



SHORT COMMUNICATION

A cross sectional pilot study on assessing the knowledge, attitude and behavior of community pharmacists to adverse drug reaction related aspects in the Sultanate of Oman



Jimmy Jose *, Beena Jimmy, Aliya Said Hamed Al-Ghailani,
Maryam Abdullah Al Majali

School of Pharmacy, University of Nizwa, P.B No 33, PO 616, Birkat Al Mouz, Nizwa, Oman

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KEYWORDS

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Abstract *Background and objectives:* Adverse drug reaction (ADR) monitoring and reporting requires a multidisciplinary approach and pharmacists have a major role to play in it. The present pilot study was conducted to assess the knowledge, attitude and behavior of community pharmacists to ADR related aspects in the Sultanate of Oman.

Methods: A self-administered questionnaire comprising of 21 questions were distributed to a random sample of pharmacists in two Governorates in the Sultanate of Oman. It assessed the knowledge of pharmacists on some of the selected basic aspects of drug safety. Further, the knowledge and attitude of community pharmacists toward ADR reporting and their behavior on ADR related aspects were assessed. A scoring scheme was used to estimate the median total score of participants for various parameters. Obtained scores were correlated with the demographics of the respondents.

Results: A total of 107 community pharmacists participated in the survey giving a response rate of 72.3%. The responses of the pharmacists to the questions on the drug safety of individual drugs were incorrect for some important and practical questions. Consequently, total median score corresponding to these questions was 5 (Inter Quartile Range, IQR 2) out of a possible maximum score of 9, which was below the acceptable score. Total median score based on knowledge, attitude and behavior was 38 (IQR 8) out of a possible maximum of 50 which shows a moderate score. Lack of

* Corresponding author. Tel.: +968 97795421.

E-mail addresses: jimmy_jose2001@yahoo.com, jimmy.jose@unizwa.edu.om (J. Jose).

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awareness on how to report an ADR and concern that the report may be wrong were the most common factors discouraging pharmacists from reporting ADRs. Qualification as well as years of experience were the only demographic parameters which had an influence on the score obtained by the pharmacists.

Conclusions: Even though the pharmacists had an acceptable knowledge, attitude and behavior on ADR reporting and related aspects, a good number of them had below than acceptable knowledge on drug safety related aspects of specific drugs. Educational programs have to be continued to generate awareness on how to report ADR and stimulate pharmacists' more active participation in the pharmacovigilance program. There is a genuine need to have training programs to improve the knowledge of pharmacists on ADR related aspects which are of benefit on a daily basis which could greatly have an impact on patient safety.

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1. Introduction

Adverse drug reactions (ADRs) are an important cause of morbidity and mortality (Lee and Thomas, 2007). ADRs are both reversible and preventable at many instances, which increase the importance of early identification and treatment of them. The preventable nature of adverse reactions is the motivation for current ADR reporting programs (Tsounonis, 2006; Ting et al., 2010). ADR and its related aspects require a multidisciplinary approach wherein various health care professionals have to make a significant contribution; especially pharmacists. Most often, the pharmacist is in a unique position to safeguard the patient from preventable ADRs (Tsounonis, 2006). Pharmacist participation can greatly help overcome underreporting of ADRs (Zolezzi and Parsotam, 2005; Elkami et al., 2011; Grootheest et al., 2004). Their role in the education of other healthcare professionals about the prevention, detection and reporting of ADRs is integral.

Community pharmacists have a unique role in monitoring and reporting of ADRs due to their ease of access for patients and chances that the patients approach them for the management of symptoms associated with ADRs. Further, they have a major role in preventing ADRs by giving appropriate medication counseling for the patients. It is important to know the community pharmacists attitude toward their role as members of the health care team in reporting ADRs, factors that encourage or discourage ADR reporting and their behavior in relation to ADRs.

