ORIGINAL RESEARCH

Completeness and legibility of prescriptions and prescribing practice at two health centres on Wilberforce Island, Bayelsa State, Nigeria

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ABSTRACT

Background: Ensuring that prescriptions are complete, legible, and in line with good prescribing practice is essential to optimizing outcomes of medication therapy.
Objectives: To assess the completeness and legibility of prescriptions, and prescribing practice at Niger Delta University Health Centre (NDUHC) and Amassoma Comprehensive Health Centre (ACHC), two primary health care centres, in Bayelsa State, Nigeria.
Methods: In this retrospective study, 344 and 303 prescriptions written at NDUHC and ACHC, respectively from January 01 to December 31, 2018 were randomly selected and assessed for presence of relevant components and their legibility and prescribing pattern was assessed using the WHO indicator study. All data generated were analyzed and presented appropriately.
Results: At NDUHC and ACHC, 309 (89.8%) and 297 (98.0%) prescriptions were dated while 311 (90.4%) and 84 (27.7%) had the symbol Rx, respectively. Most of the prescriptions were duly signed, but the prescriber's name was missing in 148 (43.0%) and 302 (99.7%) prescriptions, while the designation was absent in 222 (64.5%) and 91 (30.0%) at NDUHC and ACHC, respectively. All patient-related information excluding patient's age and weight were present in all prescriptions at ACHC but not for NDUHC. Prescriptions that were clearly legible were 24 (7.9%) and 239 (69.5%) from ACHC and NDUHC respectively. On the average, 3.91±1.35 and 4.92±1.36 drugs were prescribed per encounter at NDUHC and ACHC, respectively.
Conclusion: Compliance with completeness and legibility of prescriptions at the two health facilities were grossly unsatisfactory. Only injections prescribing conformed to appropriate prescribing practice at the two centres.

Keywords: Completeness of Prescription, Legibility of Prescription, Prescribing Indicators, Prescription Writing

INTRODUCTION

Prescription writing is said to date back to the Sumerian times, around 2000 BC. In addition, evidence of drug prescribing has been noted in records from ancient Greece, Han Dynasty, and the Islamic Golden Age in Iraq[1]. Since then, the art of prescription writing has gone through different phases ranging from presentation of list of medicaments in cuneiform in antiquity to modern day forms of prescriptions involving

sophisticated technologies[1,2,3]. Prescriptions may be written for prefabricated (pre-compounded) drug products or extemporaneous formulations. A prescription for prefabricated product(s) typically contains order for already prepared and packaged drug(s) manufactured by the pharmaceutical companies, while that for extemporaneous formulation(s) contains information from a prescriber requesting that a pharmacist prepares medication(s) in his/her pharmacy in line with the dosage form(s) and dosage(s) required for a given patient. Nowadays, more prescriptions for prefabricated drugs than for extemporaneous formulations are issued in most healthcare settings[4,5]. This is because of the proliferation of pharmaceutical companies, which produce and sell already formulated drugs in large quantities, among other reasons[5]. Generally, prescriptions are classified into different forms depending on the methods in which they are generated and transmitted. They include paper prescription in which a prescription is handwritten or printed, manually signed, and delivered to the pharmacy by the patient. A variation of the foregoing is a paper prescription sent directly to the pharmacy by the prescriber through facsimile. Another form of prescription is that which is transmitted by the prescriber to the pharmacy via phone call by which a verbal order for medication is given, provided this is allowed by the law of the State. For the computer-generated facsimile prescription, the prescriber enters the order for medication(s) into a computer, signs it electronically, and sends it to the pharmacy by facsimile.

There is also the electronic prescription (e-prescription) in which the order for drug(s) is entered into the computer, signed electronically, and then sent to the pharmacy computer via secure computer-to-computer electronic data interchange using standardized data fields. Others include, intended e-prescription converted to computer-generated facsimile, and inter-pharmacy transfer whereby a prescription is transferred from one pharmacy to the other by means of electronic transmission[2].

