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RESEARCH ARTICLE

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National Survey of Hospital Medication Safety Practice during Mass Gathering (Hajj-2016) in Makkah, Saudi Arabia: Patient Information

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Abstract

Objective: To explore the national hospital medication safety survey during mass gathering (Hajj -2016) in Makkah, Saudi Arabia: Patient information, the finding of ISMP (2011) self-assessment of medication safety at the hospitals. **Methods:** It is 15 days cross-sectional national survey of hospital medication safety at Makkah region. The survey modified from Institution of Safe Medication Practice (ISMP) self-assessment of hospital medication safety. It consisted of a demographic section and ten domains with 270 questions. The ten areas included patient information, drug information, communication of medication orders, drug preparation, medication distribution, medication devices, work environment, staff competency, patient education, quality process with risk management domain. The medications safety officer at Makkah region distributed the questionnaire and made follow up on a daily basis used physical visiting and through the telephone call. **Results:** The total score of all ISMP-self assessment of medication safety was 3.39 +/-0.51 (67.68 %) with CI (3.2-3.6) P< 0.05. The average rating of patient information domain at all hospital was 2.75+/- 0.57 (55 %) with CI (2.52-2.98) P< 0.05. The highest score of patient information section was the core information of the patient transmitted to the pharmacy 3.91 (78.2%). The lowest score of patient information section was computerized physician order entry (CPOE) with drug allergies 1.73 (34.6%), computerized order entry system with drug allergies alerting severity 1.73 (34.6%), and bar-coding used to verify patient identity during drug administration 1.9 (38%). **Conclusion:** Despite the patient information is very crucial for medication safety; the critical base information missed with the emphasis on patient allergies related issues and verification of medication administration by using new technology. An electronic prescription with complete medication history and alerting system highly recommended to during mass gathering Hajj is essential. Targeting to correct all related patient information measure will prevent drug misadventures, improved patient clinical outcomes, and quality of life.

Key words: Medication Safety, Hajj, Patient, Information, Ministry of Health, Saudi Arabia.

INTRODUCTION

The General Administration of Pharmaceutical Care (GAPC) established the first pharmacy strategic plan in the Middle East in 2013.[1] The plan contained

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several national pharmacy practice programs.[2] The mass gathering of pharmaceutical care program was among them. The program founded by the author in 2014 and the first study to evaluate pharmaceutical care basic information during hajj period published in 2015.[3,4] One of the major missed points in the mass gathering-hajj pharmacy practice was medication safety.[4] Also, The general administration of Pharmaceutical Care established national medication safety program in 2013(5). The program consisted of several elements including the application of medicines safety during Hajj period and do Institution Safe Medication Practice (ISMP) self-assessment of medication safety at hospitals annually.[5] The ISMP formulated several tools to assess background culture of medication safety at the hospital and primary care centers.[6,7] In addition to the self-assessment of the safety of oncologic medication and anticoagulation medicines.[8,9] The first publication of ISMP self-assessment of medication safety at hospitals in the USA was in 2003 then repeated in 2014. There was a significant improvement in the key elements, for instance, patient information scores changed from 43 % to 60%, drug information key element from 53% to 68%, and communication of drug orders and another drug Information 47% to 74%.[10,11] Another study in 2012 investigated a bout self-assessment of oncology medication.[12] The authors are not familiar with any study published about ISMP self-assessment finding in Saudi Arabia, Gulf countries or Middle East countries and thus it is the first study done in our area. Also, the advantage of this study, it did during the mass gathering Hajj period and may be the first survey of this property in the world. The goal of the survey to explore the hospital medication safety practice during mass gathering (Hajj -2016) in Makkah, Saudi Arabia, the finding of ISMP self-assessment of medication safety at hospitals with an emphasis on patient information key element.

