

Original Article

A SURVEY OF DRUG-RELATED-PROBLEMS AMONG PATIENTS TREATED FOR ALLERGY SYMPTOMS IN COMMUNITY PHARMACIES AT NEGERI SEMBILAN, MALAYSIA

JAMUNA RANI APPALASAMY*¹, AZMI SARIFF¹

¹School of Pharmacy, University Sains Malaysia.
Email: jhamunaa2@gmail.com

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ABSTRACT

Objectives: Patients treated for allergy symptoms are at risk of acquiring drug-related problems (DRPs), as they require various types and forms of medications. Inappropriate therapeutic management of allergy symptoms could lead to the complication of diseases such as asthma and diabetes. To date, DRPs among patients treated for allergy symptoms have not been well established in Malaysia especially in community pharmacies setting. The main objective of this study is to identify factors and medications associated with DRPs among patients treated for allergy symptoms in community pharmacies.

Methods: This descriptive and cross-sectional study was conducted in community pharmacies in Negeri Sembilan, Malaysia from June 2011 to April 2012. The Pharmaceutical Care Network Europe Classification Version (PCNE) 6.2 was used as a tool to classify DRPs.

Results: A total of 378 patients were recruited according to inclusion and exclusion criteria. A total of 792 DRPs were found; an average of 1.97 (SD = 1.6) DRP per patient. Significant DRP association ($p < 0.05$) was detected from the usage of corticosteroids and antihistamines. Meanwhile, poly pharmacy and forgetfulness were factors significantly associated ($p < 0.05$) as causes of DRPs.

Conclusion: There is a high occurrence of DRPs among patients who are treated for allergy symptoms. Identifying types and causes of DRPs in a community pharmacy would facilitate medication safety awareness among healthcare providers and patients.

Keywords: Drug Related Problems, PCNE DRP classification, Treatment of allergy symptoms, Community Pharmacy.

INTRODUCTION

Allergy symptom is a term describing responses of body immune system against an allergen such as dust, dander, food, mold, insect sting and chemicals which could trigger an allergy reaction. Chemicals cover a wide range of substances which are also inclusive of drugs [1]. Allergy is a common disorder but it could have detrimental impacts on quality of life, and untreated allergy symptoms can potentially result in disease complications such as asthma [2]. Allergy is prevalent in both gender and age in all population. The old and young are more prone to severe allergy complications [3], [4]. Allergy also occurs frequently among those who carry the susceptible genes [5]. It could affect various part of the body such as the eye, ear, nose and systems such as circulatory, cutaneous and digestive systems.

Allergy tends to be constant and chronic in Malaysia. The prevalence of eczema and asthma accounts to 20 percent of its population. From recent survey, one in three Malaysians is afflicted from any type of allergy [6]. Drug reactions or side effects were occasionally misguided for allergies. There have been instances where a patient develops an allergic reaction even after being prescribed the right medication [7].

There are many medications available as over-the-counter or prescribed drug to treat allergy symptoms. The main classes of medications prescribed for allergy are antihistamines, decongestants, steroids, bronchodilators and leukotriene modifiers depending on the severity of symptoms. These classes of drugs do have its own side effects and contraindication. Medication safety could be jeopardized if inappropriate drug dosage of choice or form is prescribed without proper justification and monitoring [8].

Drug related problem (DRP) is "an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes" [9]. Patients with allergy symptoms especially older patients and those with chronic diseases are more likely to be prescribed multiple medications, leading to increased risks of drug-drug interactions. Apart from that, age-related alterations in pharmacodynamics and pharmacokinetics of drugs, which might

potentiate or reduce their efficacies, can lead to the occurrence of DRPs [10]. Undetected DRPs if unattended or untreated may cause drug-related mortality [11]. Primary health care providers, especially community pharmacists, are in a position to recognize and prevent DRPs [12].

Up to now, the DRPs associated with patients treated for allergy symptoms have not been well studied in community pharmacies in Malaysia. Based on the findings, more collaboration of studies with community pharmacies could be implemented to improve medication safety.

MATERIALS AND METHODS

The main objective of the study was to explore the factors and medication groups associated with DRPs in patients treated for allergy symptoms. The data collection was done from June 2011 until April 2012. This descriptive and cross-sectional study design was conducted in a form of survey. Convenience sampling design was used in the survey.