Currently, e-prescribing is favoured over other forms of prescribing as it substantially eliminates issues bordering on occurrence of adverse drug events and prescription errors, which are the major concerns in medication management of health conditions. In addition, it has been reported to enhance timely access to patient prescription records, improvement in pharmacy workflow, and reduction in cost of procurement of drugs, among other benefits[6]. E-prescribing is however not without some challenges, and these include majorly costs of implementation and maintenance[7]. Other notable challenges are lack of internet connectivity and irregular power supply, particularly in resource-limited settings, as it is the case in Nigeria[8].

Globally, there is no one size fit all standards guiding prescription writing, although experts have suggested an array of modalities to be followed in ensuring that prescriptions are written as appropriate. These modalities entail that all items on the prescription be clearly presented, with all relevant information relating to the prescription, prescriber, patient, and the prescribed drug(s) indicated as required. Thus, a given prescription is said to be legible and complete when all the scenarios described above are met, absence of which may lead to misinterpretation and possibility of medication error[9,10]. In addition, benefits of adoption of rational drug use and good prescribing practice in line with published World Health Organization (WHO) prescribing indicators have also been established[11,12]. Therefore, it is important that a prescription for medication(s) contains all relevant components that are clearly written and which conform to rational prescribing in order to achieve optimal outcomes of therapy while ensuring patient safety [9,11,12].

This study was informed by the fact that prescription writing and good prescribing practice by a prescriber and the appropriate interpretation of the prescription by a

dispenser are important processes in the management of health condition(s) in any given healthcare system. Hence, the present study was aimed at assessing completeness and legibility of prescriptions and prescribing practice at Niger Delta University Health Centre (NDUHC) and Amassoma Comprehensive Health Centre (ACHC), both of which are classified as primary healthcare centes located on Wilberforce Island in Southern Ijaw Local Government Area of Bayelsa State, Nigeria.

METHODS

Setting

The study was conducted at the health record sections of the NDUHC and the ACHC. These facilities are located on Wilberforce Island in Southern Ijaw Local Government Area of Bayelsa State, South-South Nigeria. The NDUHC has nine functional bed spaces and caters for the basic healthcare needs of the students and staff of the university, including their dependents. Drug prescribing at NDUHC is done by qualified medical officers while a pharmacist, assisted by a couple of pharmacy technicians are in charge of pharmaceutical services. Staff nurses provide nursing services. The ACHC is equipped with fifteen bed spaces and serves the people living in Amassoma community and its environs. Here, diagnoses of diseases, drug prescribing and dispensing, as well as nursing of patients are done by three senior community health extension workers (SCHEWs) and two junior community health extension workers (JCHEWs).

Study Design and sampling

The study was retrospective. Using the information provided at the records centre for the period of January 01 to December 31, 2018, sample size calcualtion was done per facility. The sample sizes were calculated using Krejcie and Morgan formula[13], and aided by the sample size table by Research Advisors at confidence level of 95% and margin of error of 5%[14]. Sample sizes of 344 and 303 out of 3,254 and 1,426 prescriptions were calculated for NDUHC and ACHC respectively. The sampling interval was calculated and table of random numbers used to select the first sample from the patients' attendance registers.

Data collection tool

An appropriately designed data collection form was developed to record required data from the patient records including: prescription - (date and the symbol Rx), prescriber - (name of prescriber, designation and signature), patient - (name of patient, age, gender, weight and height) and drug - (number of drugs written in generic names, number of drugs with dosage form stated, number of drugs with strength indicated, number of drugs with frequency stated, number of drugs with duration stated, number of drugs with route of administration indicated, number of drugs with quantity to be dispensed stated and number of drugs with instruction for usage written).

