ejpmr, 2017,4(10), 56-61

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

EFFECTIVENESS OF A CLINICAL PATHWAY EDUCATION PROGRAM FOR CARDIAC NURSES

Talal Ali Hussein Al-Qalah*[1] and Hayat Fadlalla Mukhtar[2]

[1]Lecturer in Medical-Surgical Nursing.
[2]Associated Professor of Medical Surgical Nursing-Karary University-Sudan.

***Corresponding Author: Talal Ali Hussein Al-Qalah**
Lecturer in Medical-Surgical Nursing.
Mail id: talalalqalah@hotmail.com

Article Received on 16/08/2017 **Article Revised on 07/09/2017** **Article Accepted on 28/09/2017**

ABSTRACT

An implementation of an education program and a clinical pathway could improve nurses' knowledge of cardiac surgical management**. Aim of the study:** To evaluate the effect of an education program and a clinical pathway implementation. **Methods:** A quasi-experimental research design was conducted in the cardiac center at the Sudan Heart Center and Ahmed Qasim Hospital-Khartoum state-Sudan. A convenience sample of 51 nurses and 60 adult cardiac surgical patients. An education program and clinical pathway developed and implemented. **Results:** After implementation of an educational program and clinical pathway, they were associated with significant increase in nurses' knowledge (P<0.05), improve patient outcomes as significant reduction in length of ICU stay (P0.018) and decease length of hospital stay (P0.022). While there was insignificant in decrease complication (P0.065) and hospital readmission (P0.609). **Conclusion:** Education program and a clinical pathway have a positive impact on nurses' knowledge and practice as indicated by improving patients' outcome.

KEYWORDS: Education program, clinical pathway, knowledge, outcome.

INTRODUCTION

Cardiovascular diseases (CVD) are an important cause of loss of disability-adjusted life years. For most types of CVD, early diagnosis (within minutes) and intervention are independent drivers of patient outcome. Clinicians must be properly trained and centers appropriately equipped in order to deal with these critically ill cardiac patients [1].

Cardiac surgery requires meticulous attention to detail to ensure the best possible surgical result [2], and the services from professionally competent nurses with the relevant, effective, efficient, adequate knowledge, skills and understanding of cardiac surgery for the successful recovery. In order for the nurses to be able to provide optimal care to the cardiac surgical patients, they require relevant and applicable knowledge which they ought to have gained through training and/or hands on experience acquired while dealing with cardiac surgery patients [3].

A clinical pathway (CP) is a tool that can be effectively utilized with all cardiac surgery patients, nursing interventions that promote the "continuum of care" foster communication among different disciplines as well as decrease the rate of unplanned readmissions [4].
A clinical pathway has emerged as a potentially important knowledge translation strategy for promoting effective healthcare. As a clinical decision-making tool, CP operationalizes best evidence recommendations and clinical practice guidelines into an accessible bedside format for health provider teams, and in this sense, can promote standardized evidence based practices, patient safety, and efficiency in the health system. Well-designed CP also offers opportunity to free clinicians' cognitive abilities to focus on more complex thought-requiring activities and can support clinicians to deliver key management priorities in a timely manner [5].

A compassionate, knowledgeable, and skilled nurse caring for the patient after cardiac surgery is an asset in the achievement of positive outcomes for the patient [6].

Nurses have a key role in all aspects of clinical pathway use. Participating in the development of the pathway is the first step. Because they begin and end the chain of staff involved in delivering care, nurses possess a unique perspective in how health care systems work to enhance or impede the delivery of care [7].

Nursing education is a key factor in the use of the clinical pathway prior to its implementation. The implication of nursing education performed in an interactive nursing environment offers nurses a chance to learn, utilize and document scenarios related to the clinical pathway prior

to its initiation into practice. Nursing engagement and implementation is key to the success of clinical pathways [8].

METHOD

Objective

The objectives of this study were to develop an education program to cardiac nurses prior to the implementation of a clinical pathway for cardiac surgical patients, to assess the effect of a clinical pathway on nurses knowledge, and to observe the effect of nurses' practices on patients' outcome.

Setting

A quasi-experimental research design was conducted in the Sudan Heart Center and Ahmed Qasim Hospital at Khartoum State-Sudan.

Sample

A convenience sample of 51 nurses and 60 adult cardiac surgical patients was selected including all licensed nurses having at least a year of work experience, Bachelors and above, and who was enrolled in all educational sessions about a clinical pathway. Moreover, Adult patients underwent to cardiac surgery (CABG, valve procedures, or any combinations, and repair of congenital heart disease). European System for Cardiac Operative Risk Evaluation (EuroSCORE <6).

