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Labeling and Patient Knowledge of Dispensed Drugs as Patient Care Indicators in Adulala Health Center Outpatient Pharmacy, Adulala, Ethiopia

Bikila Midaksa, Fanta Gashe, Messay Wolde-Mariam Anshebo, Raghavendra Yarlagadda*

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

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ABSTRACT

Background: labeling and knowledge of dispensing drug is important for the patient to identify the contents and to ensure that they have clear and concise information about the use of the dispensed drug. Lack of this may lead the patient to incorrect use, which in turn results in an adverse effect. So the present was undertaken to assess the labeling and patient knowledge of dispensing drugs in Adulala Health Center outpatient pharmacy, Adulala, East Shoa, Ethiopia.
Method: A cross sectional, prospective study was done by examining previously prepared a checklist to gather information from each package of dispensing drugs to patients and exit interview done with patients to assess their knowledge of the dispensed drug at Adulala Health Center Outpatient Pharmacy from January 23 to February 7, 2014. The data were analyzed by using statistical software package SPSS 16.0.
Results: A total of 302 patients was studied of which majority (62.6%) of them were females and 38.2% of the patients were in the age group of 21-45. All the patients were aware of the dose and a majority (79.06%) of them about frequency. The labeling pattern of dispensing drugs attributes 100% in case of name, strength and expiry of the drug. Patient name was written in only 4.7% of the dispensed drugs. Out of a total 554 dispensed drugs most (46.93%) of them were dispensed for chemotherapeutic to a majority (192) of the patients of 21-45 age groups. Sex has no association with patient knowledge on dosage, frequency, and duration (p-value=0. 423, 0.630, 0.115) respectively.
Conclusion: The study depicts that dispensed drugs had poor labeling. Educational level and patient age have a strong association with patient knowledge of dispensing drugs whereas sex has no association with patient knowledge. Dispensing time was short. Not all prescribed medications are dispensed.

INTRODUCTION

Dispensing of drugs is the process of preparing and handing over medicine to a patient on the basis of the prescription which emphasizes more on accurate preparation and labeling of medicine. Any error in the dispensing process can affect the care of the patient (Bonnstra *et al*., 2003). The label on a dispensed drug will be useful for the patient to identify the contents of the container and the patients get clear information about the use of the drug. Every label on a dispensed drugs should clearly indicate the name, strength, and dosage form of the preparation, the name and address of the pharmacy, the patient for whom it has been prescribed, storage condition and shelf life of the drug, date of supply gives the patient clear and complete instruction on how and when to take the drug (DACA., 2007). Simplest form of patient education is counseling at the time of dispensing the prescribed drug. At minimum patients should know how to take their medicine, how often, what to do if a dose is missed, and what side effects to watch for and how to store the medication. In Ethiopia, it is commonly noticed that the dispensed drugs were found to be without a label, incomplete label, or illegible labels (Remington., 2005). According to a study done in Iran, prescription of antibiotics and injectable drugs was very high (Cheragali *et al.*, 2004). A study conducted on rational drug use in nine health centers (HCs) and nine health stations (HSS) in North West Ethiopia, the average consultation time in minutes in HSS and HCs was 5.1 and 5.8 respectively, while the dispensing times were 1.5 and 1.9 minutes, respectively (Desta *et al*., 2006).

* *Corresponding Author*
Raghavendra Yarlagadda, College of Public Health and Medical Sciences, Department of Pharmacy, Jimma University. Jimma, Ethiopia
Email: raghavendray@gmail.com

A study done by using WHO's prescribing, patient care and health facility indicators in selected health centers in South West Ethiopia in shebe HC, Yebu HC, Serbo HC and Jimma HC showed that; the mean consultation time spent between the prescriber and patient were 6.50 minutes which was the longest at SHHC and 5.47 minutes which was the shortest time spent at YHC. In this study, the average consultation and dispensing time in health centers was 6.14 minutes and 1.28 minutes (Mulugeta *et al*., 2011). However; this result was more different than the study in Niger which was 5.75 minutes and 3.25 minutes on average (Mallet *et al*., 2001). The probable reason for this variation in dispensing time may be due to manpower, set up with dispensary area and ease of access for essential materials like drugs, medical equipment among health centers.