Pharmacist's role in pharmacovigilance may vary from country to country. (Grootheest et al., 2004) Studies assessing the knowledge, attitude and behavior of pharmacists in ADR related aspects have been reported in various countries, including in Middle East and North Africa regions (MENA) Ting et al., 2010; Zolezzi and Parsotam, 2005; Elkami et al., 2011; Grootheest et al., 2004; Mes et al., 2002; Toklu and Uysal, 2004; Green et al., 1999; Herderiro et al., 2006; Rouleau et al., 2011; Gavaza et al., 2011; Bawazir, 2006; Vessal et al., 2009. Various levels of the knowledge of community pharmacists in pharmacovigilance have been reported in various countries as well as various factors influencing their involvement (Grootheest et al., 2004).

Oman has a pharmacovigilance program functioning under the auspices of the Drug Control Department, Directorate General of Pharmacy Affairs and Drugs Control, Sultanate of Oman. (Adverse drug reaction reporting in Oman, 2012)

All the health care professionals are expected to report ADRs to the center as part of the pharmacovigilance program. The directorate carries out active training programs for the health care professionals including community pharmacists on pharmacovigilance. According to the statistics of 2012 of the Drug Control Department of Oman, there are 1200 registered pharmacists working in the community sector in 476 establishments. Pharmacist's perception of their role with regard to ADR reporting and related activities can greatly influence their contribution and the same needs to be evaluated. Pharmacists as drug experts are expected to have good knowledge regarding the safety related aspects of drugs and it would be ideal to know their knowledge on drug safety as representative information. There are no published studies from Oman which tried to evaluate these important aspects. Hence, this pilot study was conducted with the aim of assessing the knowledge, attitude and behavior of community pharmacists on ADR related aspects.

2. Methodology

The study was approved by the Institutional Research Committee, College of Pharmacy and Nursing, University of Nizwa. This was a questionnaire based cross sectional survey conducted as a pilot study. A self administered questionnaire was designed based on the parameters to be evaluated as part of the study and by referring to previous literature. (Ting et al., 2010; Mes et al., 2002; Herderiro et al., 2006; Rouleau et al., 2011; Bawazir, 2006). Questionnaire had mainly three sections totally comprising of 21 questions. Section 1 comprised of 9 questions to assess the knowledge of pharmacists on some of selected basic aspects of drug safety. These questions were a mix of general and sometimes specific safety information on certain drugs or reactions. The purpose of these questions was to have a general assessment of the knowledge on safety related aspects that pharmacists might come across during routine practice. Section 2 had questions to assess the knowledge ($n = 3$), and attitude ($n = 3$) of community pharmacists toward ADR reporting and to assess their behavior ($n = 4$) on ADR related aspects. The responses to the questions in this section were supposed to be marked in a five point likert scale ranging from strongly agree to strongly disagree. Section 3 was to capture demographic and professional details of the respondents.

The actual survey was conducted during a 2-month period between April–June 2012 among qualified pharmacists in

Muscat and South Sharqiyah Governorates; two representative governorates among the ten governorates in Oman. All the community pharmacists in one wilayat (Wilayat of Sur) of the South Sharqiya Governorate and 2 wilayats of the Muscat governorate (Wilayat of Boushar and Al-Qurum) were approached for the study purpose. Those pharmacists who were willing to participate in the study were provided the prepared study information sheet (which explained the purpose of the study and study procedure) and were requested to sign the informed consent form. Enrolled participants were provided the questionnaire to respond.

The data from the filled questionnaires were evaluated for various parameters. The responses of questions in Section 1 were assessed by estimating the percentage of respondents providing the correct answer to each question. A scoring scheme was followed with a score of 1 for a correct response and 0 for incorrect response. Accordingly, the total score of the individual participants for section 1 (Q1–9) was estimated and the median total score was estimated.

