Fayyad MIM, Sabar-Ayad MM, Abduelkarem AR. Medication management by visually impaired persons in the UAE: Self-determination practice and law demands. Pharmacy Practice 2025 Jan-Marc;23(1):3028.
https://doi.org/10.18549/PharmPract.2025.1.3028

Original Research

Medication management by visually impaired persons in the UAE: Self-Determination practice and law demands

Mahmoud I. M. Fayyad, Maha M Sabar-Ayad, Abduelmula R. Abduelkarem

Received (first version): 26-Apr-2024 Accepted: 11-July-2024 Published online: 22-Jan-2025

Abstract

Background: People with visual impairment are highly prone to medication errors. Effective policies should support self-determination to provide appropriate means for this party to access medical information. Following the recommendations of the UN Committee on the Rights of Persons with Disabilities, The UAE adopted a new policy to support the visually impaired. This study determined the challenges visually impaired individuals face, the likelihood of medication administration errors, and the methods used to cope with those challenges. It also required the relevant parties to provide visually impaired persons with medicinal information consistent with international and national law demands. A survey was administered to 94 visually impaired individuals using an interviewer-guided questionnaire. Also, a random sample of 75 frequently used medications was selected to check if Braille labels and the QR codes were available in the medications' boxes. The research demonstrated that most visually impaired individuals do not receive adequate assistance with medication usage and have little knowledge of managing medications. As a result, there is an expected increase in medication errors or mismanagement in those individuals, despite the current advances in policy development in the UAE regarding visually impaired support. Therefore, developing effective strategies and policies is vital to assist this population when using medications.

Keywords: medication management; medicine information; visually impaired persons; self-determination

BACKGROUND

Blindness or visual impairment (VI) is the loss of vision that cannot be corrected with visual tools, such as glasses or other available supporting tools (WHO). Recent international statistics by the (WHO) indicate that the VI has reached 253 million; 36 million are blind, while 217 million have moderate vision impairment.[22,30] Prior studies and comprehensive national statistics have yet to be conducted in the UAE. As reported by the UAE Ministry of Community Development, the number of persons with disabilities registered in the Ministry reached 24,000, an increase of 3.87% during the second half of the year 2020, compared to the number announced in December of 2019, among them, 5.1% have vision impairment.

The UAE ratified the United Nations Convention on the Rights of Persons with Disabilities (CRPD) on February 8, 2008. Two years before, the Federal Law No. 29 of 2006 on the Right of Persons with Special Needs (LRPSN) was enacted. The CRPD was issued to "ensure equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities" (Art. 1). It aims to ensure "equal enjoyment of all human rights by all persons with disabilities (Art. 1). It requires States Parties to support the rights of disabled people by prohibiting all actions of discrimination against others (Art. 4).[18]

The UN Committee on the Rights of Persons with Disabilities (hereafter the Committee) discussed the UAE's initial report at its 275th and 276th meetings, held on 18 and 19 August 2016. It reported concerns for VI rights inconsistent with the relevant international conventions and treaties. The UAE was advised to take all possible means to ensure that VI has access to the necessary information to interact with the community (Para. 8). Also, "The absence of specific binding legal and policy frameworks to ensure accessibility for persons with disabilities, on an equal basis with others, to all facilities and services… including access to information…" was also reported (Para. 19/a). Para. 19/c recommended that the UAE take all necessary actions to enable disabled persons to live independently and guarantee access to information to help them manage their needs independently.

In response to the previous recommendation, the Emirates Ministry of Health (MOH) and Sanofi Company released a new innovative advanced medicine pack for visually impaired people. This pack can facilitate better patient compliance with the treatment regimen. Patients will benefit from the 'intake chart' on the new pack, which details the intake schedule and links it to food and daily routines. By presenting the Braille calligraphy available in Arabic and Latin on the new pack, the visually impaired will recognize their medications, avoid medication errors, and become more independent when managing their condition. Further, the QR code on the box provides patients instant access to educational materials in English and Arabic by scanning them with a smartphone. In addition, it will contain a 2D data matrix, which will make medications fully traceable for patient safety. Counterfeit and expired products can be

Mahmoud I. M. FAYYAD*. Department of Private Law, College of Law, University of Sharjah, P.O. Box 27272, Sharjah, UAE. mfayyad@sharjah.ac.ae
Maha M SABAR-AYAD. Department of Clinical Sciences, College of Medicine, University of Sharjah, UAE. msaber@sharjah.ac.ae
Abduelmula R. ABDUELKAREM. Pharmacy Practice and Pharmacoetherapeutics Department, College of Pharmacy, University of Sharjah, P.O. Box 27272, Sharjah, UAE. aabdelkarim@Sharjah.ac.ae

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)

detected using this technology automatically.

Many difficulties have been reported when VI deals with drugs.[4,5,19,22,36] They are exposed to risks due to improper medication use or incomplete therapeutic schedule.[15,34] Several studies discussed the impact of improper medicine use by visually impaired individuals. A study by Poka et al. from South Africa showed that the most remarkable problems include the inability to locate and identify medication (60%), missing doses (64%), inaccurate dosing, and spilling medicines (33%). Around 68.3% of the VI subjects who participated in this study had no specific methods to overcome those obstacles. Another study from India, by Naik et al., showed that more than half the subjects of VI recruited in the study couldn't locate the place of medication, and 45.89% couldn't identify the separate containers of medications. Almost one-third of the study participants had missed doses and spilled medications. Keeping medications at specific places and identifying separate drugs by feeling the shape of the container were the most frequent methods used to overcome those obstacles in the study group .

