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Research Article

**KNOWLEDGE, ATTITUDE, AND PRACTICES OF DRUG  
ALLERGY AMONG PRIMARY HEALTHCARE PHYSICIANS  
IN TAIF, KSA, 2021**Ahmad Hameed Allehaiby<sup>1</sup>, Talal Almalki<sup>2</sup><sup>1</sup> M.B.B.S., Family Medicine Resident, Ministry of Health Program of Taif, Saudi Arabia.<sup>2</sup> Family Medicine Consultant.

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**Abstract:**

**Introduction:** Drug allergy (DA) has a critical impact on patients' health. The reactions are unexpected; they range from a critical emergency case that may necessitate hospitalization to adjustments in subsequent therapy.

**Methodology:** This was a cross-sectional study conducted to assess the knowledge, attitudes, and practices of drug-allergy reactions in primary health care physicians in Taif city, Saudi Arabia. All physicians working in 19 PHC in Taif city were included in this study. A self-administrated questionnaire was used for data collection. **Results:** A total of 128 physicians were included in this study, 57.8% were males, and most of them (75%) were Saudi. The mean score of knowledge was (59.5±16.9), attitude (62.7±9.9), and practice (68.1±16.2). Gender was significantly associated with the participants' knowledge (P=0.048), attitude (P=0.000), and practice (P=0.001). The educational level was significantly associated with the knowledge score (P=0.003) and attitude score (P=0.003). The title was significantly associated with the participants' knowledge (P=0.033), attitude (P=0.004), and practice (P=0.041). The nationality was significantly associated with the participants' attitudes (P=0.000), and there was a significant association between smoking status and practice (P=0.021). **Conclusion:** This study demonstrated relatively good knowledge levels and positive attitudes as well as good practices towards DA among primary care physicians in Taif, Saudi Arabia. Males and consultants were the most knowledgeable, had the most positive attitudes, and best practices regarding DA.

**Keywords:** Drug allergy; Drug hypersensitivity reactions; Knowledge; Attitude; Practice

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## INTRODUCTION

Drug allergy is defined as immunologically induced drug hypersensitivity responses (DHRs) accompanied by the presence of drug-specific antibodies or T cells.<sup>1</sup>

The reactions are unpredictable; they vary from the serious emergency case, which may need hospitalization, and may need changes in subsequent therapy. Both underdiagnosis (due to under-reporting) and overdiagnosis (due to the common use of the term 'allergy') are common.<sup>1</sup>

Until this day, there are insufficient tests that rely on to identify these antibodies and cells; DHRs recommend as the appropriate term for drug reactions resembling allergy. We can not predict these reactions, and it can be hazardous to a patient's life and may need hospital admission and an urgent modification in subsequent therapy.<sup>2</sup>

The importance of DHRs as a public health concern rise from 7% effect of the general population even with commonly used medications like aspirin, non-steroidal anti-inflammatory drugs, and antibiotics like penicillin which was the most drug with allergy along with penicillin with clavulanic acid in the group that is known to have an allergy to beta-lactams.<sup>3</sup>

At present, a huge part of DHRs diagnosis can be either underdiagnosis and overdiagnosis due to underreporting and overuse of the term allergy, respectively.<sup>4</sup>

Accurate diagnosis and management of DHRs continue to be a major problem for healthcare practitioners (HCPs) as they make unmet patient demands. Several recommendations and/or worldwide consensus papers have been developed in recent years to assist medical decisions on all aspects of DHRs, substantially facilitating knowledge and management in clinical practice.<sup>5,6,7,8</sup>

Keeping in mind that if the patient is allergic to one specific drug, may be allergic to other drugs of similar chemical structure, that is defined as the cross-sensitivity structure; for example, if the patient is sensitive to non-steroidal anti-inflammatory drugs, the physician better choose another class to treat him.<sup>9</sup> Thus, adequate management of DHRs is essential, and the health care practitioner's knowledge is important for the patients' care; hence KAP studies are increasingly becoming important in improving disease control activities.<sup>10</sup>

Drug allergy (DA) is a major factor affecting mortality

and morbidity arising from health care facilities. Currently, DA remains a challenging problem for health care practitioners. At present, a huge part of DHRs diagnosis can be either underdiagnosis and overdiagnosis due to underreporting and overuse of the term allergy, respectively.<sup>12</sup>

