

***Corresponding author**

*Fawwaz Freih Alshammarie, Assistant Professor, Department of Dermatology, College of Medicine, University of Hail, Hail, Saudi Arabia

***Key Words:**

Adverse drug reaction, Knowledge, Awareness, North region, Saudi Arabia.

Adverse Drug Reactions Awareness Among Sample of People in Northern Region, Saudi Arabia

Fawwaz Freih Alshammarie^{1*}, Yasmeeen Ali Muraizeq², Rahaf Turki Aldhaban², Asma Mohammed Almutairi², Monerah Thaar Alshammari²

¹Assistant Professor, Department of Dermatology, College of Medicine, University of Hail, Hail, Saudi Arabia.

²Medical student, College of Medicine, University of Hail, Hail, Saudi Arabia.

Abstract

Background: Drug reactions are a fundamental issue in many branches of medicine. Adverse drug reactions result in high mortality and morbidity globally. There is always the risk of unwanted side effects associated with the use of any substance that has a therapeutic effect. The safe use of drugs remains a critical issue for all health care professionals.

Objective: The current study investigates the level of drug reaction awareness among the public in northern Saudi Arabia.

Materials/methods: This was a questionnaire-based cross-sectional study. Data were collected using Google Forms, which were coded and processed using Microsoft Excel and SPSS version 23. Results: Altogether 475 people participated in this study including 382 women (80.4%) and 93 men (19.6%). Of the 475 participants, 83.6% were aware of drug reactions, 40.4% believed drug reactions are hereditary, 50.9% had received a previous skin allergy test, and 21.3% had received a previous blood test for an allergy.

Conclusion: The public in northern Saudi Arabia are aware of drug reactions. We found that only half of the participants in our study had received a skin allergy test. It is the responsibility of physicians to provide the community with a valuable database of information on the adverse effects of drugs. We recommend that governmental and private institutions in Saudi Arabia carry out more studies with a larger sample to improve the understanding and awareness of drug reactions.

Introduction

The safe use of drugs remains a critical issue for all health care professionals include physicians, pharmacists and nurses as well as public (1). Drug reaction is defined by World Health Organization (WHO) as a response to a drug which is harms and unintended, occurs at normal doses used in human for the prophylaxis, diagnosis or therapy of disease (2). Multi-type reactions can result, including Stevens-Johnson syndrome, toxic epidermal necrolysis, and eosinophilia associated with drug reactions, or acute generalized exanthemata's pustulosis (3). Some other prevalent adverse reactions include epidermal eruptions, vomiting, diarrhoea, and gastric ulcerations. Death and perpetual disabilities can be caused by adverse drug reactions. It is important to recognize such reactions because they warn of future risks from a particular drug(s) and may require precautionary measures, treatment, dosage changes, or Cancellation of drug license (4,5). The current study investigates the level of drug reaction awareness among the public in northern Saudi Arabia.

Methodology**Study design and sample:**

It was a questionnaire-based cross-sectional study. processed using Microsoft Excel and the

Software Statistical Package for the Social Science (SPSS) version 23. This research study focused on public who lives in north region, Saudi Arabia.

Data collection:

The data were collected using Google forms service, it took 10 months, at beginning of January to October 2020.

Data Analysis:

The data were collected using Google forms service, coded and processed using Microsoft Excel and the Software Statistical Package for the Social Science (SPSS) version 23. Descriptive statistics including frequencies and percentages were used to describe the items and the study variables.

Chi square tests were conducted to test the differences of the nominal data.

The p values at 0.05 were considered statistically significant.

