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Review Article

An Overview of Pictogram: Need in Healthcare System

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ABSTRACT

Pictogram is a symbolic representation which is meant to grab viewers' attention. It is used to provide information to the viewer regarding a particular product and instruct a consumer regarding its usage. In health care sector a pictogram plays a very important role in various assets. A pictogram can be designed in various ways according to its needs. A pictogram can be used to instruct the patients as well as medical professionals regarding the seal opening techniques of medicinal containers as well as route of administration by which the drug is supposed to be administered. In our entire review, we have discussed regarding the importance of pictogram, its various uses, some cases which could have been avoided if Pictograms were used. We also have conducted a survey for analysing various pictograms that we designed by screening various problem statements in this review.

INTRODUCTION

A pictogram is a stylized figurative illustration meant to grab the viewer's attention and provide information in order to communicate quickly and effectively without the need of words or language. The majority of the literature on health-related pictograms dates back about 30 years. Educational institutions, community pharmacies, hospital pharmacies, discharge or outpatient clinics, primary care clinics, and different medical departments (pediatrics, pulmonology, cardiovascular medicine, internal medicine, geriatrics, gastroenterology, and ophthalmology) are among the settings where health pictogram research has been carried out.

Studies have also been conducted in graphic design, visual communication and systems engineering departments. Lühnen et al.'s 2019 systematic review highlights the insufficiency of the design process and suggests that "... studies assessing the value of pharmaceutical pictograms would benefit from establishing best practices in the design and use of the pictograms themselves."[4]

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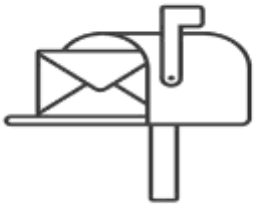
Objectives

- **Enhancing Patient Comprehension**: Pictograms help patients, especially those with low literacy levels, understand medical instructions more easily. They improve recall and comprehension of health instructions, which are essential for effective treatment adherence.
- **Improving Medication Adherence**: By clearly illustrating how and when to take medications, pictograms can enhance patients' adherence to prescribed regimens, leading to better health outcomes.
- **Overcoming Language Barriers**: In multicultural settings, pictograms transcend language differences, ensuring that patients from diverse linguistic backgrounds receive consistent and accurate information.
- **Facilitating Health Education**: Pictograms serve as effective tools in health education materials, aiding in the communication of complex medical information in an accessible manner.
- **Enhancing Safety Protocols**: In clinical environments, pictograms can depict safety procedures, reducing the risk of errors and enhancing overall patient safety.[5]

Common Uses of Pictograms

- **Public Signage:** Airport signs, restroom symbols, and road signs.
- **Safety Instructions:** Hazard symbols, emergency exits, and fire safety signs.
- **Data Representation:** Graphs, charts, and statistical icons.
- **User Interfaces:** Mobile app icons, website navigation, and buttons

Some examples of commonly used Pictograms are given below:



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CASE REPORT

Accidental IV administration of epinephrine instead of midazolam at colonoscopy☆

Ahmed Gado [a,*], Basel Ebeid [b], Anthony Axon [c]

PATIENT SAFETY

The alarming reality of medication error: a patient case and review of Pennsylvania and National data

Brianna A. da Silva, MD* and Mahesh Krishnamurthy, MD, FACP, SFHM

Internal Medicine Residency Program, Easton Hospital, Academic Affiliate of Drexel University, Easton, PA, USA

CASE REPORT Open Access

Life-threatening coma and full-thickness sunburn in a patient treated with transdermal fentanyl patches: a case report

Katia Sindali*, Katie Sherry, Sankhya Sen and Baljit Dheansa

CASE REPORT Open Access

Metoprolol-induced visual hallucinations: a case series

Jonathan A Goldner[1,2]

Journal of Medical Case Reports
BioMed Central

Case report

Open Access

Topiramate-induced psychosis in two members of the one family: a case report

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* Corresponding author

- **Case -1 [Visual hallucinations due to long term usage of metoprolol]**

In the reports of Jonathan A Goldner with the topic of Metoprolol-induced visual hallucinations: a case series in the JOURNAL OF MEDICAL CASE REPORTS, He stated that the Caucasian patients who suffered from heart related diseases specially hypertension and were under the medication of metoprolol, patients had experienced visual hallucinations; while sleeping they hallucinated that people were seating on chair and staring at them. On physical examination and laboratory evaluation, physician observed that they had no history of alcohol consumption and any kind of psychiatric disorder and after discontinuation of metoprolol, the patient's visual hallucination completely stopped.

