Full Length Research Paper

Drug use pattern in out-patient children: A comparison between primary and secondary health care facilities in Northern Nigeria

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Children are more vulnerable to adverse events related to use of drugs. It is therefore important to study drug use in children in order to optimize pharmacotherapy. The aim of this study was to compare drug utilization in paediatric outpatient departments of primary and secondary health care facilities. The patient and drug information of 600 patients was analyzed for World Health Organization (WHO) recommended prescribing indicators. The average number of drugs per prescription was significantly (p < 0.0005) lower in secondary (2.97) compared to primary (3.62) facilities, while average consultation time was shorter (p < 0.0005) in primary than secondary facilities. Percentages of drugs prescribed from Nigerian Essential Drug List (EDL, primary {89.78%}; secondary {91.79%}) and by generic name (primary {55.04%}; secondary {57.88%}) were insignificantly different between the facilities. The use of injectables was low (8.32% in primary versus 3.74% in secondary facilities) while antibiotic use was high (54.14% in primary to 60.28% in secondary facilities). Analysis of the dispensing indicators showed that the secondary facilities were significantly (p < 0.05) better than the primary facilities, even though not a single drug was adequately labeled in both the primary and secondary facilities. Prescription from EDL was found to be fair in the study area while use of injections was low. There is a need for improvement in case of medicines prescribed by generic name.

Key words: Drug utilization, out-patients, children, health care facility.

INTRODUCTION

Rational drug use has been defined as using the right drug in the right patient, for the right indication, in the right dose and dosage form, for the right duration of time. The rational use of drugs seeks to avoid the frequent problems of over- and under-prescription, inappropriate prescription and the use of new, expensive drugs when equally effective, well tried, safe, high quality and cheaper alternatives are available (NEDP, 1993). Unfortunately, in most cases, prescribing and dispensing patterns do not always conform to these criteria. The consequences of such inappropriate use of drugs cannot be overlooked especially in children. This is because children differ greatly from adults, not merely in size but also in the proportions and constituents of their bodies as...
Table 1. Characteristic of the general outpatient department prescribers.

<table>
<thead>
<tr>
<th>Facility type</th>
<th>Total</th>
<th>Doctors [n (MYT)]</th>
<th>Nurses [n (MYT)]</th>
<th>CHO/CHEW [n (MYT)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary (n=8)</td>
<td>38</td>
<td>18 (5.2)</td>
<td>14 (20.4)</td>
<td>6 (13.3)</td>
</tr>
<tr>
<td>Primary (n=12)</td>
<td>39</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>39 (13.4)</td>
</tr>
<tr>
<td>Total [n (%)]</td>
<td>77</td>
<td>18 (23.4)</td>
<td>14 (18.2)</td>
<td>45 (58.4)</td>
</tr>
</tbody>
</table>

CHO: Community health officer; CHEW: community health extension worker; MYT: mean years of training.

well as functioning of their physiological systems. These differences are reflected in the way the body handles and responds to drugs and are relevant to medication (Laurence et al., 1999). No single rule or formula suffices for all paediatric cases; the dose is therefore established partly by scaling for body weight and/or surface area and by making pharmacokinetic and pharmacodynamic measurements when opportunities arise.

Studies conducted in most developing countries have shown that a high percentage of consultations end with prescriptions regardless of the necessity to prescribe (Kronke, 1985). Numerous studies have also described irrational patterns of drug use that include polypharmacy, use of drugs that were not related to the diagnosis, patient non-compliance, overuse and misuse of antibiotics, and unnecessary use of injectable drugs (Quick et al., 2002). Such practices may result in a waste of resources, inappropriate patient demand, antimicrobial resistance, and increased drug-related morbidity and mortality. This study is therefore aimed at investigating the prescribing and dispensing practices at a representative sample of health care facilities in Kano State, Nigeria using WHO drug use indicators and comparing the results obtained between the primary and secondary health care facilities in the state.

METHODOLOGY

Study design

This was a comparative, cross sectional study involving paediatric outpatient departments of twenty (8 secondary and 12 primary) public health care facilities selected by multistage sampling technique in Kano State Northwestern Nigeria. The study was conducted between June 2009 and December 2009. The Ethical Committee of the Aminu Kano Teaching Hospital and Kano State Ministry of Health approved the study protocol.

Inclusion and exclusion criteria

The patients included in this study were those presented with general illness, aged 11 years and below. Patients presenting to the health care facilities for follow-up of chronic diseases, and patients presenting to receive services such as vaccination, and other specialized care services, were excluded.

Study sample

Based on the WHO recommended methodology (WHO, 1993), stratification of health care facilities according to senatorial districts and systematic random sampling were used to select a total of 20 health care facilities across the state. In each health care facility, 30 paediatric outpatient prescriptions were collected using systematic random sampling.