VI is also frequently experienced alongside other illnesses or disabilities, especially since most are old age, as reported in many studies. Some illnesses, such as heart disease, arthritis, diabetes, mobility issues, and hearing loss, may be permanent.[5,22] As a result, they may be exposed to risky medical practices such as non-adherence to medications, which is also common among those with normal vision.[5,36] Also, many VI are parents required to medicine their children, and many manage this situation independently.

Many studies showed that VI was forced to use several innovative approaches in the medications.[4,36] For example, non-visual approaches, such as odor or wrapping an elastic band around bottles with similar forms, are used to identify medications. A color-coding scheme is also utilized in distinguishing between different tablets.[2,3] Such practices are prone to errors, especially for those who use more than one medication, as these techniques depend on the person's memory, and thus, he may be a victim of the wrong choice.[4,33] These negative realities justify enabling the VI to access medication information for proper "self-determination."

Since finding reliable sources of information is difficult for people with VI, they are less aware of their health. To ensure that medications are managed appropriately, safely, and effectively, visually impaired individuals may rely on their memories, ask others for help, or use an assistive device.[36] To achieve a successful outcome, patients must carefully self-administer their medications. Managing medication requires administration at the right time and in the correct dosage form. Yet VI are particularly vulnerable to medication errors because they might misuse their medicines.[36] These individuals may need help with reading critical information about their medications or handling their products. A small font size or poor color contrast on labels may result in patients overlooking information such as names, dosage instructions, and storage instructions. Also, they may have difficulty handling their medicine since they may not be able to distinguish their containers or may physically drop them, making finding them a challenge. It may be tough for them to open blister packs, administer eye drops, and measure liquid doses correctly.[19] Injecting insulin or other injectables may pose a challenge to patients with VI. Sometimes, they also forget the number of doses they took. Also, they may be dependent on other people to administer their medications.

Following specific handling or administration procedures for every dosage form is necessary. Responses indicated that liquid preparations were the most challenging form to handle. When it came to oral intake, the capacity to measure the exact quantity of liquid drugs and then pour it without spilling the contents was commonly identified as a concern. Rather than spilling syrup out of the bottle, people either drank it directly or poured it into glasses.[36] Due to insufficient medication awareness, respondents might overlook other important medication information. Their primary concern was to recover from their illness rather than understand the medication.[28] It is common for physicians to fail to discuss critical aspects of a medication's use when introducing it. A patient's lack of understanding of medication directions can lead to misunderstandings and failure to take medications according to directions.[19] Healthcare professionals and visually impaired individuals must have effective two-way communication to understand better several factors involved with specific medication management. A patient's preferences, physical condition, and cognitive status are all factors to consider, along with adverse reactions and side effects.[36]

Many international organizations and countries demand that pharmaceutical producers use the braille system on their medication packages.[4,22] For example, the Pharmaceutical Society of Australia issued a Guideline for pharmacists in providing services to VI to guide pharmacists in dealing with VI needs. Braille has become a mandatory requirement in Europe for all pharmaceutical products since 2005. In addition, the United States Access Board released guidelines advise pharmaceutical businesses to incorporate Braille on packaging across the country.[19] The Hungary's practice is worthwhile in this field. The Medicine Line system has been created to guide VI patients to find information about medicines easily through mobile phones. The system provides users with medical information through a speech recognizer system.[2,3]

In the gulf countries, a study in Saudi Arabia reported positive outcomes for VI regarding receiving their medications appropriately and minimizing medication errors.[4] It showed that 89% of respondents could read Braille. This conclusion could not be relied on in the UAE because, unlike in the UAE, teaching Braille to the VI in Saudi Arabia has been implemented for several decades at governmental schools.[4,9] Also, these findings contradict many related studies which reported adverse outcomes regarding the ability of VI to use the Braille system. For example, another recent study from Saudi Arabia recommended using an electronic system for printed Braille labeling due to the negative findings regarding the ability of VI to use the Braille system.[4]

Many VI cannot use the Braille system, e.g., less than 10% of VI can use Braille in the USA and Canada, while 5.1% in South

Korea.[22] Also, using Braille to guide VI to access medication information has not been without criticism for many reasons. First, Braille is used on the outer packaging to identify the trade name, strength, generic name, and expiration date; it is not used in the primary packaging of tablets or capsules nor on bottles or ampules.[4,5,22] Second, comparing the area of the label required for writing in Braille with the size of the medication package makes it impossible to include all necessary medication information on the medication package. Third, as the system relies on embossed dots, it is subject to damage due to use or time facto. Any missing or damaged dot can completely change this information.[2,3,22]

Many studies also reported adverse outcomes regarding the role of local support groups in providing adequate assistance to VI.[4,5,33,36] Zhi-Han *et al.* reported that most VI do not receive proper support regarding medicine use, so they have low awareness of the medication management.[36] Almuzaini *et a*l. and Kentab *et al.* found that VI in Saudi Arabia is not satisfied with the healthy people's services 5;19. These conclusions support many other studies that showed that VI prefers self-determination in using their medications.[2,3,22,36]