So, such side effects could be avoided by representing pictorially to avoid long term usage of Anti-Hypertensive drugs like Metoprolol.[6]

- **Case -2 [Sunburn due to Transdermal Fentanyl patches]**

In the reports of Katia Sindali, with the topic of Life-threatening coma and full-thickness sunburn in a patient treated with transdermal fentanyl patches: a case report, he stated that the Caucasian women suffered from respiratory depression miosis and a Glasgow Coma Scale (GCS) of 3/ 15 due to sun exposure and her body temperature was 41^0 C, while she was using fentanyl patches for chronic back pain. On full clinical examination she had wide spread erythema covering the majority of anterior surface of her body as well as blistering on her abdomen and lower limbs.

Fig. Images showing full thickness sunburn due to Fentanyl Patches

As we can see the effect of fentanyl in this case report is life threatening. So we can overcome such consequences by pictorial representation of conditions to be avoided while taking a particular medication. We have also designed a pictogram for this specific case which is presented below.

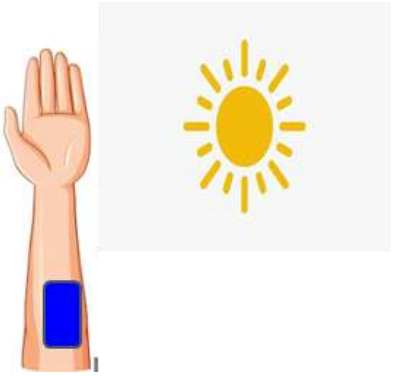


Fig- pictogram created for instructing not to use fentanyl patches under sunlight.

- **Case -3 [Accidental IV administration of epinephrine instead of midazolam at colonoscopy]**

In the reports of Ahmed Gado with the topic of Accidental IV administration of epinephrine instead of midazolam at colonoscopy, in this the accidental administration of epinephrin instead of pethidine (50 mg) and midazolam (5 mg) happened. This mistake was committed due to similar appearance of midazolam and epinephrine ampoules.

Fig. Similar appearance ampoules

So such errors occurring due to similar resemblance of ampoules, can be overcome by some pictorial representation.[7] These are few case reports many more are there, considering the problems in each situation unawareness or ignorance about the instruction or guidelines may be the reason behind the crisis. PICTOGRAM: instruction in picture or vector format will be the helping tool as solution to such crisis.