Tools

Data collection took approximately 11months (between 20-March-2016 and 28-February-2017) through two tools: Assessment questionnaire to assess nurses knowledge and an observation checklist to evaluate the effect of a clinical pathway though patients' outcome.

Content validity was checked before the pilot study and the actual data collection through distributing of the tools, an educational program and the clinical pathway were reviewed by experts in the field of study, two anaesthesiologists, three cardiac surgeon professors, three professional nurses, and physiotherapist.

Pilot Study

A pilot study was conducted in the field of the study in order to clarify and modify the tools according to the participant responses. The tools were tested for their reliability using Cronbach's alpha reliability method on 10% of sample. The correlation coefficients were 0.84 for the knowledge assessment tool, and 0.81 for observation checklist.

Data collection

Data collection involved the assessment, planning, implementation and evaluation of educational program and the clinical pathway. Data collection was carried out in the period from March-2016 and February-2017.

After initial assessment of knowledge regarding a clinical pathway, an educational program was implemented. The content of the clinical pathway educational program including theoretical and training component regarding implementation process of CP, preoperative care, and postoperative care.

The nurses attended a clinical pathway educational program sessions in the interactive learning course. This education was presented to them after their review of the clinical pathway.

After educational training sessions were provided to the nurses, the clinical pathway was implemented for the cardiac surgical patients. A clinical pathway consisted of main daily medical and nursing interventions implemented in the cardiac surgical world and intensive care unit. Variance that effect the implementation of a clinical pathway was monitored, analyzed, and action plan was developed to manage it.

A post-test was carried out after two months of the education program and the clinical pathway implemented (post I), then another test after three months of the post-test I was carried out 'after five months of education program and a clinical pathway implemented' (post II). Each subject was evaluated using self-administered structured questionnaire and observation checklist to determine the improvement of nurses' knowledge and actual practice in a clinical pathway through patient's outcome.

Patients' outcome measures included the length of hospital stay, complications, ICU Stay, and hospital readmissions.

Ethical Consideration

Ethical clearance was sought and granted from the Research and Ethics Committee at Karary University and National Research Ethics Review Committee at Federal Ministry of Health.

RESULTS

The data in **table (1)** shows the distribution of nurses according to their demographic data. It clarified that most of nurses belonged to the younger age group (26-30) 54.9%, while 9.8% belonged to the age group (31-35) with a mean age of 26.73±2.18. Most of nurses were female (70.6%), while male was 29.4%. The table highlighted that most of the nurses had Bachelor's degree 94.1%, with a minority holding a Master's degree in nursing sciences 5.9%. The majority 92.2% of the nurses had one to less than five years experience, while the high-level experience 5-10 years in their work place were less 7.8%.

Table (2) displays the distribution of cardiac surgical patients according to their demographic data. The table shows that most of the patients' age ranged between 51-60 years constituted 51.7%. Most of the patients were male 76.7%, while 23.3% was female. Valve surgery was

more prevalent 58.3%, and CABG was the second surgical procedure operated 26.7%, while CABG and valve surgery as two surgical procedures operated had less frequency 6.7%, with an insignificant difference between patient groups in relation to demographic data and P>0.05.

Table (3) displays the comparison between nurses' knowledge before and after CP educational program. According to the data analysis, the total mean scores of nurses' knowledge show a significant difference between pre- and post-CP education regarding the clinical pathway, preoperative and postoperative care were all P<0.05. The highest levels of nurses' knowledge were after educational program and the clinical pathway had been implemented.

In relation to the effectiveness of the clinical pathway on patients' outcome, **table (4)** illustrats that all mean scores of ICU stay, and length of hospital stay had significant differences (P0.018, P0.022 respectively). While the clinical pathway had a slight effect on postoperative complication, and hospital readmission with insignificant difference with P0.065, P0.609 respectively.

DISCUSSION

The demographic background of the present study showed that most of the nurses were female and the majority of them belonged to the younger age group (26-30), the mean age was 26.73±2.182. The Bachelor's degree was the most available qualification they had, and had one to five years experience. This indicates that a considerable proportion of the nurses in the present study had no long experience, and their qualification was mostly at the Bachelor's level. These factors might have their repercussion of the levels of nurses' knowledge and practice.

