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Original Article

Pattern of prescription drug use in Nigerian army hospitals

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Abstract

Background: Most health expenditure of developing countries is on drugs and medical sundries but inappropriate use of such resources is common. To our knowledge, only few studies have been done in Africa on this issue , with inadequate consideration of the sociological context of the knowledge, attitude and practice of the prescribers especially doctors. This study presents the pooled data of the pattern of prescription drug use from three Nigerian Army hospitals using some WHO criteria, and the knowledge and attitude underlying doctors' prescribing practices in these hospitals.
Methods: Retrospective cross-sectional survey of one year (March 2006-February 2007). Systematic random sample of general out patient case notes from three hospitals were collected using WHO criteria. The knowledge, attitude and practice survey of doctors at each study site towards the concept of rational drug use (RDU) were assessed using a self-administered questionnaire.
Results: Data collected from 660 case notes showed that average number of drugs per encounter was 2.8 while 49.3% of drugs were prescribed in the generic form. An average of 28.1% of patients encountered antibiotics. From the knowledge, attitude and practice survey, it is evident that 90.5% of 74 prescribers were aware of the existence of national essential drugs list but 58.1% of them did not use it as basis of prescriptions. In describing types of medicines preferred, 56.7% of prescribers claimed they prescribed a mixture of generic and branded drugs. Only 12.1% of prescribers could accurately detail the 5 steps of rational prescribing.
Conclusion: The pattern of prescription drug use in Nigerian Army hospitals is unsatisfactory. It is characterised by high number of drugs per prescription, high rate of antibiotic usage and unscientific prescription by doctors. There is a need for further education and research on rational drug use among prescribers in Nigerian military health facilities.

Keywords: Attitude and practice, knowledge, Nigerians army hospitals, rational drug use

Résumé

Arrière-plan: La plupart des dépenses de santé des pays en développement sont sur les drogues et les articles divers médicaux mais une utilisation inappropriée de ces ressources est commune. À notre connaissance, peu d'études ont été fait en Afrique sur cette question, en tenant compte du contexte sociologique de la connaissance, l'attitude et la pratique des surtout des médecins prescripteurs inadéquate. Cette étude présente les données mises en commun de la répétition de l'usage de médicaments de prescription de trois hôpitaux armée du Nigeria à l'aide de certains critères de l'OMS et les connaissances et l'attitude sous-tendent pratiques imposition des médecins dans ces hôpitaux.
Méthodes: Rétrospective enquête transversale d'un an (mars 2006-février 2007). Systématique échantillon aléatoire du général des notes de dossiers patients de trois hôpitaux ont été recueillies à l'aide des critères de l'OMS. L'enquête de connaissances, d'attitude et de pratique des médecins sur chaque site d'étude vers le concept de l'usage rationnel des médicaments (URM) ont été évalués à l'aide d'un questionnaire auto-administré.
Résultats: Données collectées à partir des notes affaires 660 a montré que nombre moyen de médicaments par la rencontre était 2.8 tandis que 49,3% des médicaments prescrits dans le formulaire générique. Une moyenne de 28,1% des patients a rencontré des antibiotiques. De l'enquête de l'attitude, la connaissance et la pratique, il est évident que 90,5% de 74 prescripteurs étaient au courant de l'existence de la liste nationale des médicaments essentiels

mais 58,1% d'entre eux n'ont pas il utilisé comme base de Préscriptions. En décrivant les types de médicaments préférées, 56,7% de prescripteurs a fait valoir qu'ils prescrit un mélange de médicaments génériques et marque. 12,1% Seulement des prescripteurs pourrait en détail avec précision les 5 étapes de prescrire rationnelle.
Conclusion: Utilisation de le motif de médicaments dans les hôpitaux de l'armée nigériane n'est pas satisfaisante. Il est caractérisé par un nombre élevé de drogues par ordonnance, le taux élevé de l'utilisation des antibiotiques et non scientifiques de prescription des médecins. Il y a un besoin de formation continue et la recherche sur l'usage rationnel des médicaments parmi les prescripteurs dans les établissements de santé militaire nigériane.