The right of the VI to access information is a means to make better decisions and improve their quality of life, not an end in itself. The right to knowledge is an umbrella principle incorporating a range of rights that affect civil, economic, political, and social rights, particularly among marginalized people.[3] Equal access to information is also linked to the right to be free of discrimination, which can be reached by access to information. Therefore, Art. 3 CRPD enumerates 'non-discrimination' as a core principle of the convention. Art. 4 addresses non-discrimination more specifically by demanding that the state parties guarantee and enhance the freedoms of disabled persons without discrimination. According to the United Nations Human Rights Committee (UNHRC), equality may require the state parties to enact favorable action to a specific group of people to eliminate conditions that cause the propagation of discrimination prohibited by the Covenant.[12,18] However, "it is a matter of permissible distinction under the Covenant" as long as this action is required to address actual discrimination. The right of VI to access information is essential to ensure the right of "Equalization of Opportunities," which the UN declared in 1993 (resolution No. UN Doc. A/RES/48/96, December 20, 1993).

The drafters of the CRPD realized these challenges, so its preamble defines accessibility as enabling this party to engage its rights. Accessibility is also recognized as one of the convention's eight General Principles in Article 3(f). Article 9 underlines the importance of enabling disabled people to manage their lives independently, so the state must take reasonable actions to ensure proper access to information and communications. Also, Para. 4.2 emphasizes their right to "take control of their own lives." The same rights are provided in the RPSN (Art. 6/2 and Art. 7). To achieve these objectives, Art. 21 CRPD demands the member states take specific measures, such as providing information for disabled persons "in accessible formats and technologies appropriate," facilitating Braille, sign languages, and other means. Financial cost demands were behind the countries' failure could not ensure this right.[18,33] 18 et al· argued that the United States should ratify the United Nations Convention on the Rights of People with Disabilities (UNCRPD) to provide legal protection and promote the rights of individuals with disabilities, including those who are visually impaired. It reviews the history and content of the UNCRPD, analyzes reasons why the United States has not ratified it, and refutes concerns about sovereignty, federalism, and parental rights. The study asserts that ratifying the UNCRPD would benefit people with disabilities, including visually impaired patients, by promoting their rights, providing legal protections, and improving access to education, employment, and healthcare.[18]

Self- determination for visually impaired persons, concept and requirements

Self-determination is defined as the capacity to live independently by exercising their own choices without the influence or pressure of others. It is a direct implementation of Art. 29/1 of the Universal Declaration of Human Rights (UDHR), adopted by the UN in 1948. The Universal Declaration of Human Rights announces that everyone is "born free and equal in dignity and rights." Patients "have the right to self-determination and make free decisions for themselves." The second paragraph of the Committee's General Comment No. 5/2017 takes a similar approach (Para.8). Therefore, the CRPD demands that the States Parties eliminate barriers to access to ensure the right of disabled persons to access services, information, and communications like others. A similar request is provided in Para 16 and Para.85 of the Committee's General Comment No. 5 (2017). Article 6/2 of the LRPSN demands that the relevant authorities ensure all means to provide them with the necessary information. Article 7 requires the member states to ensure all measures needed to empower this group to exercise the right of expression. These rights should be interpreted to include disabled persons within its scope.

Self-determination and quality for life for visually impaired individuals

The International Covenant on Economic, Social, and Cultural Rights (ICESCR) links self-determination Principe and the concept of adequate living (Art. 2-2). Even after controlling for intelligence level, people with intellectual disabilities who live or work independently or semi-independently have a more significant opportunity to express more personal control and self-determination than people who live in communal settings support this conclusion.[29] Through searches of electronic databases for studies published from 2003 to 2016, 12 and Markoski presented the findings of a literature analysis of eleven papers on self-determination for children and youths with visual impairments in 2019.[12] The review article concluded that students with visual impairments require age-appropriate opportunities to learn self-determination skills at home, school, and the community It also showed that by assisting students in making decisions that will affect their life, encouraging student participation in the education and transition planning processes, and encouraging self-advocacy, practitioners can facilitate the development of self-determination abilities. Another study on students with severe

and multiple cognitive disabilities showed that self-determined behavior refers to "volitional actions that enable one to act as the primary causal agent in one's life and to maintain or improve one's quality of life." Compared to those in conventional service delivery programs, people with intellectual disabilities who take part in consumer-directed service delivery programs feel more in charge of their life and achieve better results in terms of community integration.[12] When individuals and their families control services, there is no increased risk of adverse health outcomes for people with intellectual disabilities. Therefore, initiatives to support self-determination may affect physical and emotional well-being aspects linked to health. According to a paper released by the International Association for the Scientific Study of Intellectual Disabilities (IASSID), all efforts to reduce health disparities should emphasize increasing and encouraging individual choice and education over health-related decisions.

Although the scarcity of comparative studies conducted VI, they agree on the negative impact of visual impairment on a person's exercise of self-determination. For example, students' options for self-determination in healthcare domains are highly related to their level of visual impairment. Participants who were blind were given fewer options for making healthcare decisions than those with visual vision.[12] McDonnell and Crudden (2009) investigated the association of self-determination with the quality of employment. The practice of a target group of 41 VI participants aged 14–21 showed that self-determination was positively associated with employment opportunities.[23] Students with VI, according to another study, require age-appropriate opportunities to support self-determination abilities. Six deafblind volunteers, ages 18 to 24, took part in a one-week civic and advocacy participation workshop, which 11 and Parker used to conduct participatory research. The results revealed several important topics, including advocacy, expectations, rights, knowledge, educational reform, and the characteristics of change agents. According to the study, participants improved their self-determination abilities and gained more control over policies and issues that affect their lives.[11]

In the current study, a survey was conducted to explore the various underlying factors that affect the ability of the VI individuals to manage medication utilization and the extent to which self-determination practices are adopted by the VI in the UAE.

