



Attitudes, Practice and Predictors of Rational Use of Medicines among Medicines Prescribers and Dispensers in Nnewi Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author POUA designed the study, wrote the protocol, performed the data analysis and wrote the first draft of the manuscript. Author RO managed the literature searches. Author NBE participated in data collection and author COE did the data collation and proof read the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: Rational use of medicines (RUM) requires that patients receive the appropriate medicine, in the proper dose, for an adequate period of time, and at the lowest cost to them and their community. Positive attitude and practice of RUM among medicine prescribers and dispensers can be created through regular educational interventions. This study was aimed at assessing the attitude, practice and predictors of RUM among the practitioners in Nnewi, Nigeria.

Methodology: A cross-sectional study was carried out among pharmacists, other pharmacy staff in retail pharmacies, licensed proprietary patent medicines vendors (PPMVs), and medical doctors in Nnewi, Nigeria. Data was collected through self-administered questionnaire supervised by trained research assistants, between October 2014 and January 2015. Three hundred of seventy-

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five participants were recruited for this study. The Statistical Package for the Social Sciences (SPSS) version 17 for windows was used for data analysis. Bivariate and multivariate analyses were carried out to evaluate differences and associations based on selected variables.

Results: The respondents who were predominantly aged 20-30 years (44.8%) with mean age of 33.2±8.9 years, consist of doctors (prescribers) and other healthcare practitioners (dispensers) in private and public sector. The dispensers expressed a markedly greater willingness to attend trainings on RUM than the doctors ($p<0.02$). In all the indicators considered, higher proportions of dispensers than prescribers said they practiced RUM in the previous 3 months. Age, medical and pharmacy occupations, high education, employee status and long work experience all significantly predict RUM among the respondents.

Conclusion: Practitioners were willing to attend trainings on RUM though the dispensers were significantly more enthusiastic about it than the prescribers. The practice of RUM among the respondents was however very poor. Higher educational status, older age group, government employee status and long work experience all markedly predict RUM.

Keywords: Rational use of medicines; practices; predictors; prescribers; dispensers; Nigeria.

1. INTRODUCTION

According to World Health Organization (WHO), rational use of medicine (RUM) refers to the correct, proper and appropriate use of medicines [1-3]. RUM requires that patients receive the appropriate medicine, in the proper dose, for an adequate period of time, and at the lowest cost to them and their community [1]. Prescribers and dispensers of medicines have crucial roles to play because improper prescribing and dispensing practices pose a challenge to the actualization of RUM [4].

Rational use of medicines unfortunately, has been a low priority because there are other pressing problems such as spurious and substandard or poor quality drugs, and paucity or absence of medicines which take up the attention of the authorities [5]. Also most of the rational use of medicines studies in Nigeria had been carried out in the south western region while the north eastern and north western regions had the least (7% and 3.5% respectively) with good number of RUM studies carried out in hospital settings (77%) and very minimal work carried out in other settings like community pharmacies (4.1%). Studies suggest that about 50% of patients, who take these medicines, take them incorrectly [6]. Literature and publications have documented different ways of irrational use of medicines to include: over-prescribing or polypharmacy [7], wrong use of antibiotics [8], wrong dosage, limitations associated with procedures and hospital policies [9], wrong self-medication [10], characterized by use of ethical preparations (drugs that are available only with written instructions from a doctor or dentist to a pharmacist) and non-adherence to treatment

regimens [11,12]. These usually have negative consequences in management of chronic diseases.

Health care providers have a professional obligation to avoid the undesirable consequences of inappropriate practice and improve the quality of patient care. The concept of rational drug use is new in the developing countries [13] and it refers to the health care professional prescribing and dispensing the right drug to the right patient, in the right dose, at right time intervals and for the right duration [14]. Some measures are required for the RUM, and they include the development and revision of the national essential drug list, the national formulary development, the amending pharmacy act and the opening of drug information centers [15]. The rational drug therapy practice includes members of the health care team (prescribers and dispensers) and the clients' (patients') knowledge regarding their medications and their use [13,16].

