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CLINICAL & BASIC RESEARCH

Knowledge, Beliefs and Behaviours Regarding the Adverse Effects of Medicines in an Omani Population

Cross-sectional survey

*Jimmy Jose, Beena Jimmy, Moza N. S. Al-Mamari, Thuraiya S. N. Al-Hadrami, Halima M. Al-Zadjali

المعرفة والمعتقدات والسلوكيات فيما يتعلق بالآثار الضارة للأدوية عند العمانيين

دراسة مستعرضة

جيمي خوسيه، بينا جيمي، موزة المعمرية، ثريا الحضرمية، حليمة الزدجالي

abstract: ***Objectives:*** This study aimed to assess the knowledge, beliefs and behaviours of an Omani population with regards to the adverse effects of medicines. ***Methods:*** This cross-sectional survey was conducted between February and June 2012. A 17-item questionnaire was designed to assess three aspects: knowledge, beliefs and behaviours related to medicine safety. A total of 740 questionnaires were distributed in three representative governorates of Oman. Median total scores for the three sections were estimated. Associations with participants' demographic variables and medication histories were also assessed. ***Results:*** A total of 618 participants completed the survey (response rate: 83.5%). Many participants (46.4%) believed that side-effects occurred only with high doses of medication and over 30% believed that they did not occur at all with traditional and over-the-counter medicines. The median total score was 19 (interquartile range: 6) out of a maximum of 30. Inadequate knowledge, incorrect beliefs and good behaviours were observed among the participants. There was a significant association between certain demographic parameters (age, educational qualification, history of chronic use of medicines and employment status) and median total scores. Participants reported obtaining additional information on medication safety from various sources, with doctors as the most widely used source. ***Conclusion:*** Inadequate knowledge and incorrect beliefs among this Omani population indicate a need for interventions to improve public knowledge and address misconceptions regarding medication safety. These interventions could be initiated on both an individual and public scale, with patient interactions by healthcare professionals and mass education activities targeting the larger population.

Keywords: Knowledge; Beliefs; Behavior; Public Health; Drug Side Effects; Adverse Drug Reactions; Medication Adherence; Oman.

الملخص: الهدف: هدفت هذه الدراسة إلى تقييم معرفة ومعتقدات وسلوكيات العمانيين بما يتعلق بالآثار الضارة للأدوية. **الطريقة:** أجريت هذه الدراسة المستعرضة بين فبراير ويونيو 2012 حيث تم تصميم 17 مادة في استبيان لتقييم ثلاثة جوانب: المعرفة والمعتقدات والسلوكيات المتعلقة بسلامة الدواء. تم توزيع 740 استبيان في ثلاث محافظات في عمان. وقدر متوسط الدرجات للأقسام الثلاثة. قيمت أيضا العلاقة مع المتغيرات الديموغرافية للمشاركين وتناولهم للدواء. **النتائج:** أكمل 618 من المشاركين في الاستطلاع بمعدل 83.5%. اعتقد العديد من المشاركين (46.4%) أن الآثار الجانبية تحدث فقط نتيجةجرعات عالية من الدواء. أكثر من 30% اعتقدوا أنأنها لم تحدث على الإطلاق مع الأدوية التقليدية وعلى وصفة طبية، على التوالي. كانت النتيجة الإجمالية متوسط 19 (المدى الربعي: 6) من أصل 30 كحد أقصى. لوحظت محدودية المعرفة، المعتقدات غير الصحيحة والسلوكيات الحسنة بين المشاركين. كان هناك ارتباط كبير بين معايير ديموغرافية معينة (العمر، المؤهل العلمي، وتاريخ الاستخدام المزمن للأدوية والوضع الوظيفي) و متوسط مجموع الدرجات. أفاد المشاركون أنهم حصلوا على معلومات إضافية عن سلامة الدواء من مصادر مختلفة، وكان الأطباء المصدر الأكثرشيوعا. **الخلاصة:** محدوديةالمعرفة والمعتقدات غير الصحيحة بين العمانيين المشاركين تشير إلى الحاجة إلى التدخل لتحسين المعرفة العامة وتصحيح المفاهيم الخاطئة فيما يتعلق بسلامة الدواء. من الممكن أن تبدأ هذه التدخلات على مستوى الأفراد وعلى النطاق العام عن طريق التفاعل بين المتخصصين في الرعاية الصحية والمرضى وأنشطة التثقيف الجماعي الذي يستهدف عدد أكبر من السكان.

