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RESEARCH ARTICLE

Difficulties in swallowing oral medications in Jordan

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Abstract *Background* Difficulties swallowing oral medications can affect patient compliance and consequently can compromise patient health. *Objective* To investigate the prevalence of difficulties in swallowing oral medications among a sample of the Jordanian population and the techniques used to overcome such difficulties. *Setting* The study was carried out in outpatient pharmacies in the north of Jordan. *Method* Adult patients who were taking at least one solid oral dosage form for at least 1 month were interviewed using a questionnaire. The questionnaire included demographic details, current medication use, questions about swallowing difficulties, and patient strategies to overcome such difficulties. *Main outcome measure* The study measured the number of patients reporting difficulties in swallowing oral medications and the techniques used to overcome swallowing difficulties. *Results* In this study 1250 patients were interviewed and 130 patients reported that they experienced or were currently experiencing difficulties in swallowing oral medications (10.4%). In order to overcome swallowing difficulties, 112 patients (86.2%) stated that they drink more water while 22 patients (16.9%) stated that they cut or crush their solid dosage forms, and 13 patients stated that they open their capsules. Forty-five patients (34.6%) stated that they sometimes skip their doses due to swallowing difficulties. The majority of participants with swallowing difficulties did not discuss their difficulties with their physicians or pharmacists (85.4%). *Conclusion* Difficulties in swallowing oral medications is a problem that is encountered in Jordan. Techniques used to overcome swallowing difficulties such as crushing or opening capsules can compromise medication efficacy and negatively impact patient health outcomes. Non-compliance due to swallowing difficulties raises a major concern.

Keywords Jordan · Medication modification · Oral medications · Pharmacy · Prevalence · Swallowing difficulties

Impacts on practice

- Patients experiencing difficulties in swallowing oral medications may use inappropriate techniques to overcome these difficulties which can affect medication efficacy.
- Pharmacists and other healthcare providers are encouraged to look for swallowing difficulties and educate patients about appropriate techniques to manage them.

Introduction

Solid oral dosage forms such as tablets have a number of advantages: simple administration, easy transport, stability and low cost [1]. However, some adult patients, especially elderly, may have difficulties in swallowing solid oral dosage forms [2]. Swallowing difficulties can be caused by multiple reasons including neuromuscular disorders, lesions within the laryngopharynx and esophagus, and others [3, 4].

As a result of swallowing difficulties, patients may omit doses, crush tablets, open capsules, or even discontinue their medications. Some medications should never be

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crushed or opened such as modified release formulation, enteric coated formulations, and hormonal, cytotoxic, and steroidal medications [5]. Consequences of splitting, crushing, and opening solid oral dosage forms can cause drug instability, changes in pharmacokinetics and bioavailability, bitter tasting drugs, and other effects [6].

Internationally, several studies were conducted to investigate the prevalence of swallowing difficulties among patients. One survey investigated 410 patients with at least three different solid oral forms to determine the prevalence of swallowing difficulties among patients attending community pharmacies in Switzerland. The results showed that 9.0% of the participants reported ongoing swallowing difficulties and 13.4% reported experiencing difficulties in the past. Potential hazardous strategies to overcome such difficulties included intentional non-adherence (22.8%) and discontinuing medications (5.4%) [7].

In Germany, a questionnaire with 32 questions was developed to evaluate the reasons and nature of the difficulties in swallowing solid oral medications. Of the 1051 patients surveyed, 37.4% (n = 393) reported having swallowing difficulties with more than one-third of which classified them as very severe or severe. Additionally, more than half of the patients reported that they sometimes modified their medication in order to overcome swallowing difficulties. Dosage form modifications included splitting tablets, opening capsules, mixing solid oral medications with food, or dissolving them in water [8].

In Australia, five community pharmacies participated in a study investigating the prevalence of swallowing difficulties and the modifications made to medication dosage forms. Three hundred sixty-nine participants were interviewed using a structured questionnaire. The results showed that 16.5% of the participants reported having difficulties in swallowing medication. Of all participants, 39 participants (10.6%) reported modifying dosage forms. One hundred sixty-three participants (44.2%) did not think that modifying medication dosage forms would be an issue. The study highlighted the need for healthcare providers to be more proactive in educating patients regarding swallowing difficulties and issues regarding the modification of medication dosage forms [2].

Aim of the study

The main aim of this study was to determine the prevalence of swallowing difficulties among a sample of the Jordanian population. Other aims were to investigate what techniques patients use to overcome swallowing difficulties and to evaluate the role physicians and pharmacists have in managing such difficulties.

Ethics approval

The study protocol was approved by the Jordan University of Science and Technology Institutional Review Board (Research Number 39/89/2015) on August 5, 2015 and the Jordan Ministry of Health Ethics of Research on Humans Committee (Research Number MOHREC150115) on October 6, 2015.