METHODS

It is a fifteen days cross-sectional national survey of hospital medication safety at Makkah region. The survey modified from Institution of Safe Medication Practice (ISMP) 2011 self-assessment of hospital medication safety.[6] It consisted of a demographic section and ten domains with 270 questions. The ten areas included patient information, drug information, communication of drug orders and other drug information, drug Labeling and Packaging and Nomenclature, drug standardization, storage and distribution, medication devices acquisition, use, and monitoring. The environmental factors, workflow, and staffing, staff competency, patient education, quality processes and risk management domain. It contained a twenty core sections included essential patient information, essential drug information, a controlled drug formulary system, methods of communicating drug orders. The strategies to minimize the possibility of errors, clear labels that identify drugs are on all drug containers, standardized of IV solutions, drug concentrations, doses, and administration times. The practitioners receive sufficient orientation to medication use; the practitioners involved in medication use provided with ongoing education about medication error prevention and the safe use, patients, are included as active partners. Medications provided to patient care units safely and securely, the unit stock, is restricted, hazardous chemicals safely sequestered, the potential for human errors, medications are prescribed, transcribed, prepared, dispensed, and administered within an efficient and safe workflow. The complement of qualified, well-rested practitioners matches the clinical workload without compromising patient safety. A safety-supportive culture, practitioners are stimulated to detect and report adverse events, errors, hazards, and observed at risk behavior, and redundancies that support a system of independent double check at risk. The survey conducted at a permanent and temporary hospital located at Makkah and holy places. Most of the hospital had outpatient, and emergency services, some of them had critical care section for adults, pediatrics, and internal medicine. The hospital provided emergency and outpatient pharmacies, inpatient pharmacies. Some of the hospitals had intravenous admixture and total parenteral services and drug information services. Structural Clinical pharmacy services missed at most of the hospitals except critical care pharmacy and stewardship antimicrobial program at permanent hospitals, some essential Clinical pharmacy program; pain management, and anticoagulation program not existed at all hospital. The 5-points Likert response scale system used. The scoring key identified as number (1) equal to (A): No activity to implement, (2) equal to (B): Considered, but not implemented, (3) equal to (C): partially implemented in some or all areas. (4) Equal to (D): Fully implemented in some areas, and (5) equal to (E): Fully implemented throughout. The survey distributed to directors of hospital pharmacy during mass gathering Hajj-2016. The medications safety officer at Makkah region distributed the questionnaire and made follow up on a daily basis used physical visiting and through the telephone call. The study

made as an electronic format, and it analyzed through survey monkey system and Microsoft Excel version ten. The authors suggested some solution to improve the scoring medication safety culture and the finding of ISMP self-assessment, the 5-points Likert scale system with high priority or opportunity to implement (5) and low priority or opportunity to implement (1). Those suggestions based on General Administration of Pharmaceutical strategic goals and Saudi Central Board of Accreditation for Health Care Institutions (CBAHI) standards in Saudi Arabia.[1-13] The ten domains divided into for several parts for analysis, discussion, and solution. Part one: patient information, part two: drug information, part three: medication preparation and dispensing (communication of drug orders and other drug information, drug Labeling and Packaging and Nomenclature). The part four: medication administration (drug standardization, storage and distribution, medication devices acquisition, use, and monitoring), part five: environmental factors, workflow, and staffing, staff competency, and part six: patient education, quality processes, and risk management. The study discussed part one; it is a finding from ISMP (2011) medication safety at a hospital in Makkah.

RESULTS

The survey distributed to sixteen hospitals, the response rate, was eleven hospitals (68.75%). The number of permanent hospitals was six (54.45%) located at Makkah city while the temporary hospitals were five (45.45%) located at holy places. Of those four (36.4%) hospitals bed size was (100-199) and 3 (27.3%) bed size (200-299). The number of hospitals accredited by Saudi Central Board of Hospitals Accreditation (CIBAHI) was four (36.4%) while three hospitals (27.3%) accredited by USA International Joint Commission and CIBAHI. The total number of prescriptions was (120,598). Of those (72,627) were Ambulatory care prescriptions, while (43,242) were Emergency Prescriptions, and (4,729) were inpatient orders. The total number of the pharmacist was (180) while pharmacy technician (83) and some clinical pharmacists not reported as explored in Table 1. The total score of all ISMP-self assessment of medication safety was 3.39 +/-0.51 (67.68 %) with CI (3.2-3.6) P< 0.05 and range (2.75 – 3.93). The average of patient information domain at all hospital were 2.75+/-0.57 (55 %) with CI (2.52-2.98), P< 0.05 and range (1.73 – 3.91) as explored in Table 2. The highest score of patient information section was the core information of the patient is clear and easily visible on orders transmitted to the pharmacy 3.91 (78.2%) and scales used to weigh patients only measure in metric units 3.64 (72.8%) as explored in Table 3. The lowest score of patient information section was computerized physician order entry (CPOE) with drug allergies 1.73 (34.6%), computerized order entry system with drug allergies alerting severity 1.73 (34.6%). The bar coding used to verify patient identity during drug administration 1.9 (38%), and medication orders cannot be entered into CPOE until the patient's allergies have been entered 2 (40%) as explored in Table 4.

