DEFINING PRESCRIBING ERRORS IN GENERAL PRACTICE FOR THE HOSPITALS IN PAKISTAN

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ABSTRACT

***Objectives*:** To reach consensus on a definition of prescribing errors and different scenarios representing prescribing error situations in general practice by a Pakistani panel of expert judges. Later this definition and scenarios will be used for evaluating prescribing practices in hospitals.

***Study Design*:** The study was designed to be conducted in a Two-Round Delphi Technique though a questionnaire to be delivered hand-by-hand to each member of the panel.

Place and Duration of study: This was a prospective at various of judges hospitals study conducted in Lahore and Bahawalpur from May 2006 to July 2006.

Material and Methods: A questionnaire in a two-round Delphi technique was followed to gauge consensus on a definition and 46 scenarios proposed to be representing prescribing error situations.

Results: Consensus was reached to agree upon a definition of prescribing errors, 33 (71.7%) scenarios were considered prescribing errors, 8 (17.4%) scenarios were excluded and 5 (10.9%) were partially agreed upon to be considered depending on the individual situation.

Conclusion: The Pakistani panel of expert judges agreed upon the definition and scenarios to be considered prescribing errors. The definition and scenarios can also be used for future research on prescribing errors in Pakistani hospitals.

Key words: Prescribing error, Delphi technique, Consensus

INTRODUCTION

Medical error is considered a major killer even in developed countries. In the United States, it was placed among the top five killers [1]. Prescribing error is a sub-umbrella under medical error; accounts for errors occurring during the prescribing stage. The prescribing stage is the most error-susceptible stage as compared with administration, dispensing, and transcribing stages and prescribing errors are the most attributable errors among other medical errors [2]. Hospitalized patients are exposed to multiple drug treatment often involving potentially harmful drugs. The number of drugs marketed is substantial and super specialization of clinicians is increasing. Consequently, clinicians' knowledge and clinical experience with prescribed drugs is declining [3]. Situations considered to be prescribing errors were a hot debate subjects by prescribers and other healthcare professionals since long time. A few researchers have conducted studies to identify these situations, while those identified situations were subjects to critique and rejection by prescribers and other healthcare practitioners. Differentiation between generally practiced routine and error situation is still difficult in the absence of a generally accepted definition. A well-established widely accepted definition of prescribing errors in general practice is non-existent for Pakistan hospitals. Similarly in UK, the definition of prescribing error reached consensus recently in 2000, while a consensus on prescribing errors in pediatric practice was reached in 2005 [4,5].

Objectives

To reach consensus on a definition of prescribing errors and scenarios representing error situations by a Pakistani panel of expert judges composed of fifty members widely

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Received: 24 March 2008: Accepted 23 June 2008

selected from multidisciplinary medical professionals. Later this definition and scenarios will be used as basis for the evaluation of prescribing practice and identification of prescribing errors in public hospitals in Pakistan.

METHODOLOGY

This was a prospective study conducted at various hospitals of Lahore and Bahawalpur from Ist May 2006 to 31th July 2006.

Definition and Scenarios

An extensive literature survey was followed to identify several definitions of prescribing errors and different scenarios representing them. The most inclusive definition of prescribing errors was developed by Dean et al and the same definition was reinforced by Ghaleb et al [4,5]. the definition states that ''A clinically meaningful prescribing error occurs when, as a result of a prescribing decision or prescription writing process, there is an unintentional significant reduction in the probability of treatment being timely and effective or increase in the risk of harm when compared with generally accepted practice''. Many situations when a prescribing error occurs could be represented by "scenarios", forty three scenarios were taken from previous studies which were conducted abroad, and never been subjected to a Pakistani panel of expert judges; the present study presented three more "scenarios" that were not included in any study before [6-12]. Some of these scenarios were rephrased to increase their comprehensibility by a panel composed of wide range of medical professionals.

The panel of expert Judges

A panel of expert judges composed of fifty members carefully selected from a wide range of multidisciplinary medical professionals, the demographics of the panel is presented in Table 1. The selection was made on the basis of the participant's expertise and active involvement in patient care and interest in prescribing errors. The sampling was assured to include a cross section of healthcare professionals; the panel included; twenty one physicians (42%), nineteen pharmacists (38%), and five nurses (10%), three pharmacologists (6%) of whom one was a senior academician in a medical college; another was a senior academician in a pharmacy college, while the third is a hospital pharmacist. Two risk managers (4%) with pharmaceutical background (Table 1). All participants agreed to participate in the panel without any incentives.

