



Research article

Knowledge, practices, and patterns of data confidentiality among pharmacists in a developing country

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ABSTRACT

Background: Increased application of electronic health information systems led to the buildup of patient information and facilitated access to this data. Consequently, the confidentiality of this information became an ethical challenge to medical teams' members including pharmacists. However, no study has been conducted to assess pharmacists' knowledge or practices of data confidentiality. Thus, the aim of this study was to assess the current practices and knowledge of pharmacists concerning data confidentiality.

Methods: This was a cross sectional study that included clinical pharmacists in tertiary hospitals and health care centers in Jordan. Data was collected through phone or face to face interviews using a data collection sheet. All continuous data was presented as median \pm interquartile range (IQR) and categorical data as frequency (%). One way Chi square was used to check significant differences among categorical groups. Predictors that may affect knowledge and behavior scores were screened using simple linear regression.

Results: A total of 388 pharmacists were interviewed with a mean age of 39.59 ± 8.32 years, with an average experience of 12.55 ± 7.30 years. Pharmacists relied on their personal experience to resolve ethical dilemmas ($n = 274, 70.3\%$), and when they seek advice, their work colleagues ($n = 180, 46.4\%$), followed by the head of departments ($144 n; 37.1\%$), were the main source of advice on ethical issues. The overall median knowledge score of pharmacists about data confidentiality was 2.0 out of 5.0 (IQR = 2.0). A considerable percentage of the pharmacists was willing to share information with family members without asking for permission from the patient ($n = 98, 25.3\%$). Pharmacists had a median behavior score of 3.5 out of 4.0 (IQR = 0.4) regarding practices related to data confidentiality, where the majority of them handled medical information from the patient with great confidentiality ($304 n, 78.4\%$), and 85.8% of them ($n = 333$) gave patient's sexual diseases-related medical information the highest confidentiality. However, based on univariate and multivariate linear regression analysis, none of the examined sociodemographic variables significantly predicted pharmacists' knowledge or behaviors ($P > 0.05$).

Conclusion: Pharmacists are aware of the importance of confidentiality issues of their patients. However, a number of gaps in their knowledge and practices of data confidentiality were identified. Training that targets these gaps in their knowledge, and rectifies incorrect practices is needed during university education and as part of their continuous medical education.

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1. Introduction

Medical ethics gained a wide interest in pharmacy in recent years, especially with the shift of pharmacy practice from drug centered approach to patient-centered approach [1]. However, the worldwide shift to electronic health records and the huge surge in the quantity of detailed information collected accompanied by the ease of access and transmission of the collected data led to more focus on ethical issues such as confidentiality [2]. Thus, healthcare providers including pharmacists are increasingly faced with challenges related to data confidentiality. For example, discussing patient information in a public place where people who know the patient may hear the conversation is considered a violation of confidentiality [3]. Additionally, deliberately revealing privileged information, that was conveyed to the pharmacist by the patient or through the medical process, to others without the patient's consent is regarded as a breach of confidentiality [4].

The source of patient - related information is not merely from medical records and files. The pharmacist, who is part of the medical team, provides counseling to patients and acquires information that must be considered confidential and should be protected by law [5]. Conservation of patient's confidentiality is under the umbrella of the wider concept of patient's right to autonomy, which is one of the concepts of medical ethics [6]. Patients expect that their medical information will not be shared by anyone else unless they approve that [7]. The health care professionals must comply with these wishes even if the patient did not express them in exact words, because it is the patient's legal and ethical right [8].

Insuring confidentiality of patients is beneficial for individuals and it improves public health. Patients will be more willing to seek medical care when they are reassured that their information will not be disclosed [9]. It spares patients the risk of shame, stigma, or discrimination that might be inflicted by the lack of confidentiality [9]. Securing the patient information is demanded from the pharmacists as they practice their profession. In the code of ethics for pharmacist published by the American Pharmacists Association, pharmacists are asked to serve patients in a "private and confidential manner" [10]. Some research that addressed confidentiality issues was conducted in pharmacy practice [11, 12], but it is not enough. The evolution of pharmacy practice from a drug-based practice to a patient-centered practice led to the emergence of many ethical issues that must be addressed in a social and legal context [13]. This study was triggered by previous studies showing that patients' data confidentiality may not be optimum in Jordan and is subject to many social considerations [14]. Additionally, no study has previously assessed the knowledge or practices of pharmacists' regarding data confidentiality, which is a gap in current knowledge. Thus, the research question of the current study as formulated to be "what are the current knowledge and practices of pharmacists regarding data confidentiality?". The results of the current study have shed the light on ethical issues related to data confidentiality among pharmacists practicing at health institutions in Jordan. It, as well, provided evidence for the need for further improvement of gaps in pharmacists' knowledge and practices regarding data confidentiality.

