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# Community pharmacists' attitudes toward dispensing errors at community pharmacy setting in Central Saudi Arabia



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## KEYWORDS

Dispensing errors;  
Community pharmacy;  
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**Abstract** *Purpose:* The main objective of this study was to survey pharmacists' attitudes toward dispensing errors in community pharmacy settings in Saudi Arabia.

*Methods:* A cross-sectional survey of community pharmacists in Riyadh region, Saudi Arabia was conducted over a period of 6 months from March through September 2012. A stratified random sample of eight hundred registered pharmacy practitioners was collected all over Riyadh region. Statistical analysis was done using SPSS version 19.0 for windows (SPSS Inc., Chicago, Illinois).

*Results:* The response rate was almost 82%. The majority of the respondents are young adults (90.2%). The median for years of registration of respondent pharmacists was 9 years (range 1–37 years). About 62% (407) of the respondents have a positive response while only 37.8% ( $n = 248$ ) have a negative response in this respect. The major factors identified were pharmacist assistant (82.2%) and high workload (72.5%). The most appreciated factors that help reducing dispensing errors are improving doctors' hand writing and reducing work load of the pharmacist (82.9% and 82.8% respectively), having drug names that are distinctive (76.1%) and having more than one pharmacist in duty (75.5%).

*Conclusion:* In conclusion, majority of community pharmacists indicated that the risk of dispensing errors was increasing and most of them were aware of dispensing errors. It is obvious from the study results that dispensing errors is a big concern for community pharmacy practice in Saudi Arabia. Therefore, there is an urgent need for the professional organizations and Pharmacy Boards in Saudi Arabia to determine standards for the profession.

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## 1. Introduction

Community pharmacists today are involved in a wide variety of professional activities, which may be considered as patient care that optimizes medication therapy and promotes health,

wellness, and disease prevention (American College of Clinical Pharmacy, 2008). This field of pharmacy practice focuses on patient-oriented rather than drug product-oriented service (Barker and Valentino, 1972). However, Community pharmacists can act as a primary source of providing scientifically valid drug information and should be able to advise regarding the safe, appropriate, and cost-effective use of medications (American College of Clinical Pharmacy, 2008; Leape et al., 1999; Bero et al., 2000). The dispensing process in community pharmacy is major part of the quality use of medicines and together with patient counseling, forms the core professional activities of a pharmacist (Peterson et al., 1999).

Dispensing errors are defined as any inconsistencies or deviations from the prescription order such as dispensing the incorrect drug, dose, dosage form; wrong quantity; inappropriate, incorrect, or inadequate labeling, confusing, or inadequate directions for medication use; incorrect or inappropriate preparation, packaging, or storage or medication prior to dispensing (Szeinbach et al., 2007). The aim of the rational prescribing is reducing inappropriate prescribing process and improving patient's safety and care (Crigger and Holcomb, 2008). The concept of right drug, right dose, right route, right time and right patient ensures rational drug therapy (Khoja et al., 2011). Physician related factors, as well as social, environmental and economic factors govern the rationality of a prescription. Errors in prescription writing can occur irrespective of the age, gender, medication, dose, route of administration, or indication (Vance and Millington, 1986). Dispensing errors are believed to be the most prevalent type of medical error and are a significant cause of preventable adverse events (Dean et al., 2002; David et al., 2001; Perwitasari et al., 2010; Bobb et al., 2004).

Role of professionally competent community pharmacists with specialized training in dispensing is pivotal. They can intercept potentially harmful prescribing errors (Wang et al., 2007) and serve as an indispensable source of information for prescribing physicians and nursing staff regarding rational prescribing practices. The American Society of Health System Pharmacists (ASHP) believes that pharmacists have a role in meeting the primary (ambulatory) care needs of patients by providing pharmaceutical care, through their expanded responsibilities in collaborative drug therapy management (Scobie et al., 2003).