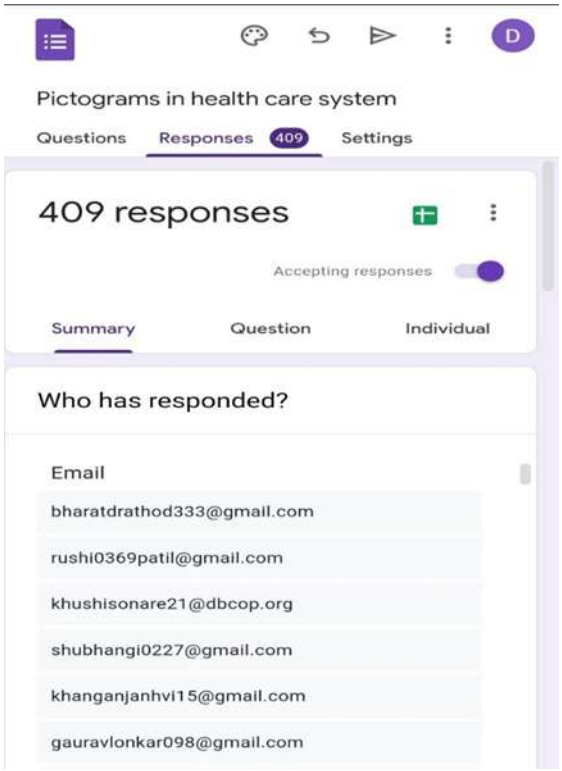
- **Steps for survey**

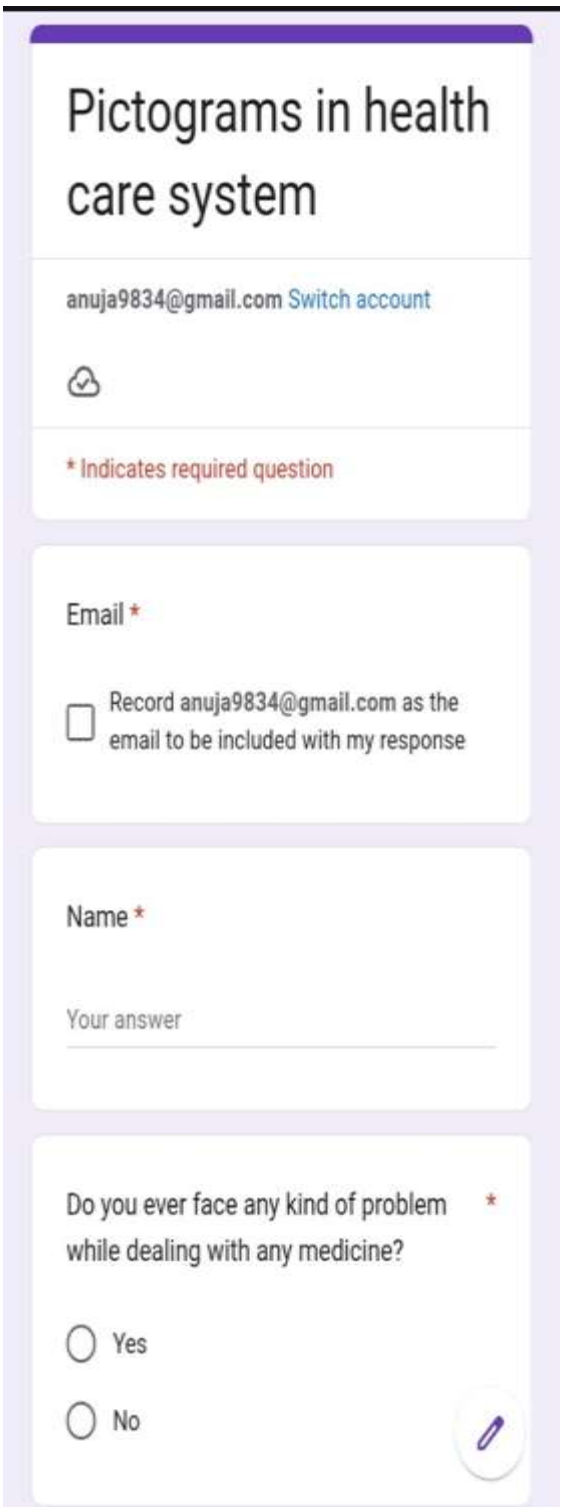
1) **Collection of problem statements**

This was our first step of the complete survey, in which we came up with the google form which we

circulated in public domain with the point of view of collecting the views of people regarding Pictogram.

https://forms.gle/CpMvUfQCZChRgroF6eri





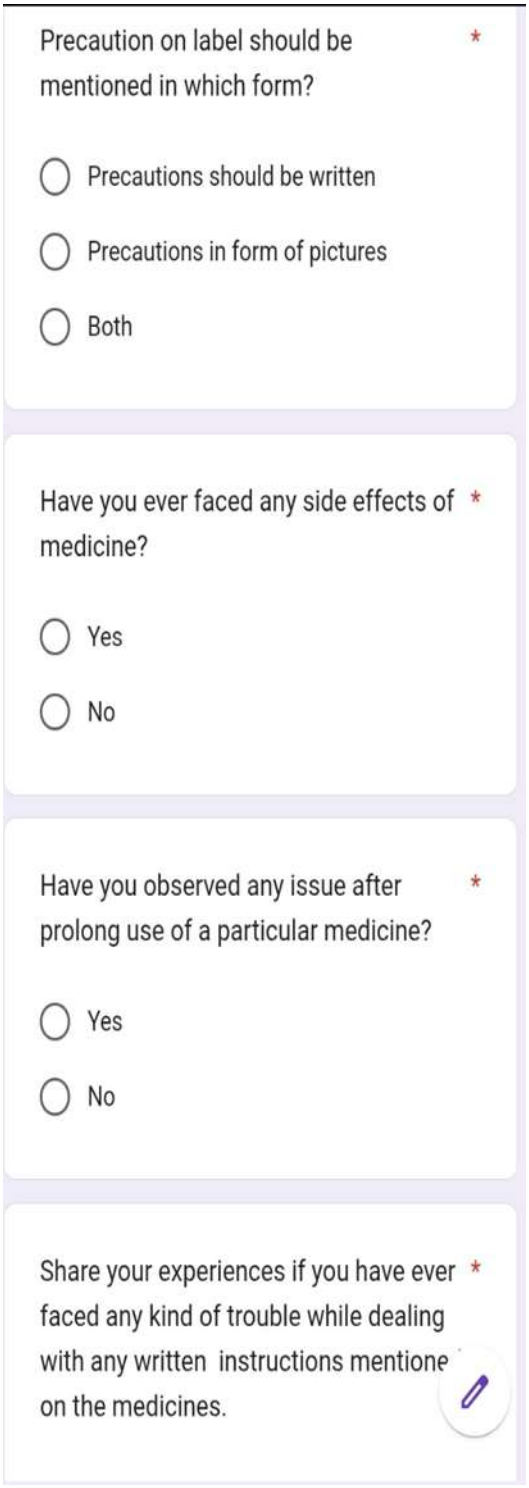
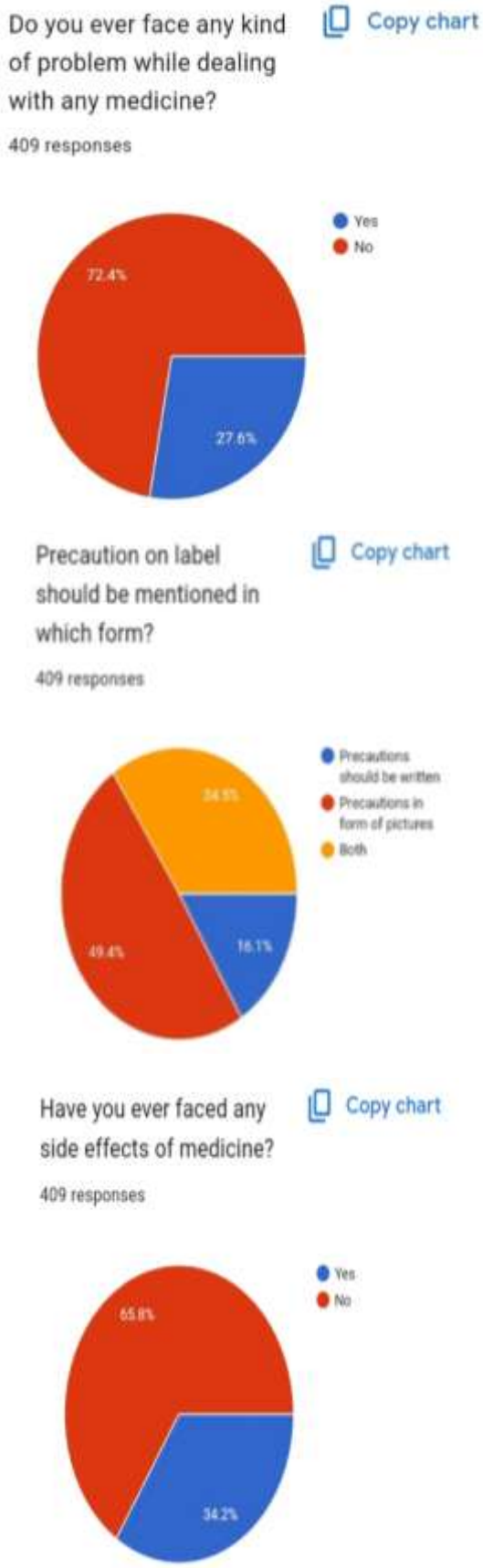