In 2017 **Yin Wang *et al.*** conducted a study titled as knowledge, attitudes, and practices survey of drug allergy among healthcare practitioners in central China study that The HCPs exhibited a lack of understanding of DA. Advanced education is critically needed to improve understanding and fill knowledge and clinical practice gaps in DA.<sup>14</sup>

**Demoly *et al.*** conducted a study about an International Consensus on drug allergy that the diagnosis of DHRs is often challenging and requires the same careful approach, no matter which specific drug is involved.<sup>1</sup>

**Wei *et al.***, in Safe medication use based on knowledge of contraindications concerning cross allergy and comprehensive clinical intervention, concluded that comprehensive clinical interventions are very effective through team cooperation. Medication use has potential for safety risks if sufficient attention is not paid to contraindications concerning cross allergy.<sup>9</sup>

**Brockow *et al.*** conducted a study about Skin test concentration for systemically administered drugs – an ENDA/EAACI Drug Allergy Interest Group position paper that it has only been possible to obtain a high to moderate level quality of evidence and a strong recommendation for specific skin test concentrations for a few drugs.<sup>11</sup>

**Cernadas JR *et al.*** conducted a study of General considerations on rapid desensitization for a drug hypersensitivity: a consensus statement that desensitization induces a temporary tolerant state, which can only be maintained by continuous administration medication.<sup>7</sup> **Demoly *et al.*** conducted a study titled Important questions in allergy: 1--drug allergy/hypersensitivity that Drug hypersensitivity reactions significantly impact clinical practice, drug development,t, and public health.<sup>2</sup> **Gomes *et al.*** conducted a study titled Epidemiology of hypersensitivity drug reactions that has hypersensitivity reactions represent about one-third of all adverse drug reactions. Adverse drug reactions affect 10-20% of hospitalized patients and more than 7% of the general population. Severe reactions including anaphylaxis, drug hypersensitivity syndromes, Stevens-Johnson syndrome, and toxic epidermal necrolysis are also associated with significant morbidity and mortality. Although several risk factors have been identified, their clinical

importance has not been fully understood. Future progress in immunogenetics and pharmacogenetics may help identify populations at risk for specific types of reactions.<sup>12</sup>

**Gomes ER *et al.*** conducted a study titled self-reported drug allergy in a general adult Portuguese population that the results showed that self-reported allergy to drugs is highly prevalent and poorly explored. Women seem to be more susceptible. Beta-lactams and NSAIDs are the most frequently concerned drugs.<sup>3</sup>

**Mittmann *et al.*** evaluated the amount of under-reporting of serious adverse drug reactions, which revealed significant under-reporting of TEN. The failure to disclose life-threatening ADRs might affect population safety. ADR reporting programs must be made more widely known.<sup>4</sup>

In 1994 Schultz LJ *et al.* conducted A nation-wide malaria knowledge, attitudes, and practices survey in Malawi that results will be used to guide policymakers and program managers in making decisions based on current data in designing and improving malaria control programs and health education messages hence the importance of KAP.<sup>10</sup>

The researcher had a case of drug allergy in the PHC he works in; the patient complained of drug allergy caused by a medication prescribed from the same PHC. that was the start point for the researcher to implement the study on the PHC physicians in Taif.

Up to the researcher's knowledge, no similar studies have been conducted in Taif. In addition, the researcher's work as a junior physician in the last three years gave him great motivation to study this issue.

### Aim of the study

This study aims to evaluate the knowledge, attitudes, and practices of drug-allergy reactions in primary health care physicians in Taif to set a base for future use.

### Objectives

- 1) To assess the knowledge of drug allergy among primary health care physicians in Taif city.
- 2) To assess the attitudes of drug allergy among primary health care physicians in Taif city.
- 3) To assess the practices of drug allergy among primary health care physicians in Taif city.
- 4) To assess the relation of demographic data and KAP among primary health physicians in Taif city.

### METHODOLOGY:

### Study Design

A cross-sectional study.

### Study Population

Physicians working in MOH primary health care centers were included in this study. 133 physicians come from different countries (Saudis and Non-Saudis), males and females with different scientific degrees.

### Inclusion criteria:

- General practitioners.
- Residents.
- Specialist.
- Consultant.

