

## Hospital Staff Perspectives toward Medication Reconciliation: Knowledge, Attitude and Practices at A Tertiary Teaching Hospital in Jordan

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### ABSTRACT

Medicine reconciliation (MedRec) is a patient safety goal. A cross-sectional study using a self-completed questionnaire was conducted at the Jordan University Hospital (JUH) in October- December 2016. A convenient sample of physicians, pharmacists, and nurses was targeted. Statistical analysis was performed to outline the variances across professional groups and factors associated with knowledge, attitude, and practice. Two hundred questionnaires were analyzed of which 41 (20.5%) were completed by physicians, 23 (11.5%) by pharmacists, and 136 (68.0%) by nurses. In total, 162 (81.0%) of the participants responded that they had heard about MedRec before the questionnaire, and 139 (69.5%) were aware of the existing policy for MedRec and 143 (71.5%) knew the requirements to complete the MedRec form. Nurses were more likely to know about the MedRec policy and the requirements to complete the MedRec form ( $p = 0.034$  and  $0.041$  Chi Square, respectively). For 119 (73.5%), working at the JUH was the main source to know about MedRec participants. Level of education appeared significantly to influence knowledge about MedRec. Those holding a postgraduate degree were more likely to know about MedRec 123 (61.5%),  $p = 0.01$ , Chi Square test). Moreover, increased years of practice at the JUH significantly influenced knowledge about MedRec ( $p = 0.04$ , Mann Whitney test). The MedRec attitude scores median (IQR) was 10 (9-12) indicating supportive views across the study profession groups. None of the variables significantly influenced attitudes toward MedRec. The median (IQR) of MedRec practice was 10 (8-13) representing moderate (62.5%) practice score. MedRec practice scores were significantly affected by profession type ( $p = 0.00$ , Kruskal Wallis test). Most often 117 (66.8%), the MedRec was completed only upon admission and information about therapy changes were less often recorded compared to patient and medical history details. One third of participants reported they often relied on one source of information, mainly family member or caregiver 117 (66.8%). In conclusion, physicians, nurses and pharmacists in an accredited teaching hospital in Jordan were found to know about MedRec, policy and form completion requirement. All profession groups showed supported views toward MedRec. However, the practice of MedRec was moderate and physicians followed by nurses were more involved in MedRec steps compared to pharmacists. MedRec often performed upon admission and focus on patient history taking. Practice of MedRec should be enhanced to achieve patient safety centered goals rather than accreditation centered purposes.

**Keywords:** Medicine reconciliation; Jordan; KAP; health care continuity, patient safety, hospital accreditation.

### INTRODUCTION

Patient transfers across health settings presents

increased opportunity for transition errors. On average 60% of medication errors occur during patient admission, discharge, or transfer of care. Additionally, over 50% of patients experience at least one discrepancy at the point of transfer and some are found to continue post-discharge.<sup>1</sup>

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Medication reconciliation (MedRec) is recognized as a patient safety goal by the Joint Commission for Health Organization Accreditation (JC) since 2006.<sup>2</sup> Consequently, accredited health organizations are urged to demonstrate the practice of MedRec for an accreditation award and renewal. MedRec consists of a set of steps, namely, collecting and creating the most possible accurate list of all medications a patient is taking, and then communicating that information to the next health care provider.<sup>2</sup> Previous international studies outlined that MedRec might not fully recognized or practiced due ambiguity in the MedRec process, responsibility and applicability across organizations<sup>3, 4, 5, 6, 7, 8, 9, 10, 11</sup> Jordan is no exception. At four tertiary hospitals accredited by JC, pharmacists' perceptions toward MedRec practice were investigated and were found to be suboptimal. Less than 50% of pharmacists were aware of the presence of MedRec policies in the hospital and MedRec was implemented for most admitted patients.<sup>12</sup> A recent study in Kuwait, assessed the perceptions of physicians and pharmacists at six governmental hospitals and reported that physicians and pharmacists were aware of MedRec terms, but the practice of MedRec was found again suboptimal.<sup>13</sup> Perceptions of the nursing team were not captured in existing studies which underlines needs for further investigation. This study aimed to investigate knowledge, attitude, and practices (KAP) of physicians, pharmacists, and nurses toward MedRec at an internationally accredited renowned teaching hospital in Jordan.