Mots-clés: Attitude et les pratiques, les connaissances, les Nigérians armée hôpitaux, URM

Introduction

According to the World Bank,[1] governments in developing countries expend between 20% and 50% of their national health budgets on drugs and medical sundries. Unfortunately, the World Health Organization,[2] (WHO) believes that much of such expenditure is misapplied, as irrational use of drugs is prevalent especially in developing countries. Hence, governments, health workers and the community are concerned with the availability, handling, effectiveness and safe use of drugs.

WHO[3] defined the concept of rational drug use (RDU) in 1985 at a meeting in Nairobi, Kenya. It requires that patients receive medications appropriate to their clinical needs, in doses that meet their individual requirements for an adequate period of time, at an affordable cost. In this paper, prescription drugs are interchangeably used with medicines. RDU is achieved when there is rational prescribing using medicines or drugs from an essential drugs list. According to the WHO,[3] a rational prescription must meet certain criteria such as appropriate indication, appropriate patient, appropriate drug, appropriate information and appropriate monitoring. Prescription drugs listed as essential are those which fulfil the real needs of majority of the population in diagnostic, prophylactic, therapeutic and rehabilitative services using criteria such as risk-benefit ratio, cost effectiveness, quality, practical administration, patient compliance and acceptance.[4]

In Nigeria, military medical facilities serve military personnel and their families. However, they also serve the contiguous civilian population. The military employ many of the skilled human resources of the national health system. Thus, it is an essential component of the national healthcare service.

The downturn in global economy in the 1980's resulted in a reduction in government funding for social services including military medical services. To maintain the credibility of the health system, the Nigerian Army introduced a drug revolving system (DRS) for medical facilities in 1994. The DRS is managed along the lines of the Bamako Initiative recommended by the African Regional Office (AFRO) of the WHO[4] to tackle the problem of availability, handling and supply of essential drugs in sub-Saharan African countries. Under the DRS, users of Nigerian army health institutions paid for their medicines and sundries "out-of pocket". However, with the introduction of the formal sector component[5] of the national health insurance scheme in all Nigerian Army health institutions in June 2007, services are now available through either the existing DRS or the insurance system depending on what treatment is required.

Drug use is a complex subject involving the prescriber, the patient (client) and pharmaceutical institutions. It is influenced by factors such as drug availability, prescribers' experience, health budget, promotional activities of the pharmaceutical industry, cultural factors, communication system and the complex interaction between these factors.[6] Hence, its study is more sociological than biomedical.[3] Despite this, to ensure consistent, valid and reliable identification of drug use problems, the WHO[3,7,8] developed and tested a set of standardized indicators of general out patients care. These indicators are divided into core and complementary drug use indicators. The core drug use indicators test prescribers, patient care and the facility. Among the uses of these indicators are to describe current treatment practices, compare health facilities and prescribers and allow for identification of potential drug use problems that may affect patient care.[7,8]

Since the WHO enunciated the concept of rational drug use, few studies on the subject have been published from developing countries. Those available[9-13] have studied the subject from the aspect of indicators without taking adequate cognisance of the knowledge and attitude behind the practice of prescribers. In view of the importance of the military health institutions to national security and overall health, this article presents pooled data on the pattern of prescription drug use from general out patients clinics of three reference hospitals of the Nigerian Army for review with national and

international findings. In this study, quantitative parameters of drug use relating to prescribers and the facility are augmented with a knowledge, attitude and practice survey of prescribers to evaluate them on the concept of RDU.

Materials and Methods

Background of the study sites

The Nigerian army medical system is organized into primary, secondary and tertiary levels. Tertiary health care is provided at the reference hospitals. The reference hospitals for the army are 44 Nigerian Army Reference Hospital, Kaduna (44 NARHK), 68 Nigerian Army Reference Hospital, Yaba, Lagos (68 NARHY) and Military Hospital, Ikoyi-Lagos (MHL). Between themselves, these 3 hospitals have more than 50% of skilled medical human resources of the Nigerian Army. Also, more than 60% of the military population belong to the Nigerian Army. Apart from providing tertiary care services, these outfits also provide primary care through their general out patient departments (GOPD). Consultation at the GOPD is by medical doctors on internship under the supervision of senior doctors. This study was based on the patients seen at the GOPD for primary care excluding immunization and medical check up. During the period of this study, patients paid for medicines through the 'user-fee' method. Ethical Committee approval was obtained at each study site. The study was conducted between March and May 2007.