Method

The study was conducted prospectively at the King Abdulla University Hospital (KAUH) outpatient pharmacy, Princess Basma Teaching Hospital (PBTH) outpatient pharmacy, and Anjarah Healthcare Center (AHC) in the north of Jordan. Adult patients (18 years and older) taking at least one solid oral dosage form for at least 1 month prior to the current study were invited to participate in the study while they were waiting for their prescriptions to be filled. Those who agreed to participate had the research goals and methods explained to them. A target sample size was estimated to 1000 patients based on previous studies [7, 8].

A questionnaire was adapted with modifications from Marquis et al. [7] and Schiele et al. [8] and then checked for face validity in its original language (English) by specialists (four pharmacists). Translation to Arabic was done according to Wild et al. [9]. Forward translation was performed by two separate translators with pharmacy background and then merged into one single forward translation. Back translation was performed by two translators with pharmacy background (the backward translators were independent from the translators who performed the forward translation) and discrepancies were resolved. The questionnaire included demographic details in addition to questions about other clinical characteristics and current medication use. The questionnaire also contained questions about swallowing difficulties and the patient strategies to overcome the difficulties.

A research assistant, who was trained to conduct interviews and administer questionnaires, conducted face-to-face structured interviews. Data collection took place from September to December 2015.

In an attempt to improve clarity and limit response bias, the questionnaire was piloted before the study in a small sample after which necessary modifications were made.

Statistical Package for Social Sciences (SPSS, version 16.0) software was used to analyze the data. Data was described using frequency distribution. Pearson's Chi Square test was used to evaluate correlation between demographic variables such as gender, age, educational status, BMI, past medical history, and number of solid oral medications ingested daily and other relevant issues to swallowing difficulties. A p value 0.05 (two-sided) was considered statistically significant.

Results

A total of 1250 patients were interviewed, where 753 (60.2%) were female. Respondent characteristics, demographics, and relevant clinical characteristics are shown in Table 1.

One hundred and thirty patients (10.4%) stated that they experienced or were currently experiencing difficulties in swallowing oral medications. Of these, 107 participants (82.3%) were currently experiencing swallowing difficulties and 120 participants (92.3%) experienced some swallowing difficulties in the past. The most common type of swallowing difficulty was experiencing an uncomfortable feeling (83.8%) followed by feeling that the drug got stuck in the throat (82.3%). Regarding the frequency of swallowing difficulties, the majority of participants stated that they face swallowing difficulties with each dose (83.1%). Data concerning participant responses in regards to type, duration, and other relevant issues to swallowing difficulties are summarized in Table 2.

Table 3 states participant swallowing techniques and applied techniques to overcome swallowing difficulties. In order to overcome swallowing difficulties, 112 patients (86.2%) drink more water while 55 patients (42.3%) change their head posture. Twenty-four patients with swallowing difficulties (18.5%) stated that they sometimes skip their doses due to these difficulties.

Data concerning participant responses in regards to the roles of physicians and pharmacists in managing swallowing difficulties are summarized in Table 4. The majority of participants that have swallowing difficulties (85.4%) did not discuss their difficulties with their physician or pharmacist. Almost all (97.7%) participants having swallowing difficulties stated that they were never asked by their physician or pharmacist if they encountered such difficulties.

Correlation analysis results showed significant relationships between gender, age, educational status, and patients tilting their head backwards when they swallow solid oral dosage forms ($p < 0.05$). In addition, a significant correlation was found between gender and past medical history and patients who experienced or are currently experiencing swallowing difficulties ($p < 0.05$). On the other hand, a significant correlation was found between the number of solid oral medications ingested daily and patients swallowing multiple oral dosage forms at once ($p < 0.05$). However, the correlation analysis results did not show significant relationship between BMI, age, educational status and number of solid oral medications ingested daily and patients who experienced or are currently experiencing swallowing difficulties ($p > 0.05$).

Table 1 Demographic details of participants (N = 1250)

Variable	n (%)
Age	
Mean ± SD (47.2 years ± 15.4)	
Median (47 years)	
Range (18–90) years	
Missing	11 (0.9)
Gender	
Female	753 (60.2)
Male	497 (39.8)
BMI category	
Under weight	14 (1.1)
Normal	355 (28.4)
Overweight	464 (37.1)
Obese	374 (29.9)
Morbidly obese	39 (3.1)
Missing	4 (0.3)
Educational status	
No schooling	70 (5.6)
Primary	229 (18.3)
Secondary	452 (36.2)
College	170 (13.6)
University	256 (20.5)
Higher education	67 (5.4)
Missing	6 (0.5)
Past medical history	
Stroke	15 (1.2)
Dysphagia	142 (11.4)
Stomatitis	195 (15.6)
Disease of esophagus	282 (22.6)
Tumors of neck area	39 (3.1)
Thyroid disorders	83 (6.6)
Parkinson's disease	0 (0)
Alzheimer's disease	0 (0)
Globus sensation while eating	140 (11.2)
Coughing while eating	119 (9.5)
Chocking while eating	120 (9.6)
Number of different solid oral medications ingested daily	
Mean ± SD (3.0 solid orals medication ±2.6)	
Median (2 solid orals medication)	
Range (1–22) solid oral medications	