A similar study stated that more than half of nurses aged between 21and 30 (mean age 30.87±6.18 years), 75% were female, 65.3% had a Bachelor's degree, and 63.9% of nurses had experience between zero and 5years [9]. Most studies by Eskander et al.,[10] Ahmed et al.,[11] Köse et al.,[12] Vijayan.,[13] Rushdy et al.,[14] and Sacco et al.[15] reported that most of nurses were female, aged below 30 years, had a Bachelor's degree, and less than five years experiences in their work. Ullman et al. pointed that the majority of the nurses were female, with a Bachelor degree or post-graduate qualification and had an average 7.5 years' experience [16]. This contrast with Hossain et al. who demonstrate that the most of nurses 70.7% were in the high age group (25-35yrs), and 94% were completed up to Diploma in nursing, 5% were Bachelor in nursing [17]. Moreover, Bjurling-Sjöberg et al. who study the intensive care nurses' conceptions of a critical pathway pointed that 75% were female, between 26 and 57 years of age, and all were specialized in intensive care and had from 1 to 40 years' professional experience at the ICU [18].

Concerning demographic data of cardiac surgical patients, the current study revealed that the cardiac surgery was seen in males more than females, age ranged between 51-60 years, and valve surgery was more prevalent surgical procedures operated.

Many studies revealed that most of cardiac surgical patients were males and the average patient age was 64 years old [19-21]. Moreover, valve replacement is the most common open-heart surgery procedure [22, 23]. Valve replacement was the most common operation type 85% [24]. On the other hand, the studies done by Meyer, and Sattari et al. found out that the coronary artery bypass surgery was the most common operation type [25, 26].

The present study demonstrated that the cardiac nurses knowledge were significantly improved after education program and clinical pathway implemented. That is reflect the implementation of a clinical pathway could improve nurse's knowledge of cardiac surgical management. Nurses need for new knowledge was factor perceived to facilitate a successful clinical pathway implementation.

These results were in line with Tantawi et al. who stated that a significant improvement in nurses' knowledge occurred after the implementation of the clinical pathway and had better knowledge about their role in postoperative care in cardiac surgery, while none of the clinical pathway team members had correct knowledge about any of the areas tested before the intervention [7]. Dong and Huang demonstrated that experts have a rich knowledge and experience in the field of CP implementation [27]. One of the significant benefits of clinical pathway management lies in the optimization of clinical pathway knowledge [28]. A study of the impact of IT- which supported a clinical pathway on medical staff satisfaction by Schuld et al. pointed that the knowledge of the aims and concept of CP increased significantly in nursing staff (from 43.4 to 74.5%) P0.006 [29].

Other studies by Vijayan; Ameri et al; Scheiber; Rahmani et al; Jansson; and Xavier showed that the nurses' knowledge improved after intervention which was particularly evident in the areas of health education [13, 30-34]. A higher percentages of satisfactory knowledge with significant difference in all areas among nurses in the study group before and after clinical pathway implementation. All these differences were statistically significant [7].

This study also demonstrated that a clinical pathway education program had a positive effect on nurses' knowledge and improved practice indicated as improvement in patients outcome, such as ICU stay, and length of hospital stay which showed significant differences (p<0.018 and p 0.022 respectively). While a clinical pathway had a slight effect on postoperative complication and hospital readmission with insignificant differences of p0.065 and p0.609 respectively.

In the same way, lin et al. found that there was no difference in postoperative complication occurrence in CABG surgery patients enrolled into clinical pathways. Another study stated that clinically significant complication rate was not different, showing 5.4% in the pre-CP group and 4.5% in the CP group (P 0.51) [19]. Another study revealed that the adoption of clinical pathways can reduce complication, although these reductions did not reach statistical significance [35]. Many other studies reported that a clinical pathway is a safe way to reduce the length of hospital stay and medical costs [36-45].

CONCLUSION

A clinical pathway educational program had a positive impact on nurses' knowledge and practice. A clinical pathway improved outcome of cardiac surgical patients.

Table (1): Distribution of nurses according to their demographic data.

Items		n=51	
		n	%
Age Group	20-25	18	35.3%
	26-30	28	54.9%
	31-35	5	9.8%
	Mean±SD	26.73±2.18	
Sex	Male	15	29.4%
	Female	36	70.6%
Educational Level	Bachelor's degree	48	94.1%
	Master degree	3	5.9%
Experience Years	1-<5 years	47	92.2%
	5-10 years	4	7.8%

Table (2): Distribution of cardiac surgical patients according to their demographic data.