Some studies have investigated the community pharmacists' attitudes toward dispensing errors (Peterson et al., 1999; Szeinbach et al., 2007). However, previous studies from community pharmacy practice describe errors in workflow (Hoxsie et al., 2006), satisfaction (Larson, 1998; Bond and Raehl, 2001) and safety (Peterson et al., 1999; Plews-Ogan et al., 2004). However, more information is needed to describe how pharmacy design, and automated dispensing systems contribute to perceptions of error in prescription processing in the community setting. In USA Outpatient prescription medications dispensed were increased from 2.1 billion in 1994 to 3.6 billion in 2005 (Kistner et al., 1994).

In UK, dispensing error rates range from 0.04% to 0.08% for community pharmacy practice (Siew-Siang et al., 2003; Ashcroft et al., 2005). Previous studies also provide evidence that people talking in the background, interruptions and background noise, and pressures (Flynn et al., 1999; Allinson et al., 2005; Edwards and Gronlund, 1998) interfere with concentration and may decrease the ability to perform cognitive func-

tions which result in concentration gaps and information sorting problems that increase the likelihood of errors in prescription processing. However, more information is needed to assess the contribution of internal design variables to dispensing errors and to determine how design variables and cognitive abilities are viewed when dispensing errors occur.

With the increasing focus on high quality outcome based service delivery in health care, it is timely for the pharmacy profession to critically self examine all processes to ensure that their services are of the highest quality from both consumers and professional standard prospective. This study is concerned with the dispensing process in community pharmacy, including factors that increase the likelihood of errors and measures that can be implemented to improve the process. Earlier studies on drug prescribing in Saudi Arabia showed patterns of overprescribing (Sebaie, 1985). On the other hand, all studies in Saudi Arabia addressed the problem of medication prescribing errors from the prospective of physicians (Khoja et al., 2011; Greenberg, 1996) and no studies explore the attitude and views of the community pharmacist toward the dispensing errors, so the main objective of this study was to survey pharmacists' attitudes toward dispensing errors in community pharmacy settings in Saudi Arabia.

## 2. Methodology

A cross-sectional survey of community pharmacists in Riyadh region, Saudi Arabia was conducted over a period of 6 months from March through September 2012. Data collection was carried out using a structured self-administered questionnaire. The validated questionnaire was adopted from previous study (Peterson et al., 1999). A draft of the questionnaire was piloted on a convenience of 20 practicing pharmacists to check for readability, understanding, question design and the length of the questionnaire. Based on the result of this pilot study the questionnaire was used with some modifications and the final questionnaire was handed over to participants in person or sent through mail or E-mail.

The questionnaire consisted of a series of questions including both closed and Likert type. The questionnaire included nine items about community pharmacists' attitudes toward dispensing errors in community pharmacy and demographic information of the pharmacist. The first four questions were about age, year of registration, and practice site. Fifth to seventh questions asked about the frequency of dispensing prescription by pharmacist, opinions on whether the dispensing errors are increasing and actual errors in dispensing are becoming more common respectively. The last two questions explored both the major factors associated with the occurrence of dispensing errors and factors important in minimizing dispensing errors, using a five-point Likert-type scale (1, very often; 2, often; 3, sometimes; 4, rarely; 5, never).

Notably, gender is not included in the demographics where female pharmacists are not allowed to work in community pharmacy in Saudi Arabia.

A stratified random sample of eight hundred registered pharmacy practitioners all over Riyadh region of Saudi Arabia was randomly chosen to respond to the survey. Community pharmacies in Riyadh region were randomly selected for visits according to their geographical distribution (i.e., north, south, east, and west). The selection of facilities was done at random

with a clear intention to include different areas of Riyadh region. The questionnaire was followed up for collection on later date that range from one to seven weeks. Non-respondents

were telephoned, emailed or visited to return their questionnaires. All returned usable questionnaires were completed anonymously.