This research paper addressed the following research questions: (1) To what extent does the UAE law regulate the right of people with visual impairments to manage their medication independently and in accordance with international best practices? (2) How to support the independent use of medications by the VI individuals recruited in this study?

METHOD

Ethical approval: The University of Sharjah Ethical Committee approved this research (Reference number: REC-21-05-19-01). The committee ensured that the study was conducted according to the principles of the Declaration of Helsinki of 1975 (revised 1983). The goal and nature of the study were explained to the participants. The names were kept anonymous, and the survey was coded.

Study Design: A quantitative questionnaire was conducted with 94 visually impaired individuals using an interviewer-guided questionnaire over four months (April to August 2021). The questionnaire used in this study underwent a rigorous validation process to ensure its validity and reliability. To establish the face validity of the questionnaire, it was reviewed by a group of experts comprising six individuals from the College of Pharmacy, College of Law. Their feedback and suggestions were considered, and necessary modifications were made to the questionnaire to improve its clarity and relevance. To evaluate the test-retest reliability of the questionnaire, it was administered to a sample of 15 participants at two different time points, with a gap of 14 days between the tests. The responses were then analyzed using Spearman's correlation coefficient (r) to determine the level of consistency between the tests. The results showed a high level of correlation between the two tests, with a correlation coefficient of 0.77, indicating that the questionnaire is stable over time and produces consistent results. To determine the internal consistency of the questionnaire, the responses from the sample population were analyzed using Cronbach's alpha coefficient. The value obtained was 0.74, considered within an acceptable range for an instrument to be reliable. Overall, the validation process revealed that the questionnaire used in this study is a reliable and valid tool for measuring the intended constructs.

Study Population: In coordination with the Emirates Association for the Visually Impaired in the Emirate of Sharjah, which includes 250 members, the association's administration distributed the questionnaire to 178 members between 18- 60 years old to ensure the reliability of the data via the WhatsApp application. Ninety-four members responded and completed the survey, with a response rate of 72 %.

Questionnaire Development: The questionnaire was developed after reviewing the published literature on the practices of the VI population regarding the drug management.[18] The final drafted survey included 28 questions covering socio-demographics, participants' characteristics, and daily medication management processes among people with impaired vision. The questionnaire was established based on the recommendations of the Australian pharmaceutical advisory council that identified six main processes: (i) self-administration; (ii) access to information sources; (iii) maintaining a current medication list; (iv) storage of medicine; (v) disposal of medicine; and (vi) medication review by the healthcare team.[4,33] Respondents were asked how frequently they had difficulty with self-administering medication. They were to rate the frequency on a scale of 1 to 5, with 1 being "Never" and 5 being "Always." They were also asked to rate how challenging it was to use dosage forms independently. The difficulty levels ranged from "Easiest" to "Hardest." Tablets, capsules, liquid formulations, topicals, and eye/ear drops were the survey's five most regularly dispensed dosage forms. The frequency of various visual aids listed was used to identify the use of aiding devices during the self-administration of medicine, and the effects of their use were investigated.

Access to information: The most often utilized source of health information on medicine was evaluated, as was the assessment of its credibility. An open-ended question asked respondents to name their preferred source of information. Respondents were asked to rank the frequency of difficulty obtaining the drug and labeling information on a scale of 1 to 5, with one being "Never" and five being "Always." Participants were also asked if they had a documented list of prescription and non-prescription medications. Respondents' awareness of their health status and medication adherence was assessed by identifying the medication's name, dosage frequency, expiration date, and an indication of drugs.

Statistical Analysis: Responses were coded and analyzed using the Statistical Package for Social Sciences (IBM SPSS statistics for windows, version 20.0, IBM Corp., Armonk, NY, USA). When analyzing the data, the responses from specific variables were used to enable more readers; comprehensible confidence intervals (95% CI) were calculated for the relative proportions of some survey questions.

Storage and disposal of medicine: The propriety of medicine storage was tested by asking the respondents where they generally kept their medications. If they had more than two types of medications, participants were asked if they separated them. The receptacle types were investigated further if the respondents answered "Yes" to this question. Also, pparticipants were asked if they stored any other medications outside the ones they were regularly taking. The behaviour of reserving medicines for use by visually impaired people was investigated.

Medication reviewed by the healthcare team: The survey's final part examined the practice of drug reviews among the VI. Respondents were asked if a healthcare practitioner had examined their drugs in the previous six months. Inquiring if they had used drugs without contacting a health professional in the past six months indicated the sixth population's awareness of potential drug-related risks.

Experimental examination of QR codes: A random sample of 75 medication boxes commonly used in national markets, for example, antihypertensive drugs, antidiabetic agents, analgesics, and cough medicines) were selected to test the availability of QR codes and the operation of these codes.