2. Methodology

2.1. Study design and eligibility criteria

This was an observational cross-sectional study using a structured face-to-face and phone interview approach. All pharmacists that worked either at a tertiary health care institution or secondary health care facility (health care center) were eligible for participation.

2.2. Study setting

The study interviews were conducted by two pharmacists, who were trained on the study protocol and who have previous experience in

conducting research studies that involves interview of study subjects. Pharmacists were selected to participate in the study based on convenience sampling where every accessible pharmacist was approached until the desired sample size was achieved. They were approached initially approached by phone call to schedule an appointment at their convenient time for either a face-to-face interview or a phone call interview.

2.3. Ethical considerations

Institutional Review Board (IRB) approval was obtained from the IRB of Jordan University of Science and Technology, document number (15/2019), February 2019. Pharmacists were informed before their participation that no identifiable data will be collected and that their participation is completely voluntary. Their approval on conducting the interviews after being informed of the details of the study and their rights was considered a consent.

2.4. Sample size calculations

The sample size of the study was calculated using G-Power 3.1., Universitat Kiel, Germany, based on convenience sample method, medium effect size, alpha of 0.05 and power of 0.90. The required minimum number of subjects was 378.

2.5. The study questionnaire

The questionnaire used in the current study was developed based on an extensive review of similar literature [15, 16]. It then was validated. At first, feedback was provided by a group of experts on the survey items. Their comments were implemented into the study survey. Thereafter, pilot testing was carried out using the modified version of the study questionnaire where participants (n = 10) provided their opinion regarding the clarity and comprehensibility of the survey items. The responses from the pilot study were not included in the final data analysis. For all items of the study questionnaire, the reliability coefficient was ensured to be > 0.65.

The study survey (Supplementary 1) contained questions on demographic information including age, gender, years of experience, workplace setting, educational degree and number of prescriptions handled per day. Participants were asked about their information sources for ethical standards to make their decisions. The next section of the questionnaire asked about the reference for advice on ethical issues, these included colleagues, head of department, books and articles, head of medical team, ethics committee, close friend or family member, religious reference, and director of hospital with "others" option was available. Participants were also asked about the frequency of ethical dilemmas encountered (daily, weekly, monthly, rarely, or never) and whether they are interested in receiving information on bioethics. Knowledge in different aspects of confidentiality issues, patterns demonstrated by pharmacists in sharing information with family members in addition to pharmacists' behavioral patterns that might compromise the confidentiality of the patient were also obtained from participants.

2.6. Scoring of knowledge

For the knowledge section, each participant gained one point for each correct answer and zero point for each incorrect or do not know answer, and a total knowledge score out of 5 was calculated for each participant. Additionally, pharmacists' behavior to compromise the confidentiality of the patient was evaluated using the following Likert scale (4: always, 3: sometimes, 2: rarely, and 1: never). A reverse scoring scale (1: always, 2: sometimes, 3: rarely, and 4: never). was used when the statements indicated wrong behavior of pharmacists in dealing with patients' confidentiality. Finally, an average score out of four was calculated for each pharmacist.

2.7. Statistical analysis

Completed questionnaires were entered manually into an excel sheet with proper coding for each variable. The Excel sheet was exported into SPSS software ver. 25 (IBM Co. USA) to conduct statistical analyses. All continuous data was presented as median \pm interquartile range (IQR) and categorical data as frequency (%). One way Chi square was used to check significant differences among categorical groups. Predictors that may affect knowledge scores and behavior scores were screened using simple linear regression. Univariate linear regression analysis was performed and all variables with P-value < 0.250 were entered into multiple linear regression analysis. Variables that independently affected participants' knowledge scores and behavior scores were identified in the multiple linear regression analysis. Variable's independence was checked using person correlation where <0.9 indicates the absence of multicollinearity between the independent variables in regression analysis. A P-value of ≤ 0.05 was considered statistically significant.