The study was carried out in community pharmacies in Negeri Sembilan, Malaysia. Out of 63 community pharmacies which were invited to participate in this study, only six of them gave their consent. Ethical clearance for the study was obtained from the Ethical Review Committee, University Sains Malaysia. Participants were voluntary patients who visited community pharmacies. They were interviewed by the author using an interviewer administered questionnaire. The estimated sample size for this study was 377, using RAOSOFT calculator with 95% confidence interval and 5% error margins. Written informed consent was obtained from all participants.

The interviewer administered questionnaire items were developed from literature reviews and consultation with experts from different related fields and then was pre-tested. The interviewer administered questionnaire comprised of three sections: (A) Socio-demographic details, (B) medical and medication history and (C) Drug related problems. The socio-demographic section was used to obtain descriptive data regarding gender, race, age and family

history of allergy. The medical and medication history section was further subdivided to (1) medical history, (2) medication history, (3) details of allergy symptom medications. These sections obtained information of existing illnesses and treatment, frequency of medications changed and the reason for the medications given. The drug related problems section was similar to the subdivision of Pharmaceutical Care Network Europe (PCNE) DRP classifications version 6.2 (revised 14 January 2010) [13]. Each DRP group has primary domains and more precise sub-domains. A description for each primary domain DRP is visibly stated. Statistical package for social sciences (SPSS) version 17 was used for data management and analyses. Demographic data were calculated and expressed as percentages. Means and standard deviations were performed. Chi square test was used for determination of significant relationship between types of medications prescribed for allergy symptoms and factors associated with occurrence of DRPs. P-value <0.05 was considered statistically significant.

RESULTS

Sociodemographic characteristics

A summary of the demographic characteristics of the participants are displayed in [Table 1]. Out of 523 participants who were interviewed in the community pharmacies, a total of 378 of them received medications for allergy symptoms. A quarter of them claimed the medications for allergy symptoms were for the first time whereas the rest of them had received medications for allergy symptoms more than once. More than half of the participants were female (65.9%) and majority of them were Chinese (63.0%) followed by (26.5%) of Malay, (9.5%) of Indian and 1% of others. A partial number of them (58.7%) were between 40-59 years old. A total of 97 (25.7%) of them had the family history of allergy.

Medications prescribed for allergy symptoms

In total, participants received 526 medications for treatment of allergy symptoms. The prescribers of medications for allergy

treatment were both from private and government healthcare facilities. A small number of the participants also self-treated their allergy symptoms with OTC medications from community pharmacies. The classes of medication are presented in [Table 2].

Of these medications, 200 (38.0%) were oral antihistamines, followed by 103 (19.6%) topical corticosteroids, 65 (12.4%) of oral decongestants and 55 (10.5%) of oral bronchodilators. This represents an average of 1.8 (SD= 1.3) medications for allergy symptoms per patient.

Table 1: It shows the sociodemographic characteristics of the participants (n=378)

Gender	No. of Participants	Percentage
Male	129	34.1
Female	249	65.9
Race	No. of Participants	Percentage
Malay	100	26.5
Chinese	238	63.0
Indian	36	9.5
Others	4	1.0
Age (years)	No. of Participants	Percentage
18-39	95	25.1
40-59	222	58.7
60 and above	61	16.2
Family history	No. of participants	Percentage
Presence of family history of allergy	97	25.7
No presence of family history of allergy	281	74.3

Table 2: It shows the medications prescribed for allergy symptoms (n=526) associated with the occurrence of DRPs in participants.

Medication prescribed for allergy symptoms	No. of medication	Percentage	p value *
Oral antihistamine	200	38.0	0.002 ^a *
Topical antihistamine	11	2.1	0.103 ^a
Oral decongestant	65	12.4	0.03 ^a *
Nasal decongestant	14	2.7	0.104 ^b
Oral corticosteroid	27	5.1	0.078 ^a
Topical corticosteroids	103	19.6	0.002 ^a *
Inhaler corticosteroids	12	2.2	0.28 ^a
Nasal corticosteroids	10	1.9	0.081 ^a
Oral bronchodilators	55	10.5	0.013 ^a *
Inhaler bronchodilators	29	5.5	0.010 ^a *

Note: A participant may receive more than 1 medication for allergy symptoms. ^aComputed using Continuity Correction; ^bComputed using Fisher's Exact Test; *Statistically significant (p<0.05)

Distribution of drug related problems among participants

The study documented 792 DRPs for 378 participants, corresponding to an average of 1.97 (SD= 1.6) DRPs per participant. The distribution of DRPs is displayed in Table 3. More than 40% of the total (792) DRPs were discovered by the participants themselves.