RESULTS

Demographic Characteristics: Among 94 participants included in the study, more than half (51.1%) were female, (53.2%) were unemployed, (59.6%) were single and living with their parents, and 62% reported that are 30 years old or above. 61.7% of the respondents held bachelor or postgraduate certificates during the study period. Almost three-quarters (73.4%) of the patients under investigation reported that their visual impairment is classified as "blind," and the majority (89.4%) said they had this problem since birth or during their childhood period. Interestingly, when the investigated were asked about their ability to use the Braille system and the smart applications for reading, 78.7% of the respondents reported "Yes". Table 1 summarizes the demographic information of the 94 respondents included in the study (Table 1).

Table 1. Demographic profile of the study respondents (n=94)

Variables	N (%)
Age	
18-29	36 (38.3)
30-39	34 (36.2)
40-49	13 (13.8)
50-60	11 (11.7)
Gender	
Male	48 (51.1)
Female	47 (49.9)
Marital Status	
Single	56 (59.6)
Married	29 (30.9)
Divorced	9 (9.6)
Widowed	0 (0)
Employment status	
Employed	44 (46.8)
Unemployed	50 (53.2)
Qualification	
Uneducated	2 (2.2)
Primary school	6 (6.3)
Secondary School	28 (29.8)
Bachelor's degree	43 (45.7)
Postgraduate	15 (16)
Type Of Visual Impairment	
Blind	69 (73.4)
Other visual Impairment	25 (26.6)
Visually Impaired from	
Birth	58 (61.7)
Childhood	26 (27.7)
Early Adulthood (18-45)	9 (9.6)
Middle or old age (>45 years old)	1 (1)
Living arrangement	
On your own	52 (55.3)
With family	37 (39)
Special facility	5 (5.3)
Ability to use Braille system for reading	
Yes	74 (78.7)
No	20 (21.3)
Ability to read using smart applications	
Yes	74 (78.7)
No	20 (21.3)

Medication Self-administration: Although most participants (89.4%) reported that they could open medication containers individually, more than half (49; 52.1%) reported having difficulty differentiating various types of medication containers. Furthermore, almost three-quarters (70; 74.5%) of the pooled sample described their difficulties distinguishing between various dosage forms, and (22; 23.4%) reported that they were forced to take the wrong medication sometimes. Interestingly, 13 (13.8%) of the patients under investigation still have difficulty taking their medication on time, as their physician and pharmacist described. Table 2 Summarize the proportion of respondents who had issued self-administering medications (Table 2).

Safe handling of common dosage forms: More than three-quarters, 73 (77.7%) and 76 (80.9%) of the studied patients reported that they were easy to manage tablet and capsule dosage forms. Furthermore, almost one-quarter of 70 (74.5%) respondents reported easy use of all topical preparations. However, this proportion was fall to less than half when they were asked about the easy handling of both liquid preparations (43; 47%), and eye drop products (46; 48.9%) (Table 3).

Sources of medication information: When the participants were asked about the difficulty, they faced in finding their medication information, the majority, 78 (83%), reported the hard finding medication name and expiry dates. A Proper dose of their medication and the drug's main indication was found hard by 67 (72%) and 62 (66%) respondents, respectively. Although the participants reported physicians 66 (70%) and pharmacists (63; 67%) as the main sources of their medication information, 62 (67%) reported that their friends and family were also considered essential sources of information. Also, 11 (12%) of the respondents that they find information independently.

Medication Management: Most visually impaired patients (93.6%) included in this study reported "No" when they were asked the statement "Self-administration of medications without consulting a healthcare professional." Even though more than three quarters (72; 76.6%) of the respondents contacted their healthcare providers to ensure proper use of medication, still 22 (23.4%) of patients under investigation reported "No" on the same statement. Only 15 (16%) said "Yes" to the statement "Dispose of original packaging and place in an easy-to-identify container." Participants needed to be aware of the proper storage practices (refrigerator, 66; 63.8%; Drawers and cabinets, 40; 42.6%; and at no particular place, 14; 14.9). Participants under investigation reported that they kept their used medications for future use and the benefit of their relatives and friends. Table 4 summarizes how participants responded to various statements on medication management (Table 4).

Pilot Screening of the QR codes: Out of 75 medications, only 14 have QR codes (20%). Surprisingly, upon scanning the codes, none was working.

DISCUSSION

Accessing reliable sources of information is difficult for people with VI. In addition, they are generally less aware of their health. The current study highlighted important challenges facing the VI when handling their medications or the related information. As VI could not always access all information, finding the right source of information was crucial. Most participants obtained information about medications from medical professionals. Having only one source of information isn't enough to ensure they can access such information.[27,29] It is recommended to use a variety of formats, such as Braille and audio presentation, to help visually impaired individuals access

Table 2. Participants who faced issues while self-administering medications

Problem statement	Frequently of Problem reported N(%)		
	Yes	**No**	**No answer**
Unable to open medication containers	8 (8.5)	84 (89.4)	2 (2.1)
Unable to differentiate various types of medication containers	49 (52.1)	39 (41.5)	6 (6.4)
Unable to differentiate various types of tablets/capsule dosage forms	21 (22.3)	70 (74.5)	3 (3.2)
Unable to take the medication on time	13 (13.8)	74 (78.7)	7 (7.4)
Taking the wrong medication	22 (23.4)	21 (22.3)	51 (54.3)

Table 3. Proportion of participants reported their difficulties to save handling of common dosage forms independently

