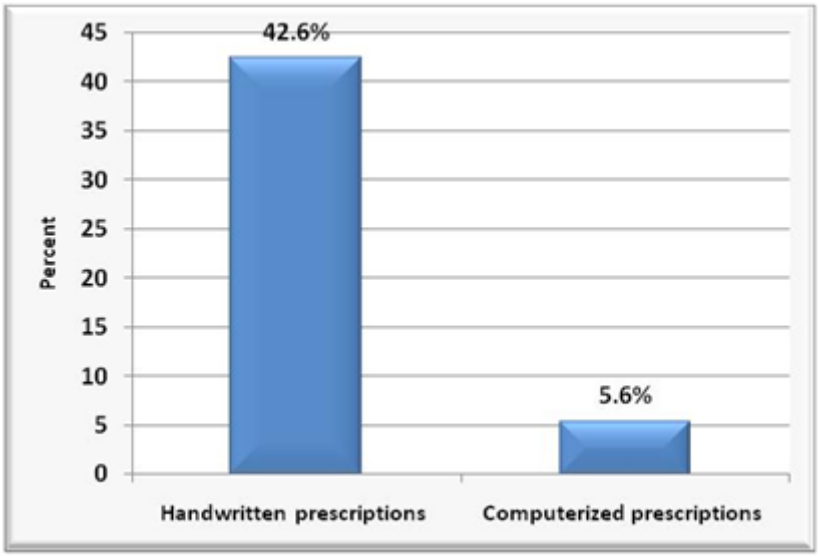

Figure (2): The rate of medications identification incompleteness in Handwritten and computerized prescriptions

There was no agreement between the experienced and the less experienced pharmacists regarding prescription legibility scoring *(Kappa= 0.026).* The experienced pharmacist reported that 97.9% of handwritten prescriptions were legible, while 2.1% of the handwritten prescriptions were legible only with effort. The less experienced pharmacist reported that 83.0% of the handwritten prescriptions were legible, while 17.0% of the handwritten prescriptions were legible only with effort; as shows in Figure 3.

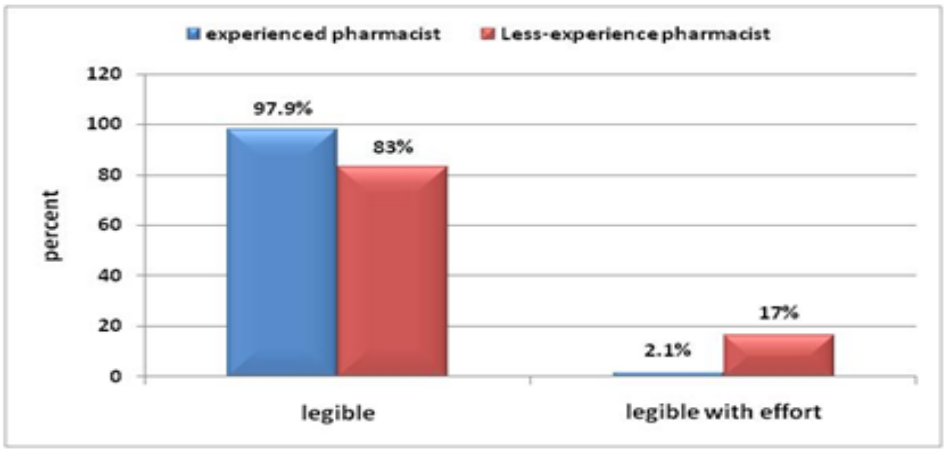

Figure (3): Evaluation of handwritten prescriptions legibility by pharmacists

IV. Discussion

"There is no global standard for prescriptions and every country has its own regulations taking in consideration that the most important requirement is that the prescription is clear" [9:66]. Incompleteness information in medication prescription and illegible handwriting leads to ambiguous and erroneous medical prescriptions [15,16]. In this study, legibility and completeness were compared in both handwritten and computerized prescriptions.