### Exclusion criteria:

- Those who refused to participate.
- Incomplete forms.

### Study area/sitting

Taif is a city in Makkah Al-Mokarramah Province of Saudi Arabia at an elevation of 1,879 m (6,165 ft.) on the slopes of the Sarawat Mountains (Al-Sarawat Mountains). It has a population of 993800 (2014 census). The city is the center of an agricultural area known for its grapes, roses, and honey. In Taif, there are many different health care sectors, including hospitals and primary healthcare centers. The study was conducted at the ministry of health primary health care centers in Taif.<sup>14</sup>

### Study period:

- Preparatory period (4-8 weeks)
  - Selecting the title and carrying out the literature review
  - Taking the permission
  - Preparing the questionnaire
- Fieldwork (4 weeks)
  - Data collection
  - Data entry and analysis
- Writing the report (2-4 weeks)

### Sample size

All physicians working in 19 PHC in Taif city were included in this study. 133 physicians are working in PHC.

### Sampling technique

The researcher distributed the self-administered questionnaire by the official MOH email of the employee to the target population, and if there is no response, the researcher contacted with target population or through directors and heads of medicals by turn, they distributed the questionnaires to their

staff during the working hours. Care was taken to not disturb the physician's work duty. The researcher was available to clarify any issue, and the questionnaires were collected on the same day. The data were verified by hand then were coded and entered into a personal computer. Thanks and appreciation were used to encourage the participants to be involved in the study.

#### Data collection tool (instrument)

A Self-administered questionnaire was used for data collection and developed and validated by published research, and permission was granted after requesting it.<sup>15</sup>

The tool consists of three parts to assess physicians' knowledge, attitude, and practice regarding drug allergy.

The questionnaire consists of 3 domains: Knowledge, attitudes, and practice. The questionnaire consisted of 25 closed-ended questions that aimed to collect the following information from the respondents:

(1) Knowledge questionnaire, including clinical manifestations, diagnosis, and management of DHRs. A binary variable scale was used to assess the level of the knowledge (from 0 to 1: 0, wrong; 1, right). Answers formats consisted of 4-choice questions (total 14 questions)

(2) Attitude's domain includes attitude towards the needs for advanced education, current diagnostic tests, and the impact of DHRs on patients' quality of life. A five-point Likert-type scale was used to ascertain the level of agreement or disagreement for the questions (from 1 to 5: 1, strongly disagree; 2, disagree; 3, uncertain; 4, agree; 5, strongly agree) (total five questions).

(3) Practice's domain, including practice pattern of taking allergy history, performing skin test and receiving advanced education of DHRs. A five-point Likert-type scale was used to ascertain the level of the practices (from 1 to 5: 1, never; 2, occasionally; 3, sometimes; 4, often; 5, always) (total six questions). Another demographic questionnaire included nationality, gender, level of education, smoker, and title.

#### Data analysis

Data was entered and analyzed by statistical package for social science SPSS version 25.0. Appropriate statistical tests were used as indicated.

#### Ethical considerations

Permission from the MOH Program of Family Medicine Taif was obtained to conduct the research. Participants in the questionnaire filled individual

consent. Approval by the research and ethical committee at MOH was taken. Permission from IRB was taken. Confidentiality was maintained all through the research steps.

#### RESULTS:

**Table (1)** shows the sociodemographic characteristics of 128 primary healthcare physicians, more than half of them (57.8%) were males, and most of them (75%) were Saudi. Most physicians (60.9%) have a bachelor's degree, 25.8% have a board or higher degree, 7% have a diploma, and 6.3% have a master. Most participants (67.2%) were residents, 18.8% were general practitioners, 12.5% were specialists, and only 1.6% were consultants. The majority (77.3%) were not smokers.

**Table (2)** presents the knowledge, attitude, and practice regarding drug allergy among primary care physicians. More than half of the participants (53.9%) reported moderate knowledge about DA with a mean score of (59.5±16.9). The majority (76.6%) have moderate attitudes towards DA with a mean score of (62.7±9.9). More than half of them (53.1%) have a good practice, and only 10.9% have poor practice regarding DA with a mean score of (68.1±16.2).