Type of dosage form	**Frequency of problem reported N (%)**		
	Easy	**Hard**	**No answer**
Tablet	73 (77.7)	11 (11.7)	10 (10.6)
Capsules	76 (80.9)	12 (12.8)	6 (6.4)
Liquid	43 (45.7)	46 (48.9)	5 (5.3)
Topical	70 (74.5)	18 (19.1)	6 (6.4)
Eye Drops	46 (48.9)	39 (41.5)	9 (9.6)

Table 4. Participants responded to various statements on medication management (n=94)

Statement	Answer	N (%)
Self-administration of medications without consulting a healthcare professional	Yes No	6 (6.4) 88 (93.6)
Report to healthcare providers to ensure proper use of medications	Yes No	72 (76.6) 22 (23.4)
Dispose of original packaging and place in an easy-to-identify container	Yes No	15 (16) 79 (84)
Storage of medication	Drawers and cabinets	40 (42.6)
	Medicine cabinet	8 (40.4)
	Refrigerator	60 (63.8)
	others	9 (9.6)
	No particularplace	14 (14.9)
Types of medication kept	Essential medications used daily	53 (56.4)
	Over-the-countermedication	19 (20.2)
	Prescription medications	80 (85.1)
Reactions to leftover medication	Store for future use	16 (17)
	Throw all the medication away	41 (43.6)
	Throw expired medications only	66 (70.2)
	Benefit other people by giving to them	27 (28.7)

and understand the information. Patient medication labels are intended to inform them about drug indications, adverse effects, and medication directions.

The content must be readable and understood for it to be effective. For visually impaired individuals, prescription labels are quite challenging to read, especially the warnings and instructions, frequently printed in small print. Even with a pair of refractive glasses, visually impaired patients had difficulty reading.[36] As a solution to this problem, all medication packaging should have both the active ingredient and its strength in Braille. Rubber bands can be wrapped around the packs as well. Patients can use different numbers of bands to remember their dose (for example, one band for each tablet). Patients can also benefit from audio-recording consultations. They can listen to reminders, record dosage instructions, and independently stay on top of their medications.

A clean, dry, and safe location should be chosen to prevent mixing with other medications or affecting their efficacy when storing medications. Most respondents preferred storing their medications in cabinets, Refrigerators, or random places due to the convenience of getting them. Those at higher risk of non-adherence may be affected by improper storage. Keeping medications in a specified area will help patients avoid missing doses. In the survey of visually impaired respondents, pillboxes were uncommon. In the survey, 84% of respondents did not remove medications from the original packaging, suggesting repackaging is a unique practice. Approximately 17% of respondents saved their unused drugs for future use. A preventive measure during emergencies was another reason for stockpiling. A similar result was found by Thompson and Stewart.[36] According to the researchers, nearly one-fifth of the patients had expired drugs at home. Keeping superfluous medications available is risky and causes extra waste and errors. Most respondents needed to learn how to dispose of their medications properly. Putting medicine in household waste may pollute the environment and negatively impact wildlife.

A recent study conducted in Malaysia found that 89 percent of VI patients couldn't read medicine labels, 75 percent couldn't read the expiration date, and 58 percent couldn't even remember the pharmaceutical name.[36] Only a few studies were conducted in the GCC countries. For example, a Saudi Arabia study reported similar challenges.[4,5,19] Kentab et al., for example, examined the medication use of 95 VI patients in Saudi Arabia and highlighted many medication difficulties.[19] The study reported that these challenges were linked to drug identification in 75% of incidents, and challenges with dose recognition were recorded in 82%. In comparison, problems in identifying expiration dates were found in 92%. It is also demonstrated that these difficulties affect medication safety and efficacy, so accidental drug errors are anticipated, especially among those who take several types of medication.[4,36]

It has also been demonstrated that some difficulties still surround using a QR system; relevant research showed that due to the lack of specific material signs indicating the position of the barcode, users have struggled in pointing the camera towards the barcode. The recommended solutions include an audio sound upon scanning the barcode and stopping once the barcode scanning is completed.[2,3] The success of this system requires the availability of the QR system on all pharmaceutical packaging sold in the market, representing a

significant financial challenge for any country. The Saudi Food and Drug Authority has enacted new legislation requiring pharmaceutical manufacturers to add QR codes to the packaging.[4] This information is provided in a database organized by the SFDA website, including all registered drug lists in the national market.[2,3] It has been demonstrated in many studies that Smartphone apps can help VI to identify the medication information.[2-5,19,22,33,35]

Even though Saudi legislation requires manufacturing firms to supply this system, research indicated that three out of ten boxes contain barcode tags, rendering the system worthless because the VI user is unaware of whether the box has a barcode. Finally, no mechanism for translating drug-related information into Arabic was discovered.[2,3] So related studies recommended using a smartphone application that targets VI Arab speakers.[2,3,4,19] Other measures should be undertaken to enhance the ability of VI subjects to be more independent when using medications. Better awareness, availability of different tools to provide information, and identifying the clear information to be delivered are key steps towards achieving such a goal.

The current study has a few limitations including the small number of participants and the fact that all are from the Sharjah Emirate. More insight into the magnitude of the problem and its impact on the VI daily life could be investigated more thoroughly through qualitative research is added to the current one.