Patient and prescriber identification should be included in medication prescriptions according to WHO [9]. and Al-Kish polyclinic's prescription form sheet. Roughead et al. (2013) and Bhosale et al. (2013) reported that incompleteness errors in the patient and prescriber identification and medication identification are often observed in handwritten prescriptions [7,24]. In this study, more incompleteness regarding patient and prescriber identification, was found in handwritten prescriptions; when compared to the computerized ones. With a significant difference in each element of the patient and prescriber identification existed *(P<0.05)*. Surprisingly, the patient's name was missed only in 21.3% of the handwritten prescriptions but, the patient's age, gender, date, and doctor's name were missed in more than 75% of the handwritten prescriptions. Meanwhile, less than 35% of computerized prescriptions were missing age and gender; as shows Table 1. In agreement with a study conducted in Gujarat by Joshi et al. (2015) reported that the handwritten prescriptions incompleteness were higher than computerized prescriptions; however, in this study, the percentage of missed elements (patient's age, date, and doctor's name) in handwritten prescriptions was high compared to that shown by Joshi et al. (2015) [4].

Calligaris et al. (2009) and Albarrak et al. (2014) suggested that an overall illegibility or incompleteness above 20% is unacceptably high [15,16]. The overall rate of the patient and prescriber identification incompleteness in the computerized prescriptions was 10.6% which is an acceptable percentage; while it was 61.4% in the handwritten prescriptions which is not only higher than that shown by Calligaris et al. (2009) but, also is unacceptably high compared to other comparable studies [15].

Missing medication identifications on prescription (e.g. dose and frequency) affect the accuracy of prescriptions and causes misinterpretation of prescriptions [11]. Many studies showed that most medication identification prescription incompleteness in handwritten prescriptions was in dose, frequency of administration, duration of treatment, or route of administration [4,15,16,25]. In this study, all handwritten and computerized prescriptions had recorded the frequency of administration, while; dose was missing in 10.6% of the handwritten prescriptions compared to nil in computerized prescriptions *(P<0.05).* In this study, both handwritten and computerized prescriptions incompleteness in dose and frequency of administration were less in percentage than the Gujarat study[4].

In addition, a significant difference existed between handwritten and computerized prescriptions in the duration of treatment, route of administration and which-eye *(P<0.05 in each one)*. They were missing in more than 75% of the handwritten prescriptions; while, the duration of treatment was missing in only 4.2% and "which-eye" was missing in 29.2% of computerized prescriptions; as shows in Table 2. These results were higher than that shown by Sanguansak et al. (2012) where the duration of treatment, route of administration, and which-eye were missing in less than 15% of handwritten prescriptions, and were missing in less than 0.5% in FormularyScript prescriptions[25].

Furthermore, a study conducted in the USA by Bizovi et al. (2002), reported that "Computer-assisted prescriptions were more than three times less likely to contain errors than handwritten prescriptions"[26:7]. The overall rate of medication identification incompleteness in the handwritten prescriptions was 42.6% which is unacceptably high. Also, this percentage was higher than the 8.5% of Albarrak et al study which was conducted in medicine outpatient department [23]. While the overall rate of medication identification incompleteness in the computerized prescriptions was 5.6% which is an acceptable percentage of error; as shows in Figure 2. This result was lower than Gujarat study result where the overall rate of medication identification incompleteness in the computerized prescriptions was 12.3% [4].

Bizovi et al. (2002), stated that computer-assisted prescriptions are not only more legible than the handwritten prescriptions, but also they require less clarification from doctors [26]. However, illegible handwriting is a safety risk problem that might lead to loss of life [22,24]. In this study, the legibility of the handwritten prescriptions was evaluated by two pharmacists. Although there was no agreement between the experienced and less experienced pharmacists regarding prescription legibility scoring *(Kappa= 0.026)*, most of the handwritten prescriptions were legible. These results are in agreement with the results of Albarrak et al. (2014), and Farnoud & Shekar (2016) studies[16,22].

