



# Awareness of Pictograms among the Undergraduate Pharmacy Students in a Pharmacy College in Karnataka, India: A Preliminary Study

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## Research Article

Please cite this paper as: Banstola A. Awareness of Pictograms among the Undergraduate Pharmacy Students in a Pharmacy College in Karnataka, India: A Preliminary Study. IJPTP, 2013, 4(1), 442-446.

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## Abstract

**Introduction:** Pictograms are pictorial representation of information about doses, medication, precautions, and warnings. They play a vital role in counseling patients by providing complete information about the medication in a visual form.

**Objectives:** To evaluate awareness about pictograms and their rational use in pharmacy undergraduates and to obtain their feedback regarding sessions conducted on this subject.

**Methodology:** In this study, 50 pharmaceutical pictograms developed by United States Pharmacopoeia Drug Information (USP- DI), were used and the study was conducted among 71 (56 male and 15 female) undergraduate students studying at the first, second, third, and fourth year of the Mallige College of Pharmacy, Bangalore, India. The study was divided into two sessions. In the first session, all the pictograms were shown to each student and their interpretation were noted. In the second session, seminar on the same pictograms was conducted among those students and their interpretations to the pictograms were re-recorded. Operational definition was set to assess the level of understanding of the pictograms as Completely Understood (CU), Partially Understood (PU) and Not Understood (NU). The feedback of the students on the training module was evaluated using a specially designed feedback form.

**Results:** Prior to the seminar, only 43% of pictogram was completely understood by the first year students whereas 49% of the same were understood by final year students. The levels of understanding of pictograms between second and third years were quite similar. After explanation majority of the pictograms (87%) were interpreted by final year students followed by third year (84%) of pictograms.

**Conclusion:** There is a low level of awareness on pictograms among pharmacy undergraduates. Present study suggests and reinforces an idea to introduce pictograms as a topic in curriculum of Pharmacy subjects. There is a strong need among the pharmacy professionals to learn this untouched and an important part of their profession.

**Keywords:** Awareness, Education, Non-compliance, Pharmacy students, Pictograms

## Introduction

Pictograms are simple, clear, graphic symbols able to convey their intended meaning to all patients, including those who are illiterate, elderly or visually impaired<sup>1,2</sup>. They are not only useful for the illiterate patients but also for the literate individuals because they can serve as one of the easiest, most important means of providing information to patients<sup>3</sup>. Individuals with limited literacy or language barriers face greater difficulty when attempting to interpret pharmaceutical drug labels and instructions, and therefore may not use medicines properly. This may result in unnecessary complications in treatment and management of acute and chronic diseases and contribute to poor adherence to prescribed drug therapy. In addition, a lower level of health literacy in patients can serve as a strong predictor for a poorer health status and well-being, decreased utilization of health services, and less likelihood of receiving preventive care and services<sup>4</sup>. Pharmaceutical pictograms are thus invaluable in reinforcing the information given to patients<sup>5</sup>.

A study conducted by Dowse R and Ehlers MS to evaluate the interpretation of pictograms before and after showed that pictograms had a positive effect in acquisition and comprehension of drug information<sup>6,7</sup>. In addition, most studies investigating health-related applications of pictograms have highlighted their value in understanding and recall of instructions on prescription and over-the-counter medicines.

Another study carried out by Dowse R on eighty seven Xhosa participants attending an outpatient



clinic revealed that presence of pictograms contribute positively to both understanding of instructions and adherence<sup>1</sup>. A study conducted by Houts and co-workers to assess the effects of pictures on health communications found that pictures can change adherence to health instructions also improve comprehension<sup>8</sup>.

Pharmacists are healthcare professionals who practice in pharmacy, the field of health sciences focusing on safe and effective medication use. Pictograms are vital to the pharmacist as they are directly involved in dispensing medications, providing information to the patients on medication, its dosage and frequency, and restriction with regard to alcohol, protecting children with regard to drugs, and counseling patients among others. For patients with multiple ailments who take various medications at different interval, and at times taking medicines fall simultaneously as pictograms might poses a challenge or threat to a patient if not guided properly by the pharmacist<sup>5</sup>. Thus, there is a need for pharmacist to clear understand and interpret those pictograms so that they could well inform the patients. However, the present pharmacy education in India does not emphasize the use of pictograms for patient counseling. Thus, this study was conducted to assess the awareness of pictograms among pharmacy undergraduates and to obtain their feedback regarding sessions.

## Material and Method

A preliminary study was carried out in July 2011 in Mallige College of Pharmacy, Bangalore, India. The target group of the study was 80 undergraduate students studying at the first, second, third, and fourth year. Seventy one (56 male and 15 female) of students participated in the study. The students were informed about the study and their verbal consent was also acquired.