3. Results

3.1. Sociodemographic and professional characteristics of participants

A total of 415 pharmacists were approached, among them 388 agreed to participate in the study (response rate was 93.5%). The pharmacists had a median age of 40.0 years (IQR = 13.0), with a median experience of 12.0 years (IQR = 10.0). Of these, 311 pharmacists (80.2%) were females, and 310 pharmacists (79.9%) were employed in governmental institutions. More than two-third of these pharmacists usually deal with more than 60 prescriptions per day (271 n; 69.8%) and the rest received <60 prescriptions per day (117 n; 30.2%). Most of the pharmacists had a bachelor's degree in pharmacy or doctor in pharmacy (354 n; 91.2%), pharmacist with postgraduate degree (master's or PhD) constituted (34 n; 8.8%) of our sample. Only 14.7% of the pharmacists reported to face ethical dilemmas on daily basis, and the majority of pharmacists reported to be interested in receiving information about bioethics (377 n:97.2%). For more details about the demographic characteristics of the participants refer to Table 1.

3.2. Who did the pharmacists seek for ethical advice?

When assessing persons who pharmacists refer to for managing their ethical issues (Figure 1), results showed that they mainly asked their colleagues (180 n; 46.4%), followed by the head of departments (144 n; 37.1%).

3.3. Knowledge of confidentiality issues

Statements that measured the pharmacists' knowledge of different aspects of confidentiality issues were assessed to explore areas of inadequate awareness, Table 2. Most of the pharmacists (242 n; 62.4%) were aware that non-medical information is considered confidential, and that third parties (i.e., insurance company) do not have the right to access medical records without patient's permission (205 n, 52.8%). Additionally, 66.0% of the pharmacists knew that confidentiality cannot be bypassed for patient's information concerning non-contagious diseases (n = 256). On the other hand, only small percentage of the pharmacists knew that law enforcement could have the right to access medical records without patient's permission (19 n, 4.9%), or confidentiality can be bypassed for patient's information concerning contagious diseases (108 n, 27.8%). The overall median knowledge score was 2.0 out of 5.0 (IQR = 2.0).

3.4. Sharing patients' information with family members

When pharmacists were asked about their action if they were asked to share patients' information with family members, 43.0% of the

Table 1. Socio-demographic characteristics of the study sample (n = 388).

Parameter	Median (IQR)	n (%)
Age (years)	40.0 (13.0)	
Gender		
Male		77 (19.2)
Female		311 (80.2)
Educational level		
Bachelor degree (BPharm or Pharm D)		354 (91.2)
Graduate degree (Masters and PhD)		34 (8.8)
Marital status		
Married		279 (71.9)
Non-married (single, widowed, divorced)		109 (28.1)
Site of work		
Government healthcare institution		310 (79.9)
Private healthcare institution		78 (20.1)
Years of experience	12.0 (10.0)	
Number of prescriptions per day		
≤ 60		117 (30.2)
> 60		271 (69.8)
Sources of advice on ethical issues		
Experience from work		273 (70.4)
University education		54 (13.9)
Lectures and seminars		16 (4.1)
Personal reading		11 (2.8)
Others		34 (8.8)
How often does the pharmacist face ethical dilemmas?		
Daily		57 (14.7)
Weekly		85 (21.9)
Monthly		52 (13.4)
Rarely		172 (44.3)
Never		22 (5.7)
Is the pharmacist interested in receiving information on bioethics?		
No		11 (2.8)
Yes		377 (97.2)
Is confidentiality and access to medical records governed by law or regulations in your institution?		
No		12 (3.1)
Yes		328 (84.5)
I don't know		48 (12.4)

IQR: Interquartile range.

pharmacists (n = 167) reported that they will ask for patients' permission, while 26.5% of them (n = 103) would give information to families if the patient <18 years old. Regarding the method of sharing medical information, more than half of the pharmacists (217 n, 55.9%) share oral information with family member, while 34.8% of them share both oral and written information (n = 135). Sharing the patient's medical information with family member are presented in Table 3.