Types of DRPs

The highest type of DRPs identified was related to drug effect (62.9%) followed by adverse effects (16.7%). A majority of them claimed there were no drug effects or optimal treatment for their allergy symptoms. Most of them also claimed having side effect or allergy effect of the drug. The author identified more than half of this pool of participants to have had the wrong effect of drug and untreated indication. A small number of the participants (12.1%) complained of unnecessary and high cost of treatment.

Causes of DRPs

A quarter number of participants had more than one cause of DRP identified (n=844). Drug selection (37%) was the highest number of

causes of DRP. This category was inclusive of 'inappropriate combination of medication' which related to patients' medical history. Many participants, who were diabetic received combined topical antifungal-steroid medication for their skin infection. 'Unnoticed indication' also occurred frequently, where a number of them had not received any treatment for skin infection due to chronic eczema. Most of these participants had also received too many drugs for similar indication; 'polypharmacy and inappropriate duplication' in which three types of antihistamines with various brands (chlorpheniramine, cetirizine, loratadine +pseudo ephedrine) for itchiness and sneezing were prescribed. Dose selection accounted (20.3%) of the total causes of DRPs. This category recorded occurrences of 'dosage regimen too frequent' which inter-related with high dose regimen especially with the use of topical corticosteroids. Drug use process category was another cause of DRPs with (17.9%) occurrences. Many participants were found to have taken the wrong drug and on wrong times. A small number of them have mistakenly taken a non-sedative antihistamine for a sedative antihistamine at wrong intervals. Treatment duration category which reported (12.3%) of the total cause of DRPs was related to incidences such as patients who were on long treatment of

oral and topical corticosteroids without follow up treatment. Whereas logistic and patient category which contributes (5.1%) and (2.5%) each from the total cause of DRPs were related to problems such as lack of information by the dispenser or prescriber, participants' non-compliance and usage of unnecessary supplement or drug for the similar symptoms.

Table 3: It shows the identified drug related problems (n=792) and its causes (n=844) in participants prescribed medication for allergy symptoms.

Identified DRP	No. of DRPs	Percentage
Drug effect	498	62.9
Adverse reactions	132	16.7
Treatment costs	96	12.1
Others	66	8.3
Cause of DRPs	No. of DRPs	Percentage
Drug selection	312	37.0
Drug form	34	4.0
Dose selection	171	20.3
Treatment duration	104	12.3
Drug use process	151	17.9
Logistics	43	5.1
Patient	21	2.5
Other	8	0.9

Note: A participant may have more than 1 cause of DRP.

[Table 2] and [Table 4] tabulates the parameters that were significantly associated with DRP occurrences. Having family history of allergy, ($p=0.034$), polypharmacy ($p=0.002$) and medication non-adherence ($p=0.021$) appeared to have significant associations with the occurrence of DRPs. Apart from that, several classes of medications commonly prescribed for allergy symptoms such as oral histamine ($p=0.002$), oral decongestant ($p=0.03$), topical corticosteroids ($p=0.002$) and oral bronchodilators ($p=0.013$) were associated with the DRPs identified. On the other hand, factors such as age, gender and concurrent chronic disease had no significant association with DRP occurrence.

Table 4: It shows factors associated with DRP occurrences

Factors	P value*
Age	0.838 ^a
Gender	0.533 ^a
Family history of allergy	0.034 ^{a*}
Concurrent chronic disease	0.451 ^a
Polypharmacy	0.002 ^{a*}
Medication non-adherence	0.021 ^{a*}

^aComputed using Continuity Correction;

*Statistically significant ($p<0.05$)

DISCUSSION

This is the first study to investigate drug-related problems among patients treated for allergy symptoms in community pharmacies in Malaysia. In this study, DRPs classification and identification depend largely on factors such as the researcher's clinical experience, study design, and study setting. Chances of inconsistencies may have occurred although a validated PCNE DRP classification was used.

A total of 792 DRPs were identified with an average of 1.97 (SD=1.6) DRPs per patient showed that early identification and resolution of DRPs is crucial in allergy treatment. Drug effect was reported as the most frequently encountered DRPs and then followed by adverse reaction in this study. A similar study conducted on discharged patients in community pharmacies reported that uncertainty of information and adverse reaction as the highest frequency of DRPs, and then followed by drug choice [14]. Discrepancies between both of these studies propose that different health care settings, study design, sample size and study populations may have led to variance in classification of DRPs. Collectively, these findings demonstrated that occurrences of DRPs among patients visiting community pharmacies is fairly high.