**Table (3)** investigates the associations between the sociodemographic characteristics and participants' knowledge, attitude, and practice regarding DA. Gender was significantly associated with the participants' knowledge (P=0.048), attitude (P=0.000), and practice (P=0.001). Males recorded higher knowledge levels (61±17.8), more positive attitudes (67.1±9.4), and better practice levels (71.6±14.7) than the females. The educational level was significantly associated with the knowledge score (P=0.003) and attitude score (P=0.003). Participants with diplomas had the highest knowledge levels (76.2±11.3), while those with board or higher had the least knowledge levels (55.5±17.9). However, physicians with board or higher had the most positive attitudes towards DA (68.4±11.5), and those with diplomas recorded negative attitudes (55.2±14.3). The title was significantly associated with the participants' knowledge (P=0.033), attitude (P=0.004), and practice (P=0.041). Consultants had higher knowledge levels (100±0), more positive attitudes (76±0), and better practice levels (90±0) than the other titles. The nationality was significantly associated with the participants' attitudes (P=0.000), as the Saudi participants had more positive attitudes towards DA

(64.8±9.4) than the non-Saudi (56.5±8.8). There was a significant association between smoking status and practice ( $P=0.021$ ), as the non-smokers had better

practice towards DA (69.7±16.4) than the smokers (63±15.1).

**Table (1): The sociodemographic characteristics of the participants (n=128)**

Parameter		No. (%)
Gender	Female	54 (42.2%)
	Male	74 (57.8%)
Educational Level	Bachelor	78 (60.9%)
	Board or higher	33 (25.8%)
	Master	8 (6.3%)
	Other (diploma)	9 (7%)
Title	Consultant	2 (1.6%)
	General Practitioner	24 (18.8%)
	Resident	86 (67.2%)
	Specialist	16 (12.5%)
Nationality	Non-Saudi	32 (25%)
	Saudi	96 (75%)
Smoker	No	99 (77.3%)
	Yes	29 (22.7%)

**Table (2): Knowledge, attitude, and practice regarding drug allergy among primary care physicians.**

Parameter		No.	%
Knowledge	Good	33	25.8%
	Moderate	69	53.9%
	Poor	26	20.3%
	Mean±SD (Min-Max)	59.5±16.9 (14.3-100.0)	
Attitude	Good	23	18.0%
	Moderate	98	76.6%
	Poor	7	5.5%
	Mean±SD (Min-Max)	62.7±9.9 (36.0-80.0)	
Practice	Good	68	53.1%
	Moderate	46	35.9%
	Poor	14	10.9%
	Mean±SD (Min-Max)	68.1±16.2 (33.3-100.0)	

**Table (3): The associations between the participants' sociodemographic characteristics and their knowledge, attitude, and practice towards DA.**

Parameter		Knowledge score (Mean±SD)	Attitude score (Mean±SD)	Practice score (Mean±SD)
Gender	Female	57.6±15.8	56.9±7.2	63.4±17.2
	Male	61±17.8	67.1±9.4	71.6±14.7
	P-value*	<b>0.048</b>	<b>0.000</b>	<b>0.001</b>
Educational Level	Bachelor	59.5±15.7	61.7±7	67.4±15.9
	Board or higher	55.5±17.9	68.4±11.5	70.1±10.5
	Master	58.1±21.8	58±11.8	74.2±28.9
	Other (diploma)	76.2±11.3	55.2±14.3	62.3±22.1
	P-value**	<b>0.003</b>	<b>0.003</b>	0.459
Title	Consultant	100±0	76±0	90±0
	General Practitioner	56.3±16.4	57.4±7.7	64.6±10.6
	Resident	58±15.2	64.5±9.6	68.7±15.1
	Specialist	67.5±20.2	60±11.1	68±26.3
	P-value**	<b>0.033</b>	<b>0.004</b>	<b>0.041</b>
Nationality	Non-Saudi	57.6±18.5	56.5±8.8	68.3±17.6
	Saudi	60.2±16.6	64.8±9.4	68.1±15.9
	P-value*	0.362	<b>0.000</b>	0.827
sSmoker	No	60.5±17	63.2±10.5	69.7±16.4
	Yes	56.2±17	61.3±7.4	63±15.1
	P-value*	0.129	0.320	<b>0.021</b>

\*Mann-Whitney test was used.

\*\*Kruskal-Wallis test was used.

