

Assessment of parents' understanding of pediatric medical prescriptions

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Objective: To assess the accuracy of the parent understanding of pediatric prescription and prescribed medications and examine factors associated. **Methods:** Cross-sectional, observational questionnaire-based study involving 354 eligible parents was carried out in the pediatric department of a tertiary care teaching hospital. Parent's sociodemographic details and their understanding of prescription including medication name, indication, dose, frequency, and duration were assessed by a self-administered questionnaire and their association analyzed statistically. **Results:** Mean age of parents was 33 ± 1.2 with the majority of females 57.06%. Out of 354 parents, 22.32% had low literacy and 37.74% were working as farmers. Overall understanding of prescription was present in only 25.14% of parents. The majority of parents were having a better understanding of the frequency of drug administration (79.09), while poor understanding was observed with respect to dosage calculation of medication (45.76%) and adverse drug reactions (25.14%) and the difference in the understanding was statistically significant ($P < 0.05$). Factors like the age of parents, Child's age, parent occupation, education of parent, experience in administering medicine, number of medicines prescribed, and type of dosage form were significantly impacting parent's understanding regarding medication ($P < 0.05$). **Conclusion:** Unperceived medication instruction understanding gaps exist at all literacy levels for pediatric patients among all parents. Communication and care delivery practices need further evaluation. Practice implications: Clinicians should be aware of the frequency of parent medication misunderstanding and give more attention to parents' counseling.

Keywords: Pediatric prescription, Prescribed medications, Unperceived medications

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Introduction

Prescription is a written communication from treating physicians to pharmacists and patients for the execution of the treatment. It is essential to convey what is written in the prescription to pharmacists and patients otherwise it can lead to usage of the incorrect drug, inadequate dose, and may be associated with potentially harmful medication errors. Unfortunately, various problems in understanding, interpreting, and communicating drug therapy have been documented all over the world at various health care facilities [1]. Patients often fail to understand the appropriate dosage of the medication as well as its beneficial effects and side effects. If not used properly, medicines can harm the patients instead of producing beneficial effects. Therefore, the medicine's side effects, dosage, and usage must be properly communicated. Most doctors are aware of the importance of the patient's knowledge of prescription when dealing with medicines, most of them hardly make appropriate efforts to communicate the same to them. [1-3] Pharmacists can contribute to positive outcomes by educating and counseling patients to prepare and motivate them to follow their pharmacotherapeutic regimens and monitoring plans and thus help in reducing medicine errors [3].

According to the World Health Organization (WHO), it is estimated that over half of all medicines are prescribed, dispensed or sold inappropriately, and half of all patients fail to take their medication as prescribed or dispensed [4]. Outpatients have more personal responsibility than inpatients for the administration and management of medicine. Careful consideration is needed, especially for pediatric patients, as they have less ability to communicate and to understand the implications of taking medicine. They are also more vulnerable to the adverse effects of medicine than adults [5].

The pediatric age group is vulnerable to medication errors. Before writing the prescription to the child, different physiological factors like age, weight, and surface area should be considered. Errors in drug administration are among the commonest medical errors. Children are particularly at risk for such errors because of the need to calculate doses individually. Mistakes in the calculation of doses may end up in too much higher doses which can be life-threatening to the patient [6]. Alteration in the amount of drug used or reconstitution of powdered formulations may not only alter the drug response

But also carries the risk of giving rise to drug resistance especially in cases of antibiotics use. As antibiotic resistance is already on the rise, causing a heavy toll on health care in developing countries like India; proper prescription, dosing, dispensing and usage of drugs specifically antibiotics may become an important contribution towards our attempt in reducing drug resistance thus facilitating the achievement of a hurdle free dispensing of health care in our country.

The ability to read and understand prescription label instructions may appear to be a simple task but it can be very difficult for patients with low education level, parents with reading difficulties, eye conditions, cognitive problems and illegible handwriting, use of short forms in prescriptions, abbreviated texts, etc. [7] Pediatric prescription differs from an adult prescription as drugs are supposed to be prescribed as per the body weight of a child, unlike adult prescription where the dosage is uniform for most of them.

Thus, it makes pediatric prescription more complex as it demands clarity from the prescription in terms of dosage, formulation, timing, frequency, and duration, as well as clarity from the pharmacists when they dispense drugs to the parents [8-13].

Thus the assessment of parental knowledge of pediatric prescription is very important in determining the extent of understanding of prescription by them, which acts as a vehicle in implementing technical care. Evidence shows that although health literacy interventions might help to improve the overall outcome in the patient, it may not eliminate health disparities [10, 2].