Fig- Specimen of online form for problem statement finding



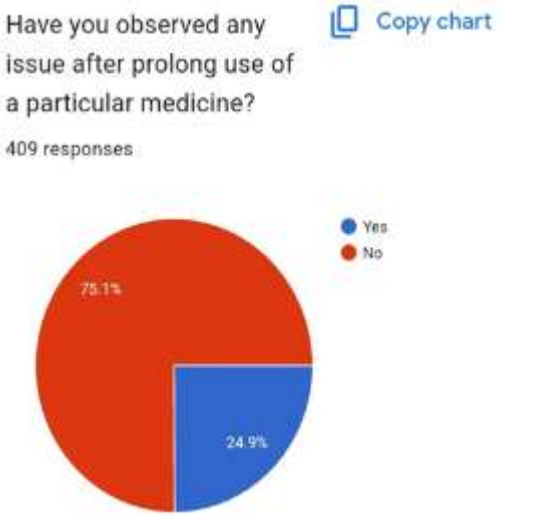


Fig- graphical representation of online form responses

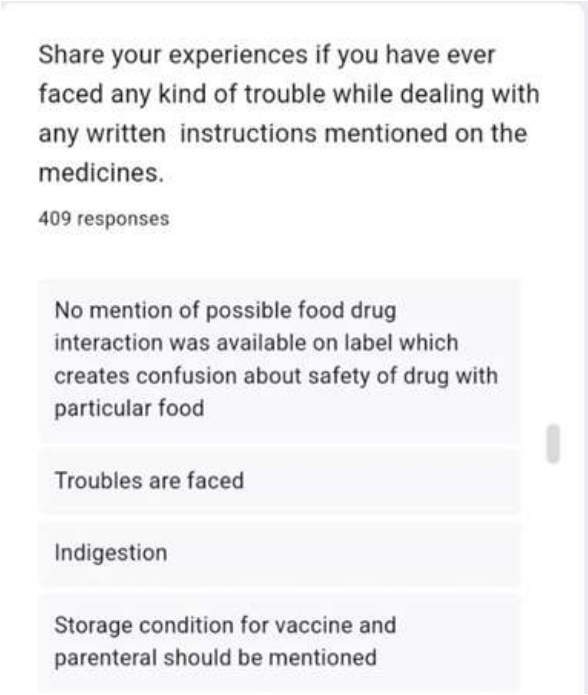


Fig- Graphical representations of google form questionnaire

Q-1 Do you ever face any kind of problems while dealing with any medicine?

Q-2 Precautions on label should be mentioned in which form?

Q-3 Have you ever faced any side effects of medicine?

Q-4 Have you observed any issues after prolong use of a particular medicine?

2) Screening of problem statements (intellectual)

This was our second step of survey, so in this we found some common problems which people are facing while administering and using the different medications.