DISCUSSION

The ministry of health in the kingdom of Saudi Arabia expands in health care services at holy places and Makkah city. It provided all type of healthcare services to all pilgrims. The MOH had general administration of Hajj and Umra and executive committee of hajj services working especially reasonable of provision all health care services and implement new services including pharmaceutical care services. New mass Gathering Medicine center newly established to evaluate the services and to do research to improve the health care services during Hajj period.[14-17] The general administration of pharmaceutical care over hundreds of pharmacists and pharmacy technician participated in the huge event. They work at all holy places and Makkah city hospitals. Every year the senior pharmacist come early days in Hajj period at begging at month eleven of Haji date to prepare all pharmacy services issues in temporary hospitals. Also, director of the pharmacy at Makkah region arranged all medication and pharmaceutical care system for all pilgrims. With an extensive medical and pharmacy services, the new program mass gathering pharmaceutical care stated in 2015 based on pharmacy strategic plan at MOH.[18] The program published a new assessment of pharmaceutical care last year; the authors found some discrepancies with medication safety.[4] This year the authors do the new project by using international stranded of medication safety like ISMP self-assessment tools. The assessment tool the first time done at Saudi Arabia hospitals especially during mass gathering hajj 2016. The authors found the total scoring of the evaluation was more or near of scores of studies in the USA. It was higher than the old study in the 2000s and almost near new study in 2011. The reason behind that is pharmacy services is tremendous improving every year as shown the pharmacy survey in 2012 done by the and new study by the first author and his team in 2016.[19,20] The results of ten key elements discussed in different six parts and the first part presented here as patient information. The overall score of patient information less or near that

Table 1: Type of hospital services and pharmaceutical care section of surveyed hospitals in Makkah.

								No of OPD Prescriptions		No of Emergency Prescriptions		No of Inpatient Prescriptions	
No and Hospitals	Location	Hospital Type	No of Beds	Accreditations	No of Pharmacy Technician	No of Pharmacist	No of Clinical Pharmacist	Pilgrims	Non- Pilgrims	Pilgrims	Non- Pilgrims	Pilgrims	Non- Pilgrims
1.Mena-1	Mena	Temporary	100-199	Non	9	1	NR	6,180	500	992	67	179	6
2. Mena-2	Mena	Temporary	100-199	Non	18	1	NR	15,203	330	1,661	113	612	17
3. Mena-3	Mena	Temporary	200-299	Non	19	2	NR	12,286	1,016	1,281	99	350	22
4. Arafat-1	Arafat	Temporary	200-299	Non	10	1	NR	527	73	272	22	129	6
5. Arafat-2	Arafat	Temporary	100-199	Non	8	1	NR	4,073	155	328	13	192	6
6. M-1	Makkah	Permanent	300-399	CIBAHI	12	9	NR	22	650	244	6,135	31	664
7. M-2	Makkah	Permanent	200-299	CIBAHI - JCI	23	10	NR	34	3,208	185	9,408	46	728
8. M-3	Makkah	Permanent	400-599	CIBAHI - JCI	60	24	NR	6,706	15,222	4,033	4,026	428	490
9. M-4	Makkah	Permanent	50-99	JCI	7	2	NR	0	0	1,754	1,159	55	11
10. M-5	Makkah	Permanent	100-199	CIBAHI	4	2	NR	1,037	NR	3,353	NR	29	NR
11. M-6	Makkah	Permanent	300-399	CIBAHI	10	30	NR	2,640	2,765	2,988	5,109	411	317
Total					180	83		48,708	23,919	17,091	26,151	2,462	2,267

Total no of prescriptions = 120,598

No.: Number , NR: Not reported

Table 2: The scores of key elements of ISMP medication safety hospitals in Makkah