Data collection

The principal investigator (PI) collected data on both prescribing and dispensing indicators prospectively from each facility due to difficulties encountered in the availability of retrospective records. Demographic data of each patient, diagnosis, antimicrobial sensitivity test and detailed prescription were recorded on a modified WHO core prescription indicators form. Data collected were coded and de-identified. These recorded forms were used to analyze the average number of drugs per prescription, number of encounters with antibiotics, percentage of drugs prescribed by generic name/listed in the Nigerian Essential Drug List (EDL), percentage of drugs actually dispensed and adequately labeled. The consultation and dispensing times (WHO, 1993) were collected using a disguise technique (the investigator stayed outside the consultation room and the pharmacy). At each facility, the consultation and dispensing times were counted for 30 patients, and 30 parents were interviewed upon exit after the drug(s) had been dispensed to investigate dispensing practices and patient knowledge.

Analysis

Data were entered into Microsoft excel 2007 and Statistical Package for Social Sciences (SPSS version 15) and a descriptive analysis was performed. Drug utilization indicators were computed and compared between the primary and secondary facilities by unpaired Student’s t-test. P < 0.05 was considered to be statistically significant.

RESULTS

In total, 77 health care providers prescribed at paediatric outpatients of the 20 selected facilities during the study period out of which only 23.4% (18/77) were qualified medical doctors (Tables 1 and 2). Among the 600 patients that participated in the study, 44.7% (286) were male and the average age of the patients was 3.7 ± 0.3 years. A total of 2016 drugs were prescribed in 600 prescriptions, giving an average of 3.36; and the range of drugs per encounter varied from 2 to 5. Three drugs were prescribed in most of the patients (57.3%) and there was not a single prescription wherein no drug was prescribed. Values of the prescription indicators are as shown in Figures 1 to 6. Dispensing and other patient care indi-
Table 2. Characteristic of the general outpatient department dispensers.

<table>
<thead>
<tr>
<th>Facility type</th>
<th>Total</th>
<th>Pharmacists [n (MYT)]</th>
<th>Pharm Tech [n (MYT)]</th>
<th>CHO/CHEW [n (MYT)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary (n=8)</td>
<td>51</td>
<td>6 (6.8)</td>
<td>42 (13.2)</td>
<td>3 (7.3)</td>
</tr>
<tr>
<td>Primary (n=12)</td>
<td>5</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>5 (12.8)</td>
</tr>
<tr>
<td>Total [n (%)]</td>
<td>56</td>
<td>6 (10.7)</td>
<td>42 (75.0)</td>
<td>8 (14.3)</td>
</tr>
</tbody>
</table>

Pharm Tech: Pharmacy technician; CHO: community health officer; CHEW: community health extension worker; MYT: mean years of training.

Table 3. Dispensing indicators for paediatric outpatients’ departments of 20 health care facilities in Kano State, Nigeria.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Health care facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary (n=12)</td>
</tr>
<tr>
<td>Average dispensing time (s)</td>
<td>25.73 ± 1.18</td>
</tr>
<tr>
<td>Percentage of drugs actually dispensed</td>
<td>56.17 ± 2.36</td>
</tr>
<tr>
<td>Percentage of drugs adequately labeled</td>
<td>0.00 ± 0.00</td>
</tr>
<tr>
<td>Percentage of parents who claim to have had adequate knowledge</td>
<td>79.03 ± 1.45</td>
</tr>
</tbody>
</table>

ns: Not significant; a ≤ 0.05; b ≤ 0.005; c ≤ 0.0005.

Figure 1. Average number of drugs per prescription for paediatric outpatients’ departments of 20 health care facilities in Kano State, Nigeria. ns: Not significant; c = < 0.0005.

DISCUSSION

This study revealed that the mean number of drugs prescribed per patient was significantly lower (p < 0.0005) in secondary (2.97) compared to primary (3.62) facilities. Values of 2.3 to 3.7 drugs per encounter in secondary facilities have been reported from India (Dimri et al., 2008), Nigeria (Odusanya, 2004) and Ghana (Owusu-Dakuu and Sablah, 2004). In primary facilities, rates of 2.5 to 3.13 drugs per encounter have been reported in India (Anuja et al., 2010), Nigeria (Nwolisa et al., 2006) and Yemen (Bashrahil, 2010). In the present study, three or more drugs were prescribed in 72.4% of prescriptions, which reflects a trend towards polypharmacy, as it has
been proposed that the average number of drugs per prescription should be 1.6 to 1.8 (Isah et al., 2006). Prescriptions of high numbers of drugs may be attributed to patient demand; patients believe that the prescribing of more drugs will ensure improvement and facilitate the cure of their conditions more quickly. Other possible factors could be that the treatment is based on pure symptoms instead of a proper diagnosis due to lack of adequately trained personnel, laboratory facilities and overcrowdings in the health care centres. Although
increasing efforts are being made to improve drug-use practices in developing countries, it should be noted that some of these patients visit the hospitals with other diseases such as anaemia, malnutrition and at times some other infections. These make poly pharmacy inevitable.

Prescribing by generic name is known to reduce the cost of drug treatment and rationalizing drug therapy. This varies from 13.3 to 93% across the globe (Nsimba, 2006). Prescribing by generic name in our study was similar (55 to 61%) in most facilities studied. Other studies have reported even lower percentages, ranging from 25 to 60%, (Bashrahil, 2010; Chedi et al., 2010), while the optimal percentage should be close to 100%.
Average consultation time (min) for paediatric outpatient departments of 20 health care facilities in Kano State, Nigeria. ns: Not significant; c ≤ 0.0005.