The classification of drug effect in PCNE classification Version 6.2 involves all DRPs associated with drug choice, dosing and its use. This study identified more than 50% of total DRPs that was related to drug effect which was related to no drug effect and not optimal treatment for their allergy symptoms. There were many instances in this study where drugs were prescribed and the patients claimed had no reduction in allergy symptoms which could be related to choice and dosing problem. This issue has been a concern and mainly associated with antihistamines. It is said that antihistamines are prescribed to relieve symptoms of allergy and do have the tendency to lose its efficacy if taken frequently or if the patients' allergy changes over time [15]. Proper dosing and frequency of antihistamines at the early stages of allergy symptoms is also very important to establish a therapeutic effect and to avoid discontinuation of drug use. In this situation, continuous medical and medication review by the physician is highly recommended.

A small number of participants in this study reported untreated indication as part of drug effect category in PCNE classification where their allergy symptoms were not diagnosed and treated by prescribers. These findings are supported by a few reports which had high statistics on undiagnosed and untreated allergy symptoms especially in cases associated to allergic rhinitis and asthma among children and adults [16],[17]. On the contrary, there could be discrepancies between these studies due to different health care settings and variance of environmental factors such as season and existence of hay fever. Another notable result was that 16.7% of the total DRPs were due to adverse reaction of drugs prescribed for allergy symptoms. These findings commonly involved allergic and non-allergic reaction. From the total of medications involved in allergy symptoms treatment, oral histamines, topical corticosteroids and oral bronchodilators were significantly associated ($p<0.05$) with DRPs. The adverse reactions frequently identified in this study and reported in an earlier study were susceptibility of skin infections and skin atrophy due to excessive use of topical corticosteroids [18],[19]. Another study showed that a proportion of elderly patients complained of constipation and urinary retention with long term use of sedative antihistamines was also similar with this study [20]. Those patients who were on bronchodilators complained of intolerance and tremors which caused them to be morbid were also complaints reported in an earlier study [21]. Nevertheless, the findings from all of these studies do support that the use of antihistamines, corticosteroids and bronchodilators are unavoidable in allergy symptoms treatment but the prescribing behavior must be monitored closely to reduce the risk of adverse reactions.

Several causes of DRPs were also observed during this study. A small number of patients had more than one causes for one type of DRP identified. In the PCNE classification drug selection category, 'inappropriate combination' was commonly identified. Inappropriate combination involved several cases in which diabetic patients were prescribed topical combination of corticosteroids and antifungals which could lead to slow healing or worsening condition. There were no follow-ups for these patients and possibility of deterioration of symptoms may have occurred. Whereas dose selection category reported frequent dosing as one main causes of DRPs in which patients who were on topical corticosteroids, applied potent amount of dose repeatedly in a day. These actions would cause severe adverse reaction in the long run if undetected [22].

In this study, having a family history of allergy was one of the factors found associated with DRP occurrences among patients treated for allergy symptoms [23]. However, it is contrary with a popular myth which says that 'family history of a reaction to a specific drug does not increase the patient's chance of reacting to the same drug' [24]. Polypharmacy was found to be a factor associated with DRP occurrences in this study. An average of 1.8 (SD= 1.3) medications for allergy symptoms per patient was recorded. In addition, a study which defined polypharmacy done recently recorded a higher average ratio [25]. Collectively, these findings demonstrated that the number of DRPs per patient increased linearly with the increase in number of drugs used. This can partly be explained by the fact that patients with chronic illnesses generally use many medications, but it also highlights the need for regular medication review for these patients.

Medication non-adherence is a common and frequent factor of DRP incidences [26]. It was found that many patients who were treated for allergy symptoms experienced forgetfulness of using the inhalers, recalling the frequency of drug administration and memorizing application technique of topical steroids. Frequent patient education and counseling is highly recommended during patients' medication review and visits to minimize DRP risks.

CONCLUSION

The DRPs identified shows that optimal medication management among patients treated for allergy symptoms remains a major challenge in clinical practice. The use of appropriate tool such as PCNE Classification V 6.2 may assist pharmacists and other health care professionals to systematically identify issues in allergy symptoms management. This study aimed at detecting actual DRPs but there could be more underlying potential DRPs with potential causes which would have been detected. Further studies are recommended.

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CONFLICT OF INTERESTS

Conflict of interest declared none.

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