Results

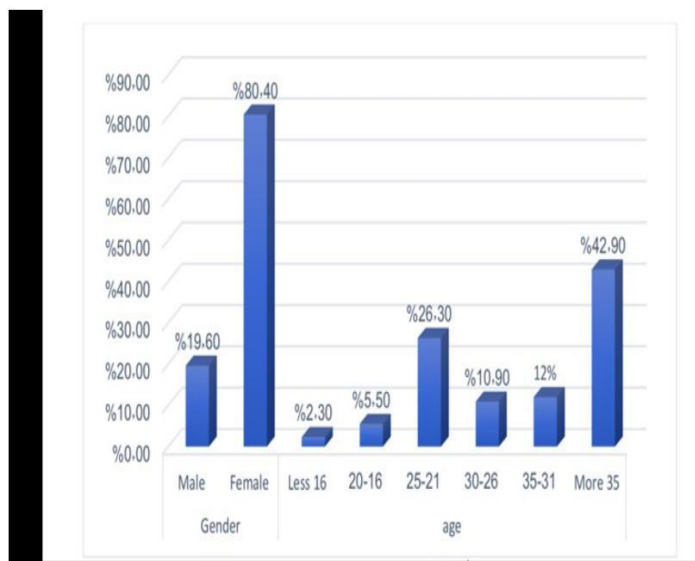


Figure 1: Demographic factors, descriptive of demographic information

As shown in Figure (1) Demographic factors, 475 people participated in this study including 382 female (80.4%) and 93 males (19.6%) ($p<0.05$). Their age were ranged between less than 16 and more than 35 with advantage for age group more than 35 (42.90%).

As shown in Table (1) Drug reactions only 43 (9.1%) had drug allergy ($p<0.01$). The participants were asked about the medication kinds that they have been used with the reaction which show the highest for Antibiotics (53.5%), other show less like: NSAID drugs (2.3%), Antiepilepsy (0%), Analgesics (18.6%), Vitamins (7%), Insulin (2.3%), Aspirin

(11.6%), Herbal (16.3%) and other (14%).

Antibiotics reported insignificant ($p>0.05$) and Antiepilepsy not used. The rest kinds only ranged between 8 (18.6%) to one (2.3%) of using ($p<0.01$). Also, the symptoms that might participants have been stated such as Rash, Skin heat, Itching, Fever, Cough, Shortness of breath, Anaphylaxis, Swelling (mouth - lips - tongue - eyes), Eye tears, Runny nose, Light headiness and Others, it was clear that they did have that much symptoms as it ranged between only 13(30.2%) for itchiness to 22(51.2%) for Fever ($p<0.01$), rash and itching were insignificant ($p>0.05$).

Starting Immediately after taking drug was insignificant ($p>0.01$), 15 (34.9%) indicated that starts hours, to 1 (2.3%) starts in months ($p<0.01$), although the symptoms were not much among the participants, however, it is clear that starts short time more than long time.

The participants reported their time of a health intervention, ranged between once 16(37.2%) which is the highest to 3 times 1(2.3%) ($p<0.05$).

As shown in Table (2) and Figure (2) knowledge, 83.6% of participants were aware, 56.2% agreed that all the body is affected in drug reaction ($p<0.05$), then face (34.3%) follows by lips (14.1%). Tongue is lowest one with 6.7% ($p<0.05$). It is clear that the family history of drug reaction is very small ranged between 8.8% for children and 1.9% for father ($p<0.05$). 59.6% of Participants did not think that drug reaction is hereditary ($p<0.05$), however 48.1% thought that drug reaction leads to death ($p>0.05$). As shown in Figure (2) Drug reactions detection, 50.9% had previous skin general allergy test ($p>0.05$), and 90.9% reported that they test accurate in identifying the drug ($p>0.01$). Only 10.7% had experience an allergy after negative test's result ($p<0.05$). 21.3% had a previous blood test for an allergy ($p<0.01$) and just 28% took an allergy's injection vaccine. ($p<0.01$).

Discussion

Out of 475 surveys distributed to public, the majorities of the participants were female (80.4%) while male (19.6%). This was consistent with reports in the literature, as most ADRs were reported by female patients (6,7).

The highest percent of age among participants having (42.9%) more than 35 years, followed by (26.3%) in age between 21 to 25 (8). In our study when we asked public about medications use related to drug reaction, (53.5%) $P>0.05$ mentioned the antibiotics cause drug reaction when used. Additionally, at a South Korean tertiary care hospital when ask said Antibiotics have been reported to be major causes of adverse drug reactions. Sulfonamides followed by penicillin were the most common causative antibiotics in a study that only included outpatients (9). Nearly 39.5% of

Table 1: Drug reactions: Descriptive analysis (n=475)

