Short Communication

Bindi: A Unique Prescription Method for Visually Impaired, Illiterate, and Naïve Patients to Solve the Dependency in Taking Medication

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ABSTRACT

A huge abundance of visually impaired and illiterate people across the world faces the issue of identifying the right medicine from their prescription at the time of consumption. Numerous devices and AI-based tools offer solutions to this challenge. However, none of these methods is universally acceptable, cost-effective, or simple. In this communication, we are sharing a unique method for resolving the VIP problem with little evidence of its effectiveness and acceptability. The Bindi, a common trinket in Indian culture, can present a simple, cost-effective, and universally adoptable solution. (Visual Explanation of Concept is available at the YouTube link: https://youtu.be/hqR3TSi0njA)

Keywords: Visually Impaired Patient, Prescription, Bindi.

INTRODUCTION

Perhaps being devoid of vision or having a vision impairment is one of the most unfortunate and perturbing conditions. Nearly one billion people are suffering from moderate to severe but avoidable vision impairment. The dashboard of the National Programme for Control of Blindness and Visual Impairment (NPCBVI), India, presents the 1.26 million registered patients (accessed on 12/22). People with severe vision impairments or who have lost their vision rely entirely on other sensory information. Legislatively, myriads of corrections are made to make things accessible to Visually Impaired People (VIP). From digital devices to public facilities everywhere, infrastructures are being developed that can be easily accessible to VIP. Despite such enormous inputs, certain things are still inaccessible to VIPs. Reading the prescription and self-management of medication are a few of the challenges for which VIP must rely on others.

Consider a VIP who has been prescribed a medication with a complicated dosage schedule. The regime comprises two to three different medicines at three different times. The vision impairment impedes taking the right medication without someone's help.[1] Difficulty in taking medicine is not only a problem for VIPs. Geriatric patients frequently have difficulty taking the correct medication as prescribed. Illiterate people always struggle with taking the right medication as per their prescription and always confirm with others before taking it. The naïve and inexperience people also get confused with their medication.

With some validation, we present a one-of-a-kind solution to the aforementioned problem. The unique approach to filling prescriptions at the pharmacy includes the smart utilization of "Bindi." The "Bindi" is a part of the unique culture of India, wherein the women apply it to their foreheads as an ornament. Originally, the "Kum-Kum" (a red-colored dye or lake color) was employed as the Bindi. It was eventually replaced with

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an adhesive-based patch of different shape, size, color, and material. A typical round-shaped self-adhesive Bindi is shown in Figure 1. The cost of the Bindi is extremely low in comparison to its purpose of serving VIPs with a unique concept.

The proposed prescription technique allows VIPs to sense the Bindi pasted on the top-right corner of the package. Three different shapes (C-half, D-half, and circle) in different combinations as per regime can be pasted in a row at the top-right corner of the package as shown in Figure 2.

The combination of C-Half, D-Half, and Circle can be utilized to represent different regimes of the medication. The C-Half presents the medication before the meal. The D-Half represents medication taken after eating. The circle represents "no medication." Table 1 represents different patterns of the Bindi that can be employed for different drug regimes.

The current novel method of filling prescriptions for visually impaired patients was tested on 18 patients. They were initially trained for the technique for identifying the top-right corner of a package and then identifying the shape of Bindi. Surprisingly, it was indeed easy for them to identify the shape with their fingertips. With initial understanding, they were given a task to identify

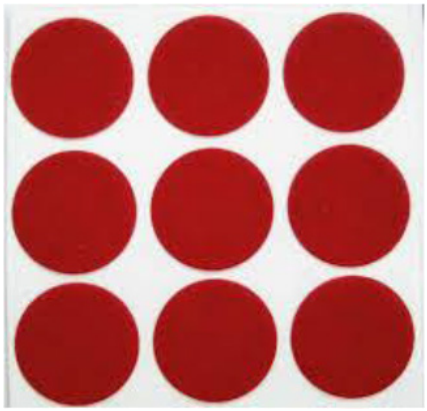

Figure 1: Typical round shaped adhesive Bindi available in Indian Market.

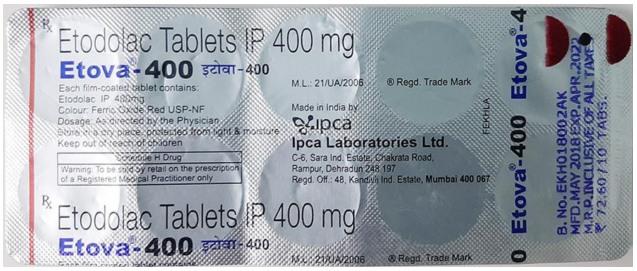

Figure 2: Position of the Bindi on Top-Right Corner of Tablet package.

Table 1: Different combination of the Bindi for different drug regime.