Even though there are different health institutions which are dispensing prescribed drugs, so far, there was no such type of study undertaken in Adulala Health Center outpatient pharmacy. So, the purpose of this study is to asses labeling and patient knowledge of dispensed drugs as a patient care indicator in Adulala Health Center outpatient pharmacy, Adulala, East shoa, Oromiya Region.

METHODS AND MATERIALS

Study area and period

Adulala is located 33 kilometers to the South of Bishoftu. The study was conducted from January 23 to February 7, 2014 on patients coming out of outpatient pharmacy of the Adulala Health Center, which located in Liban Chukala, East Shoa, Oromiya region. The patients included were from various health service departments like Outpatient department, Surgery (minor), Internal medicine, Gynecology and Obstetrics, Ophthalmology, Laboratory and Pharmacy.

Study design

A cross sectional, prospective study was conducted to assess the labeling pattern and patient knowledge of dispensing drugs in patients who were taking their dispensed drugs during normal working hours of the Adulala Health Center. Information from each drug package dispensed to the patient was examined using a pre prepared check list. In addition, to evaluate the individual package, an exit interview was made with patients to assess their understanding of the information provided on the dispensed drugs. The quality of drug labeling was assessed by calculating a mean labeling score composed of seven dispensing attributes. The mean patient knowledge score was also attained by calculating scores composed of four attributes. Dispensing time was recorded for each patient using a stop watch from the entrance to exit of the patient from the pharmacy.

Study population

All patients with dispensed drugs coming out of Adulala Health Center Outpatient pharmacy during the study period. Patients undergoing Direct Observed Treatment (DOT) of tuberculosis and patients on Antiretroviral Therapy (ART) were excluded from the study. In addition, patients under the age of 6 years and those having hearing impairments are excluded. All patients who got the prescribed drugs and all of their drugs were included during the study period. The convenient sampling technique was used, since the study attempted to cover all consecutive patients who attend the pharmacy to get the prescribed drugs over the study period. The check list was checked for having all the necessary information and whether it was properly filled.

Data collection, data analysis and presentation

To avoid dispenser bias, interview with the patients was conducted by standing 5 meters away from the dispensing unit and the whole data collection process was done in the midday. Test for statistical association had been employed to see the association of independent and dependent variables. Data was analyzed using statistical software package SPSS version 16.0 and presented using tables. A chi-square test was used to compare if there is an association between the independent variables (age, sex and educational status) and dependent variables (knowledge on dose, duration of treatment, reason for prescription and frequency of use). A P value of 0 to 0.05 was used to compare the association of the variables in the statistical analysis used. When the P value is less than 0.05 there is an association between the variables and when it is greater than 0.05 there is no association. The quality of labeling had been measured and recorded by assigning a score to each of the seven standard dispensing quality attributes, name of the patient, name of the drug, strength of drug, dosage forms, frequency of administration, duration of treatment and expiry date. Correct labeling had been given a score of 1 per attribute and a score of 0 had been given for incorrect or no labeling.

Calculation of indicators

Percentage of drugs dispensed is calculated by dividing the number of drugs dispensed to a total number of drugs prescribed, then multiplied by 100 (one hundred). Average number of drugs per encounter is calculated by dividing the total number of different drug products to a total number of encounters surveyed. Percentage of patients who adequately recall the dosage schedule was calculated by dividing the number of patients who adequately report dosage schedule for all drugs to a total number of patients interviewed then multiplied by 100 (one hundred). Similar percentage calculation pattern was carried out for frequency of drug, duration of treatment, recalling the frequency of drug and adequate labeling of the drug. Average dispensing time is calculated by dividing the total time for dispensing time to a series of patients to a total number of encounters.