No	Key elements	Mean score	SD	CL (95%)	Range	Percent	SD %	CL (95%)	Range %	USA, 2000 Scores %	USA, 2011 Scores %
I	Patient information	2.75	0.57	0.23	1.73 – 3.91	55.00	11.46	4.63	34.60 – 78.20	43.00	60.00
II	Drug Information	2.91	0.54	0.19	2.00 – 4.18	58.00	10.80	3.80	40.00 – 83.60	53.00	68.00
III	Communication of drug orders and other drug information	3.53	0.65	0.347	2.55 – 4.50	70.60	13.00	6.94	51.00 – 90.00	47.00	74.00
IV	Drug Labeling and Packaging and Nomenclature	3.57	0.68	0.238	2.10 – 4.90	71.4	13.60	4.76	42.00 – 98.00	61.00	74.00
V	Drug Standardization, Storage and Distribution	3.54	0.50	0.17	2.73 – 4.80	70.80	10.00	3.40	54.60 – 96.00	73.00	81.00
VI	Medication Devices acquisition, Use, and Monitoring	2.97	0.45	0.21	2.33 – 3.78	59.40	9.00	4.20	46.60 – 75.60	69.00	70.00
VII	Environmental Factors, Workflow, and Staffing	3.93	0.44	0.20	3.36 – 4.70	78.60	8.80	4.00	67.20 – 94.00	70.00	77.00
VIII	Staff competency and education	3.69	0.445	0.18	2.91 – 4.40	73.80	8.90	3.60	58.20 – 88.00	53.00	64.00
IX	Patient Education	3.75	0.35	0.27	3.00 – 4.20	75.00	7.00	5.40	60.00 – 84.00	48.00	68.00
X	Quality Processes and risk management	3.18	0.47	0.118	2.00 – 4.10	63.60	9.40	2.36	40.00 – 82.00	51.00	72.00
	Average self-Assessment	3.39	0.51	0.215	2.75 – 3.93	67.68	10.20	4.30	55.00 – 78.60	56.00	71.00

CL: Confidence Level

Table 3: The highest scores items of core domain essential patient safety of ISMP medication safety hospitals in Makkah.

ISMP No	Key elements	A 1	B 2	C 3	D 4	E 5	Rating Average	Percent	Response Count
	Core # Essential patient information								
21	Basic information (e.g., patient name, hospital unit location, medical record number, birth date, and physician) is clear and easily visible on orders transmitted to the pharmacy	1	0	2	4	4	3.91	78.2	11
26	Scales used to weigh patients only measure in metric units or default to metric units.	2	0	2	3	4	3.64	72.8	11
3	Prescribers and nurses can easily and electronically access outpatient laboratory values	3	2	0	0	6	3.36	67.2	11
4	Pharmacists can easily and electronically access outpatient laboratory values	3	2	0	0	6	3.36	67.2	11
5	Recent inpatient and outpatient laboratory values automatically displayed on COMPUTER ORDER ENTRY SYSTEM screens for medications that typically require dose adjustments	3	1	1	1	5	3.36	67.2	11
Answered question 11 and skipped question 0									

Table 4: The lowest scores items of core domain essential patient safety of ISMP medication safety hospitals in Makkah.

ISMP No	Key elements	A 1	B 2	C 3	D 4	E 5	Rating Average	Percent	Response Count
	Core # Essential patient information								
8	Inpatient and outpatient COMPUTER ORDER ENTRY SYSTEMS are linked so that comprehensive patient information is available to practitioners	6	1	0	1	3	2.45	49	11
24	Medication orders cannot be entered into the COMPUTER ORDER ENTRY SYSTEM until the patient's weight entered	5	2	1	1	2	2.36	47.2	11
6	An active computer surveillance system used to monitor available data sources to optimize therapy and identify patients at risk of harm related to medication therapy	6	1	1	1	2	2.27	45.4	11
15	There is a defined process that specifies how to modify patient allergies and reactions in the medical record.	5	2	2	1	1	2.18	43.6	11
11	Medication orders cannot be entered into the COMPUTER ORDER ENTRY SYSTEM until the patient's allergies have been entered and coded	4	5	1	0	1	2.00	40	11
20a	Machine-readable coding (e.g., bar-coding) is used to verify patient identity during drug administration.	6	1	2	0	1	1.90	38	10
12	COMPUTER ORDER ENTRY SYSTEMS automatically screen and detect drugs to which patients may be allergic (including cross allergies), provide a clear warning to staff during order entry	6	3	1	1	0	1.73	34.6	11
13	COMPUTER ORDER ENTRY SYSTEMS have a tiered severity rating for allergies, based on the patient's reaction to the drug.	6	3	1	1	0	1.73	34.6	11
Answered question 11 and skipped question 0									