The questions in Section 2 related to knowledge, attitude and behavior were assessed using a scoring scheme with a score of 5, 4, 3, 2, and 1 for respective responses ranging from most appropriate to most inappropriate response. Accordingly, the median knowledge, attitude and behavior score of the respondents was estimated. The maximum possible score of knowledge, attitude and behavior was 15, 15 and 20 respectively and a minimum score of zero for all the categories. Additionally, the median total score based on responses to all the aspects; knowledge, attitude and behavior was estimated with a maximum possible score of 50 and a minimum score of 0. A score equal to and greater than 80% of the possible maximum score was considered as good, between 60% and 79% as moderate and less than 60% as poor for quantitative representation. Difference in the median score obtained for Sections 1 and 2 were estimated based on gender, age group, educational qualification and status of receiving training on pharmacovigilance.

The results were statistically analyzed using SPSS (version 15) where the Mann–Whitney *U* test and the Kruskal Wallis

test was used for continuous variables for non parametric data depending on the number of comparative groups and for parametric data independent Sample '*t*' test was used. The *p* value of <0.05 was considered to be statistically significant.

3. Results

One hundred and seven questionnaires were obtained from the distributed 148 questionnaires giving a response rate of 72.3%. Characteristics of the respondents are represented in Table 1. Comparatively, there was a higher percentage of males and those in the age group of 18–30. Vast majority of the respondents had a bachelor's degree in pharmacy and only 32% of them had received training in pharmacovigilance.

3.1. Knowledge on basic aspects on drug safety in routine practice (Section 1)

The responses to questions in Section 1 assessing the basic aspects on drug safety in routine practice are tabulated in Table 2. Even though the majority of the respondents gave a correct response to most of the questions, at many instances, a good number gave incorrect responses to questions which are expected to be known by community pharmacists on a daily basis. Consequently, the total median score for the questions in Section 1 was 5 (Inter quartile range IQR, 2) out of a possible maximum score of 9 which was a poor score.

3.2. Responses to knowledge, attitude and behavior related questions

Community pharmacist's responses to questions related to knowledge, attitude and behavior on ADR reporting and on ADR related aspects are represented in Table 3. The median score for knowledge related questions was 10 (IQR 4) out of a maximum possible score of 15 which demonstrates a moderate knowledge score. Around 89% of the participants was

Table 1 Demographics of respondents and relationship between the median total score.

Demographics	No. (%)	Median total score (IQR) Q 1–9	<i>p</i> value	Median total score (IQR) Q 10–19	<i>p</i> value
<i>Gender</i>					
Male	68 (63.6)	5 (2)	0.303	39 (8.75)	0.501
Female	39 (36.4)	4 (2)		38 (9)	
<i>Age group (yrs)</i>					
18-30	54 (50.5)	5 (2)	0.309	39 (8.5)	0.451
31- 45	47 (43.9)	5 (3)		38 (7)	
46-60	6 (5.6)	6 (2.25)		45 (10)	
<i>Qualification</i>					
D.Pharm	27 (25.2)	4 (1)	0.010	38 (9)	0.695
B.Pharm	75 (70.1)	5 (3)		38 (8)	
M.Pharm	5 (4.7)	6 (1.5)		44 (9)	
<i>Years of experience</i>					
< 1	5 (4.7)	4 (0.5)	0.024	48(11.5)	0.671
1–2	10 (9.3)	4 (1.5)		37 .5 (11.5)	
> 2–5	39 (36.4)	5 (2)		38 (8)	
> 5–10	28 (26.1)	5 (3)		40.5 (10)	
> 10	25 (23.4)	6 (2.5)		38 (8.5)	
<i>Training received in pharmacovigilance</i>					
Yes	35 (32.7)	5 (3)	0.342	44 (5)	0.000
No	72 (67.3)	5 (2)		38 (6)	

Table 2 Responses to questions related to ADRs (Q 1–9).