A set of WHO drug use indicators [3], have been identified among the dispensers as RUM practice elements and they include: Explaining to customers a) the dosage and duration of use of their medicines [17,18], b) the possible side effects of the medicines, c) the expiry dates and how to store their medicines, d) the need to comply with their medications (adherence) [19] and e) refusing to sell prescription medicines to customers without doctors' prescription. Also, for the prescribers, the following RUM practice items [3] have been identified: a) prescribing injectable medicines to patients only when it is necessary, b) prescribing generic medicines to reduce cost to patients, c) not prescribing antibiotics for viral infections such as common cold, d) explaining to

the patients the dosage duration of use and side effects of their medicines [17,18], e) explaining to patients the need to comply with their medication (adherence) [19].

A standard RUM training course [3] consists of topics in the following areas: promoting the rational use of medicines, promoting the rational use of medicines in communities, drugs and therapeutics committees, problem-based pharmacotherapy teaching, pharmaco-economics, drug (medicine) policy issues for developing countries and Anatomical Therapeutic Classification / Defined Daily Dose (ACT/DDD) methodology for medicine consumption.

Therefore, in examining the roles of health care practitioners in RUM, the objectives of this study include evaluating the attitudes towards the RUMs among medicines prescribers and dispensers in Nnewi, Nigeria, determining the practice of RUM among medicines prescribers and dispensers in Nnewi, determining the predictors of rational use of medicines (RUM) among the practitioners and exploring the challenges to the control of irrational medicines use among medicine prescribers and dispensers in the area.

2. METHODOLOGY

2.1 Study Area

Nnewi is the second largest city in Anambra State. The town is located east of the river Niger and about 22 km southeast of Onitsha and within the tropical rain forest region of Nigeria. Nnewi has several private and government-owned health facilities including, health posts, primary health centers and a teaching hospital. Others include licensed private hospitals, clinics, pharmacy shops and proprietary patent medicine vendor (PPMV) stores. These health facilities are manned by health care practitioners including prescribers (mainly doctors) and dispensers (mainly pharmacists, other pharmacy staff, PPMVs etc).

2.2 Study Design

A cross-sectional study was carried out among pharmacists, other pharmacy staff in retail pharmacies, licensed patent medicines vendors (PPMVs), and medical doctors in both private and government health establishments in Nnewi, Nigeria.

2.3 Sample Size Calculation

In total, there were 28 items on the questionnaire. Using Tabachnick and Fidell (2007) sample size estimation for regression analysis as stated by Pallant [20], a minimum sample size of 320 clients was intended for this study [$N > 50 + 8m$ (where m = number of independent or questionnaire variables)]. A 10% attrition rate (i.e. 10% of 320) was added to the minimum sample size to obtain a final minimal estimate of 352 participants. A total of 365 respondents eventually participated because they were available and willing.

2.4 Selection of Participants

Pharmacists and medical doctors were recruited through their professional associations while PPMVs were recruited using a list obtained from the Pharmacists Council of Nigeria (i.e. Government agency responsible for regulation of Pharmacy Practice in Nigeria. The other drug handlers were recruited from the pharmacies, patent medicine stores selected for the study. From each group, all the participants who attended their regular associations' monthly meetings were approached to complete the questionnaires. A total of 365 respondents were available and they all agreed to participate in the study. Therefore, they were all recruited because the larger number would add to the power of the study and further improve the validity of the result.

2.5 Data Collection

Data was collected through self-completed questionnaire supervised by trained research assistants. Contact was made with the leaders of the hospitals; pharmacies (sts)', medical doctors' and licensed patent medicines vendors (chemical sellers)' association to gain their support and to mobilize their members to self-complete the questionnaires. The trained research assistants helped the researchers to distribute the questionnaires and to explain any grey areas to the respondents. They also ensured that the respondents returned the questionnaires same day before leaving the venue of their meetings, thus giving a response rate of 100%. The research was conducted between October 2014 and January 2015.

