

Research Article

Pharmacists' Perception on Dosing Instructions for Medicines - A Cross Sectional Study in a Hospital and Community Pharmacy Setting

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ABSTRACT

Background: Patients need to know dosing instructions of their medicines to ensure safe and effective therapeutic outcomes. Pharmacists play a key role in providing accurate and complete dosing instruction to patients each time medicines are dispensed. **Objective:** To assess perceptions of pharmacists, on the importance of giving specific dosing instructions, suitable mode, current practices, difficulties encountered, and on factors that could improve current practices of giving dosing instructions to patients. **Method:** A cross-sectional study was conducted among all pharmacists working in out-patient pharmacies of a selected teaching hospital and a selected community pharmacy in the Colombo district. An interviewee administered questionnaire, developed in-house was used. **Results:** Only 73% pharmacists agreed it was essential to give dosing instructions every time medicines were dispensed. Pharmacists' perception on the suitable mode of giving instructions differed from their self-reported current practices ($P < 0.05$). Pharmacists claimed that shortage of pharmacists ($N = 26$), lack of a separate place to counsel patients ($N = 22$), overcrowded medicine counters ($N = 21$) were barriers when providing dosing instructions. Pharmacists also agreed that these barriers could be overcome by, increasing the number of pharmacists ($N = 29$) and supportive staff ($N = 20$), and by organizing workshops and other training programs on counselling ($n = 30$). **Conclusion:** Pharmacists agreed that giving dosing instructions to patients was essential but most did not practice what they believed. They highlighted the high patient to pharmacists ratio as a main barrier and requested more training on providing dosing instructions to improve this process.

Key words

Pharmacist; Perception; Dosing instructions; Medication safety; Sri Lanka



INTRODUCTION

Patients need to know proper dosing instructions of their medicines to ensure safe and effective therapeutic outcomes. The Code of Ethics of the Royal Pharmaceutical Society of Great Britain also states that in supplying medicines, pharmacist must ensure that 'the patient receives sufficient information and advice to enable the safe and effective use of medicines. (1) Therefore, pharmacists have an obligation to provide accurate and complete dosing instruction to patients each time medicines are dispensed.

To achieve optimal use of medicines, patients should be informed about how to use their medicines properly. Interviews that sought patient opinion on counselling showed that, counselling by pharmacists is beneficial for their medicine use (2) and pharmacists were their preferred mode of medication information.(3) Patients mostly expected to receive advice about how, how often and when to use their medicines.(4) However, they must also be properly counselled on name and purpose of the medicine, directions for use, side effects, precautions, contraindications and storage conditions while monitoring for drug interactions and adverse drug reactions.(1) Pharmacists are the only professional group who are often in direct contact with customers in need of medicines information (5), especially when dispensing over the counter medicines. Although some standard guidelines are available to guide them on this mission, guidelines are often not followed.(6) There is evidence that essential dosing instructions are frequently missed by pharmacists which is a concern of patient safety.(7)

It is important that pharmacists are provided with the right environment and facilities to effectively disseminate medicine related information to patients. It is also important to assess the level of importance pharmacists attribute to providing dosing instructions in a suitable mode before this task is entrusted upon them. Lack of a systematic process that hinder proper communication could demotivate pharmacists in performing this task effectively. Except for a Korean study that reported both patients' and pharmacists' low satisfaction level regarding patient counselling by evaluating their perceptions, only a few studies have been published on this aspect to date.(8) Therefore we aimed to assess perceptions of pharmacists on, the importance of giving specific dosing instructions, the suitable mode, current practices, difficulties encountered, and factors that could improve current practices on giving dosing instructions to patients.

METHODS

Study design and settings

A descriptive, observational, cross sectional and prospective study was conducted among pharmacists working in out-patient pharmacies in a selected teaching hospital (study hospital pharmacies) and a selected community pharmacy (study community pharmacy) in the Colombo district. The study settings were selected through convenience sampling.