3.5. General practices and behavioral patterns of confidentiality

Regarding participants' behavior to compromise the confidentiality of the patient (Table 4), results showed that pharmacists have a median behavior score of 3.5 out of 4.0 (IQR = 0.4). More than three-fourth of pharmacist take medical information from the patient in great confidentiality (304 n, 78.4%), and 85.8% of them (n = 333) handle patient's sex-related medical information with more confidentiality. Additionally, around half of the pharmacists (210 n, 54.1%) use software to protect patient medical information. Moreover, most of the pharmacists reported that they never save medical information on USB (289 n, 74.5%), or send information using personal computer (305 n, 78.6%), internet (323 n, 83.2%) or phones (279 n, 71.9%).

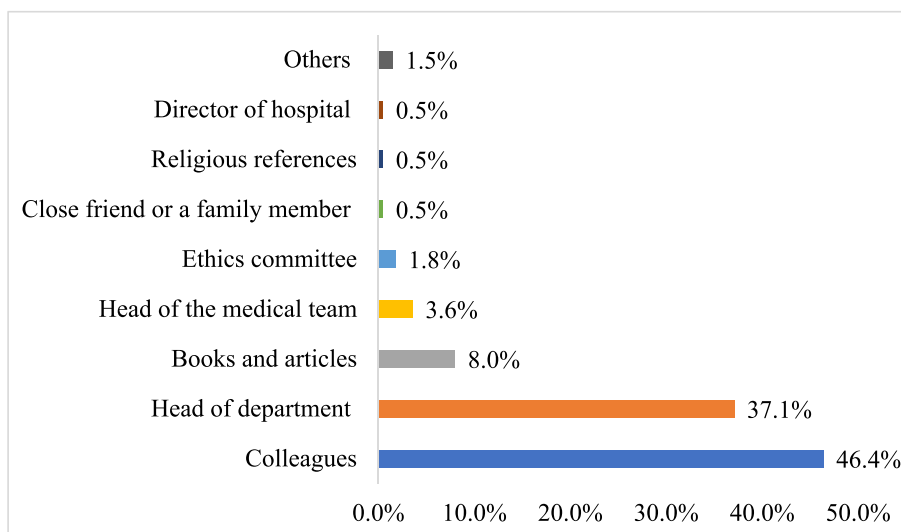


Figure 1. Who do you seek for advice on ethical issues? (n = 388).

Table 2. Parameters that measure the knowledge in different aspects of confidentiality issues (n = 388).

Question	n (%)
Is non-medical information considered confidential?	
Yes ¹	242 (62.4)
No	93 (24.0)
I do not know	53 (13.7)
Do the police have the right to access medical records without patient's permission?	
Yes ¹	19 (4.9)
No	194 (50.0)
I do not know	175 (45.1)
Does a third-party (i.e., insurance company) has the right to access medical records without patient's permission?	
Yes	22 (5.7)
No ¹	205 (52.8)
I do not know	161 (41.5)
Can patient's confidentiality rules be bypassed if the disease is not contagious?	
Yes	37 (9.5)
No ¹	256 (66.0)
I do not know	95 (24.5)
Can patient's confidentiality rules be bypassed if the disease is contagious?	
Yes ¹	108 (27.8)
No	185 (47.7)
I do not know	95 (24.5)
Knowledge score, median (IQR)	2.0 (2.0)

IQR: Interquartile range, 1: correct answer.

3.6. Predictors affecting pharmacists' knowledge in different aspects of confidentiality issues and behavior to compromise the confidentiality of the patient.

Lastly, factors affecting pharmacists' knowledge in different aspects of confidentiality issues and predictors affecting pharmacists' behavior to compromise the confidentiality of the patient were investigated using univariate and multivariate linear regression analysis (Tables 5 and 6 respectively). Results showed that none of the screened predictors were found to have significant effect of pharmacists' knowledge or behaviors (P > 0.05).

Table 3. Actions performed by pharmacists in sharing information with family members (n = 388).

