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Clinicians' contribution to cost-related medication non-adherence: Impact of irrational prescribing and influence of pharmaceutical promotional activities on prescribing behavior of clinicians

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Abstract

Poor training of clinicians on the Rational Use of Medicines (RUMs) and the impact of pharmaceutical promotional activities fuel irrational prescribing behavior, which is a major contributor to cost-related medication non-adherence. The aim of this study was to determine how training on the RUMs and related concepts and the influence of pharmaceutical promotional activities impact on clinicians prescribing behavior, a major cause of cost-related medication non-adherence.

This was a cross-sectional descriptive study, conducted among medical practitioners in South-eastern Nigeria using a self-administered questionnaire. The questions were designed to determine the clinicians' knowledge and practice of the basic concepts of the RUMs, as well as how much pharmaceutical promotional activities (information and incentives) impact on their prescribing behaviors.

There were 100 clinicians, 71 (71%) males and 29 (29%) females, with mean years of practice of 8.2±5.8 years. About 66% of the respondents claimed they were trained on the concept of the RUMs, however, only 20% were aware of the Personal Drugs (P-drugs) concept, and 17% had their own list of P-drugs, which is basic to rational prescribing. Fifty-six percent (56%) agreed that pharmaceutical promotional activities influenced their prescribing habits, while 32% were indifferent.

The poor knowledge of the basic concepts of the RUMs as seen in this study makes clinicians vulnerable to irrational prescribing and the negative impact of pharmaceutical promotional activities. In developing nations, where medicines are mostly paid out of pocket by the patient, such prescribing habits fuel cost-related medication non-adherence.

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Introduction

Cost-related medication non-adherence is defined as taking less medication than prescribed because of cost, such as delaying or failing to fill prescriptions, or skipping or lowering medication doses.[1–3] Cost-related medication non-adherence is a global problem and is largely dependent on the prescribing behavior of clinicians and factors that affects their prescribing behaviors amongst other causes. The cost of treatment is always an important criterion in prescribing medicines, whether covered by the state, an insurance company, or directly by the patient out of pocket, as is mostly obtainable in many developing nations like Nigeria.[4] Addressing the prescribing behavior of clinicians and factors that affect it will be a prime target amongst others in any meaningful effort geared towards the reduction of cost-related medication non-adherence, since the task of prescribing medicines is primarily that of clinicians.

Prescription is based on scientific evidence, it requires adequate knowledge and practices of the Rational Use of Medicines (RUMs), and it is related to the concepts of in Essential Medicine Lists (EML)and Personal Drugs (P-drugs).[5,6] P-drugs are the clinician's priority choice for given indications and are chosen from the national essential medicine list not only on the basis of efficacy,

safety and suitability, but also based on cost.[4,6,7] Factors that negatively impact on clinicians' prescribing behavior, like inadequate training or failure to apply these basic concepts, as well as external influences, like promotional activities of pharmaceutical companies and other internal health system policies besides patient-related factors, may result in cost-related medication non-adherence, with its detrimental effect on the overall treatment outcome.

Studies in developing countries have reported a heavy reliance of clinicians on drug information from pharmaceutical sales representatives, especially regarding new drugs, and the negligence of independent, peer-reviewed sources.[8,9] Though sometimes downplayed there is a wide range of evidence suggesting that drug promotion activities affect the prescribing attitude and behavior of doctors.[10–15] This study aimed at determining how training on the RUMs and related concepts and the influence of pharmaceutical promotional activities impact on clinicians' prescribing behavior, a major cause of cost-related medication non-adherence.

Materials and Methods

Study design

This was a cross-sectional descriptive study amongst medical practitioners in a South-eastern Nigeria tertiary institute of health, from June 2018 to December 2018, using a self-administered questionnaire.