Vaida AJ *et al*. in 2011 study because of computerized physician order entry not fully implemented at hospitals over all Saudi Arabia. The computerized physician order entry well known prevents medication errors, adverse drug reaction and saving cost.[21-25] Without unified one electronic patient profiling system it difficult to collect or g*et al*l patient information during the Pilgrim's arrival to the kingdom of Saudi Arabia until departures. Some resident pilgrims had the electronic patient file, and it was straightforward to assess it, however, unfortunately, it does not connect with MOH portal because the network MOH hospitals not existed yet. The authors suggested several recommendations to improve the pharmacy services with a low score of the survey. For instance; implement full electronic complete medical history for all outside and inside Pilgrim, implement of CPOE at inpatient and output pharmacy linked with patient full information, use the alerting system in CPOE linked with comprehensive patient information. All recommendations explored at table 5 with meet the specific MOH pharmacy strategic and general standards of CIBAHI with the scoring system of implementation priorities and facilities.

CONCLUSION

Self-assessment of medication safety tools is very

Table 5: The recommendations to improve the items of domain essential patient information during mass gathering Hajj period.

No.	Strategic Goals	C B A H I standards	Suggestion for improvement during mass gathering Hajj	Propriety scores	Opportunity scores
1	Pharmacy computerization				
1.1	Strategic Goal 3	MM.1 MM.5 MM.37	Implement full electronic complete medical history for all outside and inside Pilgrim	5	4
1.2			Implement full electronic complete medication history for all outside and inside Pilgrim	5	3
1.3			Implement of CPOE at inpatient and output pharmacy linked with patient full information	5	4
1.4			Use alerting system in CPOE linked with comprehensive patient information	5	4
1.5			Implement comprehensive information about patient allergies, severity, and rating	5	4
1.6			Implement complete information about patient body weight; height, body surface area with emphasis to pediatrics and neonates population	5	4
1.7			Implement comprehensive electronic patient information of all laboratory test available and reachable to all health care professional	5	3
1.8			Full implementation of patient information related to high alert complication and readily available to all health care professional	5	4
1.9			During transportation from place to another during hajj there is a full electronic complete medical history for all outside and inside Pilgrim	5	4
1.10			During transportation from one location to another during hajj, there is a full electronic complete medical history for all outside and inside Pilgrim	5	3
2	Pharmacy automation				
2.1	Strategic Goal 3	MM.1 MM.36	Implement full patient information with all bar-coding system machines	4	3
3	Pharmacy innovation and empowering culture				
3.1	Strategic Goal 4	MM.1 MM.31 MM.37 MM.35	Implement full patient information linked to managed care pharmacies to dispense medication for pilgrim	5	3
4	Pharmacy clinical audit				
4.1	Strategic Goal 5	MM.1 MM.40 MM.41	Annual survey of ISMP self-assessment of medication safety for all mass gathering hajj hospitals	5	3
4.2			Implement patient information key performance indicators	4	5

useful to recognize the basic information of medicines at hospitals and detecting the missing of medicines safety fundamental key elements and project the plan of medication safety practice during mass gathering hajj period. The authors recommend implementing these at all hospitals in Saudi Arabia with emphasis on hospitals at holy places and Makkah city and assess every one to two years.

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CONFLICT OF INTEREST

None

ABBREVIATION USED

GAPC: General Administration of Pharmaceutical Care, CPOE: Computerized physician order entry, MOH: Ministry of Health, USA: United States of America, ISMP: Institution Safe Medication Practice

REFERENCES

1. Alomi YA, Alghamdi SJ, Alattyh RA. Strategic Plan of General Administration of Pharmaceutical Care at Ministry of Health in Saudi Arabia 2012–2022. J Pharm Pharm Scien. 2015;1(3):1–8.
2. Alomi Y. National Pharmacy Practice Programs at Ministry of Health in Saudi Arabia. JPharm Pharm Scien. 2015;1(12):17–8.
3. Alomi YA, Ahmed Alomi Y, Pharm B, Clin Pharm M. National Mass Gathering Pharmaceutical Care Program at MOH in Saudi Arabia. J Pharm Pract Community Med. 2016;2(3):102–3.
4. Alomi YA, Zahran R. Self-Assessment of mass gathering (Hajj) pharmaceutical care program in Saudi Arabia. J Pharm Pract Community Med. 2016;2(24):137–43.
5. Alomi YA. National Medication Safety Program at Ministry of Health in Saudi Arabia. J Pharmacovigil.2015;3:e145.
6. ISMP Medication Safety Self Assessment for Hospitals, Key Definitions. 2011;1–4. Available from: http://ismp.org/selfassessments/Hospital/2011/definitions.pdf
7. ISMP Medication Safety Self Assessment ® for Community/Ambulatory Pharmacy. Available from: http://www.ismp.org/selfassessments/community/2017/2017_ISMP_CommunityAmbulatory_Pharmacy_Self_Assessment.pdf
8. Hind Almodaimegh, Roger W. Aderson, Carol Chambers E al. ISMP International Medication Safety Self Assessment ® for Oncology. 2012;
9. ISMP Medication Safety Self Assessment for Antithrombotic Therapy, 2017. Available from: https://www.ismp.org/selfassessments/

