

## Original Research

# Drug and therapeutics committees in Jordanian hospitals: a nation-wide survey of organization, activities, and drug selection procedures

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### Abstract

**Background:** Drug and Therapeutics Committees (DTCs) were founded about a century ago as a guide for dealing with drugs in hospitals. Since then, it has shown a vital role in rational drug use in terms of regulatory and educational activities.

**Objective:** To describe structures, functions, and activities of hospital DTCs.

**Methods:** A questionnaire was developed based on previous studies. Questions consisted of information on respondents' demographics; structures, functions, and activities of DTCs; drug selection process and resources used, and factors and criteria used in drug selection.

**Results:** The overall response rate was 95%. DTCs were mainly present in most large hospitals (45%). All DTCs had hospital pharmacists in their structure and most of them (66%) met monthly. The main responsibilities of DTCs were related to general prescribing policies. The number, frequency, and severity of adverse drug reactions were the most reported criteria for the drug selection process. Legal implications for practical, economic, and organizational factors were the most important factors that were reported for drug selection.

**Conclusions:** DTCs are mainly present in most large hospitals. The main responsibilities of the DTC in Jordanian hospitals are general prescribing policies, drug selection, hospital formulary editing, and reporting of ADR to external authorities.

### Keywords

Pharmacy and Therapeutics Committee; Formularies, Hospital; Hospitals; Pharmacy Service, Hospital; Pharmacists; Surveys and Questionnaires; Jordan

## INTRODUCTION

Drug and therapeutics committees (DTCs) are presented in the hospitals to improve prescribing and dispensing processes of medicines. Their importance appears in different aspects such as drug selection process, cost-effectiveness, and control of drug losses.<sup>1,2</sup> Altogether, DTCs have shown an important role in promoting, controlling and educating activities of rational drug use. This is mostly manifested in demonstrating how the presence of DTCs in hospitals would improve patient's health outcomes and decrease overall drug expenditures.<sup>1,3</sup> Most DTCs are organized with subcommittees. In big hospitals, different subcommittees can be established to address particular issues, like antibiotic use, adverse drug reactions, medication errors, and drug use evaluation.<sup>4</sup>

Jordan is widely recognized as one of the most advanced health care systems in the area. But, since Jordan is a developing country with minimum resources, authorities should find ways to decrease the superfluous costs such as the cost of waste drugs. Hospitals in Jordan established DTCs in their structures in order to meet the increasing demands of prescribing and dispensing processes of drugs to the large number of patients and to improve cost-effective and evidence-based health care national policies.<sup>5</sup>

To date, few studies have been done that have addressed the structure and activities of hospital DTCs in developing countries, specifically in the eastern Mediterranean region. Information on Jordanian hospital DTCs is not available. Therefore, the objective of this research was to describe the extent of DTCs presence in Jordanian hospitals; and the structure, function, and activities of the hospital DTCs.

## METHODS

This study was performed as a descriptive, cross-sectional survey, and data were collected from December 2016 to April 2017. A total of 106 Jordanian hospitals (32 governmental, nine military service, two university, and 63 private hospitals) were targeted for this study. However, three hospitals were excluded because they didn't have pharmacists at the time of study. A questionnaire was emailed to pharmacists of 103 hospitals in Jordan.

### Questionnaire

A questionnaire was developed based on previous research.<sup>2,6-9</sup> The questionnaire which was pretested consisted of five main parts of closed-ended questions. The first part included questions about the demographics and structure of DTCs. The second part focused on the activities of DTCs. The third part included questions about drug selection process by DTC. The fourth part focused on the type of information resources used in the drug selection process. The last part focused on the criteria used in drug selection. The questionnaire was piloted on two pharmacists from the university hospital, and four pharmacists from public hospitals, who participated in DTC meetings and activities.