Study population

The clinicians were drawn from resident doctors and medical officers at the Nnamdi Azikiwe University Teaching Hospital (NAUTH). NAUTH is a 450-bed tertiary hospital in Nnewi, Anambra State, South-eastern Nigeria. NAUTH is the largest medical referral center in the State, with resident doctors, medical officers and medical consultants in various clinical and non-clinical departments. Most resident doctors and medical officers in this institution are from the Southeast and South geopolitical zones of the nation, and most were trained in the medical schools in these zones.

Sampling method and sample size

The 100 participants surveyed in the study were selected from the eligible consenting resident doctors and medical officers in the surveyed clinical departments in the hospital using a systematic sampling technique (via consecutive recruitment). A sample size of 121 was obtained using Raosoft®,[16] an online statistical software based on the following assumptions: margin of error (5%), Confidence Interval (CI) (95%), the population of respondents (175 doctors in the surveyed clinical departments, internal medicine, surgery, paediatrics, obstetrics and gynaecology, and family medicine, at the time of the survey) and a response distribution of 50%. The addition of 10% of the estimated sample size gave a total sample size of 134.

Study protocol

The study was conducted using a self-administered questionnaire adapted from some selected sections of the process of rational prescribing. The questions were designed to determine the clinicians' knowledge of the principles of drug selection, especially the "P-drug concept", and how to use them in practice. The questionnaire also contained further questions on the influence of pharmaceutical activities (information and incentives) on the prescribing attitudes of the clinicians.

Inclusion/exclusion criteria

The practitioners were included if they prescribed medicines regularly in their practice and if they gave consent. Those in the Laboratory Medicine departments who do not prescribe medicines regularly, and those in Community Medicine who consult mostly in the hospital out-stations were excluded. House officers and medical consultants were also excluded from the study.

Statistical analysis

Data entry and analysis were conducted using Statistical Package for Social Sciences (SPSS), version 22.0 (IBM Corp., Armonk, NY, USA).[17] Descriptive statistics of mean, frequency, and percentages were used to summarize data on socio-demographic variables. Tests of statistical significance were carried out using Chi-square and Fisher's tests as appropriate for proportions. A p-value of <0.05 was considered significant.

Results

A total of 134 questionnaires were distributed; 118 were returned, giving a response rate of 88.1%. However, only 100 respondents with sufficient data were analyzed. They comprised 71 (71%) males and 29 (29%) females, with mean years of practice of 8.2±5.8. Table 1 shows the demographic data of the respondents, as well as years of practice.

Table 2 shows that 80% of the respondent were aware of the concept of the RUMs, but only 66% were trained in the process of rational prescribing. Similarly, 83% were aware of the concept of

Table 1. Demographic data.

Characteristics	Frequency (%)
Age	
25-34	55 (55.0)
35-44	40 (40.0)
≥45	5 (5.0)
Age range	25-49 years
Sex	
Male	71 (71.0)
Female	29 (29.0)
Years of practice	
≤10	71 (71.0)
≥11	29 (29.0)
Mean years of practice	8.2±5.8 years

Table 2. Knowledge and practice of basic concepts in the rational use of medicines.

Characteristics	Frequency (%)	
	Yes	No
Aware of the concept of RUMs	80 (80.0)	20 (20.0)
Trained on the concept of RUMs	66 (66.0)*	34 (34.0)
Aware of the concept of EML	83 (83.0)	17 (17.0)
Prescribe medicines listed in EML	37 (37.0)	63 (63.0)
Aware of the concept of P-drugs	20 (20.0)	80 (80.0)
Has own list of P-drugs	17 (17.0)	83 (83.0)

*(38 as undergraduates, 28 post-qualification as doctors). RUMs, Rational Use of Medicines; EML, Essential Medicine List; P-drugs, Personal drugs.

Essential Medicine List (EML), but only 37% prescribed medicines fromfrom the EML. Twenty percenty of our respondents were aware of the P-drug concept, and only 17% had their own list of P-drugs.