Practice	n (%)	P value*
Sharing patient information with family members		<0.001
The pharmacist asks patient for permission	167 (43.0)	
The pharmacist only gives information to families if the patient <18 years old	103 (26.5)	
The pharmacy does not ask patient for permission	98 (25.3)	
The pharmacy does not share information with families at all	20 (5.2)	
The pharmacist share patient information with family members in the form of		<0.001
Oral information	217 (55.9)	
Written information	14 (3.6)	
Oral and written information	135 (34.8)	
The pharmacist does not share information with families at all	22 (5.7)	
Type of information that pharmacist share with the family members		<0.001
Summary of patient condition	109 (28.1)	
Additional information that the pharmacist did not give to patient	127 (32.7)	
Same information that the pharmacist offered to patient	131 (33.8)	
The pharmacist does not share information with families at all	21 (5.4)	

*: p value using χ^2 chi square.

4. Discussion

Maintaining patient confidentiality is becoming more difficult due to increased number of healthcare professionals involved in the healthcare process, the use of electronic record and information systems, and accessibility to the medical charts [17]. Hence, all health care professionals including pharmacists can be involved in violations of confidentiality [18].

Almost half of the pharmacists from the current study faced ethical dilemmas at least once a month and most of the advice concerning the faced ethical problem, as seen in Figure 1, is provided from a colleague in

Table 4. Pharmacists' behavior to compromise the confidentiality of the patient (n = 388).

Statements	Participant' responses n (%)			
	Always	Sometimes	Rarely	Never
Does the pharmacist take medical information from the patient in great confidentiality?	304 (78.4)	62 (16.0)	8 (2.1)	14 (3.6)
Does the pharmacist discuss patient's medical information in front of others due to limitations of the workplace?	44 (11.3)	144 (37.1)	100 (25.8)	100 (25.8)
Does the pharmacist save patient's medical information on a USP?	14 (3.6)	30 (7.7)	55 (14.2)	289 (74.5)
Does the pharmacist save patient's medical information on the personal computer?	29 (7.5)	24 (6.2)	30 (7.7)	305 (78.6)
Does the pharmacist send patient's medical information via the internet?	5 (1.3)	30 (7.7)	30 (7.7)	323 (83.2)
Does the pharmacist send patient's medical information via the phone?	5 (1.3)	43 (11.1)	61 (15.7)	279 (71.9)
Does the pharmacist handle patient's sex-related medical information with more confidentiality?	333 (85.8)	34 (8.8)	8 (2.1)	13 (3.4)
Does the pharmacist use software to protect patient medical information on electronic devices?	210 (54.1)	39 (10.1)	27 (7.0)	112 (28.9)
Does the pharmacist discuss patient's medical information with colleagues in breaks?	18 (4.6)	125 (32.2)	117 (30.2)	128 (33.0)
Does the pharmacist discuss patient's medical information with colleagues in open spaces?	9 (2.3)	24 (6.2)	91 (23.5)	264 (68.0)
Does the pharmacist discuss patient's medical information with colleagues outside workplace?	6 (1.5)	27 (7.0)	96 (24.7)	259 (66.8)
Does the pharmacist leave notes related to the patient's medical information on the desk?	13 (3.4)	42 (10.8)	84 (21.6)	249 (64.2)
Behavior score, median (IQR)	3.5 (0.4)			

the institution followed by the head of department. Hence, the reference for the pharmacists was probably another pharmacist who would have had similar education and possibly different or similar work experiences. This clearly demonstrates the need for appropriate training in ethical problem solving in different institutions on a regular basis. In fact, Current results showed that pharmacists were eager to learn these skills as 97 % of the pharmacists expressed their willingness and desire in receiving information on bioethics.

The ethical issues that faced the pharmacists were mainly solved based on experience from work rather than a systemic training in data confidentiality practices. This finding was also confirmed by a recent qualitative study that was conducted in Jordan to explore ethical pharmacy practice [19]. University education or lectures and seminars during their professional career had little contribution to problem solving of ethical conflicts or data confidentiality. Although these pharmacists were experienced (average years of service = 12 years) but laying out the foundation for tackling ethical dilemmas in pharmacy during university education or via on-job systemic training is essential, yet still lacking. This echoes the need for more concentration in the curricula of pharmacy schools on teaching ethics and training students through role playing and debate on how to approach and solve ethical dilemmas. Acquiring skills on how to manage ethical issues and solving them according to ethical standards and pharmacy practice regulations has been an important competency for pharmacy profession in many countries. In the united States, the Accreditation Council for Pharmacy Education (ACPE) states in the goal of the curriculum that "The college or school must ensure that the curriculum fosters the development of professional judgment and a

Table 5. Assessment of factors affecting participants' knowledge in different aspects of confidentiality issues (n = 388).