However, the interviewed experienced pharmacist reported that 2.1% of the handwritten prescriptions were legible with effort, while the interviewed less experienced pharmacist reported that 17% of the handwritten prescriptions were legible with effort; as shows in Figure 3. A similar study by Albarrak et al. (2014) showed that the legible with effort prescriptions' percentage was 1.5 by expert pharmacist; while, it was 13.6% by non-

expert pharmacist [16]. In addition, a study by Farnoud and Shekar (2016) found that 7.0% of the handwritten prescriptions were legible with an effort by the less experienced pharmacist [22].

This study shows that the longer the pharmacist's experience, the easier is the prescription reading. Albarrak et al. (2014), and Farnoud & Shekar (2016) studies showed a similar observation; the new pharmacist has difficulty reading prescriptions when compared to expert ones [16,22]. Interestingly, this study shows a higher percentage of legibility with effort in comparison to other studies; the pharmacists in this study agreed that they had less difficulty especially with ophthalmology prescriptions than other prescriptions. The reason may be that ophthalmology medications items that doctors use for prescribing in Benghazi are few which may help the pharmacists to catch the medications name easily from some of the legible letters.

Computerized prescriptions have the potential to decrease medication errors related to legibility and incomplete prescribing information; they can improve the quality of prescriptions and increase patients' safety[4,16,25]. Therefore, this study highlights the need to maximize the accuracy and clarity of prescriptions by adopting computerized prescriptions.

Limitations

Firstly, the study was limited to ophthalmology clinic because of unavailability of the computerized prescriptions in other clinics which limited the generalization of our results. Secondly, the poor organization of the handwritten prescriptions at Al-Kish polyclinic's pharmacy led to the exclusion of some of the handwritten prescriptions.

V. Conclusion

This study revealed that although most of the handwritten prescriptions were legible, in the handwritten prescriptions, both patient and prescriber identification and the medication identification rates of incompleteness were unacceptably higher than the computerized prescriptions. This study clearly stating that using the computerized prescription would enhance patient safety.

VI. Recommendations

The results of this study supports the adoption of computerized prescriptions (computer printout prescriptions) to reduce illegibility and incompleteness errors in prescriptions noting that computer printout prescriptions are low in cost. Establishing more detailed research on illegibility and incompleteness errors in prescriptions on all medical specialties is needed. Special interest should be granted to the effects of electronic prescribing on medication errors.

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References

[1]. Krishna J, Singh AK, Goel S, Singh A, Gupta A, Panesar S. A preliminary study on profile and pattern of medication errors from a tertiary care teaching hospital. *IAIM* 2015;2(7):93-8. Available from: http://iaimjournal.com/wwpontent/uploads/2015/07/iaim2015020715.pdf [accessed 2018 January 9].

[2]. Rijal A, Gautam K, Rijal AS. Errors on a handwritten Cardex: Is it time for a change. *Nepal Med Coll J* 2011;13(4): 267-71. Available from: https://www.ncbi.nlm .nih.gov/pubmed/23016477 [accessed 2018 March 9].

[3]. World Health Organization. *Medication Errors: Technical Series on Safer Primary Care.* Geneva: World Health Organization Press; 2016. Available from: http://apps. who.int/iris/bitstream/handle/10665/252274/9789241511643-eng.pdf?sequence=1 [accessed 2018 January 9].

[4]. Joshi A, Buch J, Kothari N, Shah N. Evaluation of Hand Written and Computerized Out-Patient Prescriptions in Urban Part of Central Gujarat. *J Clin Diagn Res* 2015;10: (6) 1-5. Available from https://www.ncbi.nlm.nih.gov/pmc /articles/PMC4963665/pdf/jcdr-10-FC01.pdf [accessed 2018 March 9].

[5]. Ansari M, Neupane D. Study on determination of errors in prescription writing: A semi-electronic perspective. *Kathmandu Univ Med J* 2009;7(3):238-41. Available from: https://www.nepjol.info/index.php/KUMJ/article/viewFile/2730/2422 [accessed 2018 January 9].