Study design

The study was a retrospective cross- sectional study of the pattern of drug use at the GOPD of the 3 reference hospitals using a sample of the case notes of patients seen. Data for computation of core prescribing and facility indicators of RDU were collected as stipulated by the WHO[3] of general out patient care facilities. A minimum sample of 100 case notes in a single facility or for a single prescriber is considered adequate if collected in accordance with WHO criteria.[3] Facility indicators were obtained by visual inspection of prescribing and dispensing rooms at each study site. The quantitative indicators based study was augmented with a knowledge, attitude and practice (KAP) survey of prescribers at these sites. The KAP questionnaire was structured with a few open -ended questions to allow responses on various aspects of RDU. A copy of the questionnaire for the KAP study is attached as Table 1.

Sampling technique

At each study site, the GOPD register for the period March 2006- February 2007 was obtained. For each month, a suitable sampling interval was chosen to enable systematic random sampling of 20 case notes per month at 44 NARHK, 20 case notes per month at 68 NARHY and 15 case notes per month at MHL. Number of case notes sampled were 44 NARHK n=240, 68 NARHY n=240 and MHL n=180 making an overall sum of 660.

Respondents for the KAP study were obtained by purposive sampling of doctors at each study site. There was self-administration of a questionnaire to willing prescribers at the study sites during the period of data collection from case notes.

Data analysis

Quantitative variables for computation of number of drugs per prescription, number of generic drugs prescribed, number of prescribed drugs in the essential drugs list, number of patients prescribed antibiotics/injections were pooled and recorded on Microsoft Excel® software and analyzed. Prescribing and facility care indicators were calculated as provided for in the relevant WHO manual.[3] Number of essential drugs present at the pharmacy

Table 1: A sample of questionnaire for KAP study of RDU among doctors

Prescriber's questionnaire on rational drug use
Dear colleague, Kindly spare a few minutes to truthfully complete this questionnaire on rational drug use in this hospital. Your answers would be treated in strict confidence. Thank you. 1. Name (optional)…….. 2. Professional status (tick one) doctor/nurse/pharmacist/dispenser 3. Duration in the profession 4. Awareness of existence of National Essential drug list (EDL) or National Drug Formulary (NDF) Y/N 5. Possession of own copy of EDL/NDF/Neither (mark which is applicable) 6. Do you use EDL or NDF routinely in prescription Y/N 7. My definition of rational drug use is……..…….. 8. My preferred prescription drug is often (a) Generic (b) Branded (c) Mixture of both (mark only one) 9. The following are the steps taken in issuing a prescription (1 is the first step, 5 is the last step) (a) Appropriate indication (b) Appropriate drug (c) Appropriate patient (d) Appropriate information (e) Appropriate monitoring 10. Do you need education on rational drug use (a) No (b) Not sure (c) Yes

on inspection was compared to a WHO list of 16 drugs used in primary health care centers (PHC). Qualitative data such as demographic variables were also collected and analyzed. Data from KAP study were also analyzed.

Results

From the 660 case notes, it is clear that patients seen in the study period were between 0.25 and 83.0 years old (mean 32.6± 15.6). Overall, the male to female ratio was 1:1. Age and sex distribution of 660 patients pooled from all sites is shown in Table 2. The mean number of drugs per patient from the 3 sites was 2.8 ±1.5 (range 2.2-3.8). Table 3 shows the number of drugs per prescription in Nigerian Army hospitals. From it, 460 (69.7%) out of 660 clients had 4 or less drugs per prescription while only a few 61(9.2%) had 7 or more drugs. Figure 1 shows the core prescribing indicator values for Nigerian Army Hospitals. Only 49.3% of 660 clients had generic prescriptions while 28.1% encountered antibiotics in their prescriptions. A copy of the National Essential Drugs List[14] (EDL) was not found in the prescribing or dispensing rooms of any of the study sites. On inspection, 78.3% of 16 drugs from a PHC tracer drugs list were available at the two centers studied (68 NARHY was not evaluated for this indicator).