Statement		Frequency	Percentage	Chi/p value
Drug allergy exists		No	432	90.9%
		Yes	43	9.1%
What kind of medication do you take?	Antibiotics	No	20	46.5%
		Yes	23	53.5%
	NSAI	No	42	97.7%
		Yes	1	2.3%
	Antiepilepsy	No	43	100%
		Yes	0	0
	Analgesia	No	35	81.4%
		Yes	8	18.6%
	Vitamins	No	40	93%
		Yes	3	7%
	Insulin	No	42	97.7%
		Yes	1	2.3%
	Aspirin	No	38	88.4%
		Yes	5	11.6%
What symptoms do you have?	Rash	No	22	51.2%
		Yes	21	48.8%
	Skin heat	No	32	74.4%
		Yes	11	25.6%
	Itching	No	21	48.8%
		Yes	22	51.2%
	Fever	No	42	97.7%
		Yes	1	2.3%
	Cough	No	31	72.1%
		Yes	12	27.9%
	Shortness of breath	No	41	95.3%
		Yes	2	4.7%
	Anaphylaxis	No	32	74.4%
		Yes	11	25.6%
	Swelling (mouth, lips, tongue, eyes)	No	39	90.7%
		Yes	4	9.3%
	Tears	No	39	90.7%
		Yes	4	9.3%
When do symptoms start?	Runny nose	No	30	69.8%
		Yes	13	30.2%
	Lightheadedness	No	41	95.3%
		Yes	2	4.7%
	Other	No	36	83.7%
		Yes	7	16.3%
	Immediately after taking the drug	No	26	60.5%
		Yes	17	39.5%
Medical intervention	Hours	No	28	65.1%
		Yes	15	34.9%
	Days	No	33	76.7%
		Yes	10	23.3%
	Months	No	42	97.7%
		Yes	1	2.3%
Number of health interventions	Once	No	12	27.9%
		Yes	31	72.1%
	Twice	No	27	62.8%
		Yes	16	37.2%
	Three times	No	36	83.7%
		Yes	7	16.3%
	More than three times	No	42	97.7%
		Yes	1	2.3%
		No	36	83.7%
		Yes	7	16.3%

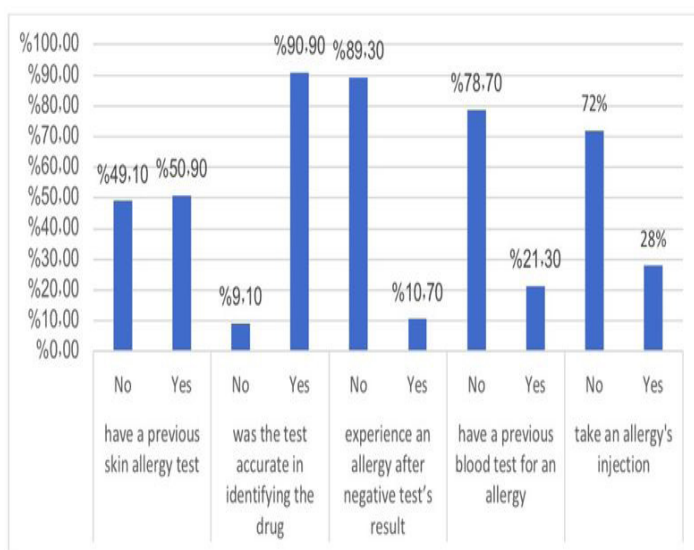
** p<0.01

*p<0.05

Ns (not significant)Na (not available)

Table 2: Descriptive analysis (n=475)

Statement		Frequency	Percentage	Chi/p value	
Awareness		No	78	16.4%	214.234**/0.000
		Yes	397	83.6%	
Which part of the body is affected?	Face	No	312	65.7%	46.739**/0.000
		Yes	163	34.3%	
	Lips	No	414	87.2%	262.335**/0.000
		Yes	61	12.8%	
	Eyes	No	408	85.9%	244.802**/0.000
		Yes	67	14.1%	
	Tongue	No	443	93.3%	355.623**/0.000
		Yes	32	6.7%	
	Hand	No	418	88%	274.360**/0.000
		Yes	57	12%	
	All the body	No	208	43.8%	7.328**/0.007
		Yes	267	56.2%	
	Other	No	456	96%	402.040**/0.000
		Yes	19	4%	
	Don't know	No	428	90.1%	305.602**/0.000
		Yes	47	9.9%	
Family history of drug reactions	Father	No	466	98.1%	439.682**/0.000
		Yes	9	1.9%	
	Mother	No	450	94.7%	380.263**/0.000
		Yes	25	5.3%	
	Sibling	No	443	93.3%	355.623**/0.000
		Yes	32	6.7%	
	Children	No	433	91.2%	321.855**/0.000
		Yes	42	8.8%	
None	No	108	22.7%	141.223**/0.000	
	Yes	367	77.3%		
Do you think drug reactions are hereditary?		No	283	59.6%	17.434**/0.000
		Yes	192	40.4%	
Do you think drug reactions lead to death?		No	246	51.9%	0.684(ns)/0.408
		Yes	228	48.1%	
** p<0.01					
*p<0.05					
Ns (not significant)					