[6]. Abdella SH, Wabe NT. Prescribers Adherence to the Basic Principles of Prescription Orders Writing in South West Ethiopia. *Natl J Physiol Pharm Pharmacol* 2012; 2(1):66-70. Available from: https://www.ejmanager.com/mnstemps/28/28-1318581880.pdf [accessed 2018 January 12].

[7]. Bhosale MS, Jadhav NB, Adhav CV. Analysis of completeness and legibility of prescription orders at a tertiary care hospital. *Int J Med Public Health* 2013;3(3): 180-3. Available from: http://www.ijmedph.org/sites/default/files/IntJMedPublicHealth_2013_3_3_180_118975.pdf [accessed 2018 January 9].

[8]. Akoria OA, Isah AO. Prescription writing in public and private hospitals in Benin City, Nigeria: the effects of an educational intervention. *Can J ClinPharmacol*. 2008;15(2):295-305 Available from: https://www.jptcp.com/articles/prescription-writing-in-public-and-private-hospitals-in-benin-city-nigeria--the-effects-of-an-educational-intervention.pdf [accessed 2017 June 9].

[9]. De Vries TP, Henning RH, Hogerzeil HV, Fresle DA. Guide to Good Prescribing: a practical manual. Geneva: World Health Organization Press. Action Programme on Essential Drugs; 1994. Available from: http://apps.who.int/iris/bitstream/handle/10665/59001/WHO_DAP_94.11.pdf?sequence=1 [accessed 2018 January 9].

[10]. Sharma AJ. Prescription drug errors in Anand District. PhD [dissertation]. Gujarat: Saurashtra University; 2011. Available from: http://etheses. saurashtrauniversity.edu/786/1/sharma_aj_thesis_pharmacy.pdf [accessed 2018 April 16].

[11]. Saleem R, Ghoto MA, Siyal FJ, Arain MI, Abbass W., Masood S. Identification of Prescription Writing Errors in Welfare Hospital and Various Private Clinics of Hyderabad City. *ISRA Medical Journal* 2017; 9 (3): 180-4 Available from: https://pdfs.semanticscholar.org/4eb5/a9823f20276bfa983864b36f2864afabbcf2.pdf [accessed 2018 April 16].

[12]. Evans KD, Benham SW, Garrard CS. A comparison of handwritten and computer-assisted prescriptions in an intensive care unit. Crit Care 1998; 2(2):73-8. Available from: https://ccforum.biomedcentral.com/track/pdf/10.1186/cc129 [accessed 2018 April 16].

[13]. Shagufta N, Muhammad HS, Najia R, Wajiha I, Sadia S, Rehana B. Prescription Writing Practices and errors in prescriptions containing cardiovascular drugs specially ACE inhibitors in Karachi, Pakistan. *Asian J Pharm Clin Res.* 2015;8(4):53-5. Available from: https://www.researchgate.net/...Prescription_writing_practices_and _errors_in_prescrip... [accessed 2018 March 16].

[14]. Al-Dhawailie A.A. Inpatient prescribing errors and pharmacist intervention at a teaching hospital in Saudi Arabia. *Saudi Pharm J* 2011; 19(3):193-6. Available from: doi: 10.1016/j.jsps.2011.03.001 [accessed 2018 April 16].

[15]. Calligaris L, Panzera A, Arnoldo L, Londero C, Quattrin R, Troncon M *et al.* Errors and omissions in hospital prescriptions: a survey of prescription writing in a hospital. *BMC Clinical Pharmacology* 2009; 9(9):1-9. Available from: https://bmcclinpharma.biomedcentral.com/articles/10.1186/1472-6904-9-9 [accessed 2018 June 16].

[16]. Al barrak A, Al Rashidi E, Fatani R, Ageel S, Ageel S, Mohammed R. Assessment of legibility and completeness of handwritten and electronic prescriptions. Saudi Pharm J 2014;22:522-7. Available from: https://www. sciencedirect.com/science/article/pii/S1319016414000267 [accessed 2018 June 16].