**Table 1** Demographic data and some characteristics of the survey respondents.

Variables	Frequency	Percentage (%)
<i>Age (in years)</i>		
25–35y	467	71.2
36–45y	135	20.6
46–55y	45	6.9
> 56 and above	9	1.4
Mean 33.87 (range 25–60)		
Median registration years	9 years (range 1–37 years)	
<i>Frequency of participating in dispensing/week</i>		
Never	48	7.3
One day	35	5.3
Two days	21	3.2
Three days	28	4.3
Four days	34	5.2
Five days	102	15.5
Six days	114	17.4
Seven days	274	41.8
Mean (5.2 ± 2.24)		

### 3. Data collection and analysis

The purpose of the study was explained to each participant and they were invited to complete the questionnaire after assuring acceptance and signing the consent form. The survey responses were treated anonymously and confidentially and data from all the respondents were collected, coded and checked for accuracy. Upon receipt of completed survey form the data were entered into the computer and analyzed by using the statistical package for social sciences (SPSS) version 19.0 for windows (SPSS Inc., Chicago, Illinois). Descriptive statistics include percentages; means and frequency distribution were calculated for each of the variables. Relationship between variables was investigated by using appropriate statistical procedure (Chi-squared test) with a *p*-value below 0.05 considered statistically significant.

### 4. Results

The response rate was almost 82% where 800 respondents were approached and 656 of them responded to our

**Table 2** Factors contributing to the dispensing errors.

Variables	Likert responses					Total (n%)
	Very often (n%)	Often (n%)	Sometimes (n%)	Rarely (n%)	Never (n%)	
Poor hand writing	222 (33.8)	145 (22.1)	158 (24.1)	59 (9)	72 (11)	656 (100)
Similar/confusing names	57 (8.7)	137 (20.9)	256 (39)	161 (24.5)	45 (6.9)	656 (100)
Existence of generic brands	55 (8.4)	117 (17.8)	259 (39.5)	176 (26.8)	45 (6.9)	652 (99.4)
Packaging & labeling	34 (5.2)	100 (15.2)	185 (28.2)	166 (25.3)	77 (11.7)	562 (85.7)
Pharmacist fatigue of any cause	51 (7.8)	132 (20.1)	250 (38.1)	155 (23.6)	62 (9.5)	650 (99.1)
Job dissatisfaction	34 (5.2)	132 (20.1)	209 (31.9)	123 (18.8)	59 (9.0)	557 (84.9)
Work load	42 (6.4)	134 (20.4)	233 (35.5)	116 (17.7)	39 (5.9)	564 (86)
Sole pharmacist	57 (8.7)	135 (20.6)	263 (40.1)	127 (19.4)	69 (10.5)	651 (99.2)
By pharmacy assistants	57 (8.7)	121 (18.4)	230 (35.1)	160 (24.4)	81 (12.3)	649 (98.9)
Noise	48 (7.3)	111 (16.9)	223 (34)	181 (27.6)	87 (13.3)	650 (99.1)
Interruption	57 (8.7)	119 (18.1)	217 (33.1)	182 (27.7)	75 (11.4)	650 (99.1)
Design of dispensary	48 (7.3)	108 (16.5)	201 (30.6)	202 (30.8)	92 (14.0)	651 (99.2)
Design of computer dispensing software	55 (8.4)	115 (17.5)	185 (28.2)	196 (29.9)	96 (14.6)	647 (98.6)
Insufficient technical resources	43 (6.6)	127 (19.4)	210 (32.0)	181 (27.6)	91 (13.9)	652 (99.4)
Lack of privacy	41 (6.3)	142 (21.6)	226 (34.5)	166 (25.3)	76 (11.6)	651 (99.2)
Lack of time to talk with patients	113 (17.2)	145 (22.1)	200 (30.5)	136 (20.7)	55 (8.4)	649 (98.9)