The study hospital is a tertiary care hospital with a bed strength of 1099 and approximately 40 different types of functioning outpatient clinics. There are three out-patient pharmacies to serve patients who attend these clinics.

Medicines are dispensed to around 21,000 clinic and other out-patients through these pharmacies per day. The study community pharmacy is one outlet of a State owned community pharmacy chain, and serves around 600 patients a day.

In Sri Lanka, essential dosing instructions are required to be provided to patients by pharmacist in written form. The common practice is to have pre-semi-printed labels on medicine envelopes which will be used for packing medicines. The printed label includes blank spaces to fill the information which varies with the type of medication. Sometimes, the printed forms are not available and pharmacists use the face of blank envelopes to write dosing instructions.

Study participants

All registered pharmacists working in the above specified pharmacies were selected for study. Due to the limited number, a separate sample size calculation was not done and all pharmacists were included in the study.

Study process

An interviewee administered questionnaire was developed and was used to assess the perceptions of pharmacist on providing dosing instructions. The questionnaire was developed in-house, was content validated by three academic pharmacy experts and was piloted among three practicing pharmacists (not included as study participants). The questionnaire was improved using comments obtained through this validation process. The areas assessed included, demographics, their perceptions on the importance of giving specific dosing instructions to patients, their perceptions on the suitable form of giving

dosing instructions, their current practices on giving dosing instructions to patients, difficulties encountered when giving dosing instructions, and factors that could improve current practices on giving dosing instructions. All questions were assessed using closed ended answers or structured response options. The questionnaire was distributed among pharmacists and responses were collected within a period of one month. One reminder was given for those who did not submit responses in the first round.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 21 was used for obtaining descriptive statistics. Percentages were calculated using the total number of pharmacists who responded to the questionnaire as the denominator. Chi square was used to compare the perceptions on suitable mode of providing dosing instructions and their self-reported current practices on providing dosing instructions considering a 5% significance level.

Ethical consideration

Ethical approval was obtained from the Ethics Review Committee (ERC) of the Faculty of Medical Sciences, University of Sri Jayewardenepura (2015 Aug). Written informed consent was obtained from participants before including them in the study.

RESULTS

We assessed perceptions of 32 pharmacists working in the above specified community or hospital pharmacy settings with a response rate of 100%. Their demographic characteristics are shown in Table 1. Most pharmacists were

women (71.9%), in 31-50 years age group (75.0%) and had a Certificate of Efficiency (43.8%) and/or Diploma in Pharmacy (31.2%) qualification. Most had 11-12 years of working experience (40.6%) as a pharmacist (Table 1).

Pharmacists' perception on the importance of giving dosing instructions are shown in (Table 2). Most pharmacists (73.0%) agreed that the majority of dosing instructions were important to be given to patients. More than 90% believed that the instructions regarding number of units per time (90.6%), frequency (93.8%), route of administration (90.6%), and relationship with meals (96.9%) need to be given when dispensing medicines. However, there were mixed consensus on the importance of providing information on medicine name, medicine strength, dosage form, duration of treatment, common side effects, storage, and special instructions, as mandatory instructions for some medicines (Table 2).

Table 3 shows the comparison between perceptions of pharmacists and their actual practice (as reported by them) on the mode of giving dosing instructions to patients. More than 50% of pharmacists believed that the number of units per time (65.6%), frequency of administration (68.8%), and relationship with meals (71.9%) need to be given in both written and verbal forms to patients (Table 3). It was observed that those who opted to give instructions both verbally and in written form did not differ significantly between their perception and self-reported practice. However, those who perceived to provide instructions in either written or verbal form differed from that of their practices significantly ($P < 0.05$).