The problem statements we observed during our survey are listed below: -

- Sometimes we neglect the warnings so it should be mentioned in picture format
- Some drugs are contraindicated in pregnancy so it should be mentioned on label
- The tip of the drops should not be touch with bare hands
- Some of the instructions like don't take it with milk or don't drive
- Side effects of antibiotics should be mentioned on label.
- Storage conditions for vaccine and parenteral should be mentioned.
- Language barrier- instructions in unfamiliar languages.
- Misinterpretation.
- Nasal drops, ear drops, and other drops precautions should be given in picture form.
- Instructions for dispersible tablets should be mentioned on label.
- Instructions for ENO that it should be firstly dissolved in water and then consumed.
- Disposal of sanitary napkins should be done with care to avoid environmental pollution.
- Some drugs are contraindicated in pregnancy.
- Amoxicillin causes red patches on bodies cause irritation to persist for 2-3 days.
- Sometimes I am unable to understand the precaution if it nis pictorially shown we can

easily understand the precautions and carefully use it.

- After taking NSAIDs inflammation in stomach.
- Complex terminology.
- Do not touch eyes when you are applying preparations.
- How to open seal of ointments and drops.
- Instructions for teratogenic action of drugs.
- Insertion methods for suppository

After analysing the above problem statements, we came up with a few pictograms, which are presented in this google form.

3) Identification of problem statements

So, from above data we saw few problems that were commonly faced by most of the population while using a drug.

1. Drugs that are not safe during pregnancy
2. Drugs that are safe in pregnancy
3. Directions for the use of ophthalmic preparation
4. Direction for the administration of dispersible tablet
5. Method to dispose sanitary napkins
6. Do not touch eyes with bare hands
7. Directions for the route of administration
8. Shake well before use for preparations like suspension

4) Creation of pictogram

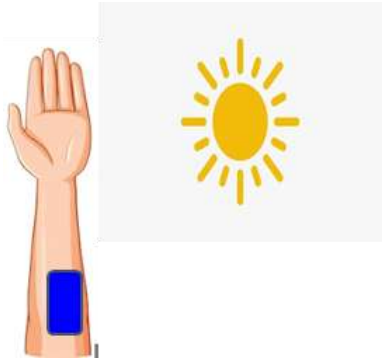
From the collected problem statements, we came up with the few pictograms.