Figure 2: Drug reactions detection.

the respondents developed adverse reaction immediately after taking the drug, whereas the reminder did within few hours, days or within months as in 34.9%, 23.3% and 2.3% respectively. The majority in this study had reported adverse drug reaction in form of itching and skin rashes in 51.2%, and 48.8% respectively. Furthermore, some of them developed runny nose, cough, and anaphylaxis in 30.2%, 27.9%, and 25.6% respectively. Conversely, another study had found gastrointestinal illnesses were the most common adverse drug reactions (10).

We found that 72.1% needed medical intervention it is just ranged between once (37.2%) to 3 times (2.3%). In our survey 83.6%, of participants think to have knowledge about adverse drug reactions. The whole body is the most site (56.2%) affected by adverse reactions to drugs in the present study followed by the face 34.3%, eyes 14.1%, lips 12.8%, hand 12% and tongue 6.7%. Most participants have no family history of adverse drug reactions. on the other hand, findings showed the higher number of cases found in children 8.8%. The proportion of participants who believe

in adverse drug reaction is hereditary was 40.4%, but more than half of them disagreed with that. An individual's gene profile can affect their susceptibility to adverse drug reactions in a dose-dependent or dose-independent manner (11). The confusion was observed between the participants regarding if drug reaction leads to death 48.1% was agreed while 51.9% disagree about that. According to previous international studies have reported the adverse drug reactions are the sixth leading cause of death worldwide (12). Most severe adverse cutaneous reactions to drugs are Stevens-Johnson syndrome and toxic epidermal necrolysis (13). In our study found that 50.9% of people had a previous general skin allergy test, which 90.0% of them show that the test was accurate in determining the drug. The use of a skin allergy test in diagnosing a person how have a drug reaction is not suitable all time and there is no uniform for it. So mostly depend on the symptoms appeared on him (14). According to our survey show that 89.3% have no allergy after a negative result of skin allergy test, and only 10.7% have allergy even when the result is negative, which give us a clue of non-specification of skin allergy test sometimes. Another option for diagnosing a drug reaction is a blood test which found in our study that 78.7% have never had this test. Blood test measures IgE against specific allergen and immunoassay is the most commonly methods used (15). Adverse drug reaction also it can diagnose by different and several tests and have more specification (16). About 72% have not taken allergy injection (vaccine), which is used to adverse the effect of drug reaction. The main idea of allergy injection "allergy immunotherapy" is to reduce response to allergic triggers and inflammatory response which sometimes produce a chronic condition (17).

Conclusion

We can conclude the general public in north region are aware of drug reactions. Our findings that people who did a skin allergy test is half of the participants in our study. The results showed contrasting perceptions about if drug reaction leads to deaths in the current opinion of participants more than half denied that, whereas others believe the drug reaction can lead to deaths. As a final note, it is the responsibility of physicians to provide the public with valuable information about pharmaceutical adverse effects.

Limitations

This was a single-region study involving a limited number of people. Therefore, the study results cannot be generalized directly to people living in the north region who did not participate in this study or those in other regions of Saudi Arabia.

Acknowledgement

We thank the patients who were all participated in and

contributed samples to the study.

Conflicting Interest

We declare that there are no conflicts of interests.

Financial support and sponsorship

Nil.

Informed consent

Written informed consent was obtained from all individual who participate in the study.

Ethical approval

The study was approved by the Medical Ethics Committee of Hail University (ethical approval number:H-2020-256).