Table 1: Demographic characteristics of pharmacists (N=32) in the hospital and community setting

Variable	Men	Women	Total
Gender, N	9 (28.1)	23 (71.9)	32 (100)
(%)			
Age groups, N (%)			
<30	1 (3.1)	6 (18.8)	7 (21.9)
31-50	8 (25.0)	16 (50.0)	24 (75.0)
51-70	-	1 (3.1)	1 (3.1)
Educational level, N (%)			
Certificate of Efficiency	6 (18.8)	8 (25.0)	14 (43.8)
Certificate of Proficiency	1 (3.1)	5 (15.6)	6 (18.8)
Diploma in Pharmacy	2 (6.3)	8 (25.0)	10 (31.2)
B.Pharm	-	-	-
/B.Sc (Pharmacy)	-	2 (6.3)	2 (6.3)
Work experience, N (%)			
<1 years	-	1 (3.1)	1 (3.1)
1-5 years	3 (9.4)	6 (18.8)	9 (28.1)
6-10 years	3 (9.4)	6 (18.8)	9 (28.1)
11-20 years	3 (9.4)	10 (31.3)	13 (40.6)

Most pharmacists agreed that shortage of pharmacists (81.3%), lack of dispensing time to provide adequate information (71.9%), lack of a dedicated counselling area (68.8%), and overcrowded dispensing counters (65.6%) were common barriers to providing appropriate dosing instructions (Table 4).

Table 2: Pharmacist perceptions on the importance of giving dosing instructions to patients

Dosing instruction	% of pharmacists (N=32)			
	Importance of giving dosing instructions			
	Yes	Sometimes	No	Responded as 'cannot say'
Medicine name	75.0 (24)	21.9 (7)	3.1 (1)	-
Dosage form	70.9 (22)	22.6 (7)	6.5 (2)	3.1 (1)
Medicine strength	71.9 (23)	25.0 (8)	-	3.1 (1)
No of units per time	90.6 (29)	6.3 (2)	3.1 (1)	-
Frequency	93.7 (30)	6.3 (2)	-	-
Duration	59.4 (19)	37.5 (12)	3.1 (1)	-
Route of administration	90.6 (29)	9.4 (3)	-	-
Relationship with meals	96.9 (31)	3.1 (1)	-	-
Special instructions	59.4 (19)	37.5 (12)	3.1 (1)	-
Common side effects	40.6 (13)	53.1 (17)	6.3 (2)	-
Storage conditions	50.0 (16)	46.9 (15)	3.1 (1)	-

Most pharmacists agreed that organizing related workshops and other training programs (93.8%), improving patient awareness on importance of dosing instructions (93.8%), increasing the number of pharmacists (90.6%) and improving available resources for providing dosing instructions (87.5%) could improve the patient – pharmacist communication process (Table 5).

DISCUSSION

The role of the pharmacists in the supply of medicines has grown significantly over the last two decades. This progress from healthcare towards providing pharmaceutical care has led to more individualized patient care where full intellectual involvement of a pharmacist is needed.(6) The upgraded modern pharmacy is part of a global trend with added pharmaceutical services. To provide a wide range of “cognitive pharmaceutical services”, there is a desire and a trend for the pharmacist to become more involved in patient care, both

in hospital pharmacies and community pharmacies.(9)

In this study, more than 90% of pharmacists believed that instructions regarding number of units per time (90.6%), frequency (93.8%), route of administration (90.6%), and relationship with meals (96.9%) need to be given when dispensing medicines. However, they did not attribute the same level of importance on providing information regarding medicine name (21.9%), medicine strength (25.0%), medicine duration (37.5%), common side effects (53.1%), storage conditions (46.9%), and special instructions (37.5%). This emphasizes the lack of standard procedure to guide the pharmacist on what information to provide and how to communicate this information appropriately to patients. Continuing to have unclarified procedures such as this could lead to treatment failures and adverse drug effects.