## DISCUSSION:

Drug hypersensitivity responses may increase healthcare expenses by raising morbidity and death in patients. Many studies have shown DHRs as a key factor in hospital readmissions.<sup>15-17</sup> As a result, recognizing, treating, and following up on DHRs is a procedure that has an impact on patient care.

Since the World Allergy Organization (WAO) International Survey on Diagnostic Procedures and Therapies in Drug Allergy/Hypersensitivity was conducted and published nearly a decade ago, several other physician assessments on the diagnosis and management of drug allergy/hypersensitivity have been conducted.<sup>18</sup> This study evaluates the knowledge, attitudes, and practices of drug-allergy reactions among primary health care physicians in Taif city, Saudi Arabia.

The present study reported fair knowledge levels and attitudes and good practices towards DA among the physicians. Most of these physicians had moderate knowledge and attitude levels and good practices regarding DA. *Haines et al.* also reported positive attitudes; however, poor practices and lack of knowledge towards adverse drug reactions among primary care physicians in South Africa.<sup>19</sup> Reports for different low- and middle-income countries were similar to our findings regarding the knowledge, attitude, and practice levels in India<sup>20</sup> and Malaysia.<sup>21</sup>

Similar to previous research, including hospital-based studies,<sup>21-26</sup> these findings imply that under-reporting of ADRs is related to gaps in knowledge, attitudes, and behaviors. These findings point to a significant and

urgent need for adequate education and training, from identification through reporting, to enhance spontaneous reporting.<sup>24</sup>

**Simons *et al.*** in WAO anaphylaxis guidelines: Summarised that the primary challenges to implementing the guidelines' recommendations include the mistaken belief that anaphylaxis is an uncommon condition and the absence of universal availability of key drugs, supplies, and equipment its testing and care across the world. Another obstacle is a lack of understanding that hypotension and shock are frequently missing in patients. For patients with anaphylaxis, that serum tryptase or plasma histamine levels are not necessarily increased, death can occur within a few minutes, and prompt basic initial treatment can be life-saving.<sup>27</sup>

This study demonstrated significant associations between the participants' knowledge, attitudes, and practices and their gender and title. Males and consultants were the most knowledgeable, had the most positive attitudes, and best practices towards DA. Physicians with higher educational levels had more positive attitudes than the others; however, those with a diploma and other degrees had higher knowledge levels. The Saudi participants had more positive attitudes than the non-Saudi, and the non-smokers had better practices than the smokers.

Advanced education became necessary to close knowledge and practise gaps among different physicians in Saudi Arabia. Nonetheless, physicians continue to be a key pillar of spontaneous reporting of ADRs across the world, and as such, they are the primary target of pharmacovigilance teaching initiatives.<sup>28</sup>

Another strategy based on educational presentations and monthly reminders increased spontaneous ADR reporting in hospital settings.<sup>29</sup> The number of ADRs recorded, and the number of reports rose as a result of educational sessions and regular visits by a research assistant.<sup>30</sup> The differing baseline reporting rates in the two research regions before the educational intervention, 36 complaints per million inhabitants in north Portugal in 2003 and 350 reports per million people in Galicia in 2006, may have impacted the size of the effect.<sup>31</sup> **Limitations**

The results of this study cannot be generalized over the Kingdom of Saudi Arabia as it was only conducted in one city. The researchers had limited time in the data

collection process which may also bias the generalization of the results. The busy clinics restricted the physicians' ability to cooperate as expected with the researchers. Furthermore, qualitative research approaches would have provided a more comprehensive insight. These concerns will be addressed in future studies. Despite these limitations, we believe our findings are sound and will help authorities enhance the use of drugs in ambulatory care in the future.

### CONCLUSION:

This study demonstrated relatively good knowledge levels and positive attitudes as well as good practices towards DA among primary care physicians in Taif, Saudi Arabia. There are significant associations between individuals' knowledge, attitudes, and behaviors with their gender and title. Males and consultants were the most knowledgeable, had the most positive attitudes, and best practices regarding DA. Physicians with higher educational levels had more positive views than those with diplomas and other degrees, although those with diplomas and other degrees had greater knowledge. Saudi participants exhibited more positive views than non-Saudi individuals, and non-smokers had better behaviors than smokers.

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