Ethical Consideration

Consent was obtained from the Adulala Health Center to carry out the research work in the health facility. The purpose of the study was explained to the study subjects and verbal consent was obtained before the interview. Any misunderstanding from the patient side was corrected. The respondents were convinced to tell

accurate information from the data included in the questionnaire. The patient's identity was maintained confidentially throughout the study period. As the research has minimal risk involved the ethics committee allowed us to take verbal consent and the script of the verbal consent was used to take the consent of the respondents.

RESULTS

Socio-demographic characteristics of the patients

A total of 302 patients from outpatient pharmacy were considered in the present study of which the majority 189 (62.6%) were females and 38.1% of the patients were in the age group of 21-45. The majority of the respondents were in the age groups of 21-45 years (38.1%) followed by 6-10 (28.8 %) years and 10-20 (21.5%) years. Educational status of the respondents was found to be very high as most of them were illiterates (71.2%) out of which 45% were females (Table 1).

Table 1: Background information of patients visited Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Background information		Number of patients served	Percentage (%)
Sex	Male	113	37.4
	Female	189	62.6
	Total	302	100
Age in year	6-10	87	28.8
	10-20	65	21.5
	21-45	115	38.1
	45-55	20	6.6
	>55	15	5
	Total	302	100
Educational status	Illiterate	215	71.2
	Primary school	65	20.5
	High school	13	4.3
	Diploma and above	12	4
	Total	302	100

Patient knowledge

All the patients were aware of the dose and a majority (79.06%) of them about frequency. Whereas, knowledge on duration of treatment was 204 (36.82%) and reason for prescribing was very low 166 (29.96%). Patient knowledge score was calculated for each of the four attributes and the mean patient knowledge score was found to be 2.46 which is (61.46%) of the total score (Table 2).

Table 2: Patient knowledge on dispensed drugs at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Indicators	Drugs dispensed		Percentage (%)
Dose	Yes	554	100
	No	0	0
	Total	554	100
Frequency	Yes	438	79.06
	No	116	20.94
	Total	554	100
Duration	Yes	204	36.82
	No	350	63.18
	Total	554	100
Reason	Yes	166	29.96
	No	388	70.04
	Total	554	100

Labeling pattern of dispensed drugs

The labeling pattern of dispensed drugs attributes 100% in case of name, strength and expiry date of the drug. Patient name was written in only 4.7% of the dispensed drugs. The mean labeling score in the health center was 4.41 and represents 63.00 % of the total scores. Accordingly, the percentage of the drug adequately labeled was 4.69 % (Table 3).

Table 3: Labeling pattern of dispensed drugs at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Indicators	Drugs dispensed		Percentage (%)
Name of drug	Yes	554	100
	No	0	0
	Total	554	100
Patient name	Yes	26	4.7
	No	528	95.3
	Total	554	100
Strength of the drug	Yes	554	100
	No	0	0
	Total	554	100
Frequency of administration	Yes	187	33.75
	No	367	56.25
	Total	554	100
Dose labeled	Yes	410	74
	No	144	26
	Total	554	100
Duration of treatment	Yes	159	28.7
	No	395	71.3
	Total	554	100
Expiry date	Yes	554	100
	No	0	0
	Total	554	100

Prescribed and dispensed drugs

Out of a total 554 dispensed drugs most (46.93%) of them were dispensed for chemotherapeutic followed by Analgesics (28.34%) (Table 4).

Table 4: Class of drugs dispensed to patients at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Class of drugs	Number of drugs dispensed	Percentage (%)
Chemotherapeutic	260	46.93
Analgesics	157	28.34
CNS	2	0.36
GIT	33	5.96
Minerals & vitamins	102	18.41
Total	554	100

Class of medications dispensed in a different patient age group

Out of 554 dispensed drugs Analgesics, GIT, CNS and Mineral and Vitamins were the different class of drugs. From 266 chemotherapeutics 82, 59, 89, 16, 14 were dispensed in the age group of 6-10, 10-20, 21-45, 45-55 and >55 years old respectively which accounts more of all the dispensed class of drugs.

