

Prescribing Practices and Polypharmacy in Kitovu Hospital, Uganda.**N. MCGAUGHEY¹, M. LYNCH² AND D. BELL¹**

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This audit of prescribing practices explores recent trends at Kitovu Hospital, Uganda. The average number of drugs prescribed per patient was 2.89 ± 0.11 , of which 1.79 ± 0.09 were generics and 0.69 ± 0.06 antibiotics. No injections were prescribed. Patient essential drug knowledge was 100% while the adequacy of labelling was 0%. The number of drugs prescribed correlated positively with patient age, was greater for female patients, similar for doctors and clinical officers but greater in medical (3.30 ± 0.15 , n=50) than surgical (2.48 ± 0.13 , n=50) outpatient clinics. The mean consultation time was 6.56 min and 10.25 min per patient in medical and surgical outpatient clinics respectively. The patient essential knowledge indicators were greatly improved but only modest reduction in polypharmacy was evident compared to the Ugandan Pharmaceutical Sector national survey of 2002. Antibiotic prescription was high and generic prescribing was found to be low. Policy changes are required to enhance rational drug use in the health sector in Uganda.

Key words: *Polypharmacy, generics, antibiotics, regional referral hospital, outpatient clinic*

INTRODUCTION

Clinically inappropriate and economically inefficient use of medicines is a serious problem worldwide. Rational use of drugs requires that patients are prescribed medications according to clinical need and established guidelines, in doses specific to individual requirements, for an adequate period of time and at the lowest possible cost [1]. Polypharmacy is the prescription of more drugs than is clinically necessary. It is estimated that more than half of all medicines are inappropriately prescribed, dispensed or sold while 50% of patients receiving medications take them incorrectly and a third of the world's population lacks access to essential medicines [2]. Unnecessary over-prescription by clinicians and incorrect self-medication by patients increases the risk of adverse drug reactions and poorer health outcomes especially in relation to chronic conditions such as diabetes, hypertension, epilepsy and mental disorders. Such practices can also fuel increased patient demand for drugs, result in unaffordable payments by patients and exhaust stocks of medicines in

public health facilities. The overall effect is loss of public confidence in the healthcare system and decreased patient visits at primary healthcare facilities [1].

Other forms of irrational use of medicines include inappropriate use of antibiotics for non-bacterial infections coupled with inappropriate selection and dosing as well as overuse of injections when oral solutions are more appropriate [1-6]. This results in morbidity and mortality especially in paediatric patients [3, 7, 8]. Further, inappropriate use of antimicrobial agents contributes to bacterial resistance [9] which is a worldwide problem. In some countries the administration of injections is under non-sterile conditions, thereby contributing to the transmission of bacterial and viral infections [1, 6].

The World Health Organisation (WHO) took the first step towards rational use of medicines in 1977 by establishing the first model list of essential medicines to support member states in forming their own national lists [1]. There is an increasing volume of information in support of rational drug prescription, in concordance

with the increasing use of objective scientific evidence to devise guidelines and policies nationally and internationally [10]. Although such research has helped identify strategies that are effective in promoting rational use of medicines, the strategies are often not implemented effectively by national governments and/or healthcare providers at local level [3, 8]. In many countries, more than 50% of patients are not treated in accordance with current clinical guidelines [10].

This prospective study provides an audit of prescribing practices in Uganda, using the case study of the Outpatient Department of Kitovu Hospital. Uganda is a developing country divided into 56 districts. Each district has 11 such regional referral hospitals. In addition there are 2 national referral hospitals, Mulago Hospital and Butabika Hospital [11]. Health facilities have increased by 400% since 1972 while the population of Uganda has doubled during that period. A 1993 survey found that less than 50% of the population lived within 5km of a health facility; as these were mostly located in towns and along major roads, thus greatly disadvantaging rural communities [11]. Missionary hospitals, including Kitovu Hospital, source their drugs from Joint Medical Stores (JMS) [11]. The revised national drug policy of Uganda in 2001 [10] was intended to improve the health standard of the Ugandan population by ensuring the continuous availability, accessibility and affordability of essential drugs and promoting rational use of drugs [12].

The Uganda Pharmaceutical Sector Survey of 2002 [11], in which Kitovu Hospital participated, provided an overview of the prescribing practices in Uganda at that time, when measured against previous studies undertaken by the Ugandan Ministry of Health and other organisations. The results showed that the mean number of drugs prescribed per patient encounter had risen from 1.9 in 1990 [5, 6, 11] to 3.2 in 2002 [11]. A study of the prescribing practices of private physicians in Uganda in 2004 reported a similarly high rate of polypharmacy [3-4]. This paper reports an audit of the prescribing practices in Kitovu Hospital in the year 2008 which provides an indication of how current trends in a typical regional referral hospital compare to most recently available national data and WHO recommendations.