Table 3: Comparison between pharmacist perceptions and self-reported current practice on the mode of giving dosing instructions

Dosing instruction	% of pharmacists (N=32)									
	Perceptions on the suitable mode of giving dosing instructions			Self-reported current practices on giving dosing instruction				Comparison of perception and self-reported practice		
	Verbal	Written	Both	Verbal	Written	Both	Not given	P value*	P value ^γ	P value ^Δ
Medicine name	3.1(1)	62.5(20)	34.4(11)	56.3*(18)	3.1*(1)	40.6(13)	-	<0.001	<0.001	0.63
Dosage form	18.8(6)	56.3(18)	25.0(8)	59.4*(19)	12.5*(4)	28.1(9)	-	0.001	<0.001	0.78
Medicine strength	3.1(1)	78.1(25)	18.8(6)	71.9*(23)	3.1*(1)	25.0(8)	-	<0.001	<0.001	0.50
No of units per time	3.1(1)	31.3(10)	65.6(21)	62.5*(20)	-	37.5(12)	-	<0.001	<0.001	0.02
Frequency	6.3(2)	25.0(8)	68.8(22)	46.9*(15)	6.3*(2)	46.9(15)	-	<0.001	0.04	0.07
Duration	46.9(15)	6.3(2)	46.9(15)	21.9*(7)	40.6*(13)	31.3(10)	6.3(2)	0.037	0.001	0.20
Route of administration	43.8(14)	15.6(5)	40.6(13)	9.4*(3)	50.0*(16)	40.6(13)	-	0.002	<0.001	1
Relationship with meals	6.3(2)	21.9(7)	71.9(23)	50.0*(16)	-	50.0(16)	-	0.001	0.005	0.07
Special instructions	34.4(11)	15.6(5)	50.0(16)	46.9(15)	18.8(6)	34.4(11)	-	0.31	0.73	0.20
Common side effects	78.1(25)	-	21.9(7)	40.6*(13)	43.8*(14)	15.6(5)	-	0.002	<0.001	0.52
Storage conditions	71.9(23)	-	28.1(9)	37.5*(12)	37.5*(12)	25.0(8)	-	0.006	0.001	0.78

*P values for comparison of perception and self-reported practice of using verbal instructions; ^γP values for comparison of perception and self-reported practice of using written instructions; ^ΔP values for comparison of perception and self-reported practice of using both verbal and written instructions

In a Romanian study, they have noted that approximately a quarter of patients who entered the pharmacy to obtain medication were not informed about important drug-related information (doses, administration method, name, and concentration). They too warn that lack of information provided on medicines to patients could lead to therapeutic

failure and the exacerbation of certain adverse effects, including overdosing.(9) According to an Indian survey retail pharmacists count and pack tablets and capsules, and distribute these to consumers without counseling. The drug retailers dispense tablets or capsules from bulk container into a paper envelope without proper labelling and written instruction.(16)

Table 4: Pharmacists responses to selected barriers when providing dosing instruction

Barriers	Response by pharmacist N =32(%)		
	Yes	Sometimes	No
Barriers proposed in the questionnaire			
Shortage of pharmacists	26(81.3)	5(15.6)	1(3.1)
Shortage of supportive staff	16(50.0)	12(37.5)	4(12.5)
Lack of dispensing time to provide adequate information	23(71.9)	7(21.9)	2(6.2)
Lack of a separate place to counsel patients	22(68.8)	7(21.9)	3(9.4)
Overcrowded counters	21(65.6)	9(28.1)	2(6.2)
Difficulty in contacting prescribers to clarify prescription doubts	11(34.4)	20(62.5)	1(3.1)
Illegible prescriptions	12(37.5)	20(62.5)	-
Patients' wasting time due to frequent out of stock situations	11(34.4)	17(53.1)	4(12.5)
Lack of knowledge to provide adequate information	5(15.6)	17(53.1)	10(31.25)
Lack of training programs and workshops	18(56.3)	12(37.5)	2(6.2)
Lack of facilities to obtain knowledge	14(43.8)	14(43.8)	4(12.5)
Language barriers with patients	4(12.5)	26(81.3)	2(6.2)
Environmental disturbances	7(21.9)	18(56.3)	7(21.9)
Following practices of senior pharmacists/forced action	3(9.4)	14(43.8)	15(46.9)
Inadequate space to write on the dispensed medicine package	6(18.8)	12(37.5)	14(43.8)
Instructions are already printed, so no need to give additional instructions	4(12.5)	14(43.8)	14(43.8)

