

Empowering the visually impaired by customized Braille prescription and thus reducing medication errors

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Purpose: To assess the use of routine Braille prescription in reducing medication errors in visually impaired patients. **Methods:** This observational, questionnaire-based study was conducted in 100 blind or visually impaired patients who were Braille literate (aged ≥ 18 years). We initiated our Braille prescription from January 2017 to March 2018. The questionnaire consisted of 8 items that captured patient details on the medication management process in addition to a face-to-face interview with them. It was administered twice to each patient at baseline and at the end. Braille prescription included details regarding all medicines, their dosages, instructions, expiry dates, and major side effects. The prescription was developed easily and quickly with an average turnaround time of 1 hour. **Results:** It was seen that most of the study patients aged between 30-40 years ($n = 80$) and majority were men (78%). At baseline, 73% of our respondents faced challenges when self-administering medications as compared to 17.5% at endline. After using Braille prescription, only 5% reported of taking a wrong dosage compared to 46.2% at baseline. Patients missing a dosage significantly reduced after using routine Braille prescription (43.7% vs. 7.5% respectively, $P < 0.05$). **Conclusion:** Our study successfully has rolled out Braille prescription as an efficacious method in addressing the key issues to medication safety with the visually impaired.

Key words: Braille prescription, medication error, visually impaired

Visual impairment is a global issue, leading to various difficulties and significantly affecting patient's quality of life.^[1] While there are 285 million people with visual impairment worldwide, 90% live in developing countries^[1]. India itself has 62.619 million (21.9%) visually disabled people.^[2]

Reports show that annually, there are about 5.2 million medical errors in India^[3] and the cost associated with medication errors has been estimated to be \$42 billion USD globally.^[4] WHO's Third Global Patient Safety Challenge - Medication Without Harm was launched in March 2017 to find solutions for the challenges that healthcare faces in reducing medication errors. It aims at reducing medication-related harm by 50%, globally in the next 5 years.^[5]

Patients with visual impairment are most likely to have the difficulty in managing medications when compared to people with normal vision.^[6-8] It was seen that among medication-handling challenges among visually impaired population,^[9] 89% of respondents were unable to read the prescription labels, 58% of respondents did not know the name of the medication and 96% of them did not tell health-care providers when they faced difficulties in handling their medication.

Although various center and state government-led initiatives focus around prevention and treatment, no

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initiatives are rolled out on creating access and empowering people with blindness. Thus, a large proportion of visually impaired population are potentially more likely to have unsafe practices related to medicinal use as reported by various studies.^[10-12]

In an effort to reduce and improve medication safety, European countries have initiated a practice of adding drug information on the packs in Braille, a language that visually impaired people can easily follow. However, in India where cost can be a major deterrent due to the socioeconomic factors, introducing Braille on all packaging has been met with criticism.

In this view, we conducted this questionnaire-based study to assess the role of braille prescription in ensuring medication safety in visually impaired patients.

Methods

This observational, questionnaire-based study was conducted in braille literate patients who were enrolled from Samarathanam, an organization where vocational training was imparted to the visually impaired. All participants were ≥ 18 years and were blind or visually impaired as per the International Statistical Classification of diseases. Any patient who was Braille literate

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had the choice of getting a braille prescription which was given for any medication.

The questionnaire was developed to capture details on the home medication management process among the patients and data was collected using the questionnaire in Braille format in addition to a face-to-face interview with the patients. Responses to the Braille questionnaire and oral Interview were compared to ensure that there were no conflicting responses. The questionnaire was administered twice to each patients at baseline and endline. The questionnaire consisted of 8 items. The patients had to respond to the items by selecting one of the two responses indicating increase or a decrease in a specific parameter.

Parameters assessed and baseline measurements included: 1. Independent with medication administration 2. Self-administration 3. Wrong dosage 4. Missed dose 5. Premature discontinuation of medications 6. Ability to locate/identify the medicines 7. Wrong Insulin Dose 8. Identify expired medicines.

The Braille prescription included details regarding all medicines, their dosages, instructions, expiry dates, and major side effects. The prescription was developed easily and quickly for any medications and prescriptions from any doctor with an average turnaround time of 1 hour for prescriptions received before 4 pm. For prescriptions received after 4 pm, patients had a choice of either collecting them the next day or to have it couriered to their residence/workplace.

Following implementation of Braille Prescription, we administered the initial questionnaire to the recipient of the prescription 15 days after the prescription was given to compare the results after our intervention.

We initiated our Braille prescription from January 2017 to March 2018. The study protocol was reviewed and approved before the commencement of study by the Institutional Ethics Committee of Apollo Hospitals, Bangalore. Written Informed consent was obtained from all the study participants. A Student's independent t-test was performed to compared the parameters and $P < 0.05$ was considered statistically significant.

Results

Of the 100 patients, it was seen that most of them aged between 30 and 40 years ($n = 48$) followed by 20–30 years ($n = 20$) and 40–60 years ($n = 12$) [Fig. 1] with majority of them being males (78%).

