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## Assessment of Quality of Out-patient Prescriptions in the National Health Insurance Scheme Unit of a Tertiary Hospital in Nigeria

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### ABSTRACT

The fact that today's evidence based guidelines recommends several drugs in the treatment of a single medical condition make drug treatment particularly challenging. Consequently, many patients use a number of medications a situation referred to as polypharmacy. Polypharmacy is linked to occurrence of health risk through increased drug therapy problems like adverse drug reactions, medication error, adherence problem, economic burden etc. This study characterized the quality of out-patient prescriptions in National Health Insurance Scheme (NHIS) of the University of Maiduguri Teaching Hospital, using some selected indicators of Polypharmacy. These include contraindication, drug interaction, drug for treating side effect of co-prescribed drug and inappropriate dosages. Five Hundred out-patient prescriptions were used for the study. The average number of drug per prescription was  $3.95 \pm 1.51$ . About 20.4% of the encounter received prescription with inappropriate combination of five or more drugs. Of this, contraindicated drugs constituted 22.2% of all encounter. There was association between inappropriate prescription and number of drug per prescription ( $p < 0.05$ ). The incidence of inappropriate prescription, potential drug therapy problems, and inappropriate polypharmacy were significantly higher at drug level  $\geq 5$  drugs. There is the need to improve on rational prescribing of drugs by retraining of health care providers.

Keywords: Polypharmacy, selected indicators, drug therapy problems, prescribing.

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## INTRODUCTION

Polypharmacy refers to the use of several medications concurrently in single individual. However, definitions vary in the minimum number of drugs used by patients concomitantly. In the elderly, polypharmacy is usually defined as the use of more than three or four medication [1]. Kingsbury et al [2] defined polypharmacy as the use of two or more medication to treat the same condition, use of two or more drugs of the same chemical class or use of two or more drugs with similar pharmacologic actions to treat different conditions. High frequency of polypharmacy was reported in literature in the treatment of serious illness [3, 4], elderly [5, 6] chronic diseases [2] and rheumatic diseases [7]. Although there are rational and irrational polypharmacy, use of multiple drugs may increase adverse drug event (ADE), drug interaction, medication error, and patient non-adherence and elevated mortality rate [8]. These possible heightened health risk occasioned by polypharmacy are usually compounded if the patient is also taking herbal preparations. Reports have shown that 80% of adult in Africa use one or more herbal preparation for treatment [9]. Polypharmacy, as commonly limited to number of drug, has limited value in measure of quality of prescription, it was advocated that the need to separate rational polypharmacy from irrational polypharmacy as rational polypharmacy is considered as a veritable tool in the management of illnesses such as hypertension, cancer, etc. In separating irrational polypharmacy from rational one some indicators/predictors of irrational polypharmacy beyond the number of drug per prescription have been identified to include presence of contraindicated drug, un-indicated drug, duplicated drug in the same category, inappropriate drug interaction, wrong dosages, and drug prescribed for treatment of side effect of co-prescribed drugs[10]. This study used some of these indicators to analyse out-patient prescription in National Health Insurance Scheme(NHIS) unit of University of Maiduguri Teaching Hospital, Nigeria.

## METHODOLOGY

This was a retrospective study that involved the use of prescription filled and stored at the NHIS pharmacy from the period of January to August, 2009.

### Sample size

The out-patient prescription from January- August 2009 was used. The total number of prescription was ten thousand five hundred and forty.

$$N = \frac{z^2 pq}{d^2} - \text{For sample frame } \geq 10,000$$

Where,

N= desired sample size

z= standard normal deviate (1.96)

p=proportion in the target population which have a particular characteristics (50% in absence of reasonable estimate i.e. 0.5)

q=1-p (0.5)

d= degree of accuracy usually at 0.05

$$N = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2}$$

$$N= 384$$

To increase the power of the research and possibly to accommodate analysis like cross-tabulation, this calculated sample size was increased to 500. Five hundred out-patient prescriptions were randomly selected from the pool of 10,540 prescriptions for the period of study. It was a multi step process, 2000 prescriptions were randomly picked from the pool and numbered 1-2000. Using a Biostat, statistical software, 500 random numbers were generated between 1 and 2000. Five hundred prescriptions were then picked

corresponding to the generated numbers for the analysis. Other data such as patient history, diagnosis/impression for the selected prescription were then obtained from NHIS database. Number of drug(s) per prescription was recorded and each prescription compared with the patient history, diagnoses/impression for any indicators of polypharmacy. Score zero (0) was assigned for absence of each indicator and score one (1) for presence of each indicator. Sum of scores of the indicators per prescription was also recorded. The analysis of data was carried out using SPSS 15.