Do not touch tip of eyedrops

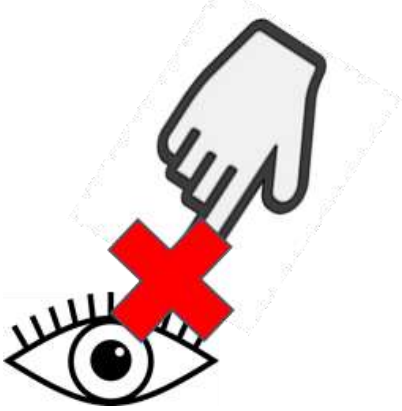
For parenteral use

Do not eat orally

Safe in Pregnancy



Do not expose patch in sunlight



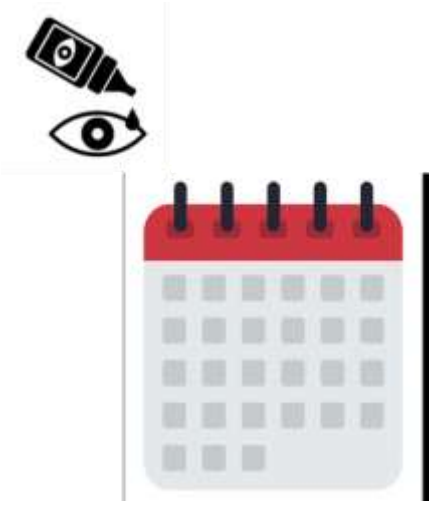
Do not touch eyes

Shake well before use

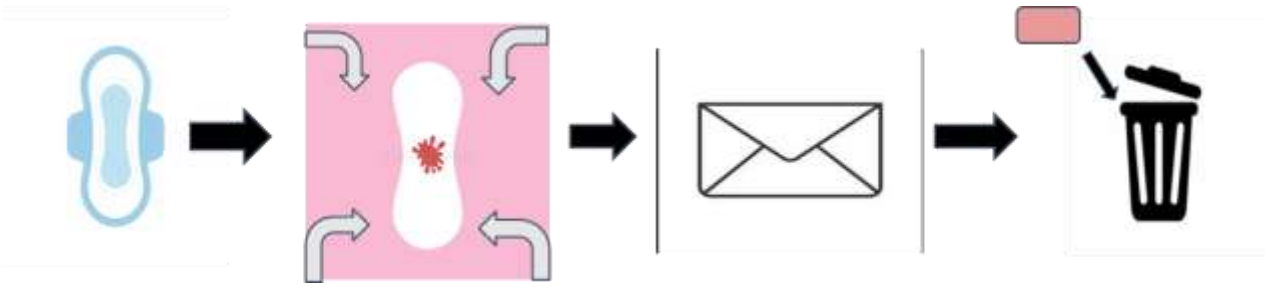
Do not use in Pregnancy

Dispersible tablet

Dissolve granules in water



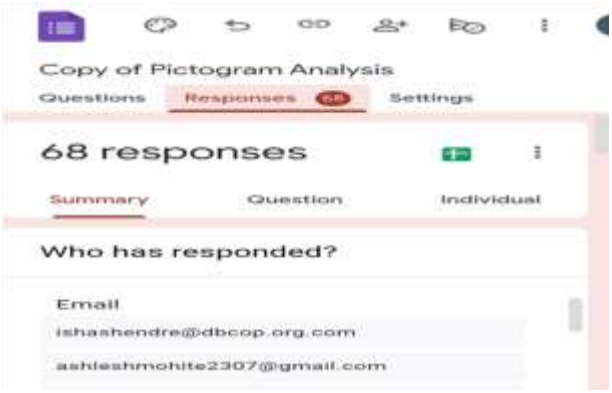
Directions for the use of eyedrop



Directions for the disposal of sanitary napkin

We created a google form for identification of above pictograms.

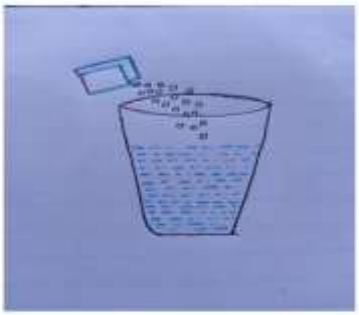
5) **Screening of pictogram (public responses)** https://forms.gle/HVuNxzZSLiTaNTZ99



Q-3 *

Your answer

Q-4 *



Your answer

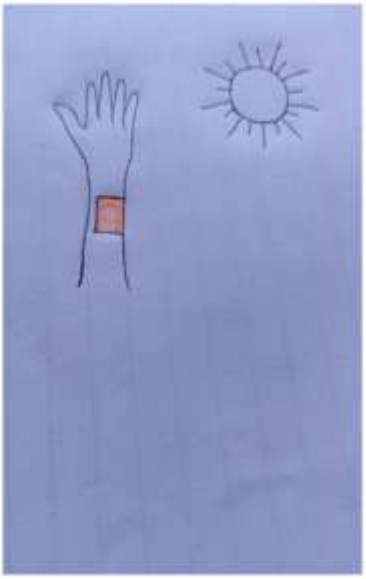
Q-5 *

Your answer

Q-6 *

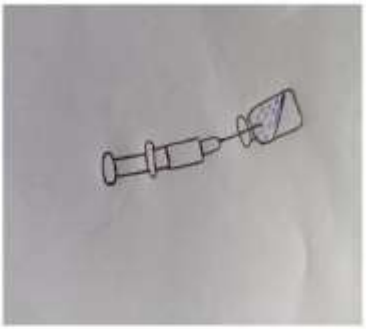
Your answer

Q-7 *



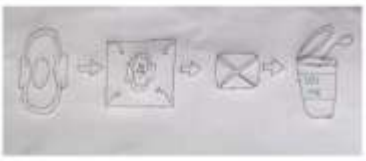
Your answer

Q-8 *



Your answer

Q-9 *



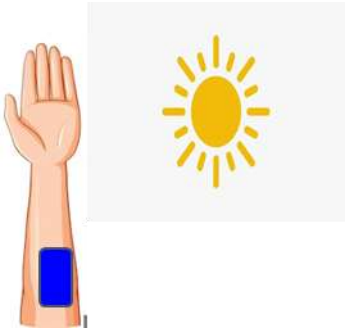
Your answer

6) Rectification of unidentified pictogram

So, after analysing the responses we found that some of the pictograms were not correctly identified by responders. So we focused on why those pictograms were not identified, and then we realize that some changes were required in those pictograms. So, we came up with the modification in those pictograms. Those pictograms are shown in this google form.

