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MISUNDERSTANDINGS OF DOSAGE
INSTRUCTIONS IN DILLA REFERRAL
HOSPITAL IN ETHIOPIA

POGREŠNO TUMAČENJE UPUTSTVA O
DOZIRANJU U BOLNICI DILLA REFERRAL
U ETIOPIJI

Correspondence to:

Fanta Gashe, B.Pharm, Msc
Department of Pharmacy
Jimma University
P.O.box: 378, Ethiopia.
Mobile: +251-910553477
Email: fantwark@gmail.com)

Aychew Mekuriaw, Dereje Kebebe, Ramanji Reddy
Tatiparthi, Fanta Gashe

Department of Pharmacy, College of Public Health and Medical
Sciences, Jimma University, ETHIOPIA.

Key words

Dosing instructions, Duration of treatment, Precaution of the drug, Dose of the drug, Dose hourly interval, Outpatients

Ključne reči

Uputstva o doziranju, Trajanje lečenja, Mere predostrožnosti leka, Doza leka, Vremenski interval leka, Vanbolnički pacijenti

Abstract

Misunderstandings of dosage instructions obviously lead to incorrect medication, results in many consequences like drug interactions, drug resistance, health care cost and even death. The main objective of this study is to assess awareness of the patient's education on dosing instructions among the outpatients at Dilla Referral Hospital.

A cross-sectional prospective study is conducted on 384 out patients at Dilla University Referral Hospital. Study subjects are selected by random sampling technique at outpatient pharmacy. The population data is collected and Analyzed by using SPSS software, the results are presented as tables and figures. A Chi square test is used to determine the significance level (α) of 0.05

The majority (51.3%) of the patient response was related to an error in dosing frequency; 40.1% (154), 11.2% (43) of patients misunderstood the interval, number of doses respectively. The majority of misunderstandings were significantly associated with number of drugs dispensed to the educational status and age ($p < .001$), but insignificances were observed in the case of dose of the drug ($p = 0.674$), with age ($p = 0.204$) and educational status of the respondents ($p = 0.247$).

At conclusion, Prevalence of misunderstandings was relatively high in the outpatients attending at Dilla University Referral Hospital. However, the amount of dose was the most understood instruction whereas the name of the medications and precautions of the drugs were the most misunderstood instructions by the patients.

INTRODUCTION

An important role of a health care practitioner is to develop a treatment plan with the patient through gathering and evaluating data (1). Therefore, when prescribing any drug therapy the practitioner must have a solid knowledge and background in the pathophysiology of the disease, pharmacotherapeutics and pharmacodynamics (2).

Pharmacist communication with patients regarding the use of medication can be both oral and written. However, oral communication is the most important component of patient education since it directly involves both the patient and the pharmacist in two way exchange which provides the opportunity for the patient to raise questions (3).

Unfortunately, drug treatment of any kind is often compromised by a lack of full compliance by the patient. Reports

indicate that at least one-third of patients failed to comply with instruction, and for patients with chronic illness on long-term treatment regimens the results suggest a rate or non-compliance of approximately 50% (4). Factors that can increase the incidence of non-compliance include the nature of the patient's illness or disease condition, multiple drug therapy, high frequency of administration of drugs, long treatment period, and failure to comprehend the importance of therapy by the patient, and patient's poor understanding of instructions (3).

Patients misunderstanding dosing instructions will obviously take their medications incorrectly, which results in so many consequences, including adverse drug reaction, drug resistance, increased health care costs, and decreased work productivity (3, 4).

Functional health literacy is the ability to read, understand, and act on health information. This includes reading and comprehending prescription labels, interpreting appointment slips, completing health insurance forms, following instructions for diagnostic tests, and understanding other essential health-related materials required to adequately function as a patient (5-7). Even well-educated patients can be a functional health illiterate at times, when they do not comprehend the meaning of health information, thus they are at great risk of misunderstanding of diagnoses and directions for administering drugs (7).