BMI = body mass index

Discussion

To the best of the authors' knowledge, this was the first study to investigate swallowing difficulties and the strategies used to overcome such difficulties in Jordan and the Middle East. In comparison to other studies [2, 7, 10], the results of the

Table 2 Participants' responses with regard to type, duration, and other relevant issues to swallowing difficulties

Variable	n (%)
Patients experienced or currently experiencing swallowing difficulties[a]	130 (10.4)
Patients currently experiencing swallowing difficulties[b,c]	107 (82.3)
Patients experienced swallowing difficulties in the past[b,d]	120 (92.3)
Type of swallowing difficulty[b]	
Drugs getting stuck in the throat	107 (82.3)
Uncomfortable feeling	109 (83.8)
The need of repeated swallowing attempts	91 (70.0)
Gagging	
Chocking	39 (17.0)
Coughing	29 (12.6)
Vomiting	35 (26.9)
Others	13 (10.0)
Number of medicines are/were concerned by such difficulties[b]	
All of them	50 (38.5)
Some of them	39 (30.0)
One of them	37 (28.5)
Duration of swallowing difficulty[b]	
Less than 1 month	4 (1.7)
1–6 months	20 (15.4)
6–12 months	4 (1.7)
1–2 years	12 (9.2)
2–5 years	19 (14.6)
More than 5 years	60 (26.1)
Did not remember	1 (0.8)
Frequency of swallowing difficulties[b]	
Sometimes	4 (1.7)
With particular doses	16 (12.3)
With each dose.	108 (83.1)
Missing	2 (1.54)

[a] Percentage calculated out of total 1250 patients

[b] Percentage calculated out of total 130 patients

[c] Includes patients currently experiencing swallowing difficulties and did not experience such difficulties in the past and patients currently experiencing swallowing difficulties and experienced such difficulties in the past

[d] Includes patients experienced swallowing difficulties in the past and are not currently experiencing such difficulties and patients experienced swallowing difficulties in the past and currently experiencing swallowing difficulties

present study showed a slightly lower prevalence of swallowing difficulties. In Australia, face-to-face structured interviews were conducted to estimate the prevalence of swallowing difficulties. The results found that 14.1% of the interviewed subjects (52/369) reported medication swallowing problems [2]. In Switzerland, 410 patients were included prospectively and evaluated for difficulties in swallowing oral medications. The results of the previous study showed that 92 patients (22.4%) were currently experiencing or experienced swallowing difficulties in the past. Specifically, 37 patients (9.0%) reported that they were currently experiencing swallowing difficulties while 55 patients (13.4%) reported experiencing swallowing difficulties in the past [7]. In the Netherlands, a telephone survey evaluated 2600 participants for the presence of swallowing abnormalities. The study found that 12.1% of the studied population identified as having swallowing abnormalities [10].

Interestingly, about two-thirds of the studied population who reported having swallowing difficulties either crushed, split, cut, dissolved in water, or opened capsules. However, other studies that investigated techniques used by patients to overcome swallowing difficulties found a lower percent of dosage form modification. For example, in Germany,

Table 3 Participants' swallowing techniques and applied techniques to overcome swallowing difficulties (N = 130)

Variable	n (%)
Patients swallowing multiple oral dosage forms at once?	
Always	17 (13.1)
Often	9 (6.9)
Sometimes	26 (20.0)
Rarely	3 (2.3)
Never	73 (56.2)
Missing	2 (1.5)
Techniques used by patients to overcome difficulties	
Drink more water	112 (86.2)
Cut, crush,	22 (16.9)
Open capsule,	13 (10)
Split and swallow smooth side first	35 (26.9)
Change posture of the head	55 (42.3)
Mix with food	14 (10.8)
Stop the medication	37 (28.5)
Ask for other form	21 (16.2)
Moisten the mouth	21 (16.2)
Dissolve in water	24 (10.4)
Nothing	1 (0.8)
Others	6 (2.6)
Patients tilting their head backwards when they swallow solid oral dosage forms	
Patients skipping doses due to swallowing difficulties	
Always	2 (1.5)
Often	19 (14.6)
Sometimes	24 (18.5)
Rarely	4 (3.1)
Never	80 (61.5)
Missing	1 (0.8)
Patients try to change the drug formulation (another dosage form)?	