Directions for the use of eyedrop

Safe in Pregnancy



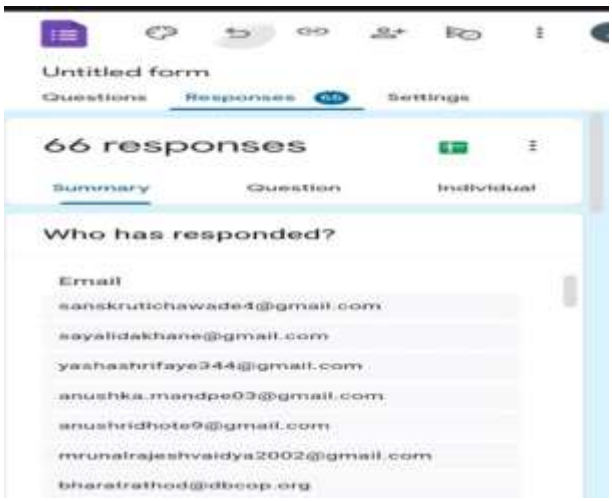
Do not expose patch in sunlight

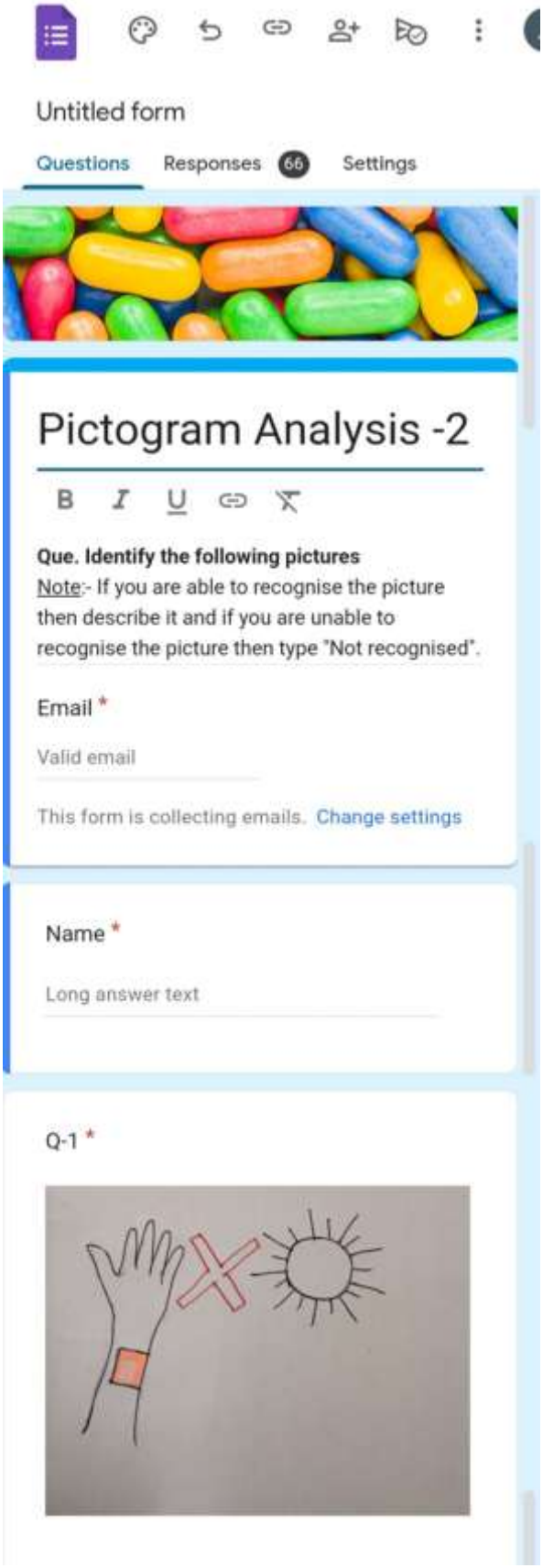
7) Rescreening of unidentified pictogram

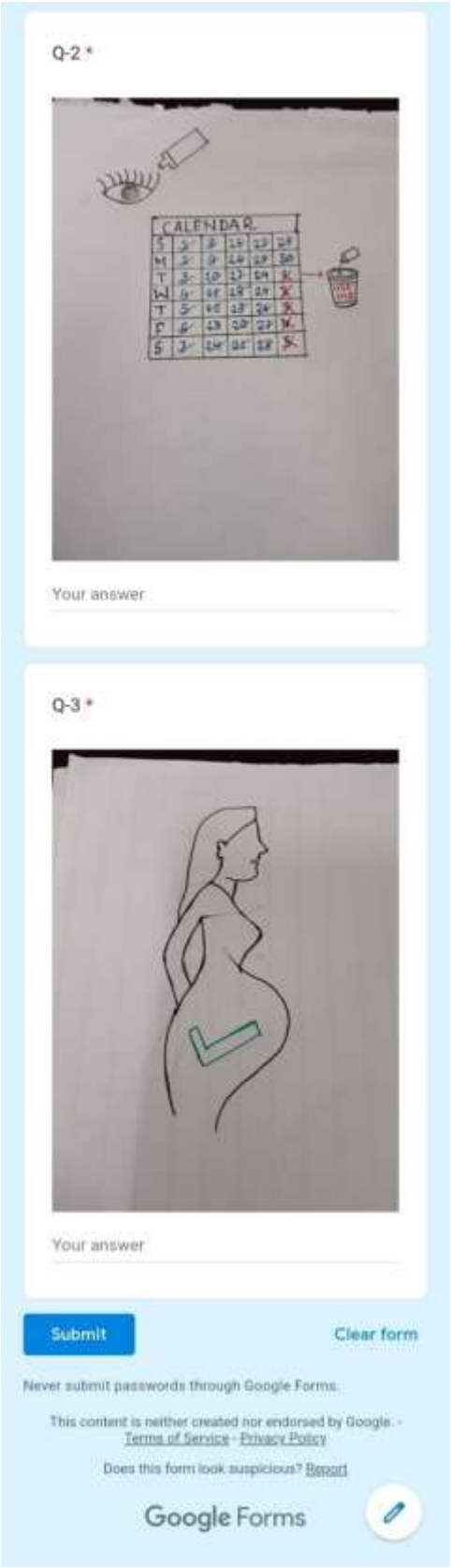
This was the second last step of our survey. In this we analyse the pictogram analysis-1 google form.