The Questionnaire & Delphi Technique

The definition along with scenarios proposed to represent prescribing errors were compiled in a questionnaire. A copy of the questionnaire was delivered hand by hand to each member of the panel of expert judges to elicit the extent of his agreement with the definition and each scenario using Delphi technique. Delphi technique is the most commonly used technique to reach consensus in clinical practice [13, 14]. According to the Delphi technique, participants indicate the extent to which they agree with a series of statements in a postal questionnaire; their scores were then summarized and included in a repeat version of the questionnaire so that each participant could reconsider his scores in view of the group's responses. The views of each participant were treated equally, and each participant was anonymous to the remainder of the panel [15-17]. The scores indicated against each scenario and any additional comments made by the judges were taken and a reminder of their own personal scores after the first round were summarized and again re-compiled into questionnaire. A copy of the new questionnaire was again delivered to each member of the panel for a second round Delphi [4, 5].

First round Delphi

Each judge was asked to indicate his agreement with the definition using a scale numbered from 1 (totally disagreed) to 9 (totally agreed), and to suggest ways in which the definition could be improved. Secondly, the judges were asked to indicate the extent to which they agreed that each of 46 general scenarios represented a prescribing error in

general practice. Judges were encouraged to include written comments to justify or qualify their scores. Finally, the judges were asked if they wish to make any additional comments on the general definition of a prescribing error, having considered the specific scenarios.

Second round Delphi

In order to avoid extreme answers which might be given by the panel of expert judges as twenty eight (56%) members were senior academicians, after conducting the first round Delphi process; it was decided to take a second round. The second round included rearrangement of the questionnaire and a brief discussion on the prescribing process and prescribing errors was made with the participant before taking part in the second round, ensuring the nonalignment of the briefer, the participants were asked to give their own opinions without being influenced by the discussion and briefings. The briefing included examples of prescribing errors, review of literature, and the other participants' opinions.

The participants were asked to reconsider their scores having studied the whole panel's anonymized responses. Judges were provided with the median of the whole panel's response for each definition or scenario, comments made by individual (anonymous) participants together with the associated score and their own score relating to that scenario or definition. Inclusion of comments and summary of responses was to increase the number of reasoned responses and to decrease the number of rounds required to reach consensus [18].

RESULTS

Analysis of data

As stated by Murphy et al [11] the guidelines for consensus in clinical guideline development can be developed according to the needs of the study; ''Consensus'' was considered to exist if the median of both first round and the second round Delphi of the participants' responses fell within the range 7-9. The scenario was considered as agreed upon and included as prescribing error situation.

''Disagreement'' was considered if the median of first round and second round Delphi, fell within the range 1–3. The scenario was considered as disagreed upon and excluded as prescribing error situation. Equivocal was considered as ''partial agreement'' if the median of first round and second round Delphi, fell within the range 4-6. The scenario would be included or excluded depending on the individual situation.

If consensus was not obtained at the end of the second stage, the participants' additional comments, together with their scores, were used to decide whether or not to classify each scenario as a prescribing error [15-20].

Response rate of the panel of expert Judges

All, the fifty experts judges (100%) approached agreed to take part. In the first Delphi round responses were received from fifty judges (100%). Again responses in the second round were received from fifty judges (100%).

Consensus on prescribing error

When asked for their opinion on the definition proposed, the median of both round one and round two Delphi was 7.6 which fell within the range 7-9. This indicated that the consensus was reached to accept the definition. Twenty participants (40%) made additional comments to stress on the words "significant" and "clinically meaningful". Consensus was reached and the majority of the participants were satisfied with it.

The terms ''significant'', ''clinically meaningful'', and ''generally accepted practice'' were included to differentiate between clinically meaningful prescribing errors and other situations where some optimization of treatment was possible but where a prescribing error could not be said to have occurred.