From a total of 157 analgesics 51, 36, 45, 14, 11 were dispensed in age group of 6-10, 10-20, 21-45, 45-55 and >55 years old respectively. From GIT drugs 3, 7, 10, 6, 7 was dispensed in age group of 6-10, 10-20, 21-45, 45-55 and >55 years old

respectively. From 102 mineral and vitamins 28, 21, 46, 4, 3 were dispensed in age group of 6-10, 10-20, 21-45, 45-55 and >55 years old respectively. And only two CNS drugs were dispensed in the age group of 21- 45 (Table 5).

Table 5: Number of different medications dispensed in each patient age group at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Medication	Age					Total
	6-10	10-20	21-45	45-55	>55	
Chemotherapeutic	82	59	89	16	14	260
Analgesics	51	36	45	14	11	157
GIT	3	7	10	6	7	33
CNS	0	0	2	0	0	2
Mineral and vitamins	28	21	46	4	3	102
Total	164	123	192	40	35	554

Patient knowledge on dispensed drugs and sex

Out of a total 554 dispensed drugs most (46.93%) of them were dispensed for chemotherapeutics to a majority (192) of the patients of 21-45 age groups. All patients, including females and males recalled the dose of drug dispensed to them. From 554 dispensed drugs frequency was recalled in 141 and 246 drugs, duration recalled in 84 and 120, reason for prescription recalled in 91 and 88 by males and females respectively. As chi-square calculation indicates there is no association between the sex of patients and their knowledge (dose, frequency and duration of treatment) on dispensed drugs (Table 6).

Table 6: Patient knowledge on dispensed drugs and sex at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Knowledge		Sex			
		Male	Female	Total	P-value
Dose	Know	206	348	554	0.423
	Doesn't know	0	0	0	
	Total	206	348	554	
Frequency	Know	141	246	387	0.630
	Doesn't know	65	102	167	
	Total	206	348	554	
Duration	Know	84	120	204	0.115
	Doesn't know	122	228	350	
	Total	206	348	554	
Reason	Know	91	88	179	0.000
	Doesn't know	115	260	375	
	Total	206	348	554	

Patient knowledge on dispensed drugs and age group

All patients recalled dose of all of drugs dispensed to them. From 554 dispensed drugs frequency was recalled in 107, 91, 141, 27 and 23 drugs, duration recalled in 44, 45, 80, 17 and 12, reason for prescription recalled in50, 27, 62, 13 and 15 in the age group of 6-10, 10-20, 21-45, 45-55 and >55 years old respectively. As chi-square calculation indicates there is a significant association between age of patients and their knowledge on dispensed drugs (Table 7).