And from that we identified problematic pictograms that were not identified by the public, then we modified those pictograms and created another google form as pictogram analysis-2. Then we circulated the google form in public domain again and collected responses. This time the pictograms were successfully identified by the responders. So we finalize those pictograms.

https://forms.gle/xipKu477FCZwabQFA







After some corrections, the pictograms were correctly identified by the responders.

8) Finalization of pictogram

This step completes our survey, we have set a criteria of 75% for finalisation of pictograms. Initially our some pictograms didn't pass our criteria, so we rectified them and came up with some modifications in them. Then our all pictograms passed it. So from this we finalized the pictogram survey.

Do not touch tip of eyedrops

For parenteral use

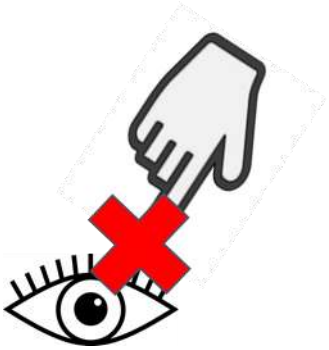
Do not eat orally

Safe in Pregnancy

Do not use in Pregnancy

Do not expose patch in sunlight

Dispersible tablet

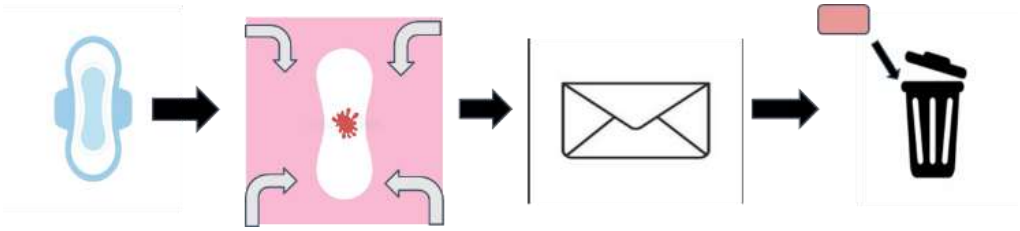


Do not touch eyes

Directions for the eyedrop

Shake well before use

Dissolve granules in water



Directions for the disposal of sanitary napkin

CONCLUSION:

Pictogram is simple figurative illustration which is meant to grab viewers' attention and provide information to communicate quickly. These are used at various public places like Airports, Bus stands, to instruct regarding No smoking zones, No alcohol zones etc. Pictograms are designed with minimal details for easy understanding. Pictograms are used in various hospitals to indicate Departments like Paediatrics, Pulmonology, Cardiovascular medicine, Internal medicine, Geriatrics, etc. It plays a vital role in bridging language and literacy gaps and enhancing patient understanding and adherence to prescribed treatment plans. By leveraging pictograms, healthcare providers can improve health outcomes, reduce medical errors, and promote patient engagement. Standardized, culturally sensitive, easy to understand pictograms are essential foe effective communication in healthcare settings. We have discussed three cases which could have been avoided if pictograms were used. They are as follows: -

1. Visual Hallucinations due to prolonged use of anti-hypertensive drugs like Metoprolol.
2. Sunburn due to exposure of Fentanyl patches in sunlight.
3. Accidental administration of Epinephrine instead of Midazolam due to similar resemblance of Ampoules.

These are certain cases which occurred due to certain Adverse effects and unawareness regarding some drugs. These can be overcome using Pictograms. From the point of view of knowing the thoughts of the people regarding pictogram, we also conducted a survey which includes various steps like:

1. Collection of problem statements from the public domain. (public responses)
2. Screening of problem statements. (intellectual)
3. Identification of problem statements.
4. Creation of Pictogram.
5. Screening of Pictograms. (public responses)
6. Rectification of unidentified pictograms.

7. Rescreening.
8. Finalization of Pictograms.

By following these steps, we designed some new pictograms. Ultimately, strategic use of pictograms can lead to improved health literacy, prevention of ADR and enhanced quality of care.

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