When asked, all participants (100%) agreed that it was not necessary for the patient to have received one or more doses of the drug or to have been harmed for the error

Table-1: Demographic details of the 50 expert Judges

No.	Profession	Grade	Specialty	Employer
1	Pharmacist	Senior	Clinical Service	Children Hospital
2	Pharmacist	Lecturer	Quality control	University
3	Pharmacist	Lecturer	Bioavailability	University
4	Pharmacist	Senior	Clinical Service	Cardiac Hospital
5	Pharmacist	Scholar	Pharmaceutical technology	University
6	Pharmacist	Lecturer & Researcher	Bioequivalence Studies	University
7	Pharmacist	Junior	Retail & marketing	Retail Pharmacy
8	Pharmacist	Senior	Retail pharmacist	Chain Pharmacy
9	Pharmacist	Lecturer	Bioavailability	University
10	Pharmacist	Senior	Hospital pharmacist	General Hospital
11	Pharmacist	Senior	Clinical service	Children Hospital
12	Pharmacist	Senior	Retail & marketing	Chain Pharmacy
13	Pharmacist	Senior	Retail & marketing	Chain Pharmacy
14	Pharmacist	Manager	Retail & marketing	Chain Pharmacy
15	Pharmacist	Lecturer & Researcher	Bioequivalence Studies	University
16	Pharmacist	Assistant professor	Pharmaceutics	University
17	Pharmacist	Senior	Clinical Service	Children Hospital
18	Pharmacist	Senior	Pharmacologist	Cardiac Hospital
19	Pharmacologist	Senior	Hospital pharmacist	Cardiac Hospital
20	Pharmacist	Lecturer	Bioavailability Studies	University
21	Pharmacologist	Assistant professor	Pharmacology	University
22	Risk manager	Lecturer	Risk management	University
23	Risk manager	Lecturer	Health safety	University
24	Nurse	Senior	Public health nursing	Nursing School
25	Nurse	Senior	Public health nursing	Nursing School
26	Nurse	Senior	Cardiology nursing	Nursing School
27	Nurse	Senior	Cardiology nursing	Nursing School
28	Nurse	Senior	Community health	Nursing School
29	Doctor	Assistant professor	Diabetes medicine	Teaching Hospital
30	Pharmacologist	Associate professor	Clinical pharmacology	Medical College.
31	Doctor	Junior	Cardiology	Cardiac Hospital
32	Doctor	Senior registrar	Medicine/ cardiology	Cardiac Hospital
33	Doctor	Professor	Pediatrics.	Teaching Hospital
34	Doctor	Assistant professor	Pediatrics.	Teaching Hospital
35	Doctor	Assistant professor	ENT	Teaching Hospital
36	Doctor	Consultant	Gynecology	Teaching Hospital
37	Doctor	Head of department	Psychiatry	Teaching Hospital
38	Doctor	Senior	Urology	Teaching Hospital
39	Doctor	Consultant	Psychiatry	Teaching Hospital
40	Doctor	Senior registrar	Medicine	Teaching Hospital
41	Doctor	Senior registrar	Diabetes medicine	Teaching Hospital
42	Doctor	Head of department	Gynecology	Teaching Hospital
43	Doctor	Assistant professor	Medicine	Teaching Hospital
44	Doctor	Senior registrar	Medicine	Teaching Hospital
45	Doctor	Senior registrar	Surgery	Teaching Hospital
46	Doctor	Assistant professor	Anesthesia	Medical College
47	Doctor	Lecturer	GP/ lecturer	University
48	Doctor	Senior registrar	Pulmonology	Teaching Hospital
49	Doctor	Senior registrar	Cardiology	Cardiac Hospital
50	Doctor	Associate professor	Medicine	Teaching Hospital

to be considered. Following the second round Delphi, consensus was achieved to include thirty three scenarios (71.7%) as prescribing errors; they are listed in Table 2. Consensus was also reached to exclude eight scenarios (17.4%) as the panel agreed that they did not represent prescribing errors; they are listed in Table 3. Equivocal "partial agreement" was