Patient knowledge on dispensed drug and educational status

All patients in all educational status recalled the dose each drug. From 554 dispensed drugs frequency was recalled in 19, 28, 232 and 110 drugs, duration recalled in 17, 7, 134 and 47, reason for prescription recalled in 16, 4, 123 and 41 by Diploma and above, High school, Illiterate and primary school respectively. As chi-square calculation indicates there is a significant association between educational status of patients and knowledge on their dispensed drugs (Table 9). The average dispensing time at the Adulala outpatient pharmacy was found to be 152 second. The minimum and maximum dispensing time were 25 seconds and 420 seconds respectively (Table 9). Due to lack of knowledge and information about the dispensed drug used by the patients it leads to incorrect use, which results in loss of efficacy or occurrence of adverse effects (Remington., 2005). The quality of labeling applied by dispensers, the time spent informing the patients, and the communication skill of the dispensers can therefore affect compliance rates (Bonnstra *et al*., 2003). In a study done in Burkina Faso eighty-eight percent of the prescribed drugs were on the essential drug list (Kralsce *et al*., 1999). In the present study a total of 302 patients from outpatient pharmacy were included. Out of 302 patients, the majority 189 (62.6%) were females. Concerning the age of the respondents, the majority of the respondents were in the age groups of 6-10 (28.8 %) years, 10-20 (21.5%) years and 21-45 years (38.1%). Regarding the educational status of the respondents most of them were illiterates (71.2%). For 302 patients 554 (84.58%) were actually dispensed out of the total drugs prescribed, which was lower than the study done in Niger (100%), North West Ethiopia (89%) (Mallet *et al*., 2001; Desta *et al*., 2006), and a study done at Yebu Health center (89.04%), Serbo Health Center (89.55%), whereas greater than the study done at Shebe health center (77.74%) and Jimma health center (77.77%), India (54.7%), South East Asia (43%) (Nismbase., 2006; Mallet *et al*., 2001; Mulugeta *et al*., 2011; Goplakrishnan *et al*., 2012). The average number of drugs per encounter was found to be 1.83 which is even less than the national value (1.99) and also the study done at Shebe health center (2.88) (MOH., 2003; Mulugeta *et al* 2011). This indicates that there are no poly pharmacy problem and it could also be the reason for good patient knowledge of dispensed drugs though dispensing time was short. The label on dispensed drugs uniquely identifies the content of container and ensures that the patient gets clear and concise information about the use of drugs. In this study all the dispensed drugs were labeled with their name, strength and expiry date even though it was not labeled by the pharmacist, but which already was on the original package of the drug and also it was not in the language all patients can understand. In addition It was observed that the majority of dispensed drugs were dispensed in their genuine original packages and the rest were dispensed in different envelops and plastic containers. All 554 (100%) dispensed drugs were labeled with their name, strength and expiry date. This value is greater than the study in Botswana which is 50% (Bonnstra *et al*., 2003). The reason for this variation in percentage was due to the fact that most of the drugs such as

Table 7: Patient knowledge on dispensed drugs and age group at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Knowledge on dispensed drug		Age group						P-value
		6-10	10-20	21-45	45-55	>55	Total	
Dose	Know	156	124	199	49	26	554	0.000
	Doesn't know	0	0	0	0	0	0	
	Total	156	124	199	49	26	554	
Frequency	Know	107	91	141	27	23	389	0.034
	Doesn't know	49	35	58	22	8	165	
	Total	156	126	199	46	31	554	
Duration	Know	44	45	80	17	12	198	0.000
	Doesn't know	112	79	109	32	16	356	
	Total	156	124	199	49	26	554	
Reason	Know	50	27	62	13	15	167	0.000
	Doesn't know	106	97	137	36	13	387	
	Total	156	124	199	49	28	554	

Table 8: Patient knowledge on dispensed drug and educational status at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Knowledge on dispensed drugs		Educational status					
		Diploma and above	High school	Illiterate	Primary school	Total	p-value
Dose	Know	20	31	374	129	554	0.000
	Doesn't know	0	0	0	0	0	
	Total	20	31	374	129	554	
Frequency	Know	19	28	232	110	390	0.000
	Doesn't know	1	3	142	19	184	
	Total	20	31	374	129	554	
Duration	Know	17	7	134	47	207	0.000
	Doesn't know	3	24	240	82	350	
	Total	20	31	374	129	554	
Reason	Know	16	4	123	41	184	0.000
	Doesn't know	4	27	251	88	370	
	Total	20	31	374	129	554	