CONCLUSION

Despite national efforts to ensure access to medical information for visually impaired individuals, more initiatives are needed to ensure the proper implementation of international standards. The right to information is a fundamental human right, particularly for visually impaired individuals, who require alternative formats to access and understand it. This study found that visually impaired individuals face significant challenges in managing their medications, including difficulties understanding medication indications, adhering to dosing schedules, and monitoring expiration dates. Despite these challenges, this research showed that they are determined to maintain their independence and take control of their health. Coping strategies include using magnifying glasses, the braille method, and seeking help from family and friends. The study highlights the success of some countries in ensuring independence in managing medications, such as including QR codes and Braille on medication leaflets, but also identifies the need for improvement. This study also showed positive outcomes regarding the ability of VI persons to use QR codes and the Braille system in reading. Most of the respondents (87%) could read using Braille and can use smartphones and access information using the QR code. Despite these positive indicators, the research showed that the national initiatives did not achieve the desired goals satisfactorily. The field research showed that a fifth of the drug packages examined contained a QR code and that all codes were not working. Therefore, it was demonstrated that a few percent of respondents (12%) could use medication independently. At the same time, the remaining percentage reported that they rely on other sources of information, such as the help of family members and healthcare professionals. In line with this outcome, most respondents (94%) could not self-administrate drugs independently.

In conclusion, the decision-maker is recommended to oblige pharmaceutical companies to attach medical leaflets with drug packages written in Braille containing the name of the drug, indications for use, dosage, and expiration date. Also, all drug packages should be included with QR codes to ensure they work effectively.

ACKNOWLEDGMENT

The author(s) would like to thank the Emirates Association for the Visually Impaired for its help in distributing the questionnaire to its members. Also, the authors would like to thank pharmacy students Shahed Nihad Aswad Al-Jubouri, and Bayan Hicham Al Jarrah for their efforts to check the QR codes of medications available in community pharmacies.

DECLARATION OF CONFLICTING INTERESTS

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Agran M, Hong S, Blankenship K. Promoting the self-determination of students with visual impairments: Reducing the gap between knowledge and practice. Journal of Visual Impairment and Blindness. 2007;101(8):453-64. https://doi.org/10.1177/0145482x0710100802
2. Al-Quwayfili NI, Al-Khalifa HS. AraMedReader: An Arabic Medicine Identifier Using Barcodes. Communications in Computer and Information Science. 2014; :383-8. https://doi.org/10.1007/978-3-319-07854-0_67
3. Al Aqeel S, Abanmy N, Aldayel A, Al-Khalifa H, Al-Yahya M, Diab M. Readability of written medicine information materials in Arabic language: Expert and consumer evaluation. BMC Health Services Research. 2018;18(1):1-7. https://doi.org/10.1186/s12913-018-2944-x