Patient Groups										
Items		***Pre-CP n=20***		***Post-CP (post I) n=20***		***Post-CP (post II) n=20***		***Total***		***Significant Test***
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
Age Group	18-30	4	20%	4	20%	5	25%	13	21.7%	X^2 4.662 P 0.588
	31-40	4	20%	2	10%	2	10%	8	13.3%	
	41-50	1	5%	5	25%	2	10%	8	13.3%	
	51-60	11	55%	9	45%	11	55%	31	51.7%	
	Mean±SD	45.70±16.72		45.35±14.80		43.95±16.27		45.00±15.69		
Sex	Male	13	65%	18	90%	15	75%	46	76.7%	X^2 3.540 P 0.170
	Female	7	35%	2	10%	5	25%	14	23.3%	
Type of Surgery	CABG	6	30%	5	25%	5	25%	16	26.7%	X^2 2.652 P 0.845
	Valve Surgery	12	60%	13	65%	10	50%	35	58.3%	
	Congenital Repair	1	5%	1	5%	3	15%	5	8.3%	
	CABG+ Valve Surgery	1	5%	1	5%	2	10%	4	6.7%	

Table (3): Comparison between nurses' knowledge before and after educational program.

Items		***Pre-CP***	***Post-I***	***Post-II***	P_1	P_2	P_3
Clinical Pathway	**Mean**	26.098	36.353	35.922	t=11.500	t=11.504	t=1.922
	±SD	±7.333	±3.979	±4.180	P 0.000*	P 0.000*	P 0.060
Preoperative Care	**Mean**	39.902	40.588	40.255	t=5.699	t=2.167	t=2.397
	±SD	±2.460	±2.334	±1.968	P 0.000*	P 0.035*	P 0.020*
Postoperative Care	**Mean**	47.902	49.902	48.567	t=6.387	t=2.107	t=2.867
	±SD	±3.413	±4.001	±3.727	P 0.000*	P 0.040*	P 0.006*
Total Knowledge	**Mean**	113.902	126.843	124.745	t=13.404	t=12.391	t=3.942
	±SD	±8.741	±6,646	±5.779	P 0.000*	P 0.000*	P 0.000*

P_1= Compare between Pre-CP and Post I. **P_2=** Compare between Pre-CP and Post II. **P_3=** Compare between Post I and Post II.
*= Significant differences at P<0.05.

Table (4) Distribution of cardiac surgical patients according to their outcome.

Items		***Patients Group***						***Significant Test***
		Pre-CP n=20		***Post I n=20***		***Post II n=20***		
ICU stay	Mean	2.99		0.167		0.033		F 4.339
	±SD	0.926		0.379		0.183		P 0.018*
Length of hospital stay	Mean	8.17		2.889		2.673		F 4.082
	±SD	2.29		1.067		0.723		P 0.022*
		n	**%**	**n**	**%**	**n**	**%**	
Complication	Yes	7	35%	5	25%	1	5%	F 2.876
	No	13	65%	15	75%	19	95%	P 0.065
Hospital readmissions	Yes	1	5%	1	5%	0	00%	F 0.500
	No	19	95%	19	95%	20	100%	P 0.609