Questions	Correct response no. (%)	Incorrect response no. (%)
1-What is an adverse drug reaction (ADR)?	42 (84%)	8 (16%)
(a) Harmful effects which occur when a drug is used in the usual dose		
(b) Only allergic/hypersensitivity responses to drugs		
(c) Effects occurring only when drugs are taken in excess dose		
(d) None of the above		
2-Which among the statement regarding ADRs is correct?	24 (48%)	26 (52%)
(a) ADRs are always preventable		
(b) ADRs are preventable to some extent		
(c) ADRs are not predictable at all		
(d) ADRs refer only to the serious harmful effects of drugs		
3-The most common ADR with anti tubercular drugs includes	28 (56%)	22 (44%)
(a) Alopecia		
(b) Hepatotoxicity		
(c) Skin rashes		
(d) Renal toxicity		
4-Which among the following drugs is most unsafe in a pregnant patient?	31 (62%)	19 (38%)
(a) Erythromycin		
(b) Paracetamol		
(c) Amlodipine		
(d) Ciprofloxacin		
5-Side effects which can occur more commonly while administering inhaled salbutamol include	32 (64%)	18 (36%)
(a) Oral fungal infection		
(b) Palpitation		
(c) Change in voice		
(d) Oral bleeding		
6-Gingival hyperplasia is more commonly seen with	34 (68%)	16 (32%)
(a) Enalapril		
(b) Ciprofloxacin		
(c) Amlodipine		
(d) Losartan		
7-Metallic taste is most commonly caused by	39 (78%)	11 (22%)
(a) Glibenclamide		
(b) Furosemide		
(c) Metronidazole		
(d) Ampicillin		
8-Dry cough with enalapril is more likely to occur in	10 (20%)	40 (80%)
(a) Elderly		
(b) Pediatrics		
(c) Males		
(d) Females		
9-NSAID induced ulcer is most likely to occur in	32 (64%)	18 (36%)
(a) Elderly		
(b) Those who are taking steroids with NSAIDs		
(c) Alcoholics		
(d) All of above		

aware of the National Pharmacovigilance program (ADR reporting program) in Oman. Twenty percentage thought that only ADRs to new drugs need to be reported to the regulatory agency or Drug Company. The median attitude score was 12

(IQR 2) demonstrating a fairly good attitude of the community pharmacists toward ADR reporting and related activities. Majority (90.6%) of the participants considered reporting of ADRs as a professional responsibility of the pharmacists.

Table 3 Responses to knowledge, attitude and behavior related questions.

Questions	Agree (%)	Neutral (%)	Disagree (%)
Awareness of the National Pharmacovigilance Program in Oman	95 (88.8)	10 (9.3)	2 (1.9)
Only ADRs to new drugs to be reported to the regulatory agency or drug company	22 (20.5)	21 (19.6)	64 (59.8)
ADRs observed to topical agents need not be reported to the regulatory agency or drug company	45 (42)	10 (9.3)	52 (48.6)
Reporting of ADRs adds up to existing knowledge of ADRs to old and new drugs	93 (86.9)	9 (8.4)	5 (4.7)
Reporting of ADRs is a professional responsibility of the pharmacists	97 (90.6)	9 (8.4)	1 (0.9)
Reporting of ADRs adds up to unnecessary workload	12 (11.2)	27 (25.2)	68 (63.6)
Report ADRs to the regulatory agency in Oman/drug company	74 (69.2)	25 (23.4)	8 (7.4)
Ask for the allergy history of the patient before dispensing the medication	89 (83.2)	18 (16.8)	0 (0)
Inform the patient of the important side effects of the medications	98 (91.5)	7 (6.5)	2 (1.9)
Inform patients of the methods to prevent ADRs of the dispensed medications	93 (86.9)	12 (11.2)	2 (1.9)

Participants reported good behavior on ADR related aspects with a median score of 16 (IQR 3) out of a maximum possible score of 20. Eighty-three percent of the participants reported asking for the allergy history in the patients before dispensing the medication, where ever required. Total median score based on knowledge, attitude and behavior was 38 (IQR 8) out of a possible maximum score of 50 which demonstrates a moderate score. Many factors discouraged reporting of ADRs by the pharmacists with the major share being lack of awareness on how to report ADR, concern that the report may be wrong, concern that the prescriber may be concerned with pharmacist reporting and non-remuneration for reporting.