Table 3 shows that 100% and 98% of the respondents agreed that efficacy and safety of medicine respectively are determinants of prescribing practice. However, only 68% of respondents agreed that the cost of medication is a determinant of prescribing practice, while 56% agreed that promotional activities (information, 43%, and incentives, 13%) are determinants of prescribing habits. On the other hand, 22%, 14% and 18% of respondents were indifferent to the effect of cost, promotional incentives and promotional information from pharmaceutical companies on their prescribing practices.nThe observed differences in the effect of the clinician's years of practice on their attitude towards the impact of the cost of medicine, pharmaceutical incentives and information on their choice of prescription were not statistically significant (Table 4).

Discussion

Cost-related medication non-adherence has not been reported in Nigeria, however, previous studies have reported medication non-adherence among different patient groups in the country.[18,19] Irrational prescribing behavior is a major cause of cost-related medication non-adherence, and this most times results from inadequate training of clinicians on the RUMs concept. In the present study, though 83% of the clinicians were aware of the concept of the RUMs, only 66% were trained on the concept of the RUMs. However, a more disturbing discovery in the study was that only 20% were aware of the "P-drug concept", which is basic to the RUMs, meaning that those trained were not adequately trained. Previous studies have shown that the percentage of clinicians practicing the P-drug concept in developing nations is low, and this may be due to the relative newness of the concept and the fact that most developing nations including Nigeria are yet to include it as an essential part of the undergraduate medical training curriculum.[20] The quality of training on the RUMs concepts that these clinicians possess will require further studies to determine. Bad prescribing habits lead not only to ineffective and unsafe treatment, but also contribute to higher costs of treatment and cost-related medication non-adherence.[4]

Only 38% of the clinicians who claimed to be trained in rational prescribing did so during undergraduate training, while the remaining 28% were trained post-qualification. Research shows that despite gains in general experience, prescribing skills do not improve much after graduation.[4] Thus, good training is needed before poor habits get a chance to develop.[4] This might explain the small percentage of the clinicians who were actually aware of the P-drug concept (20%), and a smaller percentage (17%) who have their own P-drugs list, which is an integral part of the practice of the RUMs concept. It might also explain the lack of effect of the years of practice on the attitude of the clinicians towards the effect of the cost of medicines, and the impact of pharmaceutical promotional activities on their prescribing behaviors. Poor knowledge of the RUMs also makes the prescriber vulnerable to influences such as patient pressure, bad examples from colleagues and high-powered salesmanship (from pharmaceutical companies), which can cause irrational prescribing.[4] Adequate training on therapeutic skills, particularly problem-based pharmacotherapy, during undergraduate training as incorporated in the RUMs concept is one way to promote rational prescribing.

In the present study, 10% of the clinicians disagreed that the cost of medicine was a determinant of the choice of medicine during prescribing, while 22% were indifferent to the influence of the cost of medicine on their choice of a drug during prescribing. Proposed causes of cost-related medication non-adherence include high out-of-pocket costs, especially in developing nations, and lack of prescription drug coverage and high monthly medication cost in developed nations with established health insurance schemes.[1,21,22]

The World Health Organization (WHO) defines drug promotion strategies as "all informational and persuasive activities by manufacturers and distributors, the effect of which is to induce the prescription, supply, purchase and/or use of medicinal drugs".[12]

Table 3. Determinants of choice of prescribed medicines.

Characteristics	Frequency (%)		
	Agree	Indifferent	Disagree
Efficacy of medicine	100 (100.0)	0 (0.0)	0 (0.0)
Safety of medicine (adverse effect)	98 (98.0)	1 (1.0)	1 (0.0)
Cost of medicine	68 (68.0)	22 (22.0)	10 (10.0)
Promotional incentives from pharmaceutical companies	13 (13.0)	14 (14.0)	73 (73.0)
Information from pharmaceutical companies	43 (43.0)	18 (18.0)	39 (39.0)

Table 4. A comparison of the impact of years of practice on attitude towards the impact of the cost of medicine, pharmaceutical incentives and information on the choice of prescribed medicine.