References

1. Kaur M, Kosey S, Mehra N, Kumar R. Knowledge and awareness of adverse drug reactions. *International Journal of Pharmaceutical Sciences and Research*. 2015;6:4601-4610. DOI: 10.13040/IJPSR.0975-8232.6(11).4601-10.
2. Khan S A, Goyal C, Chandel N, Rafi M. Knowledge, attitudes, and practice of doctors to adverse drug reaction reporting in a teaching hospital in India: An observational study. *J Nat Sci Biol Med*. 2013;4(1):191-196. DOI: 10.4103/0976-9668.107289.
3. Teo Y X, Walsh S A. Severe adverse drug reactions. *Clin Med (Lond)*. 2016;16(1):79-83. DOI: 10.7861/clinmedicine.16-1-79.
4. Thomas F, Abiri OT, Komeh JP, Conteh TA, Bah AJ, Kanu JS, et al. Inconsistent Country-Wide Reporting of Adverse Drug Reactions to Antimicrobials in Sierra Leone (2017–2021): A Wake-Up Call to Improve Reporting. *International Journal of Environmental Research and Public Health*. 2022 Mar 10;19(6):3264. DOI: 10.3390/ijerph19063264
5. Coleman, J.J.; Pontefract, S.K. Adverse drug reactions. *Clin. Med*. 2016; 16(5): 481–485. DOI: 10.7861/clinmedicine.16-5-481.
6. Gomes D, Herdeiro MT, Ribeiro-Vaz I, Ferreira PL, Roque F. Adverse Drug Reactions and Potentially Inappropriate Medication in Older Patients: Analysis of the Portuguese Pharmacovigilance Database. *Journal of clinical medicine*. 2022;11(8):2229. DOI: 10.3390/jcm11082229.
7. Dubrall D, Just KS, Schmid M, Stingl JC, Sachs B. Adverse drug reactions in older adults: a retrospective comparative analysis of spontaneous reports to the German Federal Institute for Drugs and Medical Devices. *BMC Pharmacology and Toxicology*. 2020;21(1):1-20. DOI:10.1186/s40360-020-0392-9
8. Sales I, Aljadhey H, Albogami Y, Mahmoud M A. Public awareness and perception toward Adverse Drug Reactions reporting in Riyadh, Saudi Arabia. *Saudi Pharm J*. 2017;25(6):868-872. DOI: 10.1016/j.jsps.2017.01.004.
9. Jung I Y, Kim J J, Lee S J, Kim J, Seong H, Jeong W, Choi H, Jeong S J, Ku N S, Han S H, Choi J Y, Song Y G, Park J W, Kim J M. Antibiotic-Related Adverse Drug Reactions at a Tertiary Care Hospital in South Korea. *Biomed Res Int*. 2017;2017:4304973. DOI: 10.1155/2017/4304973.
10. Almubark R A, Aljadani R H, Alqahtani A S, Alshammari T M, BinDhim N F. National Cross-Sectional Study of Community-Based Adverse Drug Reactions in Saudi Arabia. *Drugs - Real World Outcomes*. 2020;7(2):161-170. doi: 10.1007/s40801-020-00186-8.
11. Pirmohamed M, Park B K. Genetic susceptibility to adverse drug reactions. *Trends Pharmacol Sci*. 2001;22(6):298-305. DOI: 10.1016/

s0165-6147(00)01717-x.

12. Hacker M. Adverse drug reactions. Pharmacology 2009;327-352). Academic Press. DOI: 10.1016/B978-0-12-369521-5.00013-0.
13. Wolf R, Orion E, Marcos B, Matz H. Life-threatening acute adverse cutaneous drug reactions. Clin Dermatol. 2005;23(2):171-181. DOI: 10.1016/j.clindermatol.2004.06.012.
14. Brockow K, Przybilla B, Aberer W, Bircher AJ, Brehler R, Dickel H, Fuchs T, Jakob T, Lange L, Pfützner W, Mockenhaupt M. Guideline for the diagnosis of drug hypersensitivity reactions. Allergo Journal International. 2015 May;24(3):94-105. DOI: 10.1007/s40629-015-0052-6.
15. Siles R I, Hsieh F H. Allergy blood testing: A practical guide for clinicians. Cleveland Clinic Journal of Medicine. 2011;78(9):585. DOI: 10.3949/ccjm.78a.11023.
16. Rive C M, Bourke J, Phillips E J. Testing for drug hypersensitivity syndromes. Clin Biochem Rev. 2013;34(1):15-38. PMID: 23592889
17. Huggins J L, Looney R J. Allergen immunotherapy. Am Fam Physician. 2004;70(4):689-696. PMID: 15338781.