2.6 The Questionnaire

The participants' questionnaires were coded and they were not required to disclose their names or

other personal identifiers. Items on the questionnaire included socio-demographic variables such as age and gender, and questions to assess attitudes and practices towards rational use of medicines. The section on practice of RUM was limited to the various prescribing, dispensing and counseling activities of the practitioners at point of interaction with their clients (patients). For purposes of this research, some items of RUM practice extracted from a set of WHO drug use indicators (as described in the "introduction"), were used to identify general prescribing, dispensing and quality of care problems among the practitioners. Furthermore, to measure the attitude of respondents towards rational use of medicines in this study, two training-based attitude indicators were adopted namely; a) their willingness to attend regular training on RUM and b) the number of trainings on RUM ever attended. Attending such standard training courses (see "introduction" for content) was considered a good assessment of disposition (attitude) and an essential prerequisite to practice of RUM among the respondents.

2.7 Data Analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 17 for windows. Results were presented as frequencies, percentages and summary statistics such as mean and standard deviation. Bivariate and multivariate analyses were carried out to evaluate differences between attitudes of prescribers and dispensers towards RUM; and to determine the socio-demographic predictors of RUM among the practitioners. Significance level was set at $p < 0.05$.

2.8 Ethical Approval

Ethical approval for the study was obtained from Research Ethics Committee, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria (see attached scanned copy). Permissions were obtained from the pharmacists, medical doctors and licensed patent medicines vendors (chemical sellers) associations. The respondents also gave their verbal consent having been informed of the voluntary nature of their participation and their freedom to withdraw at any stage of the study

without unpleasant consequences. All information obtained from respondents was handled with utmost secrecy and confidentiality.

2.9 Dissemination of Findings

Reports of findings will be delivered to the leaders of the three associations, and to the Ministry of Health in Nigeria, with recommendations based on the study findings.

2.10 Funding

Personal income was used to fund this study – there was no external source of funding.

3. RESULTS

The predominant age group among the respondents was 20-30 years (44.8%) while the 51-60 years age group made up only 3.7% of the respondents (Table 1). The mean age of respondents was 33.2±8.9 years, while the median age was 35 years. There were 83 (22.1%) medical doctors and 40 (10.7%) pharmacists among the respondents. The rest were other drug handlers like PPMVs, pharmacy technicians etc. A large proportion, 147 (39.2%) had attained at least post-secondary education (lower than university degree) and majority 198 (52.8%) had acquired 2-5 years working experience. Moreover 139 (37.1%) were self-employed while the rest were in government service 236 (62.9%).

Table 2 showed there was a significantly greater willingness to attend trainings on RUM among the other health workers than among the medical doctors ($\chi^2=9.7$, $p < 0.02$).

Fig. 1 depicted that majority (53.9%) of the dispensers (pharmacists/ PPMV etc) practiced RUM by also explaining to their patients the dosage and duration of their medicines while 46.1% practiced it by explaining to customers the need to comply (adhere) to their medications.

Fig. 2 showed that in the previous three months, the doctors (prescribers) had practiced RUM mainly by explaining to their patients the dosage, duration of use and side effect of their medicines (37.9%).

Table 1. Socio-demographic variables of respondents

Socio-demographic variables	Frequency	Percent
Age group (years)		
<20	10	2.7
20-30	168	44.8
31-40	127	33.9
41-50	56	14.9
51-60	14	3.7
Total	375	100
Mean age±SD	33.2±8.9 years	
Median age	35 years	
Gender		
Male	176	46.9
Female	199	53.1
Total	375	100
Occupation		
Pharmacist	40	10.7
Pharmacy technicians	36	9.6
Trained pharmacy assistants	49	13.0
Doctors	83	22.1
PPMV	67	17.9
Other drug handlers (nurses, laboratory attendants)	100	26.7
Educational level		
Secondary education or less	49	13.0
Post-secondary qualification lower than bachelor's degree	147	39.2
Bachelor's degree	145	38.7
Master's degree	18	4.8
PhD degree	16	4.3
Total	375	100
Year of experience (years)		
≤1	64	17.1
2-5	198	52.8
6-10	48	12.8
11-20	43	11.5
21-30	14	3.7
31-35	8	2.1
Total	375	100
Mean year of experience±SD	6.3±6.9 years	
Employment status		
Self employed	139	37.1
Employee (of hospital, pharmacy or PPMV)	236	62.9
Total	375	100