Information on legibility of prescriptions were also documented and all data were presented in line with parameters contained in a checklist described previously[9,10,15]. Legibility of each of the prescriptions was determined subjectively and classified as: Grade 1 - Totally illegible (almost all words are unclear to identify), Grade 2 - Barely legible (Most words are illegible, but prescription was understood by the researcher who is a pharmacist), Grade 3 - Moderately legible (Some words are illegible, the meaning unclear) and Grade 4 - Clearly legible (all words are clear). In addition to the foregoing, information on prescribing practices at the study centres were also collected and assessed using selected WHO prescribing indicators[11,12]. All data obtained were expressed in simple percentages and mean with standard deviation, as appropriate.

Outcome measures included completeness of components of prescription-, prescriber-, patient- and drug-related information, as well as legibility of prescritions. Also,

selected precribing indices comprising average number of drugs prescribed per encounter, percentage of encounters with antibiotics, percentage of encounters with injections and percentage of drugs prescribed by their generic names in comparison with their respective reference standards were documented.

Data Analysis

All data generated were analysed with the aid of Statistical Package for Social Sciences (SPSS) version 23.0 (International Business Machines (IBM) Corp.) and GraphPad Instat version 3.10 for windows (GraphPad Software, San Diego California USA), as appropriate. They were presented descriptively, in simple percentages and mean ± standard deviation. Comparisons were done using student t-test and Chi-square test as required, while p-value < 0.05 at 2-tail was considered significant.

RESULTS

All the prescriptions surveyed were handwritten, and contained 1 – 8 and 1 – 10 drugs at NDUHC and ACHC respectively per prescription.

Prescription-related information

Most of the prescriptions (NDUHC; n=309, 89.8% and ACHC; n=297, 98.0%) were dated. The Rx symbol was missing in 311 (90.4%) of all prescriptions encountered at NDUHC and 84 (27.7%) of those at ACHC (Table 1).

Prescriber-related information

Most of the prescriptions issued were duly signed by the various prescribers at the two centres (NDUHC; n = 337, 98.0% and ACHC; n = 249, 82.2%). However, the prescriber's name and designation were not indicated on several of the prescriptions seen (Table 1).

Patient-related information

Concerning patient-related information, all patients' name (n = 303, 100.0%), gender (n = 303, 100.0%), and height (n = 303, 100.0%), most of their ages (n = 297, 98.0%) and weight (n = 266, 87.8%), were indicated on the ACHC prescriptions. At the NDUHC on the other hand, a couple of prescriptions had no name and gender indicated (n =2, 0.6% each). Also a patients' age and weight (n = 1, 0.3% each) was not stated, while another 77 prescriptions (22.4%) had no height indicated (Table 1).

Drug-related information

Of the 1330 and 1492 drugs prescribed at NDUHC and ACHC, 508 (38.2%) and 523 (35.1%), respectively were not prescribed using generic names. Similarly, dosage form, strength, frequency of use, duration for use, route of administration, quantity to dispense and instruction for use were not provided for several of the drugs ordered at the two study centres as shown in Table 1.

Legibility of prescription

Two hundred and thirty nine (69.5%) of all precriptions vetted at NDUHC were clearly legible, 25 (7.3%) were either totally illegible or barely legible, while the remaining 80 (23.2%) were moderately legible. On the contrary, only 24 (7.9%) of the prescriptions seen at ACHC were clearly legible, while 97 (32.0%) were either totally illegible or barely legible. The remaining 182 (60.1%) were moderately legible (Table 2).

Selected Prescribing Indicators

On the average, 3.91 ± 1.35 and 4.92 ± 1.36 ($p < 0.0001$) drugs were prescribed per encounter at NDUHC and ACHC, respectively. Other prescribing indicators such as percentage of encounters with antibiotics prescribed, percentage of drugs prescribed by their generic names, for both study centres were outside the standard values. Percentage of encounters with injections prescribed was within standard values (Table 3).