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N=98*		n (%)
Age (years)	24-34	38(39)
	35-45	32(33)
	46-56	28(28)
	>56	-
Gender	Male	21(21)
	Female	77(79)
Education	BS. Pharmacy	66(67)
	PharmD	18(19)
	Master's degree	14(14)
	PhD	-
Experience (years)	1-5	24(24)
	5-10	25(26)
	10-20	15(15)
	> 20	34(35)
*One public hospital has no pharmacist, one private hospital has no pharmacy and one private hospital has no pharmacist.		

To ensure a good response, a telephone interview was done with the head of pharmacy in each hospital asking about the presence of DTC in the hospital. If the answer was yes, the questionnaire was sent to the head of pharmacy either by fax, e-mail or online survey. Pharmacists who are members of DTCs responded to the questionnaire. These might be head of pharmacies in their hospitals or any other pharmacists. Face to face interviews were also scheduled when needed. Participants were followed up via phone calls and e-mails. Data were processed by Microsoft office Excel (2007). Mean, median, standard deviation and percentage were calculated.

## RESULTS

Table 1 shows respondents' demographics. The total number of Jordanian hospitals that had pharmacists was 103 hospitals. However, five hospitals refused to participate in the study, yielding a response rate of 95%. The majority of pharmacists (n=66, 67%) had a bachelor's degree in pharmacy. More than half of study hospitals (n=58, 59%) were private hospitals and slightly less than half (n=44, 45%) of the hospitals had DTC (Table 2).

Pharmacists held the position of secretary and chairman in (n=33, 75%) and (n=11, 25%) of the committees,

Characteristics		n (%)
Number of beds	<50	32 (33)
	50-99	23 (23)
	100-199	27 (28)
	200-299	6 (6)
	300-399	2 (2)
	>400	8 (8)
Hospital	Public	30 (31)
	Private	58 (59)
	Military services hospital	8 (8)
	University hospital	2 (2)
Presence of DTC	Yes	44 (45)
	No	54 (55)
DTC: Drug and therapeutics committee		

respectively. The number of committee members varied from 2 to 15. Most of DTCs (n=27, 61%) had fixed structure. Different medical specialties were presented (Table 3).

All of DTCs had hospital or clinical pharmacists in their structures. Committee members were mostly selected by the hospital management. Most of DTCs (n=42, 96%) were responsible for one hospital only. The presence of subcommittees was very low and ranged between (1-5) subcommittees in 38% of hospitals.

N=44		n (%)
Position of pharmacists in DTC	Secretary	33(75)
	Chairman	11(25)
Number of DTC members	1-2	1(2)
	3-4	3(7)
	5-6	6(14)
	7-8	17(39)
	9-10	11(25)
	11-12	1(2)
	13-15	5(11)
Structure	Fixed structure	27 (61)
	Changing structure depending on the issues addressed	17 (39)
Clinical expertise	Hospital and clinical pharmacy	44 (100)
	Internal Medicine	41 (93)
	Nursing staff	34 (77)
	Surgery	32 (73)
	Paediatrics	21 (48)
	Anaesthesiology	20 (46)
	Community Pharmacy	10 (23)
	Intensive Care Medicine	10 (23)
	Nursing Home Medicine	8 (18)
	General Practice Medicine	7 (16)
	Cardiology	6 (14)
	Neurology	5 (11)
	Medical Microbiology	5 (11)
	Psychiatry	4 (9)
	Other paramedical members	1 (2)
Pulmonology	1 (2)	
Other non-paramedical members	(0)	
DTC members selection	Hospital management	40(91)
	Ministry of Health	4(9)
DTC is in charge of:	My hospital only	42(96)
	My hospital and other hospitals	2(4)
Number of subcommittees	0	27 (62)
	1	9 (20)
	2	5 (11)
	3	2 (5)
	4	(0)
	5	1 (2)
Specialty of subcommittees	Antibiotic/antimicrobial subcommittee	17 (38)
	Medication safety subcommittee	5 (11)
	Oncology subcommittee	3 (7)
	Parenteral nutrition subcommittee	1 (2)
	Psychotropic drugs subcommittee	1 (2)
	Expensive drugs subcommittee	1 (2)
	Antithrombotic subcommittee	1 (2)
	Others	1 (2)
	Blood products subcommittee	(0)
DTC: Drug and therapeutics committee		