### Preparation of the pictograms:

A set of 91 standard pharmaceutical pictograms appears in the United States Pharmacopoeia Drug Information (USP- DI), illustrating various instructions about medicines<sup>9</sup>. Out of these 50 pictograms were randomly selected. They were printed in black colored ink on a white background and were numbered properly.

### Study design:

The study was divided into two sessions. The first session started with formal introduction. Then, all the pictograms were shown to each student and their interpretation were noted. This was done in a friendly manner to put the student at ease and was as nonthreatening as possible. In the second session, seminar on the same pictograms was conducted among those students and their interpretations to the pictograms were re-recorded. In the seminar researcher introduced the participants about pictograms, aspects of health communication influenced by pictograms, necessity of pictogram in patients counselling, and the same pictograms with caption were shown. Operational definition was set to

assess the level of understanding of the pictograms among the participants. Before and after successful completion of the seminar, participants answering exactly the same message as given by USP- DI to the pictures were mentioned as Completely Understood (CU). Those who replied the message to some extent but not completely was stated as Partially Understood (PU) and the participants who wrongly expressed the meaning as Not Understood (NU). On completion of the seminar, the participant's feedback was taken using a nine-point Likert-type questionnaire.

## Results

### Demographic data

Out of the total 80 students, only 71 of them participated in the study. The demographic characteristics of the students are listed in Table 1.

Table 1: Demographic details of the students

Characteristic		Number	Percentage
Sex	Male	56	78.87%
	Female	15	21.12%
Age	Less than 20	36	50.70%
	More than 20	35	49.22 %
Year of study	1 <sup>st</sup> year	15	21.13 %
	2 <sup>nd</sup> year	32	45.07 %
	3 <sup>rd</sup> year	10	14.08 %
	4 <sup>th</sup> year	14	19.71 %

There were 56 (79%) males and 15 (31%) females in the study. The age-wise distribution of students shows that the majority of the students (51%) were less than 20 years of age. Majority of the students (45%) were from second year followed by first year (21%).

Table 2 shows the level of understanding of pictograms by undergraduate pharmacy students. Before explaining the meaning of pictograms, the majority of the students were unable to interpret them correctly but after explanation, interpretation was comparatively improved. If all students of the first year i.e., 15 completely understood all the pictograms i.e., 50, the overall understanding would be 750. However, here not all students had fully understood all the pictograms. There was a variation in the level of understanding of each pictogram among the students giving an aggregate level of Not Understood (NU) as 291 (38.8%) before explanation about pictograms. However, NU was only 7.1% after explanation about pictograms.



The level of understanding pictogram between second and third year were quite similar. If all students of the second year i.e., 32 fully understood all the pictograms i.e., 50, the overall understanding would be 1600. But that was not the case. Only 734 (45.9%) was Completely Understood (CU) before explanation which soared to 1263 (78.9%) after explanation about the pictograms. Correspondingly, of the total 500 interpretation by the third year student, 236 (47.2%) interpretation were implicit before description of the pictograms which rose to 419 (83.8%) after explanation. Alike, 346 (49.4%) of the total 700 interpretation were correctly spelled out by the fourth year student before explanation of the pictograms which increased to 611 (87.3%) after explanation.

Figure 5



Figure 6

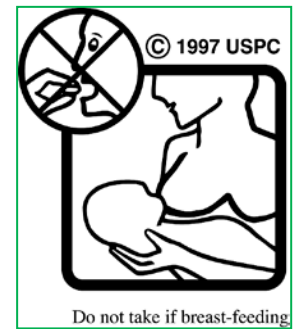


Table 2: Interpretation of pictograms before and after explanation

S N	Education level	Understanding level					
		Before explanation			After explanation		
		NU	PU	CU	NU	PU	CU
1.	1 <sup>st</sup> year	291(38.8%)	130(17.3%)	329(43.9%)	53(7.1%)	151(20.1%)	546(72.8%)
2.	2 <sup>nd</sup> year	562(35.1%)	304(19%)	734(45.9%)	120(7.5%)	218(13.6%)	1263(78.9%)
3.	3 <sup>rd</sup> year	176(35.2%)	88(17.6%)	236(47.2%)	24(4.8%)	57(11.4%)	419(83.8%)
4.	4 <sup>th</sup> year	256(36.6%)	98(14%)	346(49.4%)	25(3.6%)	64(9.1%)	611(87.3%)

NU: Not understood, PU: partially understood, CU: completely understood.

Most widely understood pictograms were; take medicines two times a day [Figure 1], place drops in the eye [Figure 2], take medicine at night [Figure 3], store in the refrigerator [Figure 4], do not drink alcohol while taking this medicine [Figure 5], do not take this medicine if breastfeeding [Figure 6], and do not give medicine to pregnant woman [Figure 7].