reached on further five scenarios (10.9%), they

DISCUSSIONS

Table 2: Situations Included as Prescribing Errors

No.	ERRORS IN DECISION MAKING: Prescription inappropriate for the patient concerned	Round One	Round Two	Mean	Decision
1.	Prescribing a drug for a patient for whom, as a result of a co-existing clinical condition, that drug is contraindicated.	7.8	8.0	7.9	Consensus & included
2.	Prescription of a drug to which the patient has a known allergy to that drug.	7.8	8.1	7.9	Consensus & included
3.	Not taking into account a potentially significant drug interaction.	8.1	7.8	7.9	Consensus & included
4.	Prescribing a drug/regime in a dose that, according to British National Formulary (BNF), Summary of product characteristics (SPC), or reference sources, is inappropriate for the patient's renal function.	7.7	7.9	7.8	Consensus & included
5.	Prescription of a drug/regime in potentially sub-therapeutic dose/doses.	7.3	6.9	7.1	Consensus & included
6.	Prescribing a drug with a narrow therapeutic range, in a dose predicted to give serum levels significantly above the desired therapeutic range.	7.5	7.3	7.4	Consensus & included
7.	Writing a prescription for a drug with a narrow therapeutic range in a dose predicted to give serum levels significantly below the desired therapeutic range.	7.6	7.4	7.5	Consensus & included
8.	Not altering the dose following steady state serum levels significantly outside the therapeutic range.	7.7	7.3	7.5	Consensus & included
9.	Continuing a drug in the event of a clinically significant adverse drug reaction.	8.0	7.6	7.8	Consensus & included
10.	Prescribing two drugs/regimes for the same indication when only one of the drugs/regime is necessary.	7.3	6.8	7.0	Consensus & included
	PHARMACEUTICAL & PHARMACOECONOMIC ISSUES				
11.	**Prescribing a drug for a diabetic patient containing sugar while sugar free preparation of similar active ingredients is available.	7.6	7.2	7.4	Consensus & included
12.	**Ordering to break (split) a modified release system which would cause dose dumping and delivery system failure, while alternative doses are commercially available.	8.0	8.1	8.0	Consensus & included
	ERRORS IN PRESCRIPTION WRITING: Failure to Communicate Essential Information				
13.	Prescribing a drug, dose or route that is not that intended.	7.8	7.2	7.5	Consensus & included
14	Writing a drug's name using abbreviations or other non-standard nomenclature.	7.7	7.6	7.7	Consensus & included
15	Writing an ambiguous medication order.	7.5	6.4	7.0	Consensus & included
16	Prescribing "one tablet" of a drug that is available in more than one strength of tablet.	7.6	7.6	7.6	Consensus & included
17	Omission of the route of administration for a drug that can be given by more than one route.	7.3	7.4	7.4	Consensus & included
18	Omission of the prescriber's signature.	8.2	7.1	7.7	Consensus & included

would be considered as prescribing errors depending on the situation, they are presented in Table 4. A third round was not necessary as consensus wasn't likely to be reached as perceived from the comments made by the participants in the first and second rounds Delphi.

Using the Delphi technique, a general definition of a prescribing error has been agreed upon together with guidance concerning the specific types of event that should be included as prescribing errors to be used as parameters in general practice for Pakistani governmental hospitals. This

practitioner led definition, more detailed than

the definitions used in previous studies, and

concordant with human error theory.

According to theories of human error, a series

Table 2: Situations Included as Prescribing Errors

	TRANSCRIPTION ERRORS				
19	On admission to hospital/centre, unintentionally not taking into account a drug/regime that the patient was taking prior to their admission.	7.3	7.2	7.2	Consensus & included
20	Continuing a GP's prescribing error when writing a patient's drug chart on admission to hospital.	8.0	8.0	8.0	Consensus & included
21	Transcribing a medication order incorrectly when rewriting a patient's drug chart.	7.4	7.4	7.4	Consensus & included
22	Writing "milligrams" when "micrograms" was intended.	8.0	8.3	8.2	Consensus & included
23	Writing a prescription for discharge medication that unintentionally deviates from the medication prescribed on the inpatient drug chart.	7.5	7.6	7.5	Consensus & included
24	On admission to hospital, writing a medication order that unintentionally deviates from the patient's pre-admission prescription.	7.3	7.5	7.4	Consensus & included
25	*Prescribing a drug in a dose above the maximum dose recommended in the British National Formulary (BNF), Summary of product characteristics (SPC), or reference sources.	7.7	7.5	7.6	Consensus & included
26	*Prescribing a dose that cannot readily be administered using the dosage forms available	7.2	6.6	6.9	Consensus & included
27	*Prescribing a dose regime (dose/frequency) that is not that recommended for the formulation prescribed.	7.1	7.2	7.1	Consensus & included
28	*Continuing a prescription for a longer duration than necessary.	7.0	6.4	6.7	Consensus & included
29	*Prescribing a drug that should be given at specific times in relation to meals without specifying this information on the prescription	7.6	7.4	7.5	Consensus & included
30	*Unintentionally not prescribing a drug for a clinical condition for which medication is indicated.	7.0	7.2	7.1	Consensus & included
31	Prescribing a drug based on the weight of the patient and not writing the final calculated dose in the prescription sheet based on that weight.	6.9	7.0	6.9	Consensus & included
32	Prescribing a drug to a patient without adjusting for age.	7.6	7.2	7.4	Consensus & included
33	Prescribing a drug to be taken when required, without specifying the maximum daily dose of the drug prescribed in the prescription.	7.2	7.2	7.2	Consensus & included