**Table 3** Perceived factors that may reduce the risk of dispensing errors.

Variables	Likert responses					Total (n%)
	Very often (n%)	Often (n%)	Sometimes (n%)	Rarely (n%)	Never (n%)	
Improving doctors' hand writing	241 (36.7)	156 (23.8)	147 (22.4)	62 (9.5)	43 (6.6)	649 (98.9)
Reducing workloads on pharmacist	201 (30.6)	175 (26.7)	167 (25.5)	62 (9.5)	45 (6.9)	650 (99.1)
Having more than one pharmacists on duty	148 (22.6)	185 (28.2)	162 (24.7)	95 (14.5)	59 (9.0)	649 (98.9)
Performance of physical dispensing by pharmacy assistants	109 (16.6)	177 (27.0)	156 (23.8)	108 (16.5)	100 (15.2)	650 (99.1)
Keeping drug knowledge up-to-date	135 (20.6)	169 (25.8)	169 (25.8)	87 (13.3)	81 (12.3)	641 (97.7)
Avoiding interruptions	134 (20.4)	185 (28.2)	163 (24.8)	79 (12.0)	79 (12.0)	640 (97.6)
Having drug names that are distinctive	108 (16.5)	198 (30.2)	197 (30.0)	95 (14.5)	42 (6.4)	640 (97.6)
Improving packaging & labeling	97 (14.8)	189 (28.8)	182 (27.7)	95 (14.5)	77 (11.7)	640 (97.6)
Checking original prescription	94 (14.3)	187 (28.5)	192 (29.3)	104 (15.9)	62 (9.5)	639 (97.4)
Systematic dispensing workflow	99 (15.1)	177 (27.0)	202 (30.8)	110 (16.8)	52 (7.9)	640 (97.6)
Having mechanism for checking dispensing procedures	86 (13.1)	209 (31.9)	182 (27.7)	109 (16.6)	55 (8.4)	641 (97.7)
Counseling patients at the time of supply	112 (17.1)	195 (29.7)	168 (25.6)	92 (14.0)	73 (11.1)	640 (97.6)
Privacy when counseling patients	113 (17.2)	189 (28.8)	181 (27.6)	86 (13.1)	72 (11.0)	641 (97.1)

questionnaire. According to Table 1 the demographic data of the Saudi community pharmacists reveal that the majority of the respondents are young adults (90.2%). Most of respondents were from age group of 25–35 years who were contributing about 71.2% of the respondents, while elderly (56 years and more) were only 1.4%. The median for years of registration of respondent pharmacists was 9 years (range 1–37 years). The years of registration refer to respondents' experience in Saudi Arabia. About 42% (274) of respondents have an average participation in dispensing of 7 days a week. Opinions were sought on whether the risk of dispensing errors is increasing. About 62% (407) of the respondents have a positive response while only 37.8% ( $n = 248$ ) have a negative response in this respect. Similarly opinions were sought on whether the actual errors in dispensing are becoming more common. There was a frequency of 364 (55.5%) answering 'yes' and 291 (44.4%) answering 'no'.

Dispensing errors occur at any stage of the dispensing process, from the receipt of the prescription in the pharmacy to the supply of a dispensed medicine to the patient. Table 2 depicts the factors that contribute to the dispensing errors as measured from the five-point Likert-type scale. The major factors identified were pharmacist assistant (82.2%), high workload (72.5%), lack of time and sole pharmacist (69.8%, 69.4 respectively), similar or confusing drug names (68.6%), pharmacist fatigue (66%), existence of generic brands (65.7%), lack of privacy (62.7%), interruption (59.9%), noise (58.2%), insufficient technical resources (58%), job satisfaction (57.8%), design of the dispensary (54.4%), design of computer software (54.1) and package labeling (48.6%).

Table 3 reveals the values of total respondents for the different variables, with respect to measures that can minimize the risk of dispensing errors as measured from the Likert scale in the survey. A number of factors were considered important in minimizing the possibility of dispensing errors. The most appreciated factors are improving doctors' hand writing and reducing work load of the pharmacist (82.9% and 82.8% respectively), having drug names that are distinctive (76.1%), having more than one pharmacist in duty (75.5%), privacy when counseling patients (73.8%), avoiding interruptions (74.3%), systematic dispensing work flow (72.9%), counseling patients at the time of supply (72.4%), having mechanism for checking dispensing procedure (72.7%), keeping drug knowledge up to date (72.2%), checking original prescription (72.1%), improving packaging and labeling (71.3) and performance of physical dispensing by pharmacy assistants (67.4%).