#### Method:

##### Study Design and Questionnaire

A cross-sectional study using a self-completed questionnaire was conducted at the Jordan University Hospital (JUH). The study commenced on October 2016 and lasted for two months. Three hundred and forty questionnaires were distributed to a convenient sample of physicians, pharmacists, and nurses. They were approached at various days, times, and locations. The JUH was accredited by the JC in 2007 and has adapted a

MedRec form that is attached to all admitted patient files.

The study questionnaire which was developed after an extensive literature review<sup>7, 8, 10, 12, 13, 14</sup> was face validated and piloted before wide distribution. The questionnaire consisted of four parts assessing the knowledge, attitudes, and practices of MedRec. Demographic data were also collected. The questionnaire is available upon request.

Responses to the questions were Yes/No answers, multiple-choice, and Likert scale depending on the nature and scope of the question.

##### Statistical Analysis

The data were coded, entered, and analyzed using the Statistical Package for Social Sciences (SPSS, Version 22). The descriptive analysis was summarized as mean (SD) and median and interquartile range (IQR) as appropriate. Frequencies and percentages were used for categorical variables. A non-parametric test was used where data were not normally distributed. Normal distribution was checked visually and using Shapiro-Wilk test, with  $p$ -value  $\geq 0.05$  indicating normally distributed continuous variables.

The MedRec attitude score was calculated scoring six statements. With attitude scores ranging from 0-12, 2 for agree, 1 uncertain and 0 for disagree. Higher scores represented better attitudes. A score of 80% or higher was considered to represent high supportive attitudes whilst a score of 60 to 79% represented moderate attitudes, and a score below 60% represented low supportive views. Similarly, a score representing MedRec practices was calculated by scoring each response as either "agree" two points, "uncertain" one point, and "disagree" zero points. Thus, the practice scores ranged from 0-16 with 16 representing a 100% practice score. A score of 80% or higher was considered to represent a high satisfactory practice, whilst a score of 60 to 79% represented moderate practice, and a score below 60% was considered to represent unsatisfactory practice.

Univariate analysis contributing to knowledge, attitude, and practice was performed. Chi Square, Mann-

Whitney test, Kruskal Wallis tests, and Fischer exact tests were used as appropriate. Bivariate Spearman correlation was used to assess the factors influencing practice and attitude scores. A P-value of less than 0.05 was considered statistically significant.

Ethical Approval

Scientific and ethical approval was obtained from the Research and Scientific Committee at the School of Pharmacy at the University of Jordan and the Institutional Review Board committee at the JUH, number 198/2016 on 27<sup>th</sup> Sep 2016.

RESULTS

Study Sample

A total of 210 questionnaires were returned with a response rate of 61.8%. Ten questionnaires were excluded due to missing data about the profession of the participant who completed the questionnaires. Therefore, 200 questionnaires were included in the analysis, of which 41 (20.5%) were completed by physicians, 23 (11.5%) by pharmacists, and 136 (68.0%) by nurses. The majority of the study participants were females for 109 (55.0%). The median (IQR) age was 27 (25-30) and 159 (79.5%) had a first university degree (BSc/MD). They mostly graduated from public universities for 153 (76.5%). The median (IQR) of practice at the JUH was 4 (2-6) years. Table 1 summarizes the study sample characteristics per profession type.

**Table 1: Characteristics of the study sample (N=200) and knowledge of MedRec, policy and hospital form**

Characteristics	Physicians (N=41)	Pharmacists (N=23)	Nurses (N=136)
<b>Gender</b>			
Female	18 (43.9%)	14 (60.9%)	77 (56.6%)
<b>Age years</b>			
Median (IQR)	27 (25-28)	29 (24-36)	28 (26-31)
<b>Education Level</b>			
Diploma	0 (0.0%)	2 (8.7%)	9 (9.6%)
BSc/MD	30 (73.2%)	19 (82.6%)	110 (80.9%)
Master	11 (26.8%)	2 (8.7%)	17 (12.5%)
<b>University/ College of graduation</b>			
Public	38 (92.7%)	14 (60.9 %)	101 (74.3%)
<b>Years of practice at JUH</b>			
Median (IQR)	3 (1-4)	5 (1-8)	4 (2-8)

**IQR, interquartile range**

Knowledge about MedRec

Table 2 present knowledge about MedRec, existing policy and requirement to complete the MedRec form as well as source of information about MedRec per profession type. In total, 162 (81.0%) of the participants had heard about MedRec before the questionnaire, whilst 139 (69.5%) responded that they were aware of an existing policy of MedRec at the JUH and 143 (71.5%) knew the

requirements to complete the MedRec form for every patient. Nurses were more likely to know about the MedRec policy and the requirements to complete the MedRec form (p = 0.034 and 0.041 Chi Square, respectively). Working at the JUH was the main source of knowledge about MedRec for 119 (73.5%) participants, followed by hospital training for 39 (24.1%) and during their study for 19 (11.7%).