According to Table 3, age groups 31-40 years and 51-60 years were significantly predictive of RUM: {Adjusted Odd's Ratio (AOR) of 2.04(1.17 - 4.20); (p<0.01)} and {AOR of 1.97(1.54 -3.90); (p<0.01)} respectively. Similarly the pharmacy and medical occupations were significantly more likely to abide by RUM than the respondents in other occupations: {AOR of 1.81 (1.20 -3.72); p<0.04} and {AOR of 2.03 (1.14 - 4.28); p<0.005} respectively. Moreover education at the bachelors and master's degree levels are significantly predictive of RUM: AOR of 1.98 (1.13 - 3.17) p< 0.01} and {AOR of 1.79 (1.09 –

3.25); p<0.01} respectively. Also respondents' years of experience and employment status were predictive of RUM among them.

4. DISCUSSION

This study has shown that from the perspective of health care practitioners, the attitude of the respondents towards RUM as measured by their willingness to attend trainings on RUM was commendably high for both the prescribers and dispensers even though the later were significantly more willing than the former to

attend such trainings. Equally high in both groups, were the proportions that had ever attended such trainings in the past. This apparent display of positive attitude is similar to the result obtained in another study [21]. The enthusiasm expressed in this regard especially by the dispensers may be borne out of a genuine desire to improve RUM within their communities. "Prevention through education" has become the newest panacea for medicine abuse. Law enforcement has failed to stem the supply of illegal drugs, and rehabilitation efforts have thus far failed to reclaim many abusers. Everyone

now talks of pouring money into education to stop the problem before it begins [22]. By regular attendance to these trainings, the practitioners hope to acquire relevant information which they will in turn transmit to their clients in course of their job. The fact that the prescribers are significantly less enthusiastic than the dispensers about attendance to such trainings is a probable pointer to the 'know it all attitude' of the doctor who may erroneously regard such training sessions as a waste of valuable time that could be utilized for the more 'productive' clinical diagnosis and treatment of patients [23].

Table 2. Attitudes towards RUM among respondents

Attitude items on RUM	Number (%) of respondents		X ²	p-value
	Doctors no (%)	Other respondents no (%)		
Willingness to attend training on RUM				
Yes	74 (89.2)	282 (96.6)	9.7	P<0.02
No	6 (7.2)	8 (2.7)		
Not sure	3 (3.6)	2 (0.7)		
Total	83 (100)	292 (100)		
Received any training on RUM				
Yes	55 (66.3)	192 (65.8)	0.004	P>0.1
No	23 (27.7)	94 (32.2)		
Not sure	5 (6)	6 (2.0)		
Total	83 (100)	292 (100)		