Characteristics	Years of practice	Agree (%)	Indifferent (%)	Disagree (%)	Value*	p-value
Cost of medicine	1-5 yrs	26 (26.0)	11(11.0)	1 (1.0)	7.137	0.121
	6-10 yrs	25 (25.0)	5 (5.0)	3 (3.0)		
	11 yrs	17 (17.0)	6 (6.0)	6 (6.0)		
	Total	68 (68.0)	22 (22.0)	10 (10.0)		
Information from sales representatives	1-5 yrs	18 (18.0)	7 (7.0)	13 (13.0)	1.751	0.790
	6-10 yrs	14 (14.0)	7 (7.0)	12 (12.0)		
	11 yrs	11 (11.0)	4 (4.0)	14 (14.0)		
	Total	43 (43.0)	18 (18.0)	39 (39.0)		
Incentives from sales representatives	1-5 yrs	4 (4.0)	4 (4.0)	30 (30.0)	4.258	0.379
	6-10 yrs	7 (7.0)	6 (6.0)	20 (20.0)		
	11 yrs	2 (2.0)	4 (4.0)	23 (23.0)		
	Total	13 (13.0)	14 (14.0)	73 (73.0)		

*Fisher's exact test [Exact-Sig (2-sided)].

Interaction between pharmaceutical sale representatives and physicians is a regular occurrence in Nigeria, and such interactions tend to influence prescribing practices.[15] In our study, we found that 13% of the clinicians agreed that promotional incentives from pharmaceutical companies were determinants to the choice of medicines they prescribed, while 14% were indifferent to whatever the effect of the incentives meant to their prescribing behaviors. These incentives from pharmaceutical companies can come in various forms, ranging from gift items like souvenirs to drug samples. However, studies have shown extensively that the use of drug samples by pharmaceutical companies resulted in a higher prescription for those drugs.[10,23-25] The consequences, especially where patients pay out of pocket for prescription medicines, are that after the samples are exhausted, the patients will be made to pay, and sometimes they cannot sustain such payments, leading to cost-related medication non-adherence, either in the form of delaying or failing to fill prescriptions, or skipping or lowering medication doses. Similarly, 43% of the clinicians in the present study agreed that their prescribing behaviors were influenced by promotional information from pharmaceutical sales representatives. This is higher than the 13% reported among family physicians in Canada, but less than the 49% reported by Keim *et al*. among resident doctors, and the 56% reported among family practice residents in the USA.[26-28]

Information from pharmaceutical sales representatives can also negatively impact on the prescribing behavior of clinicians. Previous studies in developing countries have reported heavy reliance of clinicians on drug information from pharmaceutical sales representatives, especially regarding new drugs.[8,9] A significant proportion of promotional materials from pharmaceutical companies contain some inaccuracies, or at least present very selective accounts of the evidence about the drug presented.[13,14] Solely relying on this source of information therefore may be misleading, but where the clinicians are appropriately trained on the concept of the RUMs such errors do not occur or are minimized, and the risk of cost-related medication nonadherence is markedly reduced.

One finding worth commenting on, though outside the scope of the present study, is that one respondent disagreed that the side-effect of a drug is a determinant of the choice of drug prescribed. However, the reasons could not be ascertained, due to the anonymity of the study, and the respondent did not provide a reason for the decision.

Limitations and strengths

The author acknowledges as a limitation to the study the idea that a questionnaire-based study of this nature may not be actual proof, but they assist in generating a hypothesis that will serve as a basis for further studies, especially for this common medical problem that has been sparsely investigated in the past in the nation. Again, self-assessment studies are frequently associated with various biases, and in this case, will have less validity compared with patient assessment or assessments by neutral observers on the direct impact of the clinicians' prescribing on cost-related medication non-adherence. However, this study has set the ground for further studies on cost-related medication non-adherence in the nation, including studies on the prevalence, causes and how to reduce cost-related medication non-adherence in the nation.

Conclusions

The poor knowledge of the basic concepts of the RUMs as seen in this study makes clinicians vulnerable to irrational prescribing and the negative impact of pharmaceutical promotional activities. The need for appropriate and adequate training on the concepts of the RUMs cannot be overemphasized.

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