Different studies on patient misunderstanding of dosing instruction indicated that patients misunderstood one or more dosage instructions such as frequency of dose administration, name and dose of drugs, duration of treatment and the precaution of the drugs (8-12). For instance a cross sectional study conducted in three clinics of America (Shreveport, Jackson and Chicago) on 395 outpatients showed that 46.3% of patients misunderstood one or more dosage instructions (8).

A study has also shown that patients with low literacy were less able to understand instructions compared to those with adequate literacy ($p < 0.001$) (87). Moreover, age and household income were associated with accurate recall of medication names ($p = 0.006$ and $p = 0.002$ respectively), and income was associated with accurate knowledge of the therapeutic action of the medication ($p = 0.04$) (11).

From another study on noncompliance with therapeutic regimens and the factors of noncompliance, about one fourth of the patients failed to comply with clinical prescriptions and had no change in the improvement of their illness. The factors of noncompliance were non-redemption of drugs, forgetfulness, occurrence of adverse effects, misunderstanding of dosing instruction or lack of instruction, failure in the progress of the illness and improvement of the illness (13, 14)

Therefore, the aim of this study was to assess patients misunderstanding of dosing instructions among outpatients the Referral Hospital since misinterpretation of dosing instruction is the major problem resulting in adverse drug reactions, drug resistance, drug abuse and misuse in the case of narcotic and psychotropic drugs; hence, the present study found out these major problems, so that appropriate recommendations that can reduce the extent of the problems were forwarded.

MATERIALS AND METHODS

Hospital based cross sectional study was conducted in Dilla University Referral Hospital Outpatient Pharmacies. It is one of the oldest hospitals in Ethiopia, which is located at 356 km away from the Addis Ababa capital city of the country. The hospital provides different health services for inpatients and outpatients. Sample size of 384 was determined using statistical formula.

A prospective data was collected from January to February /2013 using structured questionnaires which composed of both closed and open ended questions on misunderstandings of dosing instructions among outpatients who received the medication from the hospital pharmacy department for self-administration at home. Study subjects were selected by random sampling technique and were inter-

viewed face to face at the exit site of the outpatient pharmacy. Trained and qualified enumerators collected the data along with principal investigators. The collected data was then cleaned and entered into computing. Analysis was done using SPSS and PC computer software frequency tables. P-value and chi-square test was used to evaluate statistical significance.

Prior to the data collection official letter was written for the Hospital and permission was obtained from hospital manager. Information on purpose and procedure was given verbally to all respondents. Verbal consent was also obtained before interview to assure complete confidentiality of information's of the respondents.

RESULTS

All of the selected patients (384) were voluntary and responded to interview. Of the total respondents, 256 (66.7%) of them were males and 213 (55.5%) were aged between 25 and 44 years. Regarding the educational background of respondents, more than half of them 217 (56%) had a primary level education and only 13 (3.4%) of them were illiterate. Most of the patients involved in the study, 260 (67%) were permanent resident of urban area.

Only 8 (2.1%) respondents misunderstood the amount of dose administration at a time. However, the majority 298 (77.6%) and 297 (77.3 %) of the incorrect patient response revealed an error in name of medication prescribed and precaution of the medications, respectively (Figure.1).

The majority of the respondents 183 (47.70%), 164 (42.70%) were received one and two medications, respectively, whereas only 7 (1.8%) of them were prescribed with four medications (Figure 2).