مفتاح الكلمات: المعرفة؛ المعتقدات؛ السلوك؛ الصحة العامة؛ التفاعلات السلبية؛ الآثارالجانبية للأدوية؛ الالتزام بالدواء؛ عمان.

Advances in Knowledge

- *Little is known regarding the knowledge, beliefs and behaviours of the Omani public with regards to the adverse effects of medicines among populations in the wider Middle Eastern region. The results of the present study serve to add new data to the existing literature.*

Application to Patient Care

- *The results of this study revealed that members of the Omani public had inadequate knowledge and incorrect beliefs regarding aspects of drug safety. This finding needs to be considered in daily healthcare delivery.*
- *Misconceptions regarding the adverse effect of medicines identified in this study should be addressed both on an individual basis as well as through national campaigns.*

School of Pharmacy, College of Pharmacy & Nursing, University of Nizwa, Nizwa, Oman
**Corresponding Author e-mail: jimmy_jose2001@yahoo.com and jimmy.jose@unizwa.edu.om*

- *While Omanis claim to have good behaviours with regards to medication safety, it is important that healthcare professionals continue to share information regarding the potential adverse effects of drugs prescribed or taken by their patients.*

Adverse drug reactions (ADRs) are a significant cause of morbidity and mortality in all areas of healthcare. They can result in a significant financial burden as well as severely impacting patient quality of life.[1] In terms of adverse drug events, a recently published study based on hospital data reported overall prevalence rates of 3.22%, 4.78% and 5.64% in England, Germany and the USA, respectively.[2] Similarly, a prospective observational cohort study in a paediatric referral centre in the UK found that 17.7% of admitted patients had experienced at least one ADR.[3] In the United Arab Emirates (UAE), Saheb Sharif-Askari *et al*. reported that among patients with heart failure, ADR-related cases accounted for 6.7% of admissions to cardiac units.[4] In Oman, a retrospective review reported a prevalence of 4.3% of statin-related hepatic effects among patients.[5]

Patients are active participants in the drug therapy process; their knowledge greatly influences the way drugs are used and, in effect, the overall safety of drug use. Patients' misconceptions on drug safety can adversely affect the drug treatment process. In pharmacovigilance, the involvement of every stake-holder, including patients, is of the utmost importance.[6] It is essential that patients have adequate knowledge and information about drug risks and efficacy in order to be able to make informed decisions about their medical treatment.[7] Patients are becoming more aware of the potential side-effects of drug therapies.[8] Moreover, patients and consumers often use a number of sources to obtain information about their medicines and other health-related topics.[9,10] Nevertheless, it is the responsibility of health practitioners to ensure that patients are informed users of the medicines prescribed to them.[11,12] Most patients expect their physicians to provide detailed information concerning the possible adverse effects of prescribed medication.[13]

As reported by Cullen *et al*., patient knowledge of the risks associated with medications is frequently inaccurate and inconsistent.[14] Furthermore, poor knowledge and inadequate behaviours with regards to prescription, over-the-counter (OTC) and complementary/alternative medicines (CAM) have been widely reported among patients.[9,15,16] A cross-sectional study among members of the public in Ajman, UAE, reported poor knowledge among participants regarding the interaction of OTC and prescription medicines.[17] Khanderkar *et al*. reported a lack of modern scientific beliefs among Omani participants and identified the male gender and illiteracy as predictors of non-scientific beliefs.[18]

Minimising the impact of adverse-effects depends crucially on the early identification of possible drug reactions by patients and informed knowledge of actions to be taken in response.[19] It is therefore to be expected that patients who are better informed are more likely to avoid adverse drug-related interactions, cope with predictable side-effects and recognise potential non-dose-related side-effects.[7] With this in mind, it is essential to assess patient knowledge and practices regarding medication safety. Understanding existing drug safety knowledge held by patients/consumers benefits healthcare providers and helps to refine effective communications of drug safety.[20]

There are limited published studies from Oman as well as the Middle Eastern region assessing the existing knowledge and practices with regards to drug use and safety among members of the public. Hence, this study aimed to assess the knowledge, beliefs and behaviours of an Omani population with regard to the adverse effects of medicines.