None such studies were done in India especially on pediatric prescriptions. As there is an increasing need to understand the grey areas in parental understanding of pediatric prescriptions, this study was devised. This study was carried out to evaluate and assess the understanding level of parents about medical prescriptions given to pediatric patients and identify the associated risk factors for it.

Methodology

A prospective, cross-sectional, observational questionnaire-based study was carried out to assess the parental understanding of prescriptions. The study protocol was approved by the institutional ethics committee and written informed consent was obtained from parents.

Sample size: Constructing the prevalence of knowledge in around 50% population, the sample size calculated is 354, using the following formula: $N = Z^2P(1-P)/D^2$

Where, Z = Z statistics for level of confidence (95%) = 1.96 P = expected prevalence = 0.05 (=5%) D = precision = 0.05 (=5%). As this is a questionnaire-based design, considering noncompliance and dropout rate as 10%, 384 total patients will be enrolled.

Inclusion and exclusion criteria: Parents of children who attend the pediatric department either for preventive care, treatment or follow up of any disease and those who are able to comprehend and complete the questionnaire were included. Parents having a severe cognitive impairment or psychological disorders were excluded from the study.

Study procedure: Parents were contacted in the pediatric out-patient department after they finish their consultation with the pediatrician. A self-structured, validated and translated questionnaire has been developed which has four main components:

- 1) Socio-demographic parameters
- 2) Understanding the written medical prescription
- 3) Understanding about the ADRs
- 4) understanding of the non-pharmacological measures.

In-person interviews using structured questionnaires were conducted to assess parents' understanding of medication and their socio-demographic characteristics immediately after receiving the medicine. In terms of understanding the medication, parents were asked about the name of the medicine, its indication, dosage, frequency, and duration. Also, they were asked about the understanding of adverse drug reactions, what to do if ADR occurs, when to stop therapy, when to consult the doctor and any non-pharmacological measures to be followed for the therapy of their children. Understanding of the medication was defined as the participant's comprehension of the dosage, frequency, and duration of how long the medicine should be given. Parents' statement was compared with the description in the prescription and hospital records available with them (like case papers, investigation sheets, etc) and evaluated.

Statistical Analysis: The data were analyzed using Microsoft excel 2010 and Epi-info software. The data are expressed as frequencies, mean, percentages, and standard deviations whichever is suitable. Chi-square test and t-test will be used to find out the correlation analysis. The 'p' value will be determined to finally evaluate the levels of significance. $P < 0.05$ will be considered significant.

Result

A total of 354 parents were enrolled for the study after finishing their child's consultation with the pediatrician.

It is always critical for parents to understand pediatric prescription in terms of dose, frequency, and duration of administration and overall understating of prescription by parents in this study has been shown in table 1. It was observed only 25.14% of parents have completely understood the whole prescription while rest 74.86% of parents were partially/incompletely aware of the pediatric prescription either in terms of the name of the medication or its dosage or frequency of administration. Majority of parents were having a better understanding of the frequency of drug administration (79.09) in pediatric prescription, while poor understanding was observed with respect to dosage calculation of medication (45.76%) and adverse drug reactions (25.14%); the difference in the understanding was statistically significant ($P < 0.05$).

Table-1: Parent's Understanding of Pediatric Prescription in terms of dosage regimen.

Characteristic	N	%	P-value
Name of Medicine	249	70.33	<0.05 (Significant)
Dosage of Medicine	162	45.76	
Dose frequency	280	79.09	
Duration	262	74.01	
Indication	270	76.27	
Dosage+ Frequency+ Duration	117	33.05	
ADR related information	89	25.14 %	

Disease wise distribution of prescriptions given to the enrolled parents has been shown in Table 1. Disease wise complete understanding of prescriptions including dose, frequency, and duration of administration of medication has also been analyzed and shown in Table 2. It was observed that the parents with a child suffering from epilepsy were having the highest level of understanding (58.33%) the prescription in terms

Of dosage, frequency and duration of medication they received due to the complexity of the disease while the parents whose child was suffering from lower respiratory tract infection had a poor understanding (44.87%) of prescription regarding

The medication prescribed for their child. There was no statistically significant difference among the disease wise understanding of prescriptions (P>0.05)

Table-2: Disease wise distribution of prescriptions and their understanding by parents.