**Table 2: Knowledge about MedRec, existing policy and requirement to complete the MedRec form as well as source of information about MedRec per profession type**

Knew about	Physicians (N=41)	Pharmacists (N=23)	Nurses (N=136)	P value
MedRec	30 (73.2%)	19 (82.6%)	113 (83.1%)	0.04
MedRec policy at JUH	24 (58.5%)	13 (56.5%)	102 (75.0%)	0.02
Requirement to complete MedRec form existence	25 (61.0%)	12 (52.2%)	106 (77.9%)	0.03
Source of information about MedRec				
During my study	3 (10.0%)	5 (26.3%)	24 (20.7%)	0.32
During my training	7 (23.3%)	10 (52.6%)	22 (19.5%)	0.07
A word from a colleague	1 (3.3%)	2 (10.5%)	3 (2.7%)	0.10
During work at JUH	21 (70.0%)	8 (42.1%)	90 (79.6%)	<0.001

Factors contributing to Knowledge about MedRec, policy and requirements for the MedRec form

Education level demonstrated significant association with the knowledge about MedRec ( $p = 0.01$ , Chi Square test). With those holding a postgraduate degree across profession groups being more likely to know about MedRec for 123 (61.5%,  $p = 0.01$ , Chi Square test). Moreover, years of practice at the JUH significantly influenced knowledge about MedRec ( $p = 0.04$ , Mann Whitney test); the median (IQR) was 4 (2-8) practice years at the JUH for those who had heard about MedRec during work at the JUH. There was also a significant association between profession type and whether participants knew about MedRec through work at the JUH ( $p < 0.001$ , Chi Square test) as it can be seen Table 2.

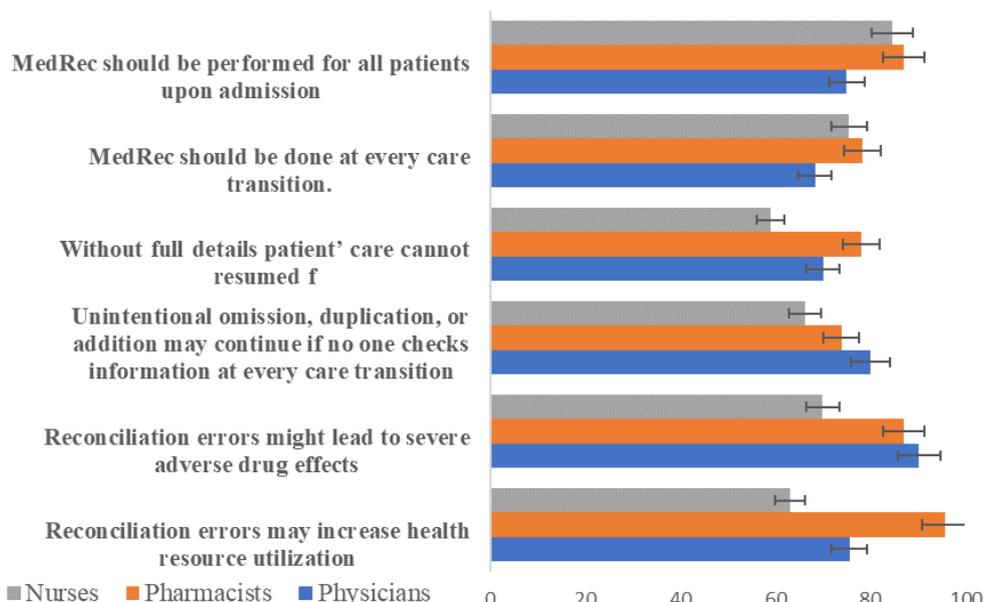
There was only a significant association between profession type and the knowledge of the MedRec policy and requirements to complete a designated form. Nurses were more likely to know about the policy. As for the requirement to complete MedRec form upon patient

admission, nurses were also more likely to know about such requirement. A significant association was found too between the knowledge of the policy and years of practice at the JUH ( $p = 0.00$ , Mann Whitney test). The median (IQR) was 4 (2-8) practice years at the JUH for those who knew about MedRec policy compared to 2 (1-3). Similarly, nurse participants and those with more years of practice at the JUH were more likely to know about the requirements to fill the MedRec form for each admitted patient ( $p$  value  $< 0.01$ )