Table 3: Situations Excluded as Prescribing Errors

No.	Scenario	Round One	Round Two	Mean	Decision
1.	Prescribing by brand name (as opposed to generic name).	2.4	2.8	2.6	Consensus & included
2.	Prescribing a drug without informing the patient of its uses and potential side effects.	3.0	2.7	2.8	Consensus & excluded
3.	Prescribing a drug for which there is no evidence of efficacy, because the patient wishes it.	1.4	2.4	1.9	Consensus & excluded
4.	Prescribing for a child a drug that has no product license for use in children.	2.3	3.0	2.7	Consensus & excluded
5.	Prescribing a drug that is not in the hospital formulary.	3.2	2.9	3.0	Consensus & excluded
6.	Prescribing contrary to hospital treatment guidelines.	3.5	2.6	3.0	Consensus & excluded
7.	Prescribing contrary to national treatment guidelines.	2.8	2.8	2.8	Consensus & excluded
8.	Prescribing for an indication that is not a drug's product license.	2.5	3.0	2.8	Consensus & excluded

Table 4: Situations to be Included as Prescribing Errors Depending on the Condition

No.	Scenario	Round One	Round Two	Mean	Decision
1.	Prescribing a drug for which there is no indication for that patient.	7.7	5.8	6.7	Equivocal
2.	**Prescribing a costly brand of a drug/regime, not taking into account the economical status of the patient while a brand with affordable cost is available.	7.1	5.7	6.4	Equivocal
3.	Writing illegibly.	6.1	7.0	6.5	Equivocal
4.	Misspelling a drug name.	6.7	5.4	6.0	Equivocal
5.	Not rewriting a prescription in full if a change has been made to it (e.g. dosage increase or change in frequency).	6.0	4.9	5.4	Equivocal

desired outcome because the plan itself was inadequate or because the actions did not go as planned. The definition reflects this distinction, including failures both in the prescribing decision and the prescription writing process [21]. Generally, prescribing without taking into account the patient's clinical status, not taking into account important pharmaceutical issues, failure to communicate essential information, and transcription errors were all considered to be prescribing errors. While failures to adhere to standards such as hospital or national guidelines, or the drug's product license, were not. The scenarios considered equivocal, the judges' comments suggested that the individual clinical situation would have to be taken into account in order to determine whether or not a prescribing error had occurred.

A strength point of this study that it received 100% response rate in both rounds of the Delphi process, the reason behind that might be due to the delivery mode was hand by hand to each member of the panel of expert judges instead of a postal questionnaire mode of delivery, another strength point was in the panel itself as it is more diverse touching a wide section of healthcare professionals and the number of participants was fifty. However, there is no standard way of defining consensus, and it is recommended that the definition used is chosen according to the study's objectives, it was decided to reconsider the methodology of obtaining consensus on the definition and the scenarios, by determining the mean of both round one and round two Delphi [17].

Comparison of the present study with other Similar Studies carried out Abroad

The present study used the definition of the prescribing errors developed by Dean et al., 2000 and was presented to a panel of experts composed of 34 judges; the definition was accepted to be used in UK for general practice. The same definition was re-presented by Ghaleb et al., 2005 to a panel of experts composed of 42 judges; the definition was accepted to be used in UK for pediatric practice.

The present study used the same definition which was presented to a Pakistani panel composed of 50 judges selected carefully from a cross section of healthcare professionals, similarly the panel agreed upon the definition therefore it can be used for Pakistani hospitals.

The results for scenarios representing prescribing errors were different from those studies conducted in UK. Some scenarios were partially agreed upon by the British panel of expert judges, while the Pakistani panel of expert judges has considered them as prescribing error, they are marked with star (*) in Table 2. Two of the newly presented scenarios which were not included in any study before were considered as prescribing errors; they are marked with two stars (**) in Tables 2 and 4.

CONCLUSION

The Pakistani panel of expert judges agreed upon the definition and scenarios to be considered prescribing errors. The

definition and scenarios can also be used for future research on prescribing errors in Pakistani hospitals.

ACKNOWLEDGMENT

The authors acknowledge all the participants in the panel of expert judges, without their participation, this work wouldn't be executed.

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