N=44		n (%)
Detailed guidelines used for drug selection in view of quality assurance	Yes	34 (77)
	No	10 (23)
Clinicians are obliged to follow specific procedures for formulary drug applications	Yes	38 (86)
	No	6 (14)
Presence of a printed hospital formulary drug application form	Yes	37 (84)
	No	7 (16)
Collect and evaluate information with respect to specialized drug selection	Pharmacist	30 (68)
	Clinicians who requested the hospital formulary drug application	14 (32)
	Pharmacotherapeutic clinical experts	(0)
Resources used in drug selection process	Regional and national pharmacotherapeutic treatment guidelines	29 (66)
	Product information from pharmaceutical industries	29 (66)
	International pharmacotherapeutic treatment guidelines	28 (64)
	Information from (sub)-governmental authorities	24 (55)
	Original clinical research in scientific literature	22 (50)
	Medical specialists' clinical expertise	22 (50)
	Clinical reviews, commentaries and case reports in scientific literature	21 (48)
	Pharmacoeconomic research reports	21 (48)
	Experiences in clinical practice in tertiary healthcare	15 (34)
	Information from patients or patient organization	13 (30)
	Experiences in clinical practice in primary healthcare	12 (27)
	Meta-analyses (e.g. the Cochrane Institute)	10 (23)
	Presentations at symposia conferences	6 (14)

About two-thirds of DTCs (n=29, 66%) met monthly and more than half (n=24, 55%) had restricted meetings to members-only (Table 4). The majority (n=41, 93%) had written documentation for the meetings of the DTC. The vast majority of respondents (n=42, 96%) reported that general prescribing is the major responsibility of their DTCs followed by drug selection and hospital formulary editing (n=38, 86%) and reporting of adverse drug effects to external authorities (n=30, 68%).

Most of DTCs (n=34, 77%) used detailed guidelines for drug selection in view of quality assurance and clinicians are obliged to follow specific procedures for formulary drug applications (n=38, 86%). Majority of DTCs (n=37, 84%) developed printed hospital formulary drug application forms, and most of them (n=30, 68%) had a pharmacist that was in charge of collecting and evaluating information with respect to specialized drug selection (Table 5). Regional and national pharmacotherapeutic treatment guidelines (n=29,

66%), product information from pharmaceutical industries (n=29, 66%) were the most used resources in the drug selection process.

As shown in Table 6, "number, frequency, and severity of adverse drug reactions" and "safety or frequency and severity of toxicity" were the most reported criteria for the drug selection process (mean=9). While contents of sodium chloride, sugars, and lactose were the least reported (mean=4).

## DISCUSSION

The study provides the readers with a significant insight into DTCs in Jordanian hospitals. To the best of the researcher's knowledge, this issue has not been investigated in the Jordanian context before.

Presence of DTCs varies considerably between countries. For example, in high-income countries such as the USA,

(N=44)	n (%)	mean (SD)
Number, frequency, and severity of adverse drug reactions.	42 (96)	9 (3.4)
Safety or frequency and severity of toxicity	38 (86)	9 (3.6)
Antibiotic resistance	30 (68)	8 (2.6)
Clinical evidence-based effectiveness in scientific literature	29 (66)	8 (2.8)
Effect on quality of life	27 (61)	8 (2.5)
Medical specialists' clinical expertise	27 (61)	8 (2.9)
Use in children or neonates	26 (59)	8 (2.5)
Number and severity of contra-indications	25 (57)	8 (3.0)
Specific characteristics of the hospital's patient population	22 (50)	8 (2.5)
Drug-drug interactions	21 (48)	7 (2.5)
Therapeutic window	42 (96)	7 (2.1)
Use during childish, pregnancy, and lactation	38 (86)	7 (2.2)
Drug-food interactions	42 (96)	7 (1.8)
New and innovative pharmacological effect	38 (86)	7 (1.8)
Number of (un)registered indications	27 (61)	6 (1.0)
Contents of sodium chloride, sugars, and lactose	29 (66)	4 (1.8)