[17]. De Silva KI, Parakramawansha KP, Sudeshika SH, Gunawardhana CB, Sakeena MH. Investigation of medication errors: A prescription survey from Sri Lanka. *Tropical Journal of Pharmaceutical Research* 2015;14(11):2115-20. Available from: https://www.ajol.info/index.php/tjpr/article/view/126932 [accessed 2018 June 16].

[18]. Aljasmi F, Almalood F, Al-Ansari A. Prevalence of medication errors in primary health care at Bahrain Defence Force Hospital - prescription-based study. *Drug Healthc Patient Saf.* 2018;10:1-7. Available from: doi: 10.2147/DHPS.S147994 [accessed 2018 June 16].

[19]. Saleem R, Dayo A, Ghoto MA, Akram M, Arain MI, Ali A. Prescription writing error in general practice: A cross sectional study at tertiary care hospital in Hyderabad, Pakistan. *IOSR-JPBS* 2013;8(4):72-7. Available from: https://pdfs.semanticscholar.org/4eb5/a9823f20276bfa983864b36f2864afabbcf2.pdf [accessed 2018 April 16].

[20]. Nguyen HT, Nguyen TD, van den Heuvel ER, Haaijer-Ruskamp FM, Taxis K. Medication errors in Vietnamese hospitals: prevalence, potential outcome and associated factors. *PLoS ONE* 2015; 10(9):e0138284. Available from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0138284 [accessed 2018 March 15].

[21]. Qureshi NA, Al-Bedah AM, Koenig HG. Handwritten to Electronic Prescriptions: Emerging Views and Practices, Saudi Arabia. *Br J Med Med Res.* 2014; 4 (28): 4607-26. Available from: http://www.journalrepository.org/media/journals/BJMMR_12/2014/Jun/Qureshi4282014BJMMR10962_1.pdf [accessed 2018 January 9].

[22]. Farnoud MG, Shekar HS. Audit of prescriptions in a tertiary care hospital a retrospective study .*World J Pharm Sci* 2016; 5 (10):886-94. Available from: https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Audit+of+prescripions+in+a+tertiary+care+hospital-a+retrospective+stud&btnG [accessed 2018 January 9].

[23]. Rathish D, Bahini S, Sivakumar T, Thiranagama T, Abarajithan T, Wijerathne B et al. Drug utilization, prescription errors and potential drug-drug interactions: an experience in rural Sri Lanka.BMCPharmacolToxicol2016;1:17-27. Available from https://bmcpharmacoltoxicol.biomedcentral.com/articles/10.1186/s40360-016-0071-z [accessed 2017 December 12].

[24]. Roughead L, Semple S, Rosenfeld E. *Literature Review: Medication Safety in Australia*. [internet]. Australian Commission on Safety and Quality in Health Care (ACSQHC) 2013. Available from: https://safetyandquality.gov.au/wp-content/uploads/2013/08/Literature-Review-Medication-Safety-in-Australia-2013.pdf [accessed 2018 March 15].

[25]. Sanguansak T, Morley MG, Yospaiboon Y, Lorch A, Hedt B, Morley K. The impact of preprinted prescription forms on medication prescribing errors in an ophthalmology clinic in northeast Thailand: a non-randomised interventional study. *BMJ open* 2012; ;2(1):e000539. Available from:https://bmjopen.bmj.com/content/2/1/ e000539.short [accessed 2018 March 15].

[26]. Bizovi KE, Beckley BE, McDade MC, Adams AL, Lowe RA, Zechnich AD et al. The effect of computer-assisted prescription writing on emergency department prescription errors. *ACAD EMERG MED* 2002;9(11)1-8. Available from:https://onlinelibrary.wiley. com/doi/abs/10.1197/aemj.9.11.1168 [accessed 2017 December 12].

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