The vast majority of studies from different countries showed that information on directions for use, dose, medicine name, and indication were more frequently given than information on side effects, precautions, interactions, contraindication and storage.(1) Some pharmacists believed that information on side effects may frighten patients. In contrast, consumers felt that receiving information about side effects of their

medication may help pharmacists to identify and resolve drug related problems. Pharmacists may use their professional judgment to provide information that meets the specific needs of each patient, but prioritizing on safe and effective use of medicines by providing essential dosing instructions should be routine practice.(1)

Table 5: Frequency of agreement by pharmacists to suggested improvements

Improvements suggested in the questionnaire	Frequency of agreement by pharmacists N=32(%)		
	Yes	Sometimes	No
Increasing number of pharmacists	29(90.6)	2(6.2)	1(3.1)
Increasing the number of supportive staff	20(62.5)	8(25.0)	4(12.5)
Improvement of available resources (e.g. tablet counting machines, air conditioning)	28(87.5)	3(9.4)	1(3.1)
Continuous medication supply system (avoidance of frequent out of stock situations)	27(84.4)	5(15.6)	-
Establishment of separate counseling area or providing adequate space for counseling	26(81.3)	3(9.4)	3(9.4)
Organizing workshops and other training programs	30(93.8)	1(3.1)	1(3.1)
Providing internet facilities	20(62.5)	9(28.1)	3(9.4)
Availability of printed prescriptions instead of hand written prescriptions	18(56.3)	3(9.4)	11(34.4)
Establishment of computerized stock management systems instead of manual stock management methods	22(68.8)	6(18.8)	4(12.5)
Improvement of patient's awareness on importance of dosing instructions (Patient educational programs)	30(93.8)	2(6.2)	-

In an American study, they reported that ensuring patient's understanding on information presented (64%), and volunteering to provide information about medicines (62%) were the most commonly provided services by pharmacists. Other services provided less

frequently were, telling patients about potential drug interactions (43%), carrying out plans to resolve (or prevent) problems with medications (26%), and asking patients if they were having any problems with a medication (23%). The services provided least often

included designing follow-up plans to measure progress toward therapeutic goals (12%) and asking questions to determine whether those goals were being met (11 %).(10)

According to a Swedish observational survey, the average pharmacist spent approximately 3 minutes (median) or 3.8 minutes (mean) on dispensing and counselling one customer. Out of this, 1.5 minutes (median) or 1.8 minutes (mean) were spent in silence, taking medicine from shelf or working on the computer. 11 seconds (median) or 25 seconds (mean) were spent talking about medical or pharmaceutical issues. This study reported that pharmacists spent more time on nonmedical than on medical matters. (11)

In our study, most pharmacists who believed medicine information should be given in both verbal and written form did not differ significantly in their current practice (as reported by them). Those who opted one of the modes (oral or written) differed significantly compared to their self-reported practice. This could mean that pharmacist had a positive perception on giving drug information to patients, specially in written form, but barriers compelled them to deviate in their actual practice. On the other hand this deviation could also mean that most pharmacists are unsure of the required mode of providing dosing instructions and hence had provided random responses to the questionnaire. Both these interpretations could mean harm to patients and must be addressed urgently. In another study conducted by us in the same study settings, it was found that dosing instructions were not 100% complete, and patients were not able to completely read or understand dosing

instructions provided.(7) This finding too reconfirms the serious gap in the communication process as highlighted by pharmacists.(7)