Table 4 shows the comparison between two age groups of the respondents (25–35 years) versus those who were 36 years old and more in respect of factors contributing to the occurrence of dispensing errors. Similar or confusing names is the only significant factor ( $p$  value = 0.001). While privacy when counseling patients was shown to be the only factor showing a significant difference between the views between these age groups (Table 5).

Table 6 shows the Spearman–Rank rho and  $p$ -values when comparing the years registered as a pharmacist against proposed factors contributing to dispensing. There were several statistically significant, albeit weak, correlations. Increasing period of registration was associated with a decline in concern about the possible contributions to the existence of generic

**Table 4** Comparison between the views of young respondents (25–35 years  $n = 467$ ) and those who are  $\geq 36$  years ( $n = 189$ ) with regard to the perceived factors contributing to the occurrence of dispensing errors.

Variables	25–35 Y	36 & above	<i>p</i> -Value
Poor hand writing by doctors	467	189	.656
Similar or confusing names	467	189	.001
The existence of generic brands	464	188	.832
The packaging and labeling of the product	404	158	.546
Pharmacist fatigue of any cause	463	187	.000
Job dissatisfaction	400	157	.729
High prescription value (Work load)	405	159	.352
Sole pharmacist	463	188	.322
By pharmacy assistants	461	188	.414
Noise	462	188	.189
Interruptions	461	189	.258
Design of dispensary and layout of shelves	462	189	.982
Design of computer dispensing software	458	189	.809
Insufficient technical resources	463	189	.698
lack of privacy when dispensing	463	188	.615
Non-professional activities occurring in the area of dispensary	461	187	.519
Insufficient time to talk with the patient	461	188	.123

**Table 5** Comparison between the views of young respondents (25–35 years  $n = 467$ ) and those who are  $\geq 36$  years ( $n = 189$ ) with regard to the perceived factors which nominated as important in minimizing the risk of dispensing errors.

Variables	25–35 Y	36 & above	<i>p</i> -Value
Improving doctors' hand writing	462	187	.266
Reducing workloads on pharmacists	461	189	.955
Having more than one pharmacist on duty	460	189	.619
By pharmacy assistants	462	188	.531
Keeping one's knowledge of drugs up-to-date	456	185	.120
Having drug names that are distinctive	457	183	.928
Checking the original prescription	456	184	.299
Having a systematic dispensing workflow	456	183	.625
Improving the packaging and labeling of drug	457	184	.061
Having a mechanisms for checking dispensing procedures	457	184	.080
Avoiding interruptions	456	184	.359
Privacy when counseling patients	457	184	.022
Counseling patients at the time of supply	456	184	.304

**Table 6** Correlation between years registered as a pharmacist and views on factors contributing to errors.

Variable	Spearman rho	<i>p</i> value
Poor hand writing by doctors	0.031	.0226
Similar or confusing names	0.057	.0082
The existence of generic brands	−0.086	.0019
The packaging and labeling of the product	−0.101	.0012
Pharmacist fatigue of any cause	0.079	.0029
Job dissatisfaction	−0.042	.0177
High prescription value dispensing (work load)	−0.023	.0304
Sole pharmacist (compared with two or more pharmacists present at one time)	0.047	.0127
Participation in dispensing by pharmacy assistants	0.041	.0165
Noise	−0.005	.0449
Interruptions (e.g. telephone, customers)	0.002	.0476
Design of dispensary and layout of shelves	−0.037	.0185
Design of computer dispensing software	−0.028	.0251
Insufficient technical resources (e.g. equipment, drug reference book)	−0.052	.0104
Lack of privacy when dispensing	0.005	.0453
Non-professional activities occurring in the vicinity (area) of dispensary	−0.014	.0372
Insufficient time to talk with the patient or his/her agent (medications)	0.005	.0454

**Table 7** Correlation between years registered as a pharmacist and views on factors that may reduce the risk of dispensing errors.