tablets, drugs in ampoules and bottles were dispensed in their original package labeled with their strength, name and expiry date and since it was labeled in English it could be difficult for the patients to understand. Only 26 (4.7 %) of them were labeled with patient name and if the name of patient was not indicated on label, medication error may occur since the drug may be used unknowingly by other members of the family of patient. The percentage 26 (4.7 %) of dose labeled adequately of dispensed drugs was very low than the study done at Shebe Health Center (71.4 %), Yebu Health Center (73.33 %), Serbo Health Center (67.27 %), Jimma Health Center (68.33 %) and Ghana (100 %) (Mulugeta *et al.* 2011; Afia *et al.*, 2012; Goplakrishnan *et al.*, 2012). Regarding the labeling score of dispensed drugs, the majority of dispensed drug have a labeling score of 4 in 410 (74 %) and 5 of 187 (33.76 %) of the total dispensed drugs. The mean labeling score in the health center was 4.41 out of 7 and represents 63.00 % of the total scores. The frequency of administration was recalled in over 79.06 % of dispensed drugs which is higher than research done in Addis Ababa (60 %) and Ghana (54 %) (MOH., 2003; Afia *et al*., 2012). The duration of the treatment was recalled in nearly 36.82 % of dispensed drugs are lower than the study done in Botswana (44%) and higher than that of Ghana (6 %) (Bonnstra *et al*., 2003; Afia *et al*., 2012). This value is very low and most of the prescribed drugs were chemotherapeutic (49.93 %) out of which most were antibiotics so poor knowledge on duration of treatment may result in antibiotic resistance and should be improved. Patient knowledge score was calculated for each of the four attributes and the mean patient knowledge score was found to be 2.46 out of 4 attributes which is (61.46%) of the total score. This value is lower than patient knowledge score found in primary health care in Botswana (2.5%) (Bonnstra *et al*., 2003).

In the present study the educational level of respondents determined the patient knowledge on dispensed drugs (p-value =0. 000). In addition to educational status, age has also strong association on patient knowledge of dispensed drugs (p-value < 0.05). Whereas sex has no association with patient knowledge on dose, frequency and duration (p-value = 0.423, 0.630, 0.115) respectively. The average dispensing time obtained in this study was 152 seconds, which is lower than the study done in Niger (204 second) (Guyon *et al*., 1994; Mallet *et al*., 2001). But this value is greater than other studies done in Yugoslavian (20.5 to 48.2 seconds), Jordan (28.8 +/- 23.7 seconds), Tanzania (average of 84seconds), Southwest Ethiopia (73.8 to75 seconds), Bangladesh (23 seconds) and India (131.4 seconds) (Jankovic *et al*., 2001; Otoom *et al*., 2002; Nismbase., 2006; Mulugeta *et al*. 2011; Goplakrishnan *et al*., 2012). This outcome has an effect on patient satisfaction and enablement since dispensing time also includes dispensing counseling time, at which time the pharmacists counsel the patient. It is regarded to be short to allow optimal information to be given on medications and for answering the questions from patients. This value is still not enough to achieve high mean patient knowledge score.

Table 9: Dispensing time at Adulala Health Center Outpatient Pharmacy from January 23- February 7, 2014.

Dispensing time (seconds)	Number of patients
25	1
30	4
32	1
42	1
45	1
50	1
56	1
57	1
60	13
70	13
80	11
90	40
102	1
110	2
117	3
118	3
120	43
130	10
133	4
134	1
140	16
144	4
150	33
170	2
180	20
190	13
193	2
195	5
198	2
200	5
201	3
210	4
220	1
230	2
240	3
246	5
250	1
260	4
270	6
300	4
310	1
316	2
330	2
340	1
381	2
390	2
410	1
420	1
Total 45904	302

CONCLUSION

The study showed that dispensed medications had poor labeling. Adequate patient knowledge score was not found. Educational level and patient age have a strong association with patient knowledge on dispensed drug whereas sex has no association with patient knowledge. Dispensing time was short when compared to WHO guidelines. Not all prescribed medications are dispensed. Dispenser should have a special concern for the elderly and low level educational status patients. The facilities should also provide dispensers at a pharmacy with marker for easy labeling in order to improve patient knowledge on their dispensed drug. Values for percentages of drugs actually dispensed are less, labeling of drugs and patient knowledge of the drug dispensed should be as high as possible.

Furthermore, Interventional study aimed at improving the quality of dispensing should be carried out using both labeling and knowledge scores. The dispensing time needs to be improved in order to allow patient ask questions what is not clear about their medication for improving rational drug use.

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