The patients with dosing instruction label among outpatients was found that the majority of medications received by respondents 258 (67.2%) were incompletely labeled. All

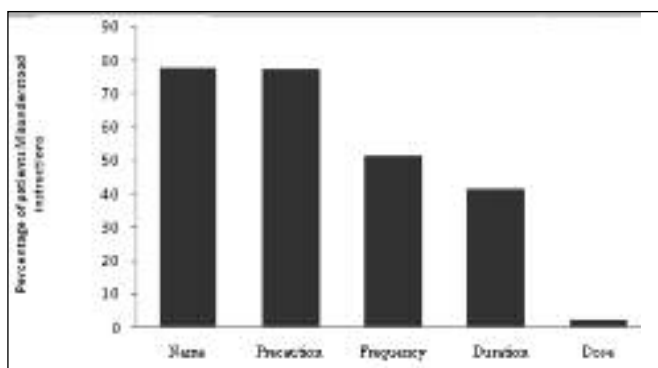


Figure 1: Patients misunderstanding of dosing instructions among outpatients

of the misunderstanding of dosing instructions was significantly associated with residence of respondents ($p < .001$) (Table 2).

Majority of misunderstanding of dosing instruction was significantly associated with educational status of the respondents ($p < 0.001$), but amounts of dose administered were not significantly associated with educational status of the respondents ($p = 0.247$).

Misunderstanding of dosing instructions were significantly associated with age of the respondents ($p < .001$), but amounts of dose administered had not significant relation to the age of the respondents ($p = 0.204$). Number of medica-

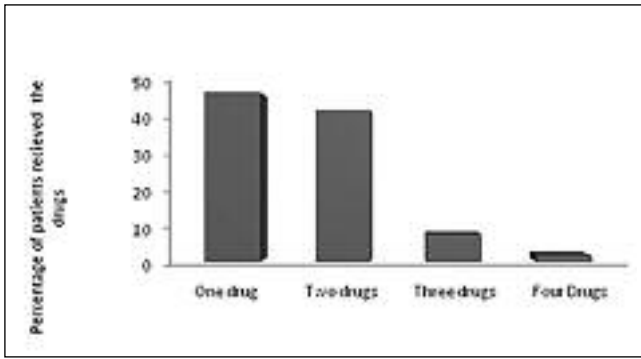


Figure 2: The number of medications dispensed for each patient at a time

tions dispensed had significant association with dose per day ($\chi^2= 9.106, p=0. 028$), hourly interval ($\chi^2= 12.862p=0.005$), duration of treatments ($\chi^2= 16.293, p=0. 001$), and name of the drugs ($\chi^2=19. 338, p<0.001$); but doesn't have a statistically significant association with the amount of drugs (dose) ($\chi^2= 1.538, p=0. 674$) and precaution of drugs ($\chi^2= 3.970, p=0. 265$).

Patient misunderstanding of dose was not found to have significant association with educational status ($\chi^2= 4.138, P=0. 247$), age ($\chi^2= 5.931, P=0. 204$), and number of drugs dispensed ($\chi^2= 1.538, P=0. 674$). However, the prevalence of misunderstanding of frequency (dose per day and hourly interval of dose) of administration had a significant association with residence of respondents ($\chi^2=25. 583$ and $\chi^2=17. 471, P< 0.001$), educational status ($\chi^2= 25.791$ and $\chi^2=65. 029, p<0.001$), Age ($\chi^2= 21.313$), $\chi^2=45. 477, p<0.001$), number of drugs dispensed ($\chi^2=9. 106, p=0. 028$ and $\chi^2=12. 862, P=0. 005$). Moreover, the rate of misunderstanding of duration of treatment was significantly associated with residence of respondents ($\chi^2=41. 733, P< 0.001$), educational status ($\chi^2= 31.985, p<0.001$), age ($\chi^2=57. 072, p<0.001$), and number of drug dispensed ($\chi^2= 16.293, p=0. 001$).

DISCUSSION

The findings of the present study showed that most of the respondents 298 (77.6%) misunderstood one or more dosage instructions. But, a similar cross-sectional study conducted in America indicated that 46.3% of patients misunderstood one or more prescription label instructions (9) which is lower than this finding. This could be due to better understanding and awareness of the community toward drug information in developed countries.