When considering verbal instructions, linguistically accessible medication instructions are particularly important to ensure patient safety. In an American study, it was found that more than 80% of the pharmacies surveyed, lacked systematic methods for identifying linguistic needs of patients and the need for translation. So, they recommended pharmacists may require supplemental training on the need and resources for meeting the verbal and written language requirements of their Limited English Proficient (LEP) patients. They recommended that dispensing software with accurate translation capability and telephonic interpretation services should be utilized in pharmacies serving LEP patients. Pharmacists should post sign boards and make effort to inform patients about language resources available to them.(12)

Labelling is one of the important modes of giving instructions to patients. A study reported that, the vulnerability of the label-generation process led to errors, and self-checking the label was a barrier to prevent these labeling errors.(13) This emphasizes the need for double checking for accuracy and completeness of labels by a separate pharmacist in addition to providing essential dosing instruction in both written and verbal form. In a study conducted in United States, they found that 79% of patients misinterpreted one or more of the ten common prescription label instructions they encountered. Although

the instructions were brief and of minimal reading difficulty, rates of patient understanding varied widely across all literacy levels. Instructing patients with more explicit language on when to take their medicine using time periods were better understood compared to instructions that vaguely stated the number of times per day or hourly intervals. (14) According to Dowse and Ehlers (15), in a population with limited reading skills, the inclusion of pictograms on medicine labels positively influenced the understanding of instructions and adherence to short term antibiotic therapy. However pictograms should not be used as the sole communication source.(15)

If good practices are deviated or bypassed due to preventable barriers this must be addressed. Most pharmacists agreed that shortage of pharmacists (81.3%), lack of dispensing time to provide adequate information (71.9%), lack of a dedicated counselling area (68.8%), and overcrowded dispensing counters (65.6%) were barriers to providing appropriate dosing instructions. Sometimes, difficulty in contacting prescribers to clarify doubts in prescriptions (62.5%), illegibility of prescriptions (62.5%), and language barriers with patients (81.25%) also posed difficulties. Other studies also reported similar reasons such as lack of time, lack of standards on patient counselling, not giving due importance to poor communication issues, and technical errors as barriers to proper patient-pharmacist communication.(9)

Aiming to overcome these barriers and improve the perceptions on giving medicines information to patients, we proposed some

improvements to which most pharmacists agreed. Increasing the number of pharmacists (90.6%), improving available resources (e.g. tablet counting machines, air conditioning) (87.5%), organizing workshops and other relevant training programs (93.7%), improving patient awareness on importance of dosing instructions (Patient educational programs) (93.7%), establishing separate counseling areas (81.2%) were agreed upon. Pharmacist could use numerous strategies to help make patients aware that pharmacist are valuable medication management resources. Possible strategies include, engaging pharmacy technicians in medicine packaging to create more time for the pharmacist to get directly involved in patient care activities.(17)

Some studies suggested to develop suitable criteria to identify appropriateness of advice given in community pharmacies.(18) In the United Kingdom, Medicine Use Review (MUR) consultations were used to improve the counselling role of pharmacists by providing interactions about dispensing medicines.(19) Some studies presented tools to improve the quality and effectiveness of medication counselling and some introduced pharmaceutical educational programs on developing pharmacists' competency on patient counselling.(20) A Canadian research had reported, that there was a statistically significant increase in pharmacists' self-efficacy with regards to both patient assessment and documentation.(21) Patient education programs also contributed to the improvement of adherence to medicines. By educating patients about consequences associated with poor adherence to medicines, and discussions on any medicine regimen

related issues may help to build confidence about their medicines.(22)

CONCLUSION

Pharmacists agreed that providing dosing instructions to patients was essential but most did not practice what they believed. They highlighted the high patient to pharmacists ratio as a main barrier and requested more training on providing dosing instructions to improve this process. Pharmacists practice patient education and patient counseling to varying degrees. These activities undoubtedly contribute to patient's knowledge and support patients' medication management. However, there is a need to at least standardize the process of communicating essential dosing instructions to patients and educate pharmacists on these new procedures.

Author's Declaration

The authors declare that all persons listed as authors have read and given approval for the submission of this manuscript.

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Competing Interests

The authors declare that they have no competing interests to disclose.

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