## RESULT AND DISCUSSION

The distribution of males and females were 38.8% and 61.2% respectively. The population aged less than 40 years constituted the majority (59.6%) and those greater than 40 years was 11%. The remaining 29.4% of the prescriptions has no age on both prescription and the database, the ages were simply written as 'ad' signifying adult. Number of drugs per prescription was shown in figure 1, the minimum and maximum number of drugs per prescription was 1 and 8 respectively. The least encountered prescriptions were those containing 8 drugs (0.8%) while the highest was prescriptions containing 4 drugs (23.8%). The average number of drug per prescription  $\pm$  for all encounter was  $3.95 \pm 1.51$  (2.44 - 4.46) which is consistent with the figure of 3.7 obtained at the central hospital, Benin- City [11] and that obtained (3.2-3.3) in paediatric hospital in Ethiopia but well above the WHO target of 2.0 [12]. Considering WHO indicators for good prescription, this average number of drug per prescription is high and it could be as a result of treatment based on symptoms without definitive diagnosis and lack of or non-conformity to treatment guidelines in health facilities. In the case of NHIS clinic it could have been due either to noncompliance to the scheme treatment protocol or ill implementation of drug use guidelines of the scheme. It might also be as a result of pressure from patient to prescribe other drugs as patients usually pay only 10% of the cost of drugs.

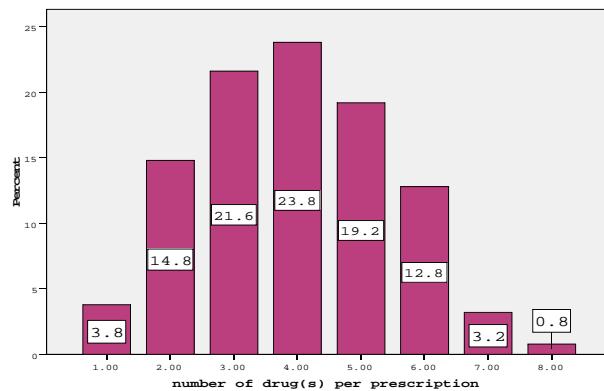


Fig1: The percentage number of drug(s) per prescription.

The contribution of each indicator for polypharmacy was shown in figure 2. The most practised indicator for polypharmacy is contraindication and the least practised is drugs prescribed to treat side effect.

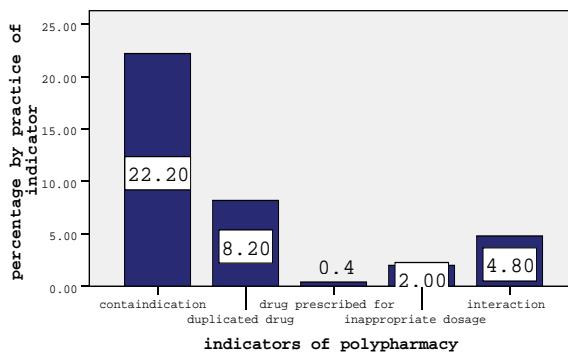


Fig 2: Polypharmacy indicators practice profile

Inappropriate prescriptions (33%) account for prescriptions which have at least one of the indicators of polypharmacy irrespective of the number of drugs per prescription. Appropriate prescription (67%) showed prescriptions without implicated indicators as shown in figure 3.