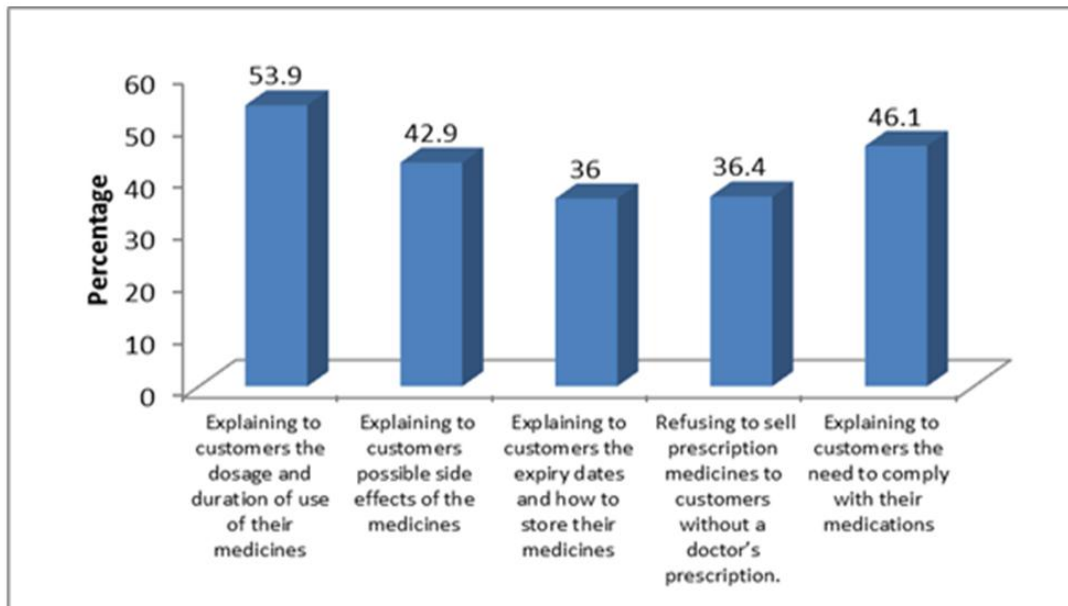


Fig. 1. Practice of RUMs by pharmacist/PPMV in the last 3 months

Table 3. Predictors of RUM among the medicines prescribers and dispensers

Socio-demographic variables	Crude OR	Adjusted OR (95% CI)	p-value
Age group (years)			
*<20	1.22		
20-30	1.91	1.43 (0.77-2.85)	0.06
31-40	2.53	2.04 (1.17-4.20)	0.01
41-50	1.90	1.68 (1.30-2.72)	0.07
51-60	2.83	1.97 (1.54-3.90)	0.01
Gender			
Male	1.52	1.26 (1.07-2.94)	0.10
*Female	1.07		
Occupation			
Pharmacist	2.23	1.81 (1.20-3.72)	0.04
Pharmacy technicians	1.82	0.98 (0.57-2.24)	0.11
Trained pharmacy assistants	1.94	1.11 (0.42-2.31)	0.08
Doctors	3.30	2.03 (1.14 - 4.28)	0.005
PPMV	1.87	1.15 (1.03- 2.16)	0.12
*Other drug handlers (nurses, laboratory attendants)	1.03		
Educational level			
*Secondary education or less	1.41		
Post-secondary qualification lower than bachelor's degree	1.76	1.13 (0.92 - 2.11)	0.18
Bachelor's degree	2.13	1.98 (1.13 - 3.17)	0.01
Master's degree	2.10	1.79 (1.09 - 3.25)	0.01
PhD degree	1.74	1.48 (1.26 - 2.32)	0.09
Year of experience (years)			
*<1	0.94		
2-10	1.21	0.97 (0.76 - 2.22)	0.37
11-20	1.93	1.21 (0.66 - 2.40)	0.11
21-30	2.54	1.43 (0.98 - 3.27)	0.01
31-35	1.85	1.20 (1.04 - 2.18)	0.12
Employment status			
*Self employed	1.93		
Employee (of hospital, pharmacy or PPMV)	3.13	2.17 (1.21 - 4.11)	0.005