#### Attitude toward MedRec

The median (IQR) of attitude score was 10 (9-12) indicating supportive views across profession groups. Figure 1 presents agreement with the MedRec attitude statements per profession type. The median (IQR) of attitude score for physicians was 10 (9-12), for pharmacists 9 (9-11) and for nurses 10 (10-12),  $p=0.42$ .

None of the variables significantly affected attitudes toward MedRec.



Practice of MedRec

Table 3 presents MedRec steps performed per profession type. The median (IQR) of MedRec practice was 10 (8-13) representing 62.5% of the practice score. MedRec practice scores were significantly associated with profession type (p = 0.00, Kruskal Wallis test); The MedRec practice score median (IQR) was 12 (8-14) for physicians, 8 (6-9) for pharmacists, and 11 (8-13) for nurses.

Overall, 65 (32.5%) of the participants reported that they use only one source to verify medication history, 41

(30.1%) use two sources, and the remainder reported using three sources or more. A family member or caregiver was the main source of information for 117 (66.8%), followed by medications brought with patients from home for 108 (61.7%), previous discharge summary for 101 (57.7%), and previous prescription for 71 (40.6%).

As per profession type, 22 (53.7%), 7 (30.4%), and 55 (40.4%) of the physicians, pharmacists, and nurses, respectively, recalled identifying reconciliation errors following a care transition in the past six months.

Table 3: MedRec Practice at JUH per profession type

MedRec step	Physicians (N=41)	Pharmacists (N=23)	Nurses (N=136)	P*
Interviewing all patients upon admission to obtain medication history.	34 (82.9%)	13 (56.5%)	112 (82.4%)	0.03
Verifying medication histories from multiple sources	40 (97.6%)	14 (60.9%)	121 (89.0%)	0.05
Verifying medication history with inpatient medication list	28 (68.3%)	14 (60.9%)	109 (80.1%)	0.05
Discussing identified discrepancies (omission, duplication, addition) with care team	27 (65.9%)	15 (65.2%)	61 (44.9%)	0.10
Providing name and phone to be contacted in case of any question	5 (12.2%)	3 (13.0%)	22	0.63

when patient transfers from your care			(16.2%)	
Providing a written summary on patient's admission and medication information to share with next health care provider	33 (80.5%)	5 (21.7%)	81 (59.6%)	0.01
Verifying discharge medications with inpatient medications upon discharge to ensure all changes to medications are documented	25 (61.0%)	10 (43.5%)	70 (51.5%)	0.07
Verifying discharge medications with preadmission medication history to ensure no omissions or duplications or discontinuation	16 (39.0%)	6 (26.1%)	65 (47.8%)	0.34

\*Chi squared test

Table 4 presents the time when each profession completed a MedRec form. Often, MedRec form was completed upon admission.

Table 4: Completion of MedRec form

Time of completion	Physicians (N=25)	Pharmacists (N= 12)	Nurses (N=106)	Total (N=143)
Upon admission	21 (84.0%)	6 (50.0%)	96 (90.6%)	123 (86.0%)
Upon discharge	4 (16.0%)	1 (8.3%)	11 (10.4%)	16 (11.2%)
Upon transfer between wards	1 (4.0%)	2 (15.4%)	16 (15.1%)	19 (13.3%)
Every time a medication changed	3 (12.0%)	1 (8.3%)	14 (13.2%)	18 (12.6%)

\*As participants were allowed to choose more than one choice, total percentages may exceed 100%

Moreover, 84 (42.0%) of the participants encountered reconciliation errors in the last 6 months following a care transition. Of them, 25 (29.8%) believed that the identified reconciliation errors were most likely unintentional, whilst 41 (48.8%) believed they were sometimes unintentional

and only 18 (21.4%) believed they were rarely unintentional.

Information filled in a MedRec form per profession is presented in Table 5.