Variable	Spearman rho	p value
Improving doctor's hand writing	.081	0.026
Reducing workloads on pharmacists	.042	0.156
Having more than one pharmacist on duty	.037	0.186
Performance of physical dispensing by pharmacy assistants	-.094	0.012
Keeping one's knowledge of drugs up-to-date	-.028	0.251
Avoiding interruptions	.046	0.138
Having drug names that are distinctive	.017	0.347
Improving the packaging and labeling of drug products	-.110	0.004
Checking the original prescription (duplicate)when dispensing repeats	-.032	0.223
Having a systematic dispensing workflow	-.040	0.171
Having a mechanisms for checking dispensing procedures	-.096	0.011
Counseling patients at the time of supply	-.007	0.431
Privacy when counseling patients	-.063	0.067

brands ( $rs = -0.086$ ,  $p = 0.019$ ) while the errors of packaging and labeling ( $rs = -0.101$ ,  $p = 0.012$ ) of products support the pharmacist's fatigue for any cause ( $rs = 0.079$ ,  $p = 0.029$ ) as a contributing factor.

Table 7 shows the Spearman–Rank rho and  $p$ -values when comparing the years registered as a pharmacist against proposed measures to minimize the risk of dispensing errors. There were four statistically significant, but weak, correlations. Increasing period of registration was associated with a decline in the perceived importance of performance of physical dispensing by pharmacy assistants ( $rs = -0.094$ ,  $p = 0.012$ ), having a mechanism for checking dispensing procedures ( $rs = 0.096$ ,  $p = 0.011$ ) and improving the packaging and labeling of drug products ( $rs = -0.110$ ,  $p = 0.004$ ). Increasing period of registration was associated with increased perception of importance of improving doctors' hand writing ( $rs = 0.081$ ,  $p = 0.026$ ) that may reduce the risk of dispensing errors.

## 5. Discussion

Prescription dispensing is one of the core functions of a pharmacist. It is a complex process that involves a range of cognitive and manual steps. There is evidence that the risk of dispensing errors is increasing (Greenberg, 1996) and this has led to an increase in the intensity of medical care and use of medication therapy. It is still necessary to pay close attention to dispensing errors, because nowadays pharmacies dispense such high volumes of medications that even a low error rate can translate into a large number of errors (Cina et al., 2006). Study results show that 55.5% of respondents perceived that errors in dispensing are more common when compared to the results of Peterson and colleagues 47% actual errors in dispensing (Peterson et al., 1999).

Similar or confusing names as a contributing factor in dispensing errors was perceived as a significant factor by (41%) of our respondents compared with 24% in a study conducted in Scotland (Williams, 2007). This might be due to the high number of medicines marketed in Saudi Arabia of variable origins with some similarities in trade names. The study results show that workload was perceived as an important contributing factor in dispensing errors, which was supported by another studies (Kistner et al., 1994; Beso et al., 2005). Moreover, some studies suggested that maximum workload should not exceed

125 prescriptions per pharmacist per 8 h shift (Greenberg, 1996; Pharmacy Board of New South Wales, 1996).

Fatigue of healthcare providers (11%) and interruptions during dispensing (9.4%) were considered as the second and third most important factors for dispensing errors as reported by a study in the United Kingdom (Beso et al., 2005). In accordance with this study, our results showed that 38.1% and 33.1% of respondents reported that fatigue of pharmacist and interruptions during dispensing were higher when compared to the pervious study because of the difference of practice setting. Like pharmacy, there is considerable concern within the medical profession about the issues of overwork and fatigue, and their contribution to errors (Nocera and Strange Khursandi, 1998; Marty and Crothers, 1995). It has been suggested that doctors and pharmacists alike have a huge responsibility to protect patients from drug prescribing and dispensing errors (Olson and Ambrogetti, 1998).

In a Danish study, a research team analyzed self-reports of community pharmacies to identify the causes of dispensing errors (Knudsen et al., 2007). The analysis team identified four root causes: handwritten prescriptions; similarities in packaging or names, or strength and dosage stated in misleading ways; lack of effective control of prescription label and medicine; and lack of concentration caused by interruptions. These findings were consistent with our study results. However, in our study similar or confusing names, pharmacist's fatigue, pharmacist workload and poor handwriting were identified as the major causes of dispensing errors.