METHODOLOGY

Kitovu Hospital is a medium-sized (250 bed) missionary hospital in Uganda serving 70-100,000 people. The hospital specialises in Obstetrics and Gynaecology services although there are other Departments within the hospital including Paediatrics, General Surgery, General Medicine, Nutrition and an Outpatient Department (OPD). The OPD runs surgical, medical, antenatal and gynaecology clinics. The clinical staff who are authorised to prescribe include surgeons, obstetricians and gynaecologists, paediatricians, physicians, medical officers and clinical officers. Ethical approval for the study was obtained from Kitovu Hospital, Uganda, and the School of Medicine, Dentistry and Biomedical Sciences, The Queen's University of Belfast.

Indicators: The audit was designed to measure three indicators in accordance with WHO guidelines [5, 13] regarding assessment of prescribing tendencies in developing countries to enable standardisation and facilitate comparison with published data

Drug Use Indicators: The core drug use indicators provide a simple first-line tool for quickly and reliably assessing drug use in primary health care and point to particular issues that warrant closer examination and subsequent action.

Patient knowledge: WHO guidelines state that patient knowledge can be evaluated when the drug name, when the drug is to be taken and in what quantity is on the drug package, on a prescription form retained by the patient or on a patient-held medical form.

Adequacy of labelling: This is the percentage of total labels for drugs dispensed which contain at least the patient name, drug name and when the drug should be taken.

Prospective study: The prospective study was conducted over a 6 week period in July-August 2008 during visits to OPD by 100 patients [14]. Drug use, patient knowledge and labelling indicators were recorded, together with the age and gender of each patient to enable the influence of these variables on prescribing practice to be assessed. The prescribers who treated the patients in the sample were classified as doctors (consultants, interns and medical officers) or clinical

officers respectively to examine provider-related differences in prescribing patterns. Prescribing encounters and treatment practices can vary between specialties; patients were sampled from both the medical and surgical outpatient clinics to provide an accurate overall picture of current prescribing tendencies in OPD and also to enable comparison between the medical and surgical departments. Fifty patient encounters were assessed at the medical and surgical clinics respectively. At each OPD clinic, the date and duration of the clinic, the doctors and clinical officers on duty as well as the number of consultations undertaken by each were recorded to provide an estimate of the mean consultation time per patient and assess the influence of duration of consultation on prescribing practice.

Retrospective study: A retrospective study was conducted on the records of 50 patients attending the medical and surgical outpatient clinics, respectively, in July 2007 and of a further 50 patients attending the medical and surgical outpatient clinics in January 2008. Due to the limitations of the record keeping at Kitovu, the only comparable factors available for the retrospective study were the number of drugs per prescription and the gender of the patient.

Data collection and analysis

Data was collected from the hospital pharmacy on the days when medical and surgical outpatient clinics took place. After the patient's consultation, each prescription was taken to the pharmacy by the patient where the data collector recorded the indicators and patient details while the pharmacist dispensed the drugs. The pharmacist explained to the patient when and how often to take the medication. All patient encounters on a given day were included in the study. Analysis of variance was performed to detect significant differences for between group or within group effects and post-hoc comparisons by Dunnett's or Student's paired t test as appropriate using SSPS (Version 15.0, SSPS Inc, Chicago, IL). Values of $p < 0.05$ were considered significant. Linear regression analysis was performed using GraphPad Prism software (Version 4.0, GraphPad Software Inc, San Diego, CA).

RESULTS

The mean age of the patients participating in the prospective study was 32.0 ± 2.5 years (mean + SE, $n=100$) while the number of drugs prescribed per patient in the OPD during July-August 2008 was 2.89 ± 0.11 (mean + SE, $n=100$), 1.79 ± 0.09 (62%) of which were prescribed by their generic name. Majority of the drugs (94%) prescribed were listed on the Essential Drugs List of Uganda. The average number of antibiotics prescribed per patient was 0.69 ± 0.06 (23.9%) while none of the patients participating in the study were prescribed an injection.