Table 5: Information filled in MedRec form per profession type

Information in MedRec form	Physicians (N=25)	Pharmacists (N=12)	Nurses (N=106)
Patient details*	20 (80.0%)	6 (50.0%)	85 (80.2%)
All medications taken at home	15 (60.0%)	7 (58.3%)	72 (67.9%)
All medications taken in the hospital	16 (64.0%)	8 (66.7%)	56 (52.8%)
All medications to take home after discharge	11 (40.0%)	3 (25.0%)	44 (41.5%)
Medication generic name	14 (56.0%)	6 (50.0%)	59 (55.7%)
Medication trade name	13 (52.0%)	5 (41.7%)	64 (60.4%)

Dose	17 (68.0%)	7 (58.3%)	78 (73.6%)
Route	15 (60.0%)	5 (41.7%)	85 (80.2%)
Frequency	17 (68.0%)	7 (58.3%)	79 (74.5%)
Start date	9 (36.0%)	2 (16.7%)	66 (62.3%)
Discontinuation date (if applicable)	8 (32.0%)	3 (25.0%)	47 (44.3%)
Known allergies	15 (60.0%)	6 (50.0%)	84 (79.2%)
Intended length of courses e.g. antibiotics	9 (36.0%)	3 (25.0%)	46 (43.4%)

\* Name, date of birth, file number, etc.

Factories contributing to MedRec practice

MedRec practice scores were significantly affected by gender ( $p = 0.01$ , Mann Whitney test); the MedRec practice scores median (IQR) was 11 (8-14) for females compared to 10 (7-12) for males. Moreover, the educational level significantly influenced MedRec practice scores ( $p = 0.01$ , Kruskal Wallis test); participants with a master degree had MedRec practice scores median (IQR) 11.5 (8-14) compared to 10 (8-13) with a bachelor degree and 6 (4-12) with a diploma degree. Furthermore, although the  $p$  values of the spearman correlation analysis between MedRec practice scores and age or MedRec practice scores and JUH practice years were both 0.02; the spearman's coefficient between MedRec practice scores and age or MedRec practice scores and JUH practice years were -0.18 and -0.17, respectively. This indicates that the correlations between MedRec practice scores and age or MedRec practice scores and JUH practice years are negligible.

### Discussion

This study evaluated the knowledge, attitude, and practice of the healthcare staff toward MedRec in an internationally accredited teaching hospital. The majority of health staff knew about MedRec, policy, and requirements for form. The year of practice in the study site and post-graduate training were contributed significantly better knowledge of MedRec, policy and the hospital form. Of note, pharmacists reported their study as the main source to know about MedRec, whilst physicians and nurses reported work as the leading source of information. Additionally, nurses were more likely to know about the MedRec policy and form completion

requirements.<sup>15</sup> This might reflect high involvement of nurses in the accreditation office. Future evaluation whether involvement in administrative and accreditation roles might catalyst knowledge and practice of MedRec is recommended.

In line with previous reports,<sup>8,10,14-16</sup> there was a consensus among participants that MedRec implementation is significant to patient care and safety and should be performed at each care transition.<sup>6, 8, 12, 13, 14</sup> The majority of participants agreed that the discrepancies of unintentional omission, duplication, or addition to patient medications might continue if no one checks patients' information at every care transition. This outlines importance of MedRec effective implementation to ensure patient safety goals.<sup>15, 16</sup> Additionally, it is vital to promote continues training and education that promote the process and implantation of MedRec during undergraduate and postgraduate levels.<sup>15</sup>

Although MedRec as a process is well defined, the practice and optimum implementation of MedRec appears to represent a major challenge for health institutions worldwide.<sup>4, 8, 17, 18, 19</sup> We found MedRec practice moderate in one of the leading JC accredited teaching hospitals. This was outlined previously by other institutions.<sup>6, 7, 12, 15</sup> These studies outlined that full MedRec was not implemented to most patients and the best possible medication history was not constructed at patient admission. Additionally, patient and therapy information were not clearly communicated or documented.<sup>6, 7, 12, 17, 18</sup> Reasons for suboptimal implementation of MedRec and strategies for effective

implementation might vary across institutions.<sup>6, 13, 15</sup> Therefore, standardization of MedRec practice across organizations and health settings might not be possible.<sup>13, 19</sup> Nonetheless, it is important to underline institutional and human barriers and facilitators through continual meetings and discussions between managers and practitioners on an organization level as well as local and international levels.<sup>4</sup>

MedRec practice varied across profession groups with physicians and nurses reporting more involvement in MedRec steps in the study site compared to pharmacists. This is in contrast with the accumulating evidence underpinning most effective MedRec interventions as those involving pharmacists and highlighting leading roles of pharmacists with MedRec steps.<sup>15, 18, 19</sup> Factors hindering pharmacist involvement in MedRec are worth investigation in Jordan.<sup>12, 13, 18, 20</sup> Of note, 11 of respondents to the study questionnaire were pharmacy and nursing assistants (Diploma holders), these were seniors and involved in similar extents of patient care to BSc staff. This highlights variances in the staff performing MedRec across organization and outline needs to understand better facilitators and barriers for each profession.