Methods

This cross-sectional survey was conducted between February and June 2012 in three representative governorates (Al Dakhiliyah, Al-Batinah and Muscat) of Oman. The study population included members of the public from one *wilayat* of each of the three representative governorates. The estimated sample size used for the study was 600 with a confidence level of 99% and interval of four for an overall estimated Omani population of 2.7 million.[21] Three investigators were involved in the distribution of 740 questionnaires. Members of the public were approached at various places, including at schools, government offices and in their homes in the *wilayats* of Samail (Al-Dakhiliyah), Saham (Al-Batinah) and Bawshar (Muscat) by one investigator. Participants were enrolled in the study using quota sampling by age and gender followed by convenience sampling methods. Inclusion criteria included participants over the age of 21 years who were neither healthcare practitioners nor students in any medical or health-related field.

A modified Arabic version of a questionnaire from a similar study conducted in Malaysia was used.[15] The self-administered questionnaire had 17 items designed to assess three aspects of medication safety:

Table 1: Demographic variables and associations with median total scores assessing knowledge, beliefs and behaviours with regard to the adverse effects of medicines among an Omani population (N = 618)

Demographic variable	n (%)	Median total score (IQR)	*P* value
Gender			**0.311**
Male	293 (47.4)	18 (5.15)	
Female	325 (52.6)	19 (5)	
Age group in years			**<0.001**
18–30	156 (25.2)	20 (4.75)	
31–45	156 (25.2)	19 (95)	
46–60	132 (21.4)	18 (5.75)	
61–75	127 (20.6)	18 (4)	
>75	47 (7.6)	18 (4)	
Educational qualification			**<0.001**
No education	130 (21.0)	18 (4)	
Primary	111 (17.9)	18 (5)	
Secondary	135 (21.8)	19 (5)	
Higher secondary	93 (15.0)	19 (5)	
Higher education	149 (24.1)	22 (6)	
Chronic use of medicines			**0.001**
Yes	283 (45.8)	18 (5)	
No	335 (54.2)	19 (5)	
Experienced side-effects			**0.090**
Yes	161 (26.1)	18 (4)	
No	277 (44.8)	19 (5)	
Unsure	180 (29.1)	18 (5)	
Employment status			**<0.001**
Employed	228 (36.9)	19 (5)	
Self-employed	106 (17.2)	18 (4.25)	
Unemployed	183 (29.6)	18 (4)	
Student	101 (16.3)	20 (4)	

IQR =interquartile range.

knowledge (n = 7), beliefs (n = 5) and behaviours (n = 5). Additionally, the questionnaire included a section designed to obtain demographic information as well as details on history of medication usage and personal experience with side-effects. The initial English version of the questionnaire was translated into Arabic. To ensure appropriate translation, it was further retranslated into English by another translator before being pilot tested on 30 participants. No difficulties in understanding or answering the questions were reported by the respondents of the pilot study. This Arabic version of the questionnaire was then used without any further modifications. For a minority of participants, the questionnaire was filled in by the investigator (e.g. in cases of illiteracy). Investigators remained on hand while participants were completing the survey for any required clarifications.