3.3. Relating the median score with the participant characteristics

The knowledge of the participants on the basic aspects on drug safety in routine practice (median score for Section 1) differed significantly only based on qualification ($p = 0.010$) and years of experience ($p = 0.024$); [Table 1](#). Those pharmacists with a master's qualification and bachelors were having a better score compared to those with only a diploma. Similarly, higher the years of experience, better was their median total score.

Apparently, the median total score for Section 2 assessing the knowledge, attitude and behavior on ADR reporting and related aspects differed significantly only based on the status of receiving training in pharmacovigilance ($p = 0.000$); [Table 1](#). Similarly, the individual aspects of knowledge, attitude and behavior did not differ based on the demographics of the participants while all the individual aspects were significantly better for those who have received training in pharmacovigilance; [Table 4](#).

4. Discussion

Knowledge and attitude of pharmacists on drug safety related aspects could greatly influence their behavior and thereby contribute to patient safety. It is important to assess these parameters to identify the need for actions or interventions from various bodies including regulatory organisations. The present study is the first study of its kind in Oman which tried to assess the knowledge, attitude and behavior of community pharmacists to ADR related aspects. The present study was designed as a pilot study before a broader study could be conducted among a wider population.

Table 4 Demographics of respondents and relationship between median knowledge, attitude and behavior score.

Demographics	Median Knowledge Score	p value	Median Attitude Score	p value	Median Behavior Score	p value
<i>Gender</i>						
Male	10 (3)	0.396	12.5 (2)	0.115	16 (4)	0.603
Female	10 (4)		12 (3)		16 (2)	
<i>Age group</i>						
18–30	11 (3.25)	0.339	12 (3)	0.709	17 (4)	0.451
31–45	10 (3)		12 (2)		16 (3)	
46–60	13.5 (5.5)		13 (2.25)		17 (2.5)	
<i>Qualification</i>						
D.Pharm	10 (4)	0.680	12 (5)	0.920	16 (3)	0.315
B.Pharm	10 (3)		12 (2)		16 (3)	
M.Pharm	13 (5.5)		13 (3.5)		18 (3)	
<i>Years of experience</i>						
< 1	14 (4.5)	0.325	15 (4.5)	0.769	18(3)	0.861
1-2	10 (6)		12.5 (2)		16 (4.25)	
> 2-5	10 (2)		12 (3)		16 (4)	
> 5-10	10 (4)		12.5 (3.75)		16 (3.5)	
> 10	10 (4)		12 (2)		16 (2)	
<i>Training received</i>						
Yes	12 (5)	0.011	14 (2)	0.000	17 (3)	0.002
No	10 (3)		12 (2)		16 (3)	

Majority of the participants in the study were males and those with a bachelor's degree qualification. More pharmacists who were young (age group of 18–30) and had lesser years of experience (>2–5 years) participated in the study. Only just more than a quarter of the participants had received any sort of training in ADR reporting in the past.

Total median score based on questions related to ADRs in general and for some specific ADRs/drugs was poor. It was discouraging to note that a good majority of the participants gave an incorrect response to questions related to daily practice such as palpitation as a common side effect of inhaled salbutamol and risk factors for NSAID induced ulcers. Qualification as well as years of experience had a significant influence on the knowledge of pharmacists on ADR related aspects useful on a daily basis. This is a finding which is self explanatory. We could not find published studies evaluating the knowledge of pharmacists specifically to certain drugs or reactions to make effective comparisons for these results.