	1 tablet thrice a day, each after meal	1-1-1
	1 tablet thrice a day, each before meal	1-1-1
	2 tablets thrice a day, each after meal.	2-2-2
	2 tablets thrice a day, each before meal	2-2-2
	1 tablet twice a day, before meal	1-0-1
	1 tablet twice a day, after meal	1-0-1
	1 tablet once a day, after meal	1-0-0
	1 tablet once a day, after meal	0-1-0
	1 tablet once a day, before meal	0-1-0
	1 tablet at night, after meal	0-0-1

Figure 3: Dummy tablet packages with different patterns of Bindi that represents different dosage regime.

the dosage regime for given sample packs, as shown in Figure 3. For each correct identification, one point was assigned and half a point for errors. Out of 18 volunteers, 67.5% of participants have identified all five samples correctly. The score results for all questionnaires are shown in Table 2. Initial results with the small group of participants are very encouraging, but nevertheless need to be validated with a larger group.

The present innovative approach to filling prescriptions has numerous advantages, including certain challenges. Firstly, this approach to sorting out the accessibility issue of VIP is extremely cost-effective and simple compared to state-of-the-art techniques that include electronic devices and AI-based software. The braille-based technique needs special technology at packaging level.[2,3] Incorporating braille patterns in all packages can

Table 2: List of questions and data captured from participants for the Bindi based method of prescription.

Age	Gender	Q1	Q2	Q3	Q4	Q5	Sample Number					Total Score	% Score	Q6	Q7	Q8
							1	2	3	4	5					
73	Male	No	No	Yes	Yes	No	0.5	0.5	1	1	1	4	80	Yes	Yes	Yes
60	Male	No	No	No	No	No	0.5	0.5	0.5	0.5	0.5	2.5	50	Yes	Yes	Yes
60	Female	No	No	Yes	No	Yes	1	1	0.5	1	1	4.5	90	Yes	Yes	Yes
44	Female	No	Yes	Yes	No	Yes	1	1	1	1	1	5	100	Yes	Yes	Yes
73	Female	No	No	Yes	Yes	Yes	1	1	1	0.5	1	4.5	90	Yes	Yes	Yes
70	Female	No	No	No	No	No	1	1	1	1	1	5	100	Yes	Yes	Yes
76	Female	No	No	No	No	No	0.5	0.5	1	0.5	0	2.5	50	Yes	Yes	Yes
75	Male	No	No	No	Yes	No	0	0.5	0.5	0.5	0	1.5	30	Yes	Yes	Yes
20	Female	No	No	No	No	No	1	1	1	1	1	5	100	Yes	Yes	Yes
40	Female	No	No	No	No	No	0.5	0.5	0.5	1	1	3.5	70	Yes	Yes	Yes
59	Female	No	Yes	Yes	Yes	No	0.5	0.5	1	1	1	4	80	Yes	Yes	Yes
26	Female	No	No	No	No	Yes	1	1	1	0.5	1	4.5	90	Yes	Yes	Yes
69	Female	No	No	No	Yes	No	1	0	1	1	0	3	60	Yes	Yes	Yes
64	Male	No	Yes	Yes	No	Yes	0.5	0.5	1	1	1	4	80	Yes	Yes	Yes
73	Male	No	No	Yes	No	Yes	0.5	0.5	1	1	0.5	3.5	70	Yes	Yes	Yes
60	Male	No	No	No	No	Yes	0.5	0.5	1	1	0.5	3.5	70	Yes	Yes	Yes
58	Male	No	No	No	No	Yes	1	0.5	1	1	0.5	4	80	Yes	Yes	Yes
75	Male	No	No	No	No	Yes	0.5	0.5	0.5	1	0.5	3	60	Yes	Yes	Yes
Q1:	Were you born with loss of eyesight?															
Q2:	Do you face problems taking medicines?															
Q3:	Do you get confused when prescribed many medicines?															
Q4:	Can you take it without assistance?															
Q5:	Do you feel like discontinuing your drug therapy?															
Q6:	Do you find this new prescription technique useful?															
Q7:	Do you find it effective method to take medications correctly?															
Q8:	Do you think this method should be proposed for VIP to provide a better service to you?															

unnecessarily affect the cost of production. Bindi is a trinket that will not cause any hesitation at the pharmacy's end. It is affordable, easy to store and maintain, and available almost everywhere. This method is applicable for both solid and liquid preparation in blister packs, strip packs, and bottle packs.

Besides its invaluable advantages, this method possesses the challenge of training. Both pharmacists as well as VIPs need to be formally trained for applying and understanding the dosage regime, respectively. The Pharmacy Council of India has made a refresher course compulsory for every pharmacist across the nation. A small training session can be implemented in the refresher course for nationwide pharmacist training.

In essence, along with the preliminary encouraging responses, the current method of filling prescriptions for VIPs is indeed intriguing and must be evaluated with a larger group of participants. The authors also anticipate and appreciate suggestions for the method presented herewith for value addition.

CONCLUSION

A simple and innovative approach for prescription filling with the help of "Bindi" can conveniently resolve the medication dependency for visually impaired as well as illiterate and naïve people. The trivial cost of the Bindi can not increase the cost of medication and can be easily manageable at the end of pharmacist. The label stickers, that most pharmacist uses now a days, can be replaced with the Bindi for such patients. The certain challenge this method possesses is training of pharmacist and acquaintance of patients. However, urban/rural health centers, NGOs for visually impaired people, schools, and the concept of refresher course for pharmacist can help to disseminate this novel approach among the stakeholders.

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CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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