The majority of the questionnaire responses were scored using a three-point Likert scale (agree, unsure or disagree). Two of the questions did not follow the Likert scale. Subsequently, responses to these questions, in the three sections of knowledge, beliefs and behaviours, were assessed by estimating the percentage of respondents choosing each response. Scores of 2, 1 and 0 were used for correct, unsure and incorrect responses, respectively, following the Likert scale.[15] Median scores were then estimated for each section, with a maximum score of 14, 8 and 8 for the knowledge, beliefs and behaviours sections, respectively, and a minimum score of 0. In addition, median total scores were estimated based on responses to all three sections, with a maximum score of 30 and a minimum score of 0. A score of >80% of the possible maximum score was considered good, 60–80% was considered moderate and <60% was considered poor. The median total scores of the participants were correlated with selected demographic variables in order to determine associations, including gender, age group, educational qualification, employment status, history of medication usage or previous experience with side-effects.

Statistical analysis of the data was conducted using the Statistical Package for the Social Sciences (SPSS), Version 15 (IBM, Corp., Chicago, Illinois, USA). The Mann-Whitney U test was used for analysing the difference in median total scores as well as median knowledge, belief and behaviour scores when evaluation was based on more than two groups (gender and chronic use of medicine status). Similarly, the Kruskal-Wallis test was used when evaluation was based on more than two groups (age, educational status, history of experiencing side-effects and employment status). A *P* value of <0.05 was considered statistically significant.

Ethical approval for this study was obtained from the Research Committee of the College of Pharmacy & Nursing, University of Nizwa, Oman.

Results

A total of 618 participants completed the survey, giving a response rate of 83.5%. The demographic characteristics of the participants and associations

Table 2: Responses to selected questionnaire items assessing knowledge, beliefs and behaviour on drug safety among an Omani population (N = 618)

Questionnaire item	Response n (%)		
	Agree	Unsure	Disagree
Knowledge			
Side-effects occur only with high doses of medicine	287 (46.4)	181 (29.3)	131 (21.2)
Traditional medicines do not cause any side-effects	212 (34.3)	254 (41.1)	152 (24.5)
Over-the-counter medicines* do not cause any side-effects	231 (37.3)	246 (39.8)	141 (22.8)
Beliefs			
Medicines prescribed by a doctor are completely safe	370 (59.9)	140 (22.7)	108 (17.5)
Doctors are responsible for any side-effects caused by prescribed medicines	359 (58.1)	165 (26.7)	94 (15.2)
Behaviours			
I normally tell my doctor if I am using traditional medicines	443 (71.7)	97 (15.6)	78 (12.6)
I try to obtain additional information before taking a new medication	484 (78.3)	68 (11.0)	66 (10.7)

**Medicines bought without a prescription.*

with median total scores assessing knowledge, beliefs and behaviours are shown in Table 1. A total of 26.1% of participants reported previously experiencing adverse effects from medicines.

The median total score based on the responses to all sections was 19 (interquartile range [IQR]: 6) out of a possible maximum score of 30, which constituted a moderate score. Individual median scores in the knowledge, beliefs and behaviours sections were 8 (IQR: 4), 4 (IQR: 2) and 7 (IQR: 3), out of maximum scores of 14, 8 and 8, respectively. This indicated poor knowledge, poor beliefs and good behaviour scores among the participants. Significant associations were observed between the median total score and age, educational qualification, history of chronic use of medicines and employment status [Table 1].

Participants' responses to selected questionnaire items in the knowledge, beliefs and behaviours sections are presented in Table 2. Many participants (46.4%) were under the impression that side-effects occured only when using medication in high doses. Furthermore, 34.3% and 37.3% of the participants believed that traditional and OTC medicines, respectively, did not cause side-effects at all. The majority (59.9%) believed that medicines prescribed by doctors were completely safe. The vast majority (71.7%) of the participants claimed that they informed consulting doctors regarding any history of allergies or the use of traditional medicines [Table 2].

Almost all of the selected demographic variables were found to have a significant association with median knowledge scores, except gender. However, only educational qualification was significantly associated with median belief score, while the median behaviour score was influenced by educational qualification and a personal history of experiencing side-effects [Table 3].

Most of the participants (56.1%) reported that they expected healthcare professionals to provide comprehensive information regarding side-effects and medication safety. Participants also reported obtaining additional information on medication safety and adverse effects from various sources, with consulting a doctor being the most widely used method (59.7%) followed by consulting a pharmacist (33.9%) [Table 4].