Table 2: Age and sex distribution of 660 clients analyzed for rational drug use in Nigerian army hospitals

Age group (in years)	Male	Female	Number (% of total)
0 to 18	49	47	96 (14.5)
19 to 29	122	117	239 (36.2)
30 to 39	73	62	135 (20.5)
40 to 49	43	45	88 (13.3)
50 to 59	18	34	52 (7.9)
60+	25	25	50 (7.6)
Total	330	330	660 (100.0)

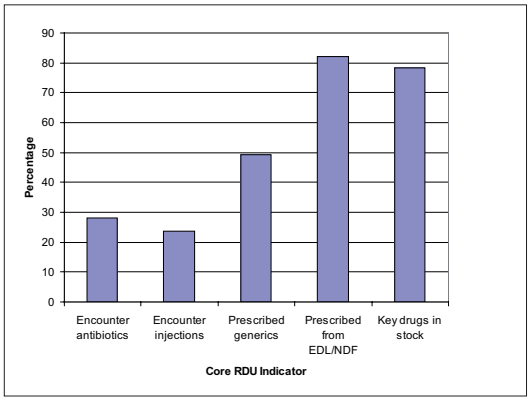

Figure 1: Core prescribing indicator values for Nigerian Army Hospitals

Out of 85 prescribers who received the KAP questionnaire, 74 returned them with 87.1% response rate. All the prescribers were doctors. Of 74 respondents, 67 (90.5%) were aware of the existence of the EDL[14] while 42 (56.8%) prescribed a mixture of branded and generic drugs mostly. Only 9 (12.1%) could accurately detail the 5 steps to rational prescribing while 60 (81.0%) wanted to have more education on RDU. Among the definitions given for RDU were "judicious use of drugs to benefit patient", "use of basic and cheap drugs to achieve maximum effect", "use drug only when indicated", "use drug based on EDL and the manufacturer" and "use the right drug for the right purpose in proper duration and the right purpose". The KAP characteristics of 74 doctors studied in three Nigerian Army Hospitals are given Table 4.

Table 3: Distribution of prescription drugs per patient in Nigerian army hospitals

Number of drugs	Number of patients	Percentage of total
None	57	8.6
One to two	186	28.2
Three to four	217	32.9
Five to six	139	21.1
Seven and above	61	9.2
Total	660	100.0

Table 4: Knowledge, attitude and practice characteristics of 74 prescribers in Nigerian army hospitals.

Characteristics	Number (% of total)
a. Duration of professional practice (range 0.25-37 years)	
-Less than 1 year	34 (46.0)
-1-10 years	14 (18.9)
-Above 10 years	24 (32.4)
-Not stated	2 (2.7)
b. Possession of EDL	
-Possess	26 (35.1)
-Do not possess	43 (58.1)
-Did not indicate	5 (6.8)
c. Use the EDL as basis for prescription	
-Yes	22 (29.7)
-No	46 (58.1)
-Did not indicate	6 (6.8)
d. Most prescriptions are	
-Generic	31 (41.9)
-Branded	1 (1.4)
-Mixture of branded and generic	42 (56.8)
e. Expressed need for education on RDU	
-Yes	60 (81.1)
-No	6 (8.1)
-Not sure	5 (6.8)
-Not indicate	3 (4.1)