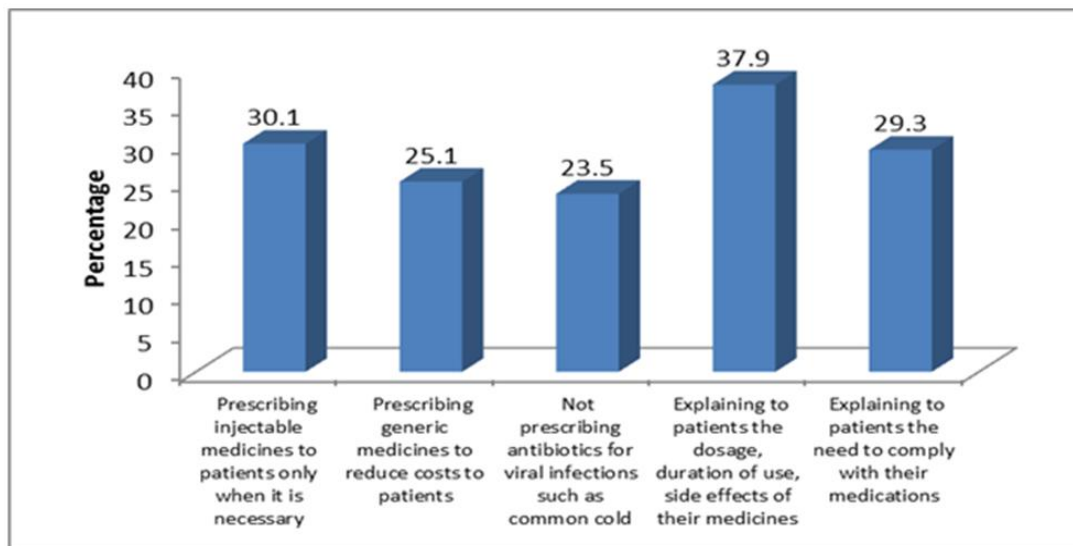


Fig. 2. Practice of RUMs by doctors in the last previous month

It is noteworthy that in spite of the positive attitude expressed by the respondents towards RUM, there was no commensurate increase in the practice of RUM among the practitioners. Only 53% of dispensers and 37.9% of prescribers would bother to explain the dosage, duration and side-effects of the medicines to their patients. Less plausible were the proportions of prescribers (29.3%) and dispensers (46.1%) who had ever bothered to explain to their clients the need for adherence to their medicines. A previous study recorded that 91% of prescribers provided counseling while prescribing, while 56.6% took special interest in encouraging adherence [21]. Our study probably recorded a lower RUM practice in this regard because it is a community based study consisting of respondents in both public and private enterprises, as opposed to the cited research which took place in a tertiary hospital. Teaching hospitals are expected to set standards in all aspects of healthcare including RUM.

The very low proportions of doctors who would prescribe generic medicines to patients [25.1%] and who would not prescribe antibiotics for treatment of viral infections [23.5%] are testimonies of the poor practice of RUM among prescribers. The larger proportion of prescribers who did not practice RUM contributes to increasing health risks, and potentially needless expenditure [24]. This evidence makes the need to promote RUM in the community more compelling. Compared to brand name drugs, prescription of generic medicines leads to large savings in healthcare costs without compromising quality [25,26]. Generic drugs are also sometimes better absorbed into the system than brand-name drugs [27], even though the average difference in absorption into the body between the generic and the brand-name drugs was 3.5 percent [25]. Also the indiscriminate prescription of antibiotics even for treatment of viral infections leads to development of resistant strains [28]. Furthermore, when doctors prescribe injectable medicines to patients only when it is necessary, they help to stem the spread of blood borne diseases [29].

What should be considered the most important functions of the dispenser in preserving the integrity of RUM are 'explaining to customers the expiry dates and how to store their medicines', and 'refusing to sell prescription medicines to customers without doctors' prescription'. These have unfortunately recorded the poorest compliance by the dispensers in our study. A

prescription medicine is a pharmaceutical drug that legally requires a medical prescription to be dispensed. In contrast, over-the-counter drugs can be obtained without a prescription. The reason for this difference in substance control is the potential scope of misuse, from drug abuse to practicing medicine without a license and without sufficient education [30]. The findings in this study which suggest that pharmacies sell prescription only drugs to patients are similar to reports of a survey in Abu Dhabi UAE and the common reasons given by pharmacies for breaking the law were that everyone was doing it, and if they didn't satisfy customers then the nearest rival pharmacy would. Patients also said bypassing a doctor was cheaper and simpler; it was easy to obtain what they wanted [31]. This no doubt, exacerbates an already complex situation of easy access to medicines and constitutes the potential danger of taking drugs without medical supervision.