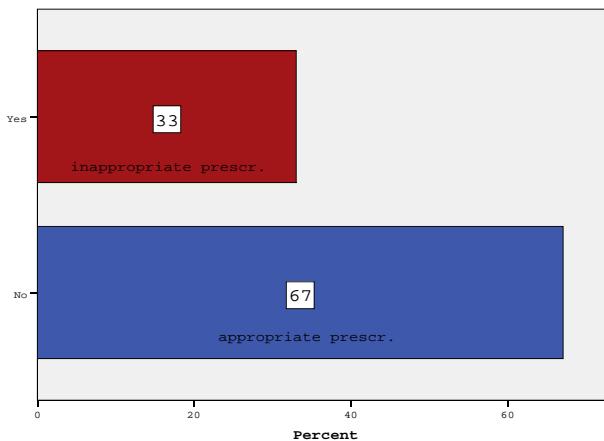


Fig 3: The frequency of appropriate and inappropriate prescription

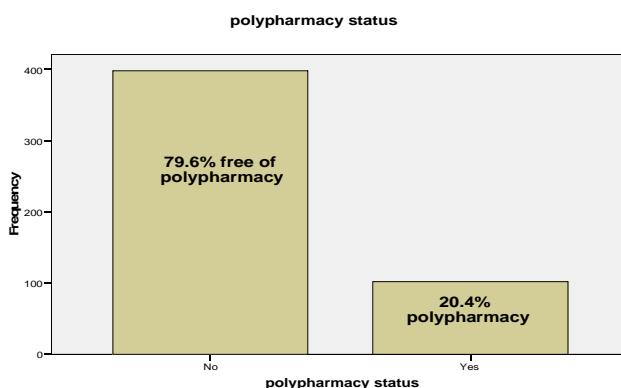


Fig 4: Polypharmacy status of prescriptions in NHIS, UMTH

Polypharmacy occurred in 20.4% of the prescriptions, i.e the prescriptions contained 5 or more drugs and at least one implicated indicators of polypharmacy. Contraindicated drugs constituted 22.2% of all encounter. This study considered inappropriate drug-disease interaction under contraindication. This observed drug interaction is comparable to other studies in primary health care that reported 24% of potential drug interaction for patient expose to polypharmacy [10]. Contraindication contributed most to the inappropriate polypharmacy and was high due to inclusion of unindicated drugs on the prescription.

The relationship between inappropriate prescription and number of drugs per prescription was shown in figure 5. The curve showed that increase in number of drugs lead to increased chances of inappropriate prescription. As observed the prescription with the highest number of drugs (8) has 100% chances of being inappropriate.

The cross-tabulation of incidence of inappropriate prescription with numbers of drugs per prescription which was subjected to Chi square test show some level of association between these two variables that was statistically significant ( $p<0.05$ ). To determine the strength of association between them, they were also correlated using Pearson correlation analysis which confirmed the association to be positively related ( $p<0.05$ ). Inappropriate polypharmacy and potential drug therapeutic problems showed strong positive correlation with the number of drug per prescription.

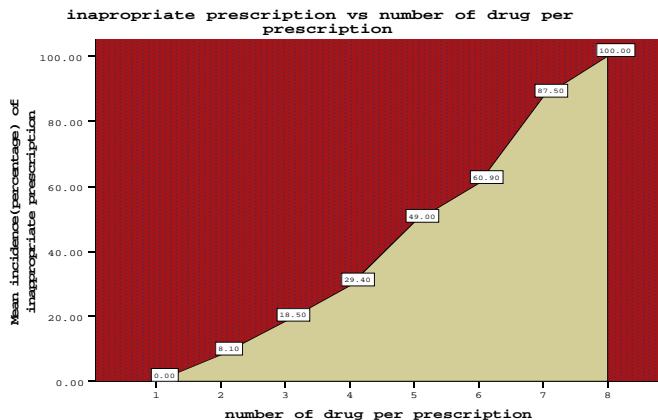


Fig 5: Incidence of inappropriate prescription with number of drugs per prescription

Post hoc ANOVA showed that the incidence of inappropriate prescription, and potential drug related problems which correspond with the sum of scores of all indicators per prescription were significantly higher at drug level  $\geq 5$  drug when compare with the other drug level (0-1 and 2-4 drug). This is consistent with other pharmacoepidemiological studies that have shown number of drug per prescription as a strong predictor of these variables [10]. Linear regression analysis showed that all the indicators contributed to polypharmacy practice in NHIS. Drug prescribed for side effect was a weak independent factor for polypharmacy in this study area.

#### CONCLUSION

Despite this study discrimination among rational and irrational polypharmacy, the incidence of the PP was high (20.4%). Inappropriate prescriptions and chances of drug therapeutic problems vary directly with the number of drugs per prescriptions and the variance is more pronounced with prescriptions with 5 or more drugs.

On this note, the quality of prescriptions can be improved and potential DTPs reduced if the physicians, the pharmacists ensure that the choice of drug for the patient is based on indication and safety by avoiding potentially dangerous combination with proper attention to these indicators of polypharmacy.

Strict compliance to and proper implementation of treatment guidelines is imperative to improving quality of prescription. Drug and therapeutic committee and drug information centre need to be established and utilised in our various clinics.

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