Pharmacy design and layout of the drug store may also contribute to the occurrence of dispensing errors that may not provide the pharmacist with sufficient privacy to counsel patients (Abood, 1996; Flynn et al., 1996; Anonymous, 1994; Turner, 1995). In consistent with these studies (Abood, 1996; Flynn et al., 1996; Anonymous, 1994; Turner, 1995), most of our study respondents (62.4%) perceived that dispensary design is a significant cause contributing to dispensing errors. Lack of up-to-date knowledge may also be a factor in misinterpreting the prescriber's intent with bad handwritten prescriptions and it is unacceptable for pharmacists to be unaware of new strengths and dosage forms. Lack of up-to-date knowledge is another factor contributing to dispensing errors reported by our study respondents, which was in accordance with another previous work (Abood, 1996).



The responding pharmacists mentioned a number of factors that may reduce the risk of dispensing errors. These factors include improving doctors' handwriting, reducing pharmacist's workload, using distinctive drug names, having more than one pharmacist in duty, privacy when counseling patients, avoiding interruptions, systematic dispensing workflow, counseling patients at the time of supply, having mechanism for checking dispensing procedure, keeping drug knowledge up to date, checking original prescription, improving packaging and labeling and performance of physical dispensing by pharmacy assistants. The current study findings revealed a consistency with the findings of Peterson et al. (1999). These findings necessitate the implementation of quality assurance procedures to avoid dispensing errors and should be an integral part of dispensing practice (Greenberg, 1996).

Being one of the most reported contributing factors for dispensing errors from our study respondents all efforts should be directed to minimize interruptions to dispensing pharmacists. Abood suggested a number of procedures to minimize stress that can reduce the number of interruptions to the pharmacist (Abood, 1996). To optimize the patient counseling, the dispensary area should be designed in a way that provides better patient privacy and comfort. Proper utilization of pharmacy technician and other pharmacy personnel will improve dispensing process and reduce the risk of dispensing errors. It is clear that patient counseling can help avoid and detect dispensing errors (Kistner et al., 1994). Counseling can reduce the number of errors, as it allows the pharmacist to formally identify the products and ensure that the correct drugs are dispensed to the right person separating drugs with a similar name or appearance, Keeping interruptions in the dispensing procedure to a minimum and maintaining the workload of the pharmacist at a safe and manageable level.

Another reported significant cause of dispensing errors acknowledged by the study respondents is an insufficient technical resource. Pharmacies need to introduce several methods and strategies to reduce dispensing errors, depending on the different working phases of the pharmacies in the medication process and the development of information technologies (Marty and Crothers, 1995; Kaushal and Bates, 2002; Halkin et al., 2001; Poon et al., 2006; Oswald and Caldwell, 2007; Anacleto et al., 2005). Additionally, use of Electronic prescribing may help to reduce the risk of dispensing errors. Keeping updated pharmaceutical knowledge by the pharmacist is to be expected by the public and is a reasonable demand on the profession as a whole.

In conclusion, majority of community pharmacists indicated that the risk of dispensing errors was increasing and most of them were aware of dispensing errors. The major causes were pharmacist assistant, high workload, lack of time, sole pharmacist and similar or confusing drug names. The major factors believed to reduce dispensing errors were improving doctors' handwriting, reducing work load of the pharmacist, having drug names that are distinctive, having more than one pharmacist in duty, privacy when counseling patients, avoiding interruptions, systematic dispensing work flow, counseling patients at the time of supply, having mechanism for checking dispensing procedure, keeping drug knowledge up to date, checking original prescription, improving packaging and labeling and performance of physical dispensing by pharmacy assistants. It is obvious from the study results that dispensing errors is a big concern for community pharmacy

practice in Saudi Arabia. Therefore there is an urgent need for the professional organizations and Pharmacy Boards in Saudi Arabia to determine standards for the profession.

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