The name of the medication was the most misunderstood medication instruction (77.6%) followed by precaution of the medication (77.3%). This is different from a similar study conducted in New Zealand in which the medication name was correct in 85% of the respondents (11). The dissimilarity may be due to the knowledge gap on medication between respondents in New Zealand and in the present study.

The prevalence of misunderstanding of the amount of dose administration among the total respondents was 8 (2.1 %). Patients with illiterate were less able to state the correct number of pills taken daily compared to those adequately literate patients. Similarly, study in Shreveport, Jackson and Chicago showed that patients with low literacy were less able to understand instructions (8).

This study indicates that the rate of misunderstanding the frequency of dose administration was 51.3%. A similar study done in America showed that 79% patients reported taking all TID doses within 12 hours (8). This finding is higher than the present study which could be due to the fact that the study was done only on the TID (three times a day) frequency of drug administration, but the present study concerned all the prone (as needed), BID (two times a day), TID (three times a day) and QID (Four times a day). Besides, the same study showed that 65.3% of patients with low literacy did not know the number of drugs to be taken daily (8). These

Table 1: Association of misunderstanding of dosing instructions with residence of respondents

Misunderstanding of dosing instruction		Residence of respondents			χ^2 (p. value)
		Urban	Rural	Total	
Name of the drug	Correct	81	5	86	33.99 (0.000)
	Incorrect	179	119	298	
	Total	260	124	384	
Dose of the drug	Correct	259	117	376	8.957 (0.001)
	Incorrect	1	7	8	
	Total	260	124	384	
Dose per day	Correct	246	95	341	25.583 (0.000)
	Incorrect	14	29	43	
	Total	260	124	384	
Dose hourly interval	Correct	175	55	230	17.471 (0.000)
	Incorrect	85	69	154	
	Total	260	124	384	
Duration of treatment	Correct	182	43	225	41.733 (0.000)
	Incorrect	78	81	159	
	Total	260	124	384	
Precaution of the drug	Correct	72	15	87	10.780 (0.001)
	Incorrect	188	109	297	
	Total	260	124	384	

findings confirm that low literacy has more influence on misunderstanding of the frequency of dose administration.

Patients interpretation may widely vary when dosing intervals are presented in vague terms like "twice daily" or "three times daily" which may stray from the original intent of the prescribing physician. Most of the respondents consider one day has 12 hours and within these hours taken their all medications. Due to this perception, the majority of respondents made an error and gave insufficient information such as „morning” „evening” „night” during the interview. On the other hand significant numbers of the respondents have poor understanding of the duration of treatment. This might be due to lack of adequate knowledge regarding the duration of treatment and / or they have forgotten the infor-

Table 2: Association of misunderstanding of dosing instruction by number of drugs dispensed

Misunderstanding of dosing instruction		Number of drug dispensed				Total	χ^2 (p-value)
		1	2	3	4		
Name of the drug	Correct	24	53	8	1	86	19.338 (0.000)
	Incorrect	159	111	22	6	298	
	Total	183	164	30	7	384	
Dose of the drug	Correct	178	162	29	7	376	1.538 (0.674)
	Incorrect	5	2	1	0	8	
	Total	183	164	30	7	384	
Dose per day	Correct	154	153	27	7	341	9.106 (0.028)
	Incorrect	29	11	3	0	43	
	Total	183	164	30	7	384	
Dose hourly interval	Correct	93	114	19	4	230	12.862 (0.005)
	Incorrect	90	50	11	3	154	
	Total	183	164	30	7	384	
Duration of treatment	Correct	92	108	18	7	225	16.293 (0.001)
	Incorrect	91	56	12	0	159	
	Total	183	164	30	7	384	
Precaution of the drug	Correct	37	38	11	1	87	3.970 (0.265)
	Incorrect	146	126	19	6	297	
	Total	183	164	30	7	384	

mation given by the pharmacist or physician. In this study it was also observed that the rate of misunderstanding of duration of treatment was 41.4 %. This result is almost similar to a cross sectional study conducted in Jimma Zone (Ethiopia) on assessment of knowledge and practice on appropriate use of drugs in rural and urban community in which 39.9% patients terminated drug administration when the symptoms of the disease disappeared (12). This could be due to similarity of awareness of the community in which the studies were conducted.