Diseases	Total number of prescriptions	Understanding of Dose + Frequency + Duration of medication administration		P-value
		N	%	
URTI	78	35	44.87	>0.05 (NS)
LRTI	62	34	54.84	
Diarrhea	59	28	47.46	
Typhoid fever	38	22	57.89	
Malaria	41	19	46.34	
epilepsy	12	7	58.33	
Nephrotic syndrome	10	6	60.00	
PEM	54	26	48.15	

URTI – upper respiratory tract infection, LRTI – lower respiratory tract infection, PEM – protein-energy malnutrition

The socio-demographic characteristics of parents also play an important role in understanding the prescription of their child. Factors like the age of parents, Child's age, parent occupation, education of parent, experience in administering medicine, number of medicines prescribed, and type of dosage form were significantly impacting parent's understanding regarding medication (P<0.05) as shown in Table 3.

Table-3: Sociodemographic characteristics of Parents and their association with their understanding of medication.

Characteristic	Demographic Data		Medication Understood		P-Value
	n	%	N	%	
Age					
<20	18	5.08	8	44.44	< 0.05 (significant)
20-24	78	22.03	40	51.28	
25-30	102	28.81	48	47.06	
31-39	118	33.33	55	46.61	
>40	38	10.73	14	36.84	
	354				
Sex					
Female	202	57.06	96	47.52	> 0.05 (NS)
Male	152	42.94	73	48.03	
Child's Age					
0-1	52	14.69	22	42.31	<0.05 (significant)
1-4	174	49.15	72	41.38	
5-14	128	36.16	72	56.25	
Relationship To the child					
Father	175	49.44	75	42.86	>0.05 (NS)
Mother	151	42.66	70	46.36	
Other	28	7.91	12	42.86	
Occupation					
Private sector	92	25.99	52	56.52	<0.05 (Significant)
Public sector	95	26.84	50	52.63	
Farmer	53	14.97	20	37.74	

Bussiness	40	11.30	22	55.00	
Housewife	74	20.90	40	54.05	
	354				
Language					
English	63	17.80	33	52.38	>0.05 (NS)
Hindi	187	52.82	101	54.01	
Regional	104	29.38	55	52.88	
Education Level					
No education	79	22.32	33	41.77	<0.05 (Significant)
Primary	68	19.21	31	45.59	
Secondary	60	16.95	28	46.67	
Collage level	147	41.53	82	55.78	
Experience of administering medicine					
Yes	154	43.50	93	60.39	<0.05 (Significant)
No	200	56.50	84	42.00	
No of Medicine					
1	116	32.77	67	57.76	<0.05 (Significant)
2	82	23.16	38	46.34	
3	85	24.01	42	49.41	
4 or more	71	20.06	28	39.44	
Type of Dosage form					
Tablet	82	23.16	44	53.65	<0.05 (Significant)
Capsule	46	12.99	21	45.65	
Syrup	173	48.87	75	43.35	
Others	53	14.97	31	58.49	

Discussion

Prescription misunderstanding and medication errors have been the worrisome issue all over the world in all health care systems. Efforts should be directed towards minimizing these errors and help parents better understanding the prescriptions for their children. This study has evaluated the level of understanding of prescriptions by parents and their associated factors in the Indian population. Most of the parents in the present study were young homemakers with at least high school education, although they came from less privileged backgrounds. This demographic profile is similar to a South Korean study by Ryu and Lee [14] where 85.7% were female caregivers, with 95.3% having at least a high school education and were either the parent or grandparent of the child in 94% cases. In the present study, among the demographic parameters, age of parents, Child's age, parent occupation, education of parent, experience in administering medicine, number of medicines prescribed, and type of dosage form were significantly impacting parent's understanding regarding medication. Younger children's parents

Tend to give more attention to medication instruction than older children. More educated parents understood the importance of the medication prescription and its administration.

Oral liquids were the most frequently used medicine dosage form, given the fact that the children in the study had a median age of 4 years. At this age, swallowing liquids are preferable to swallowing tablets. However, dispersible tablets were also used by care providers. A study in Tanzania has also reported the preference for liquid medicines in case of young children and swallowed or water-dispersible tablets for others. A fondness for sweet-tasting medicine was also revealed in that study [15]. The present study found that many parents lacked proper knowledge of the quantity implied in one teaspoon and one tablespoon. Since most pediatric liquid formulations in the Indian market now come with a measuring cup or spoon, a better practice would be to mention the exact volume of the liquid medicine, and if necessary, demonstrate the measuring out process using the cup or spoon supplied by the manufacturer. Household measures were used by some care providers, but encouragingly, the bulk of them used the standardi

-zed measuring devices. The accuracy of 5 mL measurements using the dosing cup provided by the investigators was achieved by the majority. This is in contrast to Yin et al [16] who reported that nearly 23.3% of parents (double that in the present study) used non-standardized liquid dosing instruments, and 67.8% were unaware of weight-based dosing [16]. However, Ryu and Lee [14] have reported that the error committed in dosing measurement was only 11.3% and calibrated dosing cup, printed calibrated dosing cup, dosing spoon, dispensing bottle or spoon with bottle adapter were used by caregivers to measure out liquid medicines. Most of the parents properly reconstituted dry powder and used appropriate fluids for reconstitution. They also washed the dosing devices before storing them. These are also encouraging practices that were encountered.