Discussion

In recent years, ensuring that patients are active partners in drug therapies has become a priority. As demonstrated by Jha *et al*., well-informed patients are more likely to play an active role in drug therapy, thereby influencing its outcome and practice.[22] Understanding the existing knowledge, beliefs and behaviours of the public regarding drug safety-related issues can therefore be beneficial in attaining safer drug utilisation among members of the public. In the present study, over a quarter of the Omani participants reported having previously experienced adverse effects from medications. This was similar to results from a study conducted by Hughes *et al*. in the UK which indicated that a number of patients had experienced ADRs.[9]

Alarmingly, a good number of participants in the current study were under the impression that both traditional and OTC medicines could not cause adverse effects at all; a similar study conducted in Malaysia by Jose *et al*. also reported misconceptions regarding the safety of these agents.[15] In the USA, Wilcox *et al*. observed that 46% of exclusive OTC users believed that these medications were safe.[16] In contrast, a high level of awareness on the potential abuse, and the safety and effectiveness, of OTC medicines was observed in Tanzania.[23] In the Middle Eastern region, a study conducted among the Kuwaiti public found that 61.4% of participants considered natural herbal products to be safe due to the fact that they were made from natural ingredients.[24] Due to the wide-spread nature of these misconceptions, it is imperative that members

Table 3: Demographic variables and associations with median knowledge, belief and behaviour scores with regard to the adverse effects of medicines among an Omani population (N = 618)

Demographic variable	Median knowledge score (IQR)	*P* value	Median belief score (IQR)	*P* value	Median behaviour score (IQR)	*P* value
Gender		**0.504**		**0.815**		**0.834**
Male	8 (4)		4 (2)		7 (3)	
Female	8 (4)		4 (2)		7 (2)	
Age group in years		**<0.001**		**0.601**		**0.258**
18–30	9 (4)		5 (2)		7 (2)	
31–45	8 (4)		4 (2)		7 (2)	
46–60	7 (4)		4 (2)		7 (3)	
61–75	7 (3)		5 (2)		6 (3)	
>75	6 (3)		4 (2)		8 (2)	
Educational qualification		**<0.001**		**0.005**		**0.015**
No education	7 (3)		4 (2)		7 (3)	
Primary	7 (4)		4 (2)		6 (3)	
Secondary	8 (3)		4 (2)		7 (3)	
Higher secondary	8 (4)		4 (2)		7 (3)	
Higher education	9 (4)		5 (2)		8 (2)	
Chronic use of medicines		**<0.001**		**0.471**		**0.058**
Yes	7 (3)		4 (2)		7 (3)	
No	8 (4)		4 (2)		7 (2)	
Experienced side-effects		**0.001**		**0.410**		**0.013**
Yes	7 (3)		5 (2)		8 (3)	
No	8 (4)		4 (2)		7 (2)	
Unsure	8 (4)		4 (2)		6 (3)	
Employment status		**<0.001**		**0.706**		**0.421**
Employed	8 (4)		4 (2)		7 (2)	
Self-employed	7 (3)		4 (2)		7 (3)	
Unemployed	7 (3)		4 (2)		7 (3)	
Student	9 (3)		5 (2)		7 (2)	

IQR =interquartile range.

of the public be educated regarding OTC medicines, the safety of these medications and potential adverse effects. Necessary caution needs to be exercised while using traditional medicines with due consideration of potential interactions with other medications (e.g. interactions between traditional medicines and diseases and between traditional medicines and other drugs).