Discussion

To optimize the benefits of expenditure on drug purchases by government and patients, it is imperative to promote RDU and select from an EDL.[14] In the pioneer study of 12 countries by Hogerzeil *et al*,[8] the average number of drugs prescribed per client was between 1.3 and 3.8. The higher value (3.8) was also obtained in later Nigerian studies at a university teaching hospital[15] and a secondary health care center.[16] Lower values have been reported from some PHC[17] possibly due to the limits on allowable prescriptions at this level. From our results, the overall average number of drugs per prescription from 660 case notes was 2.8 (range 2.2-3.8). Though no universal or even national standards exist for what the number should be, the disparity between developing countries is worrisome and the number is quite high. Our findings are higher than those from Sudan 1.4 and Zimbabwe 1.3.[8] GOPD patients at military reference hospitals, however, had fewer drugs per prescription than in previous Nigerian reports from other secondary and tertiary care centers.[15,16] Odusanya[16] showed that 50% of patients were prescribed 4 or more drugs in a general hospital (secondary care facility) in Lagos, Nigeria. This contrasts with our finding that 69.7% of our patients had 4 or less drugs per prescription [Table 3]. The prescription of several drugs per patients (poly pharmacy) is a serious problem in Nigeria. It has been attributed to patients' demand;[11] desire to treat several ailments at the same time[18] and inadequate diagnostic facilities to determine definitive cause of ill health.[16] There is a need for education of patients and prescribers on the hazards of poly pharmacy. Also, managerial interventions to improve training of prescribers to ensure accurate diagnosis and provision of diagnostic facilities at the primary care level in Nigerian hospitals would alleviate the tendency.

WHO[3] encourages the use of generic analogue of drugs, as they are cheaper than branded substitutes and have equal potency. In the Sudan as at 1987,[8] only 17% of drugs prescribed at rural health facilities were prescribed in their generic names. But in Tanzania, Massele *et al*,[19] found that 84.0% of drugs were prescribed in their generic forms. In this study, 49.3% of prescriptions in military reference hospitals were generics as evident from Figure 1. This is quite poor. This is borne out by the finding from the KAP study that more than half (56.8%) of prescribers claimed the use of both generics and branded drugs [Table 4]. Use of branded drugs where generics are available is a waste of clients' resources. While it increases market share of the branded products of pharmaceutical companies, it would rapidly deplete resources in an insurance-funded health system as is now operational in military medical facilities. It should be remembered that the National Health Insurance Scheme (NHIS) reimburses at the cost of generics.[20] Qualitative studies should be carried out to further elucidate on the factors influencing the prescription behavior of Nigerian doctors so as to propose measures for intervention. Meanwhile, there is a need to curtail the activities of pharmaceutical marketers in hospitals who promote use of branded drugs over generics by claiming higher potency, distributing free drug samples and sponsoring scientific meetings. Public education is necessary to re-orientate both prescribers and clients on the benefit of generic prescriptions.

A high proportion of drugs prescribed in this study (>80%) were from the EDL[14] [Figure 1]. Also it is evident from Table 4 that only very few prescribers (9.5%) were ignorant of the EDL.[14] The high rate of drugs prescribed from the EDL[14] appears to conflict with the low rate of generic prescriptions. It should be remembered that several branded products with a single generic name exist in the EDL.[14] This high rate of prescriptions from the EDL[14] is negated by low rate of generic prescriptions, as patients would source for branded products at higher cost. From Table 4, it is evident that most (58.1%) did not use the EDL[14] as basis for their prescriptions as this was not available in the prescription rooms. In its absence, doctors' reliance was probably on proprietary books such as the Monthly Index of Medical Specialties (MIMS®) and drug manufacturers' manuals as basis for prescriptions. Use of brand names of drugs can confuse patients especially when they have to procure such from patent medicine stores. As stated earlier, use of an essential drugs list either the national or institutional type is necessary to complement RDU. However, studies on its rate of utilization are quite few. To our knowledge, this is the first report from Nigeria on the availability and utilization of unbiased reference materials in prescribing within government health facilities.

From our inspection of all the study sites, no copy of EDL was found either in the prescribing rooms or at the dispensary. This was also the finding from Ghana[21] and Jordan.[10] This can be corrected by the managers of Nigerian public health institutions through the provision of unbiased prescription reference materials such as essential drugs list, formularies and standard treatment guidelines to all prescribers and dispensers. The utilization of EDL coupled with education to promote its use can improve prescribing practises.[13,22,23]

As in several developing countries, antibiotics are

often prescribed irrationally in Nigeria. In hospital-based studies,[11,16,24] more than half of the patients encountered antibiotics in their prescriptions. But, the WHO[25] believes that not more than 20% of general out patient prescriptions should include antibiotics. In Ghana, Bosu and Ofori-Adjei[21] found that antibiotics are prescribed for malaria and diarrheal diseases where they are in effective. From Figure 1, it can be seen that 28.1% of 660 clients' encountered antibiotics in the study period. This is lower than other Nigerian values (50%-75%).[11,16,24] Our findings may reflect better diagnostic acumen in military medical facilities. Unnecessary antibiotic use promotes drug resistance, increases risk of side effects and is wasteful of medical resources.