Deficiencies in information completed in the MedRec form and the less focus on therapy changes information needs careful attention. Lack of such practice might present a risk for unintentional discrepancies to be continued resulting in potential patient harm and treatment costs.<sup>4, 8, 11, 17</sup> In addition, the MedRec forms mostly completed upon admission and those information left unreconciled might be carried until discharge. Effective and optimum implementation on the organization level requires meetings and discussions between professions, practitioners, and managers to ensure continuous evaluation of the process. Thus, it is recommended for accreditation bodies to focus on mapping the MedRec process across organizations to ensure applicability and feasibility.<sup>21</sup> Onsite evaluation for accreditation renewal

should be linked to organization compliance with active implementation of MedRec. This requires defining MedRec practice indicators and assessing the quality of information sharing at every point of patient transition.

#### Limitations

This is a single sited study using convenient sampling techniques. Thus, there is an inherent selection bias. The generalizability to other settings or unaccredited facilities can be enhanced by multi-center study design and further statistical validation of the study tool to ensure adaptability across organization. However, this study scoped the perspectives of physicians, pharmacy, and nursing staff and outlined factors associated with knowledge, attitude, and practice of MedRec. Future studies to investigate causative links via regression analysis between MedRec perception and practice across health organizations are recommended.

#### Conclusion

Members of the medical team in an accredited teaching hospital in Jordan knew about MedRec, its policy, and its form. All professional groups reported supportive attitudes toward MedRec. MedRec practice was found moderate and mainly in the form of history taking. Therapy changes and contact information were often not reconciled fully. Reasons underlying the perceptions and practice across profession groups should be investigated. Health accreditation bodies and managers should map MedRec process often to ensure effective implementation .

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#### Conflict of interest

All authors wish to declare no conflict of interest.

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## وجهات نظر الطاقم الطبي بما يتعلق ب التوافق الدوائي: المعرفة و التطبيق في مستشفى تعليمي متخصص في الاردن

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قسم الصيدلة السريرية و الحيوية- كلية الصيدلة - الجامعة الأردنية

### ملخص

التوافق الدوائي هو مطلب لأمن و سلامة المريض و استمرارية العناية بالمريض. تم اخذ عينة مقطعية و توزيع استبيان في مستشفى الجامعة الاردنية لأطباء و صيادلة و ممرضين في مواقع متعددة و اوقات دوام و تخصصات من المستشفى. تم تحليل الاستبيانات تحليلاً وصفيًا و سببياً لتحديد التنوع بالأراء و المواقف بين التخصصات. منتان استبيان تم تعبئتهما بشكل كامل وتم تحليلهما. معظم المشاركين من مختلف التخصصات يعرفون عن سياسات و نماذج تطبيق التوافق الدوائي في المستشفى. الممرضين كانوا الاكثر معرفة من حيث السياسات و الخطوات. أجمعت التخصصات ان تطبيق التوافق الدوائي في غاية الاهمية لتحقيق رعاية و سلامة المرضى و يجب تطبيقه بكل حالات انتقال المريض. ممارسة التوافق الدوائي كانت متوسطة و كان الاطباء و الممرضين اكثر مشاركة في التوافق الدوائي مقارنة مع الصيادلة. المعلومات المتعلقة بتغيرات الدواء في معظم الاحيان لا تعبأ في النموذج المخصص. اعضاء الفريق الطبي من اطباء و صيادلة و ممرضون يعرفون عن التوافق الدوائي و سياساته في المستشفى . و لكن تطبيق التوافق الدوائي غير كامل . جميع التخصصات اجمعت على اراء ايجابية بما يتعلق بأهمية التوافق الدوائي. البحث عن الأسباب مهم لتحسين الاداء و التطبيق في المستقبل.

**الكلمات الدالة:** التوافق الدوائي، الأردن، المعرفة و الممارسة و الآراء، تواصل الرعاية الصحية.

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