Patient knowledge was rated 100% since all essential knowledge indicators were met for each patient. However adequacy of labelling was rated 0% since patient name was omitted from the labels of all drug packages dispensed. The number of drugs prescribed per patient correlated ($p < 0.05$) with increasing patient age as shown in Figure.1. There was a trend towards higher drug prescribing in female patients with a mean age of 32.2 ± 3.2 years ($n=59$) than in male patients with mean age 31.7 ± 3.8 years ($n=41$) but the difference was not significant.

Drug indicators were similar for Doctors ($n=31$ patient encounters) and Clinical Officers ($n=69$ patient encounters) participating in the study. The mean number of drugs prescribed per patient was greater ($P < 0.05$) in the Medical Outpatient clinics 36.3 ± 3.9 years ($n=50$), than in the Surgical Outpatient clinics (27.9 ± 3.0 years, $n=50$). The mean consultation time was 6.56 min/patient in the Medical Outpatient Clinic and 10.25 min/patient in the Surgical Outpatient Clinic.

Analysis of the retrospective data indicated that the number of drugs prescribed per patient had increased ($p < 0.05$) in the Medical Outpatient clinics since July 2007 while that in the Surgical Outpatient clinics had remained constant. Overall, when the 300 patient encounters in OPD sampled during the three time periods in 2007-2008 were pooled, the number of drugs prescribed per patient encounter was 2.63 ± 0.06 (mean+SE).

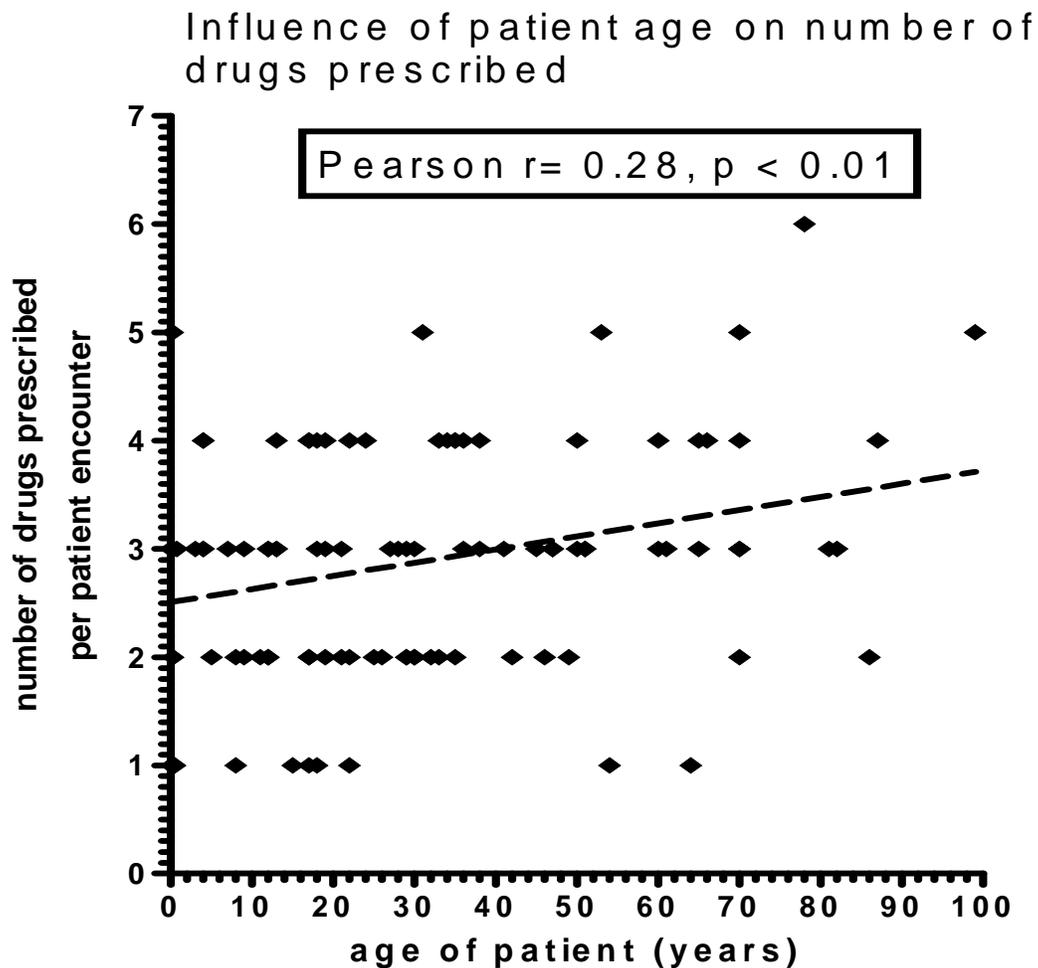


Figure 1: Influence of patient age on the number of drugs prescribed per patient encounter in the outpatient clinics of Kitovu Hospital. (n=100 patients)