Inappropriate use of injections is another aspect of irrational drug use. Between 36% and 48% of patients encounter injections in Uganda, Sudan and Nigeria.[8] Figure 1 shows that 24% of our clients encountered an injection. It is claimed that some patients believe injections are more potent than oral form of drugs, hence they request doctors to prescribe them. Injections are probably popular in the Third world because the syringe and needle are seen as symbols of western medicine. According to Wyatt,[26] these symbols connote disease control as yaws, small pox and measles eradication programss of the last century were accomplished through the use of injectable vaccines. Excessive and unnecessary use of injections is expensive in terms of health care cost to patients, health staff time and sterilization equipment. Injectables can be complicated by injection abscess, paralysis, and infection with deadly viruses such as hepatitis B and human immunodeficiency virus.[27]

It has been reported that availability of essential drugs is important for RDU. Using a tracer list of essential drugs, Otoom *et al,*[10] found that 80% of drugs were available in a Jordanian survey. Based on the 35 drugs regarded as essential in the Bamako Initiative, Uzochukwu *et al*,[28] found that those implementing the initiative had significantly better stock of drugs than those who are not in the programme. While no reports of the state of the DRS in military health institutions are available, our study found that 78.3% of 16 tracer drugs for primary care designed by the WHO were available at the two sites evaluated for this indicator. Evaluation of this parameter was not carried out at 68 NARHY for technical reasons. This result indicated poor drug availability as only 16 drugs were evaluated. It would appear as if the DRS system in Army health institutions have not fared much better than those in other parts of Nigeria. Also, it would be interesting to review the performance of military medical facilities at all levels using the 35 drugs earlier studied by Uzochukwu *et al*.[28]

It was observed from the KAP study that only 12.1% of 74 respondents in the three reference hospitals of the Nigerian Army could accurately detail the 5 steps in rational prescribing. In another study, Chukwuani *et al*,[12] found that none got the steps right. This makes the expressed need for education on RDU by prescribers at the study sites [Table 4], which is very important for military medical authorities in particular and other government policy makers in general. It is essential for the NHIS to sponsor programs on promotion of RDU and to evaluate impact of intervention as these would optimize their expenditure on medicines.

An important limitation of the prescribers KAP study is that the respondents are not exactly the same as those who issued the prescriptions being evaluated for RDU. However, there was no record of previous RDU education programs in any of these institutions. In view of the pattern of prescriptions observed and the expressed need for RDU education by the prescribers, the authors are reasonably satisfied that the prescribers behavior observed is indicative of the prescription pattern in the three Nigerian Army hospitals. According to Bosu and Ofori-Adjei,[21] the pattern at lower levels of health care might be worse.

Holloway[27] believes that RDU could be promoted by utilizing a fraction of the resources devoted to drugs to foster its proper use. This is because irrational drug use reduces the quality of drug therapy, causes increased morbidity and mortality and wastes resources. It is advised that RDU studies should be carried out at all levels of Nigeria's health system to optimize the benefits of government expenditure on health of their personnel and improve the quality of medical services.

Conclusion

A multi-center study of the pattern of use of drugs in Nigerian Army reference hospitals showed that various forms of inappropriate use occur. An excessive number of drugs are prescribed per patient; too many antibiotics are prescribed while the number of generic drugs prescribed for patients is too low. No copy of the EDL was found in the hospitals studied. All these show that severe challenges exist to ensuring RDU within these facilities that have more than 50% of the army's human medical resources. Recommendations are made to enhance RDU and improve use of the EDL within military medical facilities.

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