Figure 6. Average consultation time (min) for paediatric outpatients' departments of 20 health care facilities in Kano State, Nigeria. ns: Not significant; c ≤ 0.0005.

The percentages of drugs prescribed from EDL in this study were lower among the primary facilities (89.78%) compared with secondary facilities (91.79%) but this was not significant (p > 0.05). These figures were higher than the values previously reported in the same area (Chedi et al., 2010) but lower than the optimal value of 100% (Isah et al., 2006). When the prescribers were asked concerning their low number of prescriptions from the EDL, some of the arguments forwarded by them were that, not all the drugs for various diseases are available in the EDL and resistance had developed to some of the drugs on the list. Appropriate use of antibiotics is necessary to prevent emergence of drug resistant bacteria. It has been recommended that fewer than 30% of prescriptions should contain an antibiotic (Isah et al., 2006). Percentages of antibiotics prescribed per encounter obtained in this study compared favourably with those reported from Ghana (Bosu and Ofori-Adjei, 2000), Cambodia (Chareonkul et al., 2002) and other parts of Nigeria (Chukwuani et al., 2002). The major factors that influence high antibiotic prescribing at health centers have been reported to be a lack of knowledge about appropriate antibiotic use, including overestimation of the severity of illness to justify antibiotic prescribing by prescribers, and pressure from patients who believe that antibiotics provide rapid symptomatic relief of the disease (Awad et al., 2006). The same factors may possibly play a role in health care centres of Kano. Antibiotics are essential drugs, but the overuse may increase antibiotic resistance, which will endanger their therapeutic effectiveness, increase treatment failure and, as a result, lead to longer and more severe illness episodes with higher costs and mortality rates.

Although inappropriate high levels of injection prescribing (17.1% to 80%) have been reported in Tanzania (Massele et al., 2001) and Zimbabwe (Trap et al., 2002), in the present study, overall injection use was low (5.0 to 8.0%). The proportion was higher in primary as compared to secondary facilities, but not significant. During the period of this study, prescribers spent a mean of 4.3 to 5.0 min in the secondary and 2.9 to 3.1 min in the primary facilities with patients. These figures correspond well with values measured in other developing countries (Hogerzeil et al., 1993). Health care providers have attributed the short time of contact with patients to their work overload, namely, a large number of patients. Though it is difficult to present optimal standards for consultation time, prescribers should take enough time to provide the patient with the necessary information regarding his/her condition and instructions/warnings related to the prescribed drug.

The mean dispensing time was found to be shorter (p <
0.005) in primary (24.8 to 36.1 s) than that observed in secondary (35.8 to 44.8 s) facilities. These figures are slightly higher than the average value obtained (12.5 s) from other studies in twelve developing countries (Hogerzeil et al., 1993) but far shorter than 86.1 s recorded in Nepalese pharmacies (Kafle et al., 1992). Although, from a management point of view, a short dispensing time could imply a very efficient dispensing system, from a clinical point of view, such a short time would not be expected to provide adequate counseling on medication, and may infer less attention to detail and a greater potential for errors. Factors that may account for a short dispensing time include pre-packed and pre-labeled drugs as well as a heavy flow of patients or even shortage of staff.

The percentage of drugs that were actually dispensed in secondary facilities was close to 100%, as recommended (Isah et al., 2006). This indicates a good stock control system in the secondary health care centers in Kano. In contrast, only 56.17% was actually dispensed in the primary facilities studied. The significant difference (p < 0.0005) between the secondary and primary facilities could be explained by the fact that the Drug Revolving Fund (DRF) scheme of all the secondary health care facilities in the state was supported by the Partnership for Transformation in the Health Sector in Nigeria (PATH), while only one primary facility out of the twelve selected was under the programme during the study period. Although the WHO (1993) and National Drug Policy of Nigeria (NDP) (2005) recommend that each drug label should contain the dose regimen, generic name of the drug and patient’s name. In the study area, not a single dispensed drug was adequately labeled in all the facilities. Similar result was obtained in Cambodia (Chareonkul et al., 2002) and India (Rishi et al., 2003). At the end of the study, when the dispensers were asked about the inadequate labeling, they stated that given their typical workload they hardly had time to interact with the parents; hence, they prefer to draw pictograms and explain how the individual drugs should be taken.

About 90 and 80% of parents in the secondary and primary health care facilities, respectively claimed to know the correct dosage schedule. These figures, though higher than 55 to 68.3% reported in Bangladesh (Gyoun et al., 1994), Burkina Faso (Krause et al., 1999), Cambodia (Chareonkul et al., 2002) and India (Rishi et al., 2003), did not necessarily reflect reality since the response “Yes, I know the dose” was accepted as positive answer.

**Conclusion**

Conclusively, this study provides few insights into the drug use patterns in children outpatient departments of primary and secondary public health care facilities in Kano State, Nigeria. The prescription from EDL was fair, the use of injections was low and there is a scope for improvement in case of medicines prescribed by generic name.

**Conflict of interest**

Authors declare that there are no conflicts of interest

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