Netherlands, UK, Australia, and Germany, the presence of DTCs in hospitals was 98%, 98%, 97% and 92%, respectively.<sup>10-12</sup> However, DTC was present in 65% of Pakistan's hospitals.<sup>13</sup> A Brazilian study found that about 11.6% of hospitals have DTCs.<sup>14</sup> In this study, 45% of hospitals had active DTCs which is considered low compared to developed countries. This could be due to: the presence of many private hospitals with low number of beds (59%); the absence of enforcements that make hospitals to have DTCs; and the absence of the pharmacist's role in representing the DTC in the hospital due to the low number of pharmacists in hospitals.<sup>10,13,15</sup> DTCs are available in 66% of the Ministry of Health (MOH) hospitals and in all university hospitals and Royal Medical Service hospitals in Jordan. This could be due to the participation of MOH hospitals in the Joint Commission International Accreditation (JCIA) which in some ways ensure the presence of DTCs in hospitals' structure. Also, clinical pharmacists' presence in the hospitals to meet JCIA policies, encourage the presence of DTCs in these hospitals.<sup>6,16-18</sup>

The position of the DTC chairman in many cases held by physicians.<sup>3,6,7,19-21</sup> However, this study found that 25% of DTCs were chaired by pharmacists. The structure and number of DTC members varies according to the type of hospital and medical specialties in the hospital.<sup>2-4,11,20</sup> This study also found that there was a variation in the structure and number of DTC members in the hospitals depending on the specialties and number of beds. Also, the representation of clinical expertise varies noticeably since there are not many regulations that define the structure.<sup>16</sup> The number of DTC members in this study is with a median of 8 (range of 3-15). This is in line with the number of DTC members in other countries when compared to the total number of beds, in Dutch (median=12), Ireland (median=7) and the USA [median=10].<sup>11</sup>

Generally, in many countries, the majority of DTC members are physicians and they represent more than half of the DTC members.<sup>7,12,22</sup> On the other hand, pharmacists, nurses and hospital administrators are less represented in DTCs.<sup>2,3,7,11,15,20,23</sup> DTCs' pharmacists have direct access to the information resources and act as a bridge between different specialties of medical fields.<sup>11,12,22</sup> They have an important role in decision making in their committees.<sup>2,3,20</sup> Results of this study are in agreement with other studies' findings which demonstrated that pharmacists in most DTCs (75%) are assigned the position of committee secretary and are present in all DTCs in Jordanian hospitals.<sup>11,12,22</sup> Despite being experts in their field, the representation of pharmacotherapy and clinical pharmacists is very low and this issue is almost common in different countries.<sup>3,17,22</sup> In our study, their presence was negligible. This coincides with other studies which revealed that pharmacists were mainly in charge of collecting and evaluating information with respect to specialized drug selection.<sup>12,21</sup>

Results of this survey suggest that the main responsibilities of DTCs in Jordan are general prescribing policies, drug selection, and formulary management. Worldwide, the main roles of the DTC include drug evaluation and the maintenance of hospitals' drugs availability.<sup>12,15,22,24,25</sup>

Formulary management, ADR and medication errors reporting are also of the main responsibilities of DTCs.<sup>13,16,17,19,21,26,27</sup> The World Health Organization (WHO) also directs DTCs to write and implement policies and guidelines of drug use in their institutions.<sup>28</sup> DTC activities and meetings varied according to the type of hospital, number of beds, and the structure of DTC.<sup>2,7,11,13,20</sup> DTC meetings help in controlling formulary and the management of drug policies and procedures.<sup>2,11,13,17,20,22</sup> On average, in Germany, 47% of DTCs meet bimonthly while about 18% meet monthly.<sup>22</sup> While in Pakistan, DTCs meet 3-4 times annually, and in Canada, DTCs meet 8.2 times annually in hospitals with more than 300 beds and 6 times annually in hospitals with less than 300 beds annually.<sup>7,13</sup> This study showed that most of DTCs in Jordan meet monthly. This high number of meetings compared to other countries could be explained by the fact that DTCs were organized with a low number of subcommittees. Subcommittees were not present in 62% of hospitals and only one subcommittee was present in 20% of hospitals.