Predictors of RUM in this study include occupational status as pharmacist or doctor and high educational status. Granted that the medical and pharmacy curricula are full and it is not easy to find additional time for the subject of rational use of medicines [5], yet doctors and pharmacists are well educated professionals trained on the pharmacokinetics and pharmacodynamics of drugs. They are also well informed about the rudiments of handling and administration of medicines. The topic of RUM should be included in the curriculum and questions on it set at the examination for undergraduates to study it [5]. One should however worry about the other drug handlers like PPMVs in this study who did not enjoy the privilege of good education and on account of this, tend to lack the required skill to perform their duties effectively. Regular informal trainings in form of conferences and workshops targeted at this group could fill the gap in knowledge and practice of RUM.

The discovery that higher age groups and years of experience significantly predict RUM among the respondents is a pointer to the pivotal role of maturity and experience in rational prescription and dispensing of medicines to patients. Studies have shown that as people grow older and acquire experiences in life, they tend to act more rationally [32]. This study has shown that the self-employed respondents are less likely than their employee counterparts to rationally use medicines on their clients. Rational use of medicines will be possible if practitioners eschew

any other forms of material or pecuniary considerations while taking decisions on best drug options for their patients. This has been further re-affirmed in some other review which posits that the possibility of financial or other material gain arising in course of professional interaction with clients gives room for conflict of interest in clinical decision making by practitioners [33]. This situation is more likely to arise among the self-employed practitioner who is not accountable to anyone but himself. No wonder then that RUM is applicable mainly to the employee practitioner who must work hard and engage in continuous professional development to update his knowledge to remain relevant and approved by his employer.

5. RECOMMENDATIONS

In view of the foregoing, it is therefore recommended that government in collaboration with the various health professional bodies (unions) should organize regular trainings on RUM for health care practitioners. Prescription and dispensing standards should be emphasized at such trainings to bring every practitioner whether self-employed or employee to the knowledge of prevailing global situations. Already continuing professional development has been made a pre-requisite for yearly renewal of practice license among doctors in Nigeria. Other health professional bodies or unions should be encouraged to adopt this strategy as a forum to get all practitioners under a common informal educational umbrella needed to spread the right message about RUM. There are already existing laws about prescription and dispensing of medicines, and there are health regulating bodies like Medical and Dental Council of Nigeria, Pharmaceutical Council of Nigeria etc. The law should be allowed to take its natural course among erring health practitioners without compromise by the enforcers. The administration of necessary punishment on defaulters should however go hand in hand with rewards for good and exemplary performance on deserving practitioners of RUM.

6. CONCLUSION

This study has shown that the practitioners were very willing to attend trainings on RUM though the dispensers were significantly more enthusiastic about it than the prescribers. The practice of RUM among the respondents left much to be desired. Nonetheless, about 50% of the dispensers counseled their clients on dosage

and duration of their medications while 37% of prescribers did the same. Occupation, educational status, age, employment status and duration of employment of the practitioners were all markedly predictors of RUM.

7. LIMITATIONS OF STUDY

This was a descriptive cross-sectional study (snap-shot) in which the conclusions of the researchers were based purely on questionnaire response and there were no concrete means of verification of the participants' responses. In future, a 'before and after interventional study with control' shall be designed to determine, in more concrete terms, the effect of regular educational intervention on the practice of RUM among prescribers and dispensers. Checklists, focus group discussions and interviews of key informants shall be used to compliment the quantitative component of the study and to serve as means of verification of questionnaire responses.

Furthermore, the indicators for RUM as stated in the study are only examples to examine the health care practitioners' (prescribers and dispensers) roles for RUM and not enough to make claims about rational use of medicines in general.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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