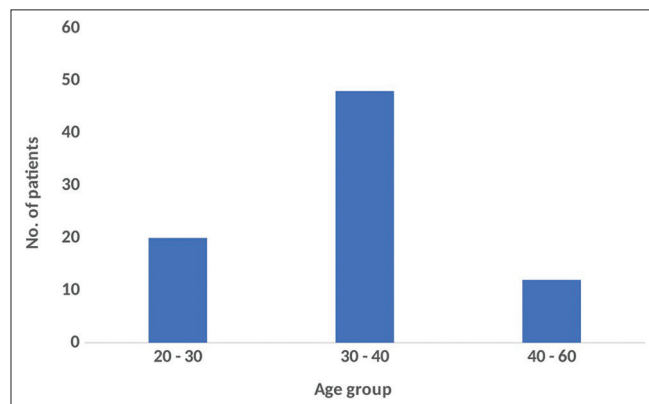


Figure 1: Age distribution of patients

At baseline, only 21.0% confirmed that they were using medications independently and 87.0% of patients routinely relied on a regular carer or other visually able-bodied support. It was seen that 56.0% of our respondents faced challenges when self-administering medications and the inability to read doctor's prescription it made self-administration challenging. It was also reported that 46.0% of the patients had taken at least one wrong dosage and 43.7% had missed a dose of the medication. Inability to remember all the frequencies and instructions in case of multiple medications was the commonest cause for a missed dose.

63.0% of the respondents said they have had instances in their last medication cycle where they were unable to locate their right medications. 8% of the diabetics in our study group said they have taken wrong dose of insulin due reliance on memory on the dose prescribed. Expired Medicines were taken by 15.0% of study patients due to inability to read the labeling on the medications.

After using Braille prescription, it was seen that most of the medication errors such as wrong or missed dosage, challenges to identify and locate medicines had significantly reduced in patients ($P < 0.05$). Data pertaining to same are presented in Fig. 2.

Discussion

As part of the solution to ensure medication safety among visually impaired, we provided routine Braille prescriptions to all our patients, a very cost-effective and easily adoptable practice that can improve medication safety for the visually impaired. Implementation of this simple solution can help India and the world move toward the WHO goal of reducing medication-related harm by 50%, globally in the next 5 years, in a truly inclusive way.

Braille prescriptions were successfully given to all those who needed one in our hospital over the last 2 years. This is the first such initiative in Asia and we report that 93% of patients are able to manage their prescriptions independently, without any untoward incident reported ($P < 0.001$).

In the current study, 25% of patients who received a Braille Prescription were unable to locate medications that were lower than findings reported from other studies (51.36% and 33.33%) 5,7. These differences could because of lower sample size in the previous studies carried out.

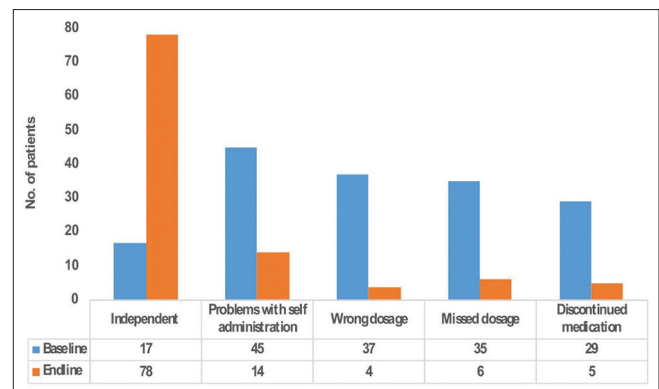


Figure 2: Comparison of parameters post Braille prescription

Usage of Braille prescription showed tremendous improvement in this study wherein only 5% of patients reported to be taking wrong dosage post-intervention when compared to baseline (46.2%). This is the foremost concern among the visually impaired patients as wrong dosage can at many times lead to various adverse drug reactions and also death.^[13] Additionally, none of the diabetic patients reported to take wrong dose of insulin in our study. The current results provide direct evidence of Braille prescription's effectiveness in management of various medication errors in Asia when compared to other findings. Studies from India have shown that majority of their patients not know the correct dose (96.8%) and 44.44% participants consumed wrong medications.^[10] As per a study by Apoorva *et al.*, majority of their patients did whereas report from Sri Lanka, reported that 12.69% of study participants consumed wrong dose.^[12]

We were very successful in ensuring the blind and visually impaired were able to take their medications independently. We were able to empower them the ability to manage their prescriptions without having to depend on others. Most importantly we were able to reduce the medication errors. Besides patients from our hospital, we also receive requests and provide support with Braille Prescriptions for patients from other medical centers and local clinics.

Since the introduction of Braille prescriptions, we have received positive feedback from the blind and visually impaired patients, with a large number of them saying they feel empowered and safe having all the information on their medications include drug, dose, route, frequency and expiry dates. Those with multiple medications felt less overwhelmed with the medications they had to take as they no longer needed to rely on their memory, and could read the prescription before every administration.

100% of the patients who received a Braille Prescription rated our services as 'excellent'. About 89% of patients who received a Braille Prescription have referred others in need of a prescription.

Although our study on the medication practices and challenges of the visually impaired led us to the solution of a Braille prescription, key challenge in identifying a cost-effective protocol with a quick turn round time still remains unsolved. Apollo Group of Hospitals is currently reviewing the cost of procuring and manning a Braille printing machine against the cost of using an external vendor. Additionally, widespread awareness on the availability of our service was hindered as traditional methods such as newspaper ads or TV ads would not provide the needed connect with the end users' due to inherent limitations of these media in reaching to the visually impaired. Thus, we targeted various organizations supporting the visually impaired and other social support groups.

Conclusion

In summary, our study successfully has rolled out Braille prescription as an efficacious method in addressing the key

issues to medication safety with the visually impaired. The wider goal of this study aims at reducing medication errors by 50% in the next 5 years with every visually impaired or blind person in our country to be independent with his/her medication and prevent medication errors. We also want every blind person to have direct and independent access to label information as do sighted people.

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Conflicts of interest

There are no conflicts of interest.

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