Different issues are raised globally when considering the drug selection process.<sup>5,27,28</sup> For instance, the drug selection process guidelines in the Netherlands are not well used in Dutch hospitals since the drug selection process is a part of quality assurance.<sup>22</sup> Drug selection procedures in different countries are similar and use evidence-based medicine concept and pharmaco-economic information.<sup>1,2,6,7,19,20,22,24,26</sup> Information about new drugs' efficacy is obtained from scientific journals, formulary inclusion, prescriber contact, clinical trials and direct relationship between the pharmaceutical industry and clinicians.<sup>29</sup> Similar to other studies, our study found that 77% of pharmacists in DTCs use detailed guidelines for the drug selection process in view of quality assurance.<sup>15,20,29-31</sup> Pharmacists in DTCs expand their role in drug selection to ensure safety, effectiveness, and optimal utilization of drugs.<sup>17</sup> There are 4-17 indicators that were related to policies or procedures for reporting and documenting drug selection.<sup>18-20</sup> JCIA included policies that are used to ensure the safety of overall drugs.<sup>19</sup> Criteria of drug selection process such as; therapeutic effectiveness, toxicity profile and cost are used by most DTCs, but their importance varied according to different issues.<sup>1-3,7,11,15,20,24</sup> Drug availability and acquiring costs were among the most important criteria used in the drug selection process by DTCs in Canada.<sup>7</sup> Also, institutional evidenced-based medicine and antimicrobial resistance rate were infrequently used in drug selection in Canada and Australia.<sup>7,10</sup> An Australian study found that the inclusion of drugs with a narrow therapeutic index into the formulary is considered valuable.<sup>19</sup> Similar to other studies, our study reported that the number, frequency, and severity of ADR, the safety or frequency and severity of toxicity, were the most important criteria used in the drug selection process.<sup>7,10,19,27,32</sup>

Prices of some drugs within the same class could vary according to the institution they are presented in.<sup>11,12</sup> A Canadian study found that 25% of respondents used formulary submission binders with pharmaceutical industries for DTCs.<sup>7</sup> A pleasant relationship with the pharmaceutical industry doesn't affect drug selection by DTCs.<sup>4,7,15</sup> In fact, pharmaceutical industries have a role in

prescribing drugs and in drug selection from the pharmacists' and clinicians' points of views. Even if this issue is true, it doesn't mean that the quality of the selected drug is low, or affects the drug in a negative way.<sup>2</sup> In large teaching hospitals, pharmaceutical companies were attracted by professors and their students and this could affect drug selection.<sup>13</sup> However, a Nigerian study found that pharmaceutical promotional activities and clinical meetings with pharmaceutical sales representative could affect physicians' prescriptions negatively.<sup>33</sup>

## CONCLUSIONS

The low number of hospitals that have DTCs in Jordan is considerable. When present, DTCs differ to some extent with respect to their clinical expertise and some of their activities. However, DTCs in Jordan are relatively similar to those in other countries in terms of structure, activities, and criteria used in the drug selection process. DTCs are mainly present in most large hospitals. The main

responsibilities of the DTC in Jordanian hospitals are general prescribing policies, drug selection, hospital formulary editing, and reporting of ADR to external authorities. Policies and legislations should be reviewed to ensure the presence of DTCs in most hospitals in Jordan.

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## CONFLICT OF INTEREST

None.

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