Table 4 Participants' responses with regard to physicians and pharmacists role in managing swallowing difficulties. (N = 130)

Question	No n (%)	Physician n (%)	Pharmacist n (%)	Physician and pharmacist n (%)	Missing n (%)
Did you discuss your difficulty with your physician or pharmacist?	111 (85.4)	12 (9.2)	2 (1.5)	4 (3.1)	1 (0. 8)
Has the physician or pharmacist ever asked you if you encountered such difficulty?	127 (97.7)	2 (1.5)	0 (0)	0 (0)	1 (0. 8)
	Change the drug n (%)	Change dosage form n (%)	Gave hints n (%)	Did not do anything n (%)	Missing
Physician or pharmacist recommendation	0 (0)	4 (3.1)	1 (0.8)	12 (9.2)	1 (0. 8)

58.8% of patients having swallowing difficulties reported modifying their medications to facilitate swallowing [8]. In Switzerland about half of the participants reported cutting, crashing, chewing, splitting, or opening capsules in order to overcome swallowing difficulties. This finding can be alarming if the medications altered are modified release, enteric coated, hormonal, steroidal, or cytotoxic. The efficacy can be compromised and negative health

consequences can happen [5]. It is worth mentioning that no correlation was found between educational level and the practice of modifying medication dosage forms to overcome swallowing difficulties in the present study. This indicates that there is a need for increasing public awareness regarding medication modification risks and the consequences and promoting the pharmacist's role in patient counseling regarding medication administration [11]. In one study that was conducted in a teaching hospital in Jordan, the counseling behavior and content of 60 patient–pharmacist/pharmacy assistant interactions were observed and analyzed. It was revealed that in 85% of cases (n = 51) no counseling about preparation, storage, or administration of dosage forms was offered by the pharmacist/assistant. Also, the counseling offered was described as "not satisfying" by the authors in 15% of the observed interactions [12].

About half of participants complaining of swallowing difficulties stated that they tilted their head backwards whenever they swallowed a solid oral dosage form. In addition, more than one-third of patients complaining of swallowing difficulties reported that they at least sometimes swallowed multiple solid oral dosage forms at once. Patients should be educated that such practices can exacerbate swallowing difficulties and should be avoided. Alarmingly, more than one-third of participants complaining of swallowing difficulties stated that they at least sometimes skipped their doses due to such difficulties. This is more than that reported in Switzerland (22.8%) and in Germany (9.4%) [7, 8].

The majority of participants stated that they did not discuss their difficulties with their physician or pharmacist and almost all patients reported that they were never asked by their physician or pharmacist if they encountered such difficulties. The present authors suggest conducting public awareness campaigns to encourage patients to discuss their swallowing difficulties with their healthcare providers. Additionally, physicians and pharmacists are encouraged to inquire about such difficulties and educate their patients on how to manage them with techniques that will not compromise efficacy. An Australian study collected data from patients who were enrolled in the Outpatient Pulmonary Rehabilitation Program and received swallowing difficulty interventions. Interventions included a 1-h swallowing difficulty education program which discussed strategies used to improve swallowing among other aspects; in addition, educational material was handed to participants. The results showed a statistically significant improvement post intervention compared to pre-intervention in the number of aspects including the burden of swallowing difficulties and physical problems related to swallowing difficulties [11]. Similar educational programs are applicable in Jordan and may be used to educate patients on how to manage their swallowing difficulties.

Limitations

Face-to-face interviews were conducted by a pharmacist-research assistant. Although every effort was taken to minimize the social desirability effect, this may have affected participant responses. However, due to logistic problems, the use of mailing or emailing system is not feasible or reliable in Jordan. Participant responses were subjected to a recall bias especially in the case of patients who experienced swallowing difficulties in the past. Furthermore, names and dosage forms of medications associated with swallowing difficulties were not identified and consequently researchers were not able to detect if medication modification can result in harmful effects. This study was conducted in Irbid, the main city in the north of Jordan, so results may not be generalizable to the rest of the country although it is believed that conducting the study in other areas of Jordan would not have affected the results significantly.

Conclusion

Difficulties in swallowing oral solid dosage forms is a problem that is encountered in pharmacy practice the north of Jordan. Patients use techniques to overcome swallowing difficulties such as cutting or crushing solid oral dosage forms which can result in negative consequences on drug efficacy. Non-compliance due to swallowing difficulties raises a major concern. Physicians and pharmacists are encouraged to have an active role in detecting and managing such difficulties. On the other hand, patients are also encouraged to report swallowing difficulties to their healthcare providers and include these difficulties as part of the management plan.

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