Table 1: Core drug indicators

Indicator number	Prescribing Indicator
1	Average number of drugs per encounter
2	Percentage of drugs prescribed by generic name
3	Percentage of encounters with an antibiotic prescribed
4	Percentage of encounters with an injection prescribed
5	Percentage of drugs prescribed from an essential drugs list or formulary

DISCUSSION

Drug use indicators were compared to the Ugandan Ministry of Health Study of 2002 [11], in which Kitovu Hospital participated. Whereas, no injections were prescribed to the patients included in the present study, the mean number of injections per prescription in the 2002 national survey was 0.23 [11]. The mean number of drugs prescribed per outpatient, pooled from the records of 300 patient encounters sampled during 2007-2008, was 2.63 which was lower than the national average of 3.2 reported in 2002 [11]. When extrapolated this indicates a modest reduction in polypharmacy in the intervening period but is still much higher than the WHO target value of <1.5 [6]. The percentage of drugs prescribed from the Essential Drugs List (EDL) was consistent with the national average of 94 %. A copy of the EDL was readily available and represents a positive indicator of the hospital's prescribing policy. Patient knowledge indicators were scored highly (100%) while adequacy of labelling remained poor (0%) [11]; on an account of the absence of the patient's name on the drug packaging label. This omission can be easily remedied.

No difference was noted in drug use indicators between doctors and clinical officers since Ugandan doctors complete a standard five year undergraduate medical curriculum with a significant clinical pharmacology and therapeutics component in the second and third years, followed by further periods of postgraduate training. In contrast, the clinical officers complete an abbreviated three year programme of study focused largely on 'front-line' medicine to equip them to work in primary health care facilities.

The total number of drugs prescribed per patient was significantly greater in the Medical than Surgical Outpatient Clinics in July-August 2008, while the total number of drugs prescribed in the Medical Outpatient Clinics were comparable to the national value of 3.2 reported in 2002 [11] and that in private practices in 2004 [4] This represents a slight improvement when extrapolated nationally. This finding is likely to be partly accounted for by the study design or factors peculiar to Kitovu Hospital.

Older patients tend to present with a greater number of diseases and co-morbidities requiring increased number of drug interventions [14]. Indeed 80% of the patients aged 60 or greater in the study were receiving ≥ 3 drugs.

Sixty two percent of all drugs prescribed in the outpatient clinics during the 6 week study period were prescribed by their generic name although generic prescribing is not actively promoted in Kitovu Hospital. There was a tendency to prescribe some drugs by brand names especially for Brufen® (Ibuprofen) and Coartem® (artemether-lumefantrine). The big number of prescriptions of these particular drugs contributed significantly to reducing the proportion of drugs prescribed by generic name.

The rate of antibiotic prescription in the Surgical Outpatient Clinics was similar to that reported in the Ugandan Ministry of Health Study in 2002 [11] which has been described as 'unacceptably high'. This rate is greater than the 0.4-0.6 per patient encounter reported in 1990 when a target of <0.2 was advocated [5-6] Oral amoxicillin, erythromycin and ciprofloxacin were the main antibiotics prescribed at Kitovu Hospital. The high rate of prescription of antibiotics is likely to reflect the judgement of the prescribing clinician rather than patient demand. Often in a busy hospital setting, with few laboratory investigations available and many patients requiring medical attention, the clinician is more likely to carry out empirical prescription of antibiotics and antimalarials for patients presenting with fever [3, 9].

In contrast to the Pharmaceutical Sector Survey of 2002 [11], none of patients presenting at the Outpatient Clinics at Kitovu Hospital were prescribed an injection. This may have been influenced by the small sample size in the current study.

Kitovu is typical of hospitals in developing countries such as Uganda which struggle to maintain a proficient level of healthcare within limited resources. This creates a cycle of poor health, leading to over-prescription of medications, wastage and worse health outcomes. The WHO Medicines Strategy 2008-2013 advocates a multi-stakeholder

approach towards a national programme to promote rational use of medicines [2] Supporting regional teams in identification of local problems and implementation of effective interventions to remedy these is vital. Continuous audit and review of prescribing practices and assessment of the impact of policy decisions is the key in enhancing rational drug use

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