Parameter	Knowledge score			
	Beta	P-value#	Beta	P-value\$
Age (years)	0.199	<0.001 [^]	0.135	0.165*
Gender				
Male	Reference			
Female	-0.121	<0.017 [^]	-0.067	0.205
Educational level				
Bachelor degree (BPharm or Pharm D)	Reference			
Graduate degree (Masters and PhD)	0.026	0.608	—	—
Marital status				
Married	Reference			
Non-married (single, widowed, divorced)	-0.147	0.004 [^]	-0.086	0.112
Site of work				
Government healthcare institution	Reference			
Private healthcare institution	-0.112	0.027	-0.029	0.601
Years of experience	0.173	0.001 [^]	0.004	0.965
Number of prescriptions handled per day				
≤60	Reference			
>60	-0.023	0.648	—	—
Is the pharmacist interested in receiving information on bioethics?				
No	Reference			
Yes	0.075	0.139 [^]	0.072	0.154

[^]Eligible for entry in multiple linear regression, # Using simple linear regression, \$ Using multiple linear regression, * Significant at 0.05 significance level.

Table 6. Assessment of factors affecting participants' behavior to compromise the confidentiality of the patient (n = 388).

Parameter	Behavior score			
	Beta	P-value#	Beta	P-value\$
Age (years)	0.030	0.559	—	—
Gender				
Male	Reference			
Female	0.068	<0.183 [^]	0.060	0.241
Educational level				
Bachelor degree (BPharm or Pharm D)	Reference			
Graduate degree (Masters and PhD)	-0.088	0.083 [^]	-0.077	0.132
Marital status				
Married	Reference			
Non-married (single, widowed, divorced)	0.076	0.134 [^]	0.044	0.403
Site of work				
Government healthcare institution	Reference			
Private healthcare institution	0.092	0.070 [^]	0.068	0.199
Years of experience	-0.019	0.706	—	—
Number of prescriptions handled per day				
≤60	Reference			
>60	-0.004	0.944	—	—
Is the pharmacist interested in receiving information on bioethics?				
No	Reference			
Yes	0.014	0.777	—	—

[^]Eligible for entry in multiple linear regression, # Using simple linear regression, \$ Using multiple linear regression, * Significant at 0.05 significance level.

commitment to uphold ethical standards and abide by practice regulations" [20]. In the United Kingdom, the General Pharmaceutical Council (GPhC), the official body that regulates pharmacists and help to enhance professionalism, in their pre-registration Manual states that the conduct of the pharmacist "must be consistent with ethical behavior expected by the GPhC" [21]. Despite the universal agreement on the importance of ethics in pharmacy education, information and problem solving in these courses, workshops, or seminars must be tailored according to the country's laws, culture, and social norms.

Assessment of knowledge of the pharmacists in the different aspects of confidentiality revealed that there were deficiencies in certain areas. Pharmacists had the lowest extent of appropriate knowledge in two situations: patients' confidentiality in contagious diseases and cases where the law enforcement have access to information without patient's permission. The previous finding suggests gaps in the knowledge and awareness in the ethical basics and laws. Pharmacists must know that confidentiality is not absolute, and in certain conditions it must be overpowered by law and public health and safety requirements [22]. Mandatory reporting of infectious diseases (MRID) is important in controlling and tracking of communicable diseases [23]. In the covid 19 pandemic, the notification process by medical institutions was necessary to contain the spread of the disease and keep track of the numbers of infected individuals. Yet, disease notification systems should be developed and implemented in a manner that balances benefits of the individuals and those of the society [24]. In the predictive model, none of the characteristics of the pharmacists had a statistically significant effect on their knowledge scores.

All the pharmacists agreed that confidentiality concerning psychological disorders, illegal drugs and sexual diseases is of outmost importance. These subjects are a source of stigma and shame in developing countries and preserving the confidentiality of patient's information in these diseases reflects the awareness of the pharmacists of the sensitivity of these medical conditions. Public conception towards patients with mental health diseases is discriminative, and these individuals are perceived as dangerous and are exposed to social distancing [25]. Pharmacists, similar to other health care professionals, should be trained and advised on the type and extent of mental health information that can be disclosed that would guarantee the safety of the patients [26].