However, knowledge regarding the duration of storage of reconstituted medicine was not optimum as most of the parents were unable to read the prescription due to poor writing. Although most caregivers could not read and understand the expiry date on the medicine labels and others could rely on their literate partners or family members. Nearly, half the study subjects stopped the medicines once the child got better, instead of following the advice of the physician. This practice can compromise therapeutic outcomes and in the case of antibiotics, foster resistance. This also implies inadequate counseling of the parents or guardians by doctors and other caregivers. It was often found that if children vomited medicines, the mothers resorted to skipping the present dose or feeding the medicine after some time. In an online survey to identify the practices and opinions of pediatricians about redosing of medicines after vomiting, [17] it was found that the time between ingestion and vomiting was the most important factor to redose the medicine. This time was stated as 30 min by 60% doctors and 15 min by 32% care providers. Thus, guiding the mother to redose only if the time gap between ingestion and vomiting was within 30 min would be essential information to avoid overdosing.

Pediatric patients are susceptible to medication error due to lack of appropriate pediatric formulations, liquid nature of pediatric dosage forms, availability of non-standardized devices for measurement, dose calculation mistakes, ignorance of caregivers, and inadequate information and counseling by physicians [18,19] it is observed that under supervised conditions of indoor wards,

Medications errors are less frequent than in the OPD setting. Most errors were wrong timing of the dose or the amount of dose fed, committed by the mother or other primary parents. An Australian study [20] has documented that regarding medication errors in children, incorrect or double dosing accounted for 58% and 26% cases, respectively, were made at home in 98%, occurred via the oral route in 98.4%, and close family members were responsible in 83.1% instances. Literacy status improvement leads to a better understanding of the measurement of liquid medicines, proper comprehension of physician's instructions, and less frequent medication error [16]. In addition, the demonstration of measurement can decrease the rate of medication error [16]. Similar trends were encountered. Thus, such errors can be minimized by the appropriate demonstration of dose measurement by the physician or nursing staff, the use of more accurate devices for measurement, and improvement of the information given to parents on the prescribed medicines.

It was found that more than half of parents were unaware of total instructions with respect to all factors of pediatric prescription which seems to have a major contribution towards medication side effects. Knowledge of prescription is not well imparted in pediatrics and even not well understood by parents of the child but is highlighted by the Agency for Healthcare Research and Quality as an important factor for quality treatment and better healthcare [21]. A pediatric study in the Kingdom of Saudi Arabia revealed that 47% of subjects recognized possible medication side effects due to poor understanding of all factors of prescription [22]. The present study revealed a lower frequency but expands these findings to Indian and primarily minority populations, filling an understudied research gap in the pediatric literature.

The present study has the limitations of being the only hospital-based and of relatively short duration. Despite this, in conclusion, it can be said that clinicians should be aware that many caregivers still continue potentially wrong practices in measuring and administering liquid medicines to children. Once the knowledge gaps and wrong practices can be identified by spending time over these issues, remedial measures can be implemented, beginning with rapport building between the treating physicians and the caregivers who look after these children and continuing with counseling at every

Opportunity. This would contribute to making medicines safer and more effective for sick children.

Conclusion

Pediatric physician's prescriptions are not being completely understood by parents. Pharmacists are unable to follow all the physicians' prescriptions and are too busy to communicate either with the doctor or the patient for the same. Parents are unable to get all the information needed either from the

Physician or the pharmacist and this varies with their education levels.

What does the study add to the existing knowledge?

No attempt is made to understand the parent's ability to follow what is conveyed through a prescription. Factors like the age of parents, Child's age, parent occupation, education of parent, experience in administering medicine, number of medicines prescribed, and type of dosage form were significantly impacting parent's understanding regarding medication. Proper communication with parents can serve as a key factor for the betterment of their children.

Author's contribution

Dr. Jatin Dhanani: Concept, study design

Dr. Rameshkumar Dihora: Manuscript preparation

Dr. Ashish Goti: Data analysis

Dr. Rima Shah: Concept, manuscript preparation

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