The majority of respondents (67.2 %) received the prescribed medication from the pharmacy with incomplete labeling. Almost all medications which were packed in blisters, strips, bottles and tubes were dispensed for patients with incomplete labeling and drug information was given verbally.

Number of medications dispensed had significant association with dose per day, hourly interval, duration of treatments, and name of the drugs; but doesn't have a statistically significant association with the amount of drugs (dose) and precaution of drugs. This finding is different from the study conducted in America in which the patients taking a greater number of prescription medications had statistically significantly associated with misunderstanding of medication instructions (10). The deviation might be due to incomplete labeling of the medication instruction in the present study.

Educational status of the respondents were statically significant associated variable with almost all misunderstood medication instructions except dose of the drug

$\chi^2 = 4.138$ (P=0.247). This is similar with the study done in America which showed that patients with low literacy were less able to understand instruction compared to those with adequate literacy (p<0.001) (10). The reason is clear that the less educated people in both developed and developing country have similar limitation concerning interpretation and understanding of the label.

CONCLUSION

The prevalence of misunderstanding of dosing instruction was relatively higher in outpatient of Dilla University Referral Hospital; however, amount of drug (dose) administration of was the most understood instruction whereas the

name of the medications and precautions of the drugs were the most misunderstood patients' medication instructions. Incomplete label especially medication packed in blisters, strips, bottles and tubes were the most likely cause of misunderstanding of dosing instruction, in addition to these the common phrases used to describe dosage instructions like morning and evening could contribute to misunderstanding of frequency of dose instruction. Therefore, pharmacists should counsel and educate patients especially on the frequency of drug administration and avoid using words like „morning” and „evening” during the dispensing and tell the exact time interval of drug administration, and confirm methods for patients understanding like the „teach-back”, in which patients are asked to repeat instructions to demonstrate their understanding.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Sažetak

Pogrešno tumačenje uputstva o doziranju očigledno vodi ka pogrešnom lečenju, vodeći ka mnogim posledicama kao što su interakcija lekova, rezistentnost leka, troškovi lečenja kao i smrtnost. Glavni cilj ove studije je procena svesnosti o pacijentovom nivou znanja o uputstvu o doziranju među vanbolničkim pacijentima bolnice Dilla Referral.

Potencijalna studija poprečnog preseka je sprovedena na 384 vanbolnička pacijenta Univerzitetske bolnice Dilla Referral. Učesnici studije su selektovani tehnikom slučajnog izbora u vanbolničkoj apoteci. Podaci stanovništva su sakupljeni i analizirani pomoću SPSS softvera, rezultati su prikazani kroz tabele i brojeve. Chi kvadrat test je korišćen za određivanje nivoa statističke značajnosti (α) od 0.05.

Najveći broj pacijentovih odgovora (51.3%) je bio vezan za grešku u učestalosti doziranja, 40.1% (154) pacijenata je pogrešno razumelo interval doziranja a 11.2% (43) pacijenata broj doza leka. Većina grešaka u razumevanju lekova koji su izdavani je bila značajno vezana za obrazovni nivo i godište ($p < .001$) dok su beznačajna posmatranja ustanovljena u slučaju doze leka ($p = 0.674$) sa godištem ($p = 0.204$) i nivoom obrazovanja kod ispitanika ($p = 0.247$).

Kao zaključak, prevalenca greške u razumevanju lekova je bila relativno visoka kod vanbolničkih pacijenata lečenih u Univerzitetskoj bolnici Dilla Referral. Međutim, uputstva o količini doze su se najbolje razumela dok su pacijenti najviše pogrešno tumačili naziv leka i uputstva o merama predostrožnosti.

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