4. Almukainzi M, Almuhareb A, Aldwisan F, Alquaydhib W. Medication use patterns in the visually impaired in Saudi Arabia and the importance of applying Braille labeling. Saudi Pharmaceutical Journal. 2020;28(3):274-80. https://doi.org/10.1016/j.jsps.2020.01.006
5. Almuzaini MA, Abdullah-Al-Wadud M. A Review on Medication Identification Techniques for Visually Impaired Patients. 21st Saudi Computer Society National Computer Conference, NCC 2018. https://doi.org/10.1109/NCG.2018.8593193
6. Apoorva R, Vasundara K, RS U. A study on medication adherence, medication related challenges faced and coping strategies adopted by visually impaired subjects in a tertiary care hospital. International Journal of Basic & Clinical Pharmacology. 2017;6(10):2323. https://doi.org/10.18203/2319-2003.ijbcp20174100
7. Ayoubi L. Human Rights Perspectives on Access of the Blind, Visually Impaired and Other Reading Disabled Persons to Copyrighted Materials [Lund University]. In SSRN Electronic Journal. 2012; https://doi.org/10.2139/ssrn.1927825
8. Beverley CA, Bath PA, Barber R. Health and social care information for visually-impaired people. Aslib Proceedings: New Information Perspectives. 2011;63(2-3):256-74. https://doi.org/10.1108/00012531111135691
9. Bin Battal ZM. Special Education in Saudi Arabia. International Journal of Technology and Inclusive Education. 2016;5(2):880-6. https://doi.org/10.20533/ijtie.2047.0533.2016.0113
10. Brehmer-Rinderer B, Zigrovic L, Naue U, Weber G. Promoting Health of Persons With Intellectual Disabilities Using the UN Convention on the Rights of Persons With Disabilities: Early Implementation Assessment in Spain and Hungary. Journal of Policy and Practice in Intellectual Disabilities. 2013;10(1):25-36. https://doi.org/10.1111/JPPI.12018
11. Bruce SM, Parker AT. Young deafblind adults in action: Becoming self-determined change agents through advocacy. American Annals of the Deaf. 2012;157(1):16-26. https://doi.org/10.1353/AAD.2012.1607
12. Cmar JL, Markoski K. Promoting Self-Determination for Students with Visual Impairments: A Review of the Literature. Journal of Visual Impairment and Blindness. 2019;113(2):100-13. https://doi.org/10.1177/0145482X19839796
13. Conn VS. Self-management of over-the-counter medications by older adults. Public Health Nursing (Boston, Mass.). 1992;9(1):29-36. https://doi.org/10.1111/J.1525-1446.1992.TB00069.X
14. Court H, McLean G, Guthrie B, Mercer SW, Smith DJ. Visual impairment is associated with physical and mental comorbidities in older adults: a cross-sectional study. BMC Medicine. 2014;12(1):1-8. https://doi.org/10.1186/S12916-014-0181-7
15. Devasahayam AJ, Wallack EM, Ploughman M. Gaps in Medicare and the Social Safety Net Predict Financial Strain Among Older Canadians With Multiple Sclerosis. Journal of Disability Policy Studies. 2020;31(2):77-86. https://doi.org/10.1177/1044207319893621
16. Donaldson N. Visually impaired individuals' perspectives on obtaining and maintaining employment. Dissertation Abstracts International: Section B: The Sciences and Engineering. 2018;79(1-B(E)), No-Specified. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc15&NEWS=N&AN=2017-54456-005
17. Gooding P. The Right to Independent Living and being included in the Community: Lessons from the United Nations. International Journal of Mental Health and Capacity Law. 2018;2018(24):32. https://doi.org/10.19164/ijmhcl.v2018i24.747
18. Kanter AS. Let's Try Again: Why the United States Should Ratify the United Nations Convention on the Rights of People with Disabilities. Touro Law Review. 2019;35(1):301-43.
19. Kentab BY, Al-Rowiali KZ, Al-Harbi RA, Al-Shammari NH, Balhareth WM, Al-Yazeed HF. Exploring medication use by blind patients in Saudi Arabia. Saudi Pharmaceutical Journal. 2015;23(1):102-6. https://doi.org/10.1016/j.jsps.2014.05.002
20. Köbsell S. Towards Self-Determination and Equalization: A Short History of the German Disability Rights Movement. Disability Studies Quaterly. 2006;26(2).
21. Kohn NA. Legislating Supported Decision-Making. Harvard Journal on Legislation. 2021;58(2):313-56. https://doi.org/10.2139/SSRN.3768684
22. Lee BH, Lee YJ. Evaluation of medication use and pharmacy services for visually impaired persons: Perspectives from both visually impaired and community pharmacists. Disability and Health Journal. 2019;12(1):79-86. https://doi.org/10.1016/j.dhjo.2018.07.012
23. McDonnall MC, Crudden A. Factors affecting the successful employment of transition-age youths with visual impairments. Journal of Visual Impairment and Blindness. 2009;103(6):329-41. https://doi.org/10.1177/0145482x0910300603
24. Nedovic T, Umeri-Sali N, Denecke K. Supporting blind and visually impaired persons in managing their medication. Studies in Health Technology and Informatics. 2019;267:189-96. https://doi.org/10.3233/SHTI190826
25. Németh G. et al. Automated Drug Information System for Aged and Visually Impaired Persons. Computers Helping People with Special Needs. 2008;2533-6. https://doi.org/10.1007/978-3-540-70540-6
26. Németh G, Olaszy G, Bartalis M, Kiss G, Zainkó C, Mihajlik P, et al. Automated drug information system for aged and visually impaired persons. Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 5105 LNCS. 2008;238-241. https://doi.org/10.1007/978-3-540-70540-6_35
27. Owen R, Crabb C, Stober K, Mitchell D, Yamaki K, Heller T. Utilization of and Relationships With Primary Care Providers During the Transition to Medicaid Managed Care. Journal of Disability Policy Studies. 2020;31(2):67-76. https://doi.org/10.1177/1044207319880278
28. Pellegrini LC, Geissler KH. Disability, Federal Disability Benefits, and Health Care Access After the Affordable Care Act. Journal of Disability Policy Studies. 2021;31(4):244-54. https://doi.org/10.1177/1044207320919959

29. Qian X, Shogren K, Odejimi OA, Little T. Differences in Self-Determination Across Disability Categories: Findings From National Longitudinal Transition Study 2012. Journal of Disability Policy Studies. 2022;32(4):245-56. https://doi.org/10.1177/1044207320964396
30. RRA B, SR FTB, MV C, A D, JB J, J K, et al. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. The Lancet. Global Health. 2017;5(9):e888-e897. https://doi.org/10.1016/S2214-109X(17)30293-0
31. SA A. Self-medication practice among patients in a public health care system. Eastern Mediterranean Health Journal. 2011;17(5):409-16. http://www.emro.who.int/emhj-volume-17/issue-5/article8.html
32. Shankar, P. R., Partha, P., & Shenoy, N. Self-medication and non-doctor prescription practices in Pokhara valley, Western Nepal: a questionnaire-based study. BMC Family Practice. 2002;3:1-7. https://doi.org/10.1186/1471-2296-3-17
33. Smith MVA, Adams D, Carr C, Mengoni SE. Do people with intellectual disabilities understand their prescription medication? A scoping review. Journal of Applied Research in Intellectual Disabilities. 2019;32(6):1375-88. https://doi.org/10.1111/jar.12643
34. Smith SD, Hall JP, Kurth NK. Perspectives on Health Policy From People With Disabilities. Journal of Disability Policy Studies. 2021;32(3):224-32. https://doi.org/10.1177/1044207320956679
35. Weeraratne C, Opatha S, Rosa C. Challenges faced by visually disabled people in use of medicines, self-adopted coping strategies and medicine-related mishaps. WHO South-East Asia Journal of Public Health. 2012;1(3):256. https://doi.org/10.4103/2224-3151.207022
36. Zhi-Han L, Hui-Yin Y, Makmor-Bakry M. Medication-handling challenges among visually impaired population. Archives of Pharmacy Practice. 2017;8(1):8. https://doi.org/10.4103/2045-080x.199613