One fourth of the pharmacists did not think that it was a breach of confidentiality to provide the family members with the patient's medical information. The relationship between patients and their families is tight and complicated. Patients commonly consult their family members before they make decisions and consider the impact of their decisions on their families. Unfortunately, sometimes patients are coerced or threatened by family members and the patients lose their essential right of withholding their medical information [27]. Spouses may attempt to acquire information about each other for custody or divorce issues or a child may exploit the medical information to declare his parent as mentally incompetent for financial manipulation. Others argue that families have a central social and moral role in the patient's lives. Consequently, family-oriented medical practices should be established [28]. In a developing country such as Jordan, the influence of family members is even greater due to the existence of extended families and vast reliance on family members for emotional and financial support. This comes with a price that involves the struggle to maintain information regarding the patient's medical condition away from family members. A suitable arrangement might be to restrict the access of information to limited members of the family that the patient designates. This issue gets more complicated when family members accompany patients to medical appointments and hospital visits. One review showed that almost one third of patients were accompanied by family members, especially older patients with mental and physical health needs. Although the presence of family companions reflects positively on the communication process between the physicians and patients [29], but it makes the job of the pharmacist of maintaining the confidentiality of their patients in these circumstances difficult. One solution is to approach

the patient privately without the family members, unless the patient declares that it is acceptable to share the information with the accompanying family members.

Concerning the practices and behavior of pharmacists that might compromise confidentiality of patients, only half of the pharmacists used software to protect the patient's information, this policy should be implemented and promoted by the institution itself where appropriate security measures can be used to ensure confidentiality practices. It also demonstrates the importance of training pharmacists and other health care personnel who manage patient health information to guarantee that this information is protected.

The results of this study showed that the pharmacists did not discuss patient's information with colleagues in open spaces or during breaks (Table 4). This behavior in places such as cafeterias, surgical waiting rooms [30], and elevators [31] can be a serious source of breach of confidentiality. One study revealed that most frequent comments in the elevators of 5 hospitals were violations of patients confidentiality [31]. Approximately half of the pharmacists discussed patient's information in front of others due to limitations of the workplace. This is expected since pharmacists work in an open space and in proximity of other staff members and other patients. Consequently, adherence to confidentiality requirements is challenging and medical institutions should invest in providing appropriate pharmacy layout and private areas for patient education and pharmacist-patient consultation. This lack of confidentiality in mental health conditions, such as depression, was considered one of barriers that must be addressed to insure effective role of the pharmacists in depression care [32]. None of the characteristics of the pharmacists were significant predictors of their behavior score in the predictive model.

4.1. Study limitations

The study has several limitations, this was a quantitative study where pharmacists were asked specific questions with specific answers. However, ethical issues and attitudes are related to the personality of the pharmacists and background which were not reflected in this study. Open ended questions would have provided detailed information of the attitude and experiences of the pharmacists in ethical problem solving. Additionally, due to time restraints and to make the questionnaire manageable by the participants, the pharmacists' opinions regarding opportunities for improvement were not explored. All these missing aspects can be implemented in future complementary studies.

5. Conclusion

Pharmacists are aware of the importance of confidentiality issues of their patients. However, a number of gaps in their knowledge and practices about data confidentiality were identified. Training that targets these gaps in their knowledge, and rectifies incorrect practices is needed during university education and as part of their continuous medical education. The results of the current study have shed the light on ethical issues related to data confidentiality among pharmacists practicing at health institutions in Jordan. It, as well, provided evidence for the need for further improvement of gaps in pharmacists' knowledge and practices regarding data confidentiality.

Ethics approval

Institutional Review Board (IRB) approval was obtained from the IRB of Jordan University of Science and Technology, document number (15/2019) on February 2019.

Consent to participate

Verbal informed consent was obtained prior to the interview.

Consent for publication

There is no identifying data or images in the manuscript and participants knew that the results of this research will be published.

Declarations

Author contribution statement

Lobna Gharaibeh and Reema A. Karasneh: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Sayer I. Al-Azzam: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

Karem H. Alzoubi and Rana Abu Farha: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

Supplementary content related to this article has been published online at <https://doi.org/10.1016/j.heliyon.2022.e09115>.

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