Table 1: Analysis of prescription

Prescription characteristics	NDUHC		ACHC	
	Information present, N (%)	Information absent, N (%)	Information present, N (%)	Information absent, N (%)
Prescription-related information	(n = 344)		(n = 303)	
Date	309 (89.8)	35 (10.2)	297 (98.0)	6 (2.0)
Symbol Rx	33 (9.6)	311 (90.4)	219 (72.3)	84 (27.7)
Prescriber-related information	(n = 344)		(n = 303)	
Name of prescriber	196 (57.0)	148 (43.0)	1 (0.3)	302 (99.7)
Designation	122 (35.5)	222 (64.5)	212 (70.0)	91 (30.0)
Signature	337 (98.0)	7 (2.0)	249 (82.2)	54 (17.8)
Patient-related information	(n = 344)		(n = 303)	
Name of patient	342 (99.4)	2 (0.6)	303 (100.0)	0 (0.0)
Age	343 (99.7)	1 (0.3)	297 (98.0)	6 (2.0)
Gender	342 (99.4)	2 (0.6)	303 (100.0)	0 (0,0)
Weight	343 (99.7)	1 (0.3)	266 (87.8)	37 (12.2)
Height	267 (77.6)	77 (22.4)	303 (100.0)	0 (0.0)
Drug-related information	(n = 1330)		(n = 1492)	
Number of drugs written in generic names	822 (61.8)	508 (38.2)	969 (64.9)	523 (35.1)
Number of drugs with dosage form stated	871 (65.5)	459 (34.5)	1409 (94.4)	83 (5.6)
Number of drugs with strength indicated	599 (45.0)	731 (55.0)	358 (24.0)	1134 (76.0)
Number of drugs with frequency stated	851 (64.0)	479 (36.0)	1212 (81.2)	280 (18.8)
Number of drugs with duration stated	792 (59.5)	538 (40.5)	1265 (84.8)	227 (15.2)
Number of drugs with route of administration indicated	115 (8.6)	1215 (91.4)	89 (6.0)	1403 (94.0)
Number of drugs with quantity to be dispensed stated	13 (1.0)	1317 (99.0)	2 (0.1)	1490 (99.9)
Number of drugs with instruction for usage written	50 (3.8)	1280 (96.2)	15 (1.0)	1477 (99.0)

Key: N, number of observations; n, sample size; Range of drugs prescribed per encounter at NDUHC, 1 – 8 drugs; Range of drugs prescribed per encounter at ACHC, 1 - 10

Table 2: Analysis of Prescription legibility

Legibility of prescription	NDUHC (n = 344) (%)	ACHC (n = 303) (%)
Grade 1 and 2	25 (7.3)	97 (32.0)
Grade 3	80 (23.2)	182 (60.1)
Grade 4	239 (69.5)	24 (7.9)

Key: Grade 1: Totally illegible, Grade 2: Barely legible, Grade 3: Moderately legible, Grade 4: clearly legible

Table 3: Selected Prescribing Indicators

Indicators	Values of indicators NDUHC	Values of indicators ACHC	Standard values‡
Average number of drugs prescribed per encounter, (mean ± SD)	3.91 ± 1.35†	4.92 ± 1.36†	(1.6 – 1.8)
Percentage of encounters with antibiotics, (%)	62.5	85.5	(20.0 – 26.8)
Percentage of encounters with injections, (%)	22.4	18.2	(13.4 – 24.1)
Percentage of drugs prescribed by their generic names, (%)	61.8	65.0	(100)

Key: SD, standard deviation; ‡Standards culled from a study by Isah *et al.* [12]

DISCUSSION

All the prescriptions surveyed at the two health facilities within the study period were handwritten. However, not all the prescriptions had complete components of prescription-, prescriber-, and drug-related information. Meanwhile, name of patient, gender, and height components of patient-related information were present on all prescriptions analyzed at ACHC but not on those from NDUHC. In addition, several of the prescriptions were not clearly legible, and all the selected prescribing indices excluding percentage encounters with injections prescribed at both centres were not within the standard values.