Antithrombotic/2017/2017_ISMP_Antithrombotic_Self_Assessment.pdf

10. Smetzer JL, Vaida AJ, Cohen MR, Tranum D, Pittman MA, Armstrong CW. Findings from the ISMP Medication Safety Self-Assessment® for Hospitals. Jt Comm J Qual Saf. 2003;29(11):586–97.
11. Vaida AJ, Smetzer JL, Lamis RL, Cohen MR, Kenward K. Assessing the state of safe medication practices using the ISMP medication safety self-assessment® for hospitals: 2000 and 2011. Jt Comm J Qual Patient Saf. 2014; 40(2):51-67.
12. Greenall J, Shastay A, Vaida AJ, U D, Johnson PE, O 'leary J, et al. Establishing an international baseline for medication safety in oncology: Findings from the 2012 ISMP International Medication Safety Self Assessment Õ for Oncology. J Oncol Pharm Pract. 2015;21(1):26-35.
13. Medication Management (MM). In: National Hospital Standards. 2nd Ed. Saudi Central Board for Accreditation of Healthcare Institutions.; 2015. p. 194–211. Available from: http://www.cbahi.gov.sa
14. Al-Tawfiq JA, Memish ZA. Mass gathering medicine: 2014 Hajj and Umra preparation as a leading example. Int J Infect Dis. 2014;27:26-31
15. Ministry of Health. 2013. 1st Ed. Riyadh, Saudi Arabia: Available from http://sgsminsk.by/_/media/Global/Documents/Technical Documents/Technical Datasheets/SGS-PCA-SA-Datasheet SFDA-A4-EN-11-V2.pdf
16. Ziad Memish: father of mass gatherings medicine Ziad. Lancet. 2014;383:e21.
17. Saudi Ministry of Health. Statistical Book 1436. Saudi Ministry of Health. 2015. p. 28–49. Available from: http://www.moh.gov.sa/ministry/statistics/book/pages/default.aspx
18. Ahmed Alomi Y, Pharm B, Clin Pharm M. National Mass Gathering Pharmaceutical Care Program at MOH in Saudi Arabia. J Pharm Pract Community Med. 2016;2(23):102–3.
19. Alsultan MS, Khurshid F, Salamah HJ, Mayet AY, Al-Jedai AH. Hospital pharmacy practice in Saudi Arabia: Prescribing and transcribing in the Riyadh region. Saudi Pharm J. 2012;20(3):203–10.
20. Alomi YA, Alghamdi SJ, Alattyh RA E a. National survey of pharmacy practice at MOH hospitals 2016: pharmacy management and resources. Value Heal. 2017;20(5):A1–A383.
21. Bates DW, Teich JM, Lee J, Seger D, Kuperman GJ, Ma 'luf N, et al. The Impact of Computerized Physician Order Entry on Medication Error Prevention. J Am Med Informatics Assoc. 1999; 6(4):313–21.
22. Potts AL, Barr FE, Gregory DF, Wright L, Patel NR. Computerized Physician Order Entry and Medication Errors in a Pediatric Critical Care Unit. Pediatrics. 2003;113(1):59-63.
23. Maat B, Bollen CW, Van AJ, Toine V, Egberts CG, Rademaker CMA. Impact of computerized physician order entry (CPOE) on PICU prescribing errors. 2013; Available from https://search.proquest.com/openview/1b979db2cdd732ecdf05d9be1d7628a0/1?pq-origsite=gscholar&cbl=48752
24. Vermeulen KM, van Doormaal JE, Zaal RJ, Mol PGM, Lenderink AW, Haaijer-Ruskamp FM, et al. Cost-effectiveness of an electronic medication ordering system (CPOE/CDSS) in hospitalized patients. Int J Med Inform. 2014;;83(8):572-80.
25. Grissinger MC. Omission of High-Alert Medications: A Hidden Danger. Am J Nurs. 2017;117(7):66-70.

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