In the current study, the majority of respondents believed that medicines prescribed by a doctor were completely safe, which suggests that members of the public put great confidence in physician management. Furthermore, most respondents expected doctors and pharmacists to provide comprehensive safety-related information. This was similar to results observed in a Canadian study by Nair *et al*.[25] Additionally, these results corresponded with those of earlier studies with patients reporting that inadequate information about drugs and a lack of monitoring were important causes of ADRs.[19]

The overall median knowledge score observed in the present study was low in contrast to a study in Malaysia where a moderate knowledge score was observed.[15] However, the median behaviour score of the participants was good. This is encouraging as it

Table 4: Responses to selected questionnaire items assessing expectations regarding side-effect-related information and sources of information among an Omani population (N = 618)

Questionnaire item	Response
	n (%)
I expect healthcare professionals to inform me regarding:	
All possible side-effects	347 (56.1)
Severe side-effects	263 (42.5)
Common side-effects	175 (28.3)
Patient identifiable side-effects	142 (22.9)
Predictable side-effects	184 (29.7)
Sources of information	
Asking the doctor	369 (59.7)
Asking the pharmacist	210 (33.9)
Information leaflet	195 (31.5)
Internet	70 (11.3)
Family members or friends	145 (23.4)

shows that members of the Omani public are aware of the importance of informing doctors about their allergy and side-effect history as well as informing them of any concomitant use of traditional and/or OTC medicines. In contrast, the results observed in a study conducted in Taiwan found that the majority of participants did not inform their doctor or pharmacist about their current medications.[26] A study conducted among members of the public in Saudi Arabia observed that only a minor percentage of participants discussed CAM use with their physicians.[27]

The majority of the participants in the present study reported that they expected to be informed of all possible adverse effects of medications; this was in line with other studies.[13,25] Moreover, most participants considered their doctor to be the primary source of their information on side-effects; pharmacists were considered to be the secondary source of information. This finding indicates that improving patient-pharmacist interactions is an important priority and should be given due consideration. Patients should be more confident in interacting with pharmacists regarding drug-related information as these healthcare professionals have expertise in this field. Nair *et al.* demonstrated that Canadian patients considered pharmacists to be the most accessible source of drug-related information.[25] Based on a study conducted in Abu Dhabi, UAE, Fahmy *et al.* reported that pharmacists need more education on drug indications, interactions and adverse events as well as precautionary education on the use of herbal products.[28] However, pharmacists in Thailand recommended that drug safety education be provided directly to patients, especially those who are considered to be high-risk.[29] In the UK, Hughes *et al.* reported that patient information leaflets were rarely used by patients, despite their wide availability.[9]

Significant associations were observed in the current study between median total scores and age, educational qualification, history of chronic use of medicines and employment status. Younger participants (under 45 years old) were found to have a higher score in comparison to their older counterparts. Furthermore, younger participants had greater knowledge and belief scores, although this did not extend to their behaviour scores. Further, as might be expected, participants with a secondary school education or higher demonstrated better scores in all sections (knowledge, beliefs and behaviours), as those with a higher education qualification had the highest scores. However, no significant associations were observed between median belief scores and a history of experiencing side-effects; this was at odds with results observed by Jose *et al.* in Malaysia.[15]

This study had the following limitations. The use of a convenience sample instead of a random sample should be considered as a possible source of bias in the sample selection. In order to accommodate the general public and ensure the questionnaire was easy to answer, a 3-point Likert scale was used instead of a more objective 5-point Likert scale. Additionally, even though the number of participants who required the interviewer to respond to the questionnaire on their behalf was limited, the possibility of interviewer bias among these cases needs to be considered. Furthermore, caution needs to be exercised in interpreting the findings related to behaviours as questionnaire responses were self-assessed by participants and therefore may not always reflect real practices. Finally, there were limited responses from members of the public who were over 75 years old. Collecting data from individuals of this age group is important considering that this group is likely to use more medications. As such, further studies are recommended in this field.

Conclusion

This study evaluated the knowledge, beliefs and behaviours regarding the adverse effects of medicines among an Omani population. Members of the public were found to underestimate the risk of side-effects when using traditional and OTC medications. There is, therefore, a need for educational interventions to improve public knowledge and address misconceptions regarding medication safety. On the other hand, participants reported several encouraging

drug safety-related behaviours. However, these behaviours need to be objectively observed and assessed in actual drug use situations in order to verify self-reported findings. Furthermore, this study found that participants expected comprehensive information regarding medication safety to be shared by healthcare professionals. Effective communication on drug side-effects between healthcare professionals and patients is recommended as well as obtaining patient histories on their use of alternative and OTC medications.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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