The presentation of all prescriptions seen in this study in handwritten forms confirms a report that most orders for drugs are still being written by hand, particularly in resource-limited settings[16]. However, this is not without some challenges bordering on the readability of the handwriting of the prescriber and the established causal relationship between bad handwriting and occurrence of medication errors[10,16]. Most of the prescriptions seen were dated, indicating that virtually all of the prescribers at these centres do take into cognisance the importance of medication record keeping and essence of validity of prescriptions at the time of presentation at the pharmacy[4,9]. Unfortunately, the prescribers, particularly the medical doctors at the NDUHC and a few of the community health workers (CHEWs) who prescribe at ACHC seemed to see no need for the indication of the symbol Rx at the topmost left corner of the prescriptions. It is important to note that the symbol Rx (which means, “take thou or you take”) is what authenticates the piece of paper on

which drugs are written as a prescription and gives the instruction to the pharmacist to dispense the medication[4].

More of the prescriptions written by the CHEWs at the ACHC had complete patient related information compared to those by the physicians at NDUHC which is unexpected. Unfortunately, not including all requisite patient-related information in a prescription is inimical to achieving optimal outcomes of medication therapy. This is because these information are invaluable in ensuring that prescribed medications are tailored to each patient's specific need(s)[10].

Most of the prescribers at both centres signed their prescriptions but majority did not write their names and designations. This scenario is similar to the findings by Phalke and colleagues[17] and it contradicts the standards for prescription writing which require that a prescriber indicates his/her name and designation on every prescription issued. This is to enable prescriber tracing should there be a need[10].

Regarding the drugs prescribed, information on dosage form, strength, frequency of use, duration of use, route of administration, quantity to dispense, and instruction for use were missing on several of the prescriptions written by the prescribers at both NDUHC and ACHC. These findings are similar to the report of Bhosale and colleagues where it was documented that prescribers routinely leave such decisions for pharmacists[10].

In this study, the doctors appear to write more legibly than the CHEWs with about two-thirds of the prescriptions written at NDUHC being clearly legible compared to ACHC where most of the prescriptions could not be easily read. However, that many of the prescriptions were not clearly legible in both centres made this finding not to be consistent with the recommendation of the WHO's manual on guide to good prescribing which posits that it is important that all prescriptions be easy to read in order to avoid misinterpretation and consequent adverse drug events[9].

Assessment of the drugs prescribed for the patients encountered in this study revealed that polypharmacy, which involves prescribing of five or more drugs per prescription, was more at ACHC than NDUHC. Polypharmacy is generally frowned at in several quarters often due to incidence of adverse drug reactions, it is nonetheless necessary in certain situations, notably those involving medication use in the elderly or in patients presenting with multiple health conditions[18].

Of the prescribing indicators surveyed, only percentages of encounters with injections prescribed were within the standard values for both study centres[12].

It is noteworthy that the outcome of this study should not be taken, wholly, as an indictment on the prescribers surveyed. This is because literature documents that excessive workload and fatigue may affect the productivity of health workers, and these may contribute to risk of slips and lapses in prescription writing, thus leading to prescribing errors[19].

A couple of limitations exist for this study. First of all, the legibility of items on each of the prescriptions was assessed subjectively without recourse to a scientifically sanctioned methodology. Secondly, not all prescribing indices as described by the WHO were evaluated for the assessment of overall prescribing practices at the two centres studied. Finally, because of the difference in prescribers in the centres used, comparison of data between the centres was not done.

CONCLUSION

Findings from this study revealed that compliance with the need for completeness and legibility of prescriptions at the two health facilities studied were grossly unsatisfactory. Also, values derived for selected prescribing indicators, except percentage of encounters with injections prescribed were not within referenced standards. Thus, it is important to communicate to the prescribers at these centres the importance of presenting all components of a prescription while ensuring the legibility of the written items. In addition, it is important that they be enjoined to adhere

to good prescribing practice as advanced by the WHO. Appropriate in-service training programmes should be organized for the prescribers.

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THEME:

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