A moderate knowledge of community pharmacists toward ADR reporting as evident from the median knowledge score was observed. Almost all of them were aware of the National Pharmacovigilance program in Oman which is a good indicator of the effectiveness of the activities carried out by regulatory agencies in Oman in raising awareness on ADR reporting. This was different from the results obtained in the study conducted among community pharmacists in Turkey, where only (17.2%) of the pharmacists had any knowledge about pharmacovigilance (Toklu and Uysal, 2004).

Total median attitude score demonstrated a good level of attitude of pharmacists toward ADR related activities. It was encouraging to note that almost all of them were in agreement that reporting of ADR helps in adding up to existing knowledge on ADR to old and new drugs and the majority of the participants considered reporting of ADRs as a professional responsibility of the pharmacists. This was similar with the study conducted in Saudi Arabia (Bawazir, 2006) where 97% of them considered reporting of ADRs to be an integral part of pharmaceutical care and in Turkey (Toklu and Uysal, 2004) where 89% of the pharmacists believed that the role of the pharmacist in ADR reporting was essential.

Participants reported good behavior on ADR reporting and related aspects. Around 70% of the participants claimed that they report ADRs to the regulatory agency in Oman or to the Drug Company. Most of the participants rarely (82%) observe or have patients report ADRs to them. In the study conducted in Turkey, 65% of the pharmacists stated that the patients reported an ADR to them during the previous 12 months and 21% of the pharmacists reported to the concerned organizations. (Toklu and Uysal, 2004) It was encouraging to note that community pharmacists reported asking for allergy history before dispensing medicines and informing patients of important side effects and methods to prevent ADRs.

Several factors were identified by the community pharmacist which discourage them from reporting of ADRs; lack of awareness on how to report ADRs and concern that the report may be wrong as the commonest factors. These factors have to be addressed and effectively solved during the educational/awareness programs conducted for the pharmacists. Similarly in the study conducted among community pharmacists in Canada and Saudi Arabia, several barriers were identified that prevent pharmacists from reporting ADR including, unknown address, reporting form not available, do not know how to

report (41.7%) and uncertainty concerning causal relationship between ADR and the drug (30.1%) (Rouleau et al., 2011; Bawazir, 2006).

No significant difference in total median score for questions on knowledge, attitude and behavior on ADR related aspects in relation with the participant demographics was observed similar to the study conducted in Malaysia (Elkami et al., 2011). But, the same differed depending on the status of training on pharmacovigilance received in the past. This indicates the influence and need of extensive efforts from regulatory bodies at a larger scale to improve and maintain the knowledge and attitude of community pharmacists on ADR reporting and related aspects.

Our study did have some limitations. As the number of participants was limited being a pilot study, we could not generalize the results to the entire community pharmacy population in the country. Behavior score obtained was based on what the participants claim to be doing, which may be different from what might be happening in the actual situation.

5. Conclusion

In conclusion, the majority of community pharmacists had below than acceptable knowledge on drug safety related aspects on specific drugs and a good number of them were not aware of certain practical aspects which they are expected to be aware of. There is a genuine need to have training programs to improve the knowledge of pharmacists on ADR related aspects which are of benefit on a daily basis which could greatly influence the impact on patient safety. Community pharmacist's knowledge toward ADR reporting was encouraging even though it requires improvement. A positive attitude and behavior of community pharmacists toward ADR reporting and drug safety related aspects were observed. Background training in pharmacovigilance did have an influence on the knowledge, attitude and behavior observed. Educational programs have to be continued to generate awareness on how to report ADR and stimulate pharmacists' active participation in the ADR reporting program. An extensive study covering all the governorates in the country is essential to generate more valuable data which would form the basis for educational interventions and other actions.

Conflicts of interest statement

There are no conflicts of interest for the study.

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Nil.

Contributions

Jimmy Jose conceptualized and designed the study, evaluated the data, did the statistical analysis and prepared the manuscript. Beena Jimmy assisted in designing the study, evaluated the data and prepared the manuscript. Aliya Al Ghailani and Maryam Al Majali helped in designing the study, data collection and evaluation of data.

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