Figure 1

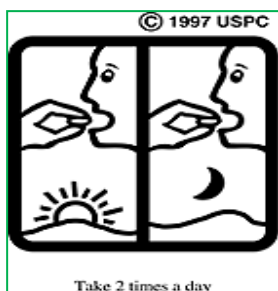


Figure 2



Figure 3



Figure 4

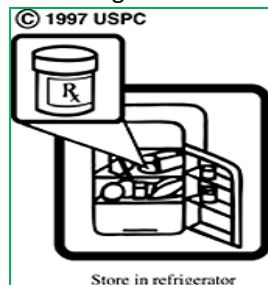


Table 3: Feedback from students on the seminar

Statements used in the questionnaire	Median Score (inter-quartile range)
Patient non-compliance is one of the major problems of prescribed medications.	4 (4-5)
Patients find it difficult to process medical information because they are unfamiliar with medical terminology.	5 (4-5)
Pictograms attract attention of people to bring the piece of information that has to be conveyed.	4 (4-5)
Pictograms along with written and spoken enhance attention, comprehension, recall, and adherence of people.	5 (4-5)
Pictograms are effective tools for educating the illiterate patients.	4 (4-5)
Pictogram is very much important for pharmacy students.	5 (4-5)
The session was informative and interesting.	5 (4-5)
This session made me aware of pictograms.	4 (4-5)
I would welcome similar season in future.	5 (4-5)



Most of the participants valued the sessions and were looking forward to similar sessions in the future.

## Discussion

The results revealed that the interpretation of the USP pictograms among the undergraduate pharmacy students was poor. Even final year pharmacy undergraduate students are not able to understand and interpret the pictograms. The reason was their poor understanding and knowledge regarding the same. The logic and response expressed were mismatched. Factors that may have led to poor or misunderstanding of pictogram were; pictograms were unfamiliar to them, there was no prior explanation about pictogram, pictograms are not taught to pharmacy students. The need for conducting the evaluation of pictograms among the pharmacy students was to understand ability to interpret the pictograms correctly for the betterment of pharmaceutical care.

American Society of Hospital Pharmacists (ASHP) states pharmaceutical care as "the direct, responsible provision of medication-related care for the purpose of achieving definite outcomes that improve a patient's quality of life"<sup>10</sup>. The concept of pharmaceutical care involves the pharmacist's decision to avoid, initiate, maintain, or discontinue drug therapy, both of prescription and non-prescription drugs. The ultimate goal of pharmaceutical care is to optimize a patient's quality of life. Patient counseling is an important part of it and is defined as providing medication related information orally or in written form to the patients or their representatives, on topics like direction of use, advice on side effects, precautions, storage, diet and life style modifications<sup>11</sup>. In a comparative study carried out by khatri and co-workers in understanding of pictograms among pharmacy and non pharmacy students revealed that Non Pharmacy Postgraduates were better placed than the pharmacy students<sup>12</sup>. In profession, where Pharmacy students are not taught much about pictograms, this study gains attention. In this regards, pictograms plays a pivotal role and each pharmacy college has to focus on it.

## Conclusion

The importance of evaluating pictograms was apparent from the results of this study. The study was successful in evaluating the student's feedback on the educational sessions about pictograms. Overall, students liked the session and were interested in having similar sessions in the future. Present study suggests and reinforces an idea to introduce pictograms as a topic in curriculum of Pharmacy subjects. This module can be taken as a model for other researchers to carry out educational sessions of pictograms for pharmacy students.

## Limitations

Our study has a few limitations. Study was conducted in a small number of pharmacy undergraduate students. Number

of pictograms included was less and time spent for the study was not sufficient to explain all the pictograms.

## Practice Implications

Present study has shown that pictograms can be helpful in understanding medication information. Budding pharmacist, if they are trained in understanding and interpretation the pictograms can play crucial role in counseling patients. There is a need for such programs, which evaluate children's knowledge and interest concerning medicines, and use of this information to generate medication education<sup>13</sup>. Further research should be continued to give awareness about pictograms to pharmacist.

## Acknowledgement

The authors would like to acknowledge Dr. Shiva kumar Swomy (Principal), Mrs Nagalakshmi NC (Assistant professor) and management for providing opportunity for conducting study. Authors are obliged to all the students who participated in the study spending their valuable time and expressing their opinions. Authors are also grateful to Dr. Ravi Shankar (HOD, Department of clinical pharmacology) and Mr. Amrit Banstola (founder, Public health perspective) and Nitish Joshi for the review of manuscript.

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#### **AUTHORS' CONTRIBUTIONS**

Authors contributed equally to all aspects of the study.

#### **PEER REVIEW**

Not commissioned; externally peer reviewed

#### **CONFLICTS OF INTEREST**

The authors declare that they have no competing interests