REFERENCES

1. Tubaro M, Vranckx P, Price S, Vrints C, European Society of C, Acute Cardiovascular Care A. The ESC textbook of intensive and acute cardiovascular care. 2nd ed. Oxford Oxford University Press, 2015.
2. Bojar RM. Manual of perioperative care in adult cardiac surgery. 5th ed. Chichester, UK: Wiley-Blackwell, 2011.
3. Writers QP. Nurses' Knowledge on Care of Open Heart Surgery Patients; Critical Care Unit 2013 [Available from: http://ogot10480.blogspot.com/2013/08/nurses-knowledge-on-care-of-open-heart.html.
4. Fasken LL, Wipke-Tevis DD, Sagehorn KK. Factors associated with unplanned readmissions following cardiac surgery. Progress in cardiovascular nursing, 2001; 16(3): 107-15.
5. Jabbour M, Curran J, Scott SD, Guttman A, Rotter T, Ducharme FM, et al. Best strategies to implement clinical pathways in an emergency department setting: study protocol for a cluster randomized controlled trial. Implementation science, 2013; 8(1): 55.
6. Nair SG. A study to assess the knowledge of cardiac nurses about commonly administrated drugs in cardiac surgical ICU: SCTIMST, 2011.
7. Tantawi HR, Lotfy I, Abdallh A, Sadek BN. Clinical Pathway versus Traditional Care Plan method for Caring of Postoperative Children Undergoing Cardio thoracic Surgery. Life Science Journal, 2015; 12(7).
8. Scheiber-Case LM. A Clinical Pathway Education Program for Pediatric Nurses, 2015.
9. Maraş GB, Güler EK, Eşer İ, Köse Ş. Knowledge and practice of intensive care nurses for endotracheal suctioning in a teaching hospital in western Turkey. Intensive and Critical Care Nursing, 2016: 1-10.
10. Eskander HG, Morsy WYM, Elfeky HAA. Intensive Care Nurses' Knowledge & Practices regarding Infection Control StandardPrecautions at a Selected Egyptian Cancer Hospital. Journal of Education and Practice, 2013; 4(19): 160-74.
11. Ahmed GEL, Abosamra OM. Knowledge of Pediatric Critical Care Nurses Regarding Evidence Based Guidelines for Prevention of Ventilator Associated Pneumonia (VAP). Journal of Education and Practice, 2015; 6(9): 94-101.
12. Köse I, Öztunç G. Knowledge of Nurses Working in Intensive Care Units in Relation to Preventive Interventions for Pressure Ulcer. International Journal of Caring Sciences, 2016; 9(2): 677.
13. Vijayan A. A study to assess the knowledge and practices staff nurses regarding fluid and electrolyte amdinistration in post operative cardiac surgical patients admitted in cardiac surgical ICU and cardiac surgical ward, SCTIMST, Trivandrum: SCTIMST, 2011.
14. Rushdy TI, Youssef W, Elfeky H. Nurses' knowledge and practice regarding care of patients connected to intra-aortic balloon pump at Cairo university hospitals. Egyptian Journal of Nursing, 2015; 10(1).
15. Sacco TL, Ciurzynski SM, Harvey ME, Ingersoll GL. Compassion satisfaction and compassion fatigue among critical care nurses. Critical care nurse, 2015; 35(4): 32-42.
16. Ullman AJ, Long DA, Rickard CM. Prevention of central venous catheter infections: A survey of paediatric ICU nurses' knowledge and practice. Nurse education today, 2014; 34(2): 202-7.
17. Hossain A, Arif IH, Haque M. Assessment of the Level of Knowledge and Practice on Intravenous Cannulization among Staff Nurses of Selected Tertiary Care Hospital in Dhaka City. MOJ Public Health, 2016; 4(5): 1-5.
18. Bjurling-Sjöberg P, Engström G, Lyckner S, Rydlo C. Intensive care nurses' conceptions of a critical pathway in caring for aortic-surgery patients: A phenomenographic study. Intensive and Critical Care Nursing, 2013; 29(3): 166-73.
19. Lin Y-K, Chen C-P, Tsai W-C, Chiao Y-C, Lin BY-J. Cost-effectiveness of clinical pathway in coronary artery bypass surgery. Journal of medical systems, 2011; 35(2): 203-13.
20. Azer SZ, Eldeen SMA, Abd-Elwahb M, Ahmed AM. Impact of Educational Program among Open Heart Surgery Patients on Minimizing the Incidence of Post Operative Infections. Journal of American Science, 2011; 7(6): 820-34.

21. Fredericks S. Timing for delivering individualized patient education intervention to coronary artery bypass graft patients: An RCT. European Journal of Cardiovascular Nursing, 2009; 8(2): 144-50.
22. Raboi A, Al-Motarreb A, Al-Kanadi A, Abdulmughni A, Kadi A. Mechanical valve dysfunction in Yemen. Heart Views, 2010; 11(2): 47-51.
23. Al-Qalah TAHS, Salam WIS, Hassanein AA. Effectiveness of Planned Preoperative Teaching on Self-Care Activities for Patients Undergoing Cardiac Surgery. International Journal of Healthcare Sciences, 2015; 3(1): 210-27.
24. Ahmed HH, Ibrahim YM, El Soussi AH, El Said MM. The Effect Of Early Activity On Patients Outcome After Open Heart Surgery. AJAIC, 2006; 9(3).
25. Meyer K. Pre-operative health education for patients undergoing cardiac surgery: UNIVERSITY OF SOUTH AFRICA, 2009.
26. Sattari M, Baghdadchi ME, Kheyri M, Khakzadi H, Ozar S. Study of patient pain management after heart surgery. Adv Pharm Bull, 2013; 3(2): 373-7.
27. Dong W, Huang Z. A method to evaluate critical factors for successful implementation of clinical pathways. Applied clinical informatics, 2015; 6(4): 650-68.
28. Yang H, Li W, Liu K, Zhang J. Knowledge-based clinical pathway for medical quality improvement. Information systems frontiers, 2012; 14(1): 105-17.
29. Schuld J, Schäfer T, Nickel S, Jacob P, Schilling MK, Richter S. Impact of IT-supported clinical pathways on medical staff satisfaction. A prospective longitudinal cohort study. International journal of medical informatics, 2011; 80(3): 151-6.
30. Ameri ZD, Vafaee A, Sadeghi T, Mirlashari Z, Ghoddoosi-Nejad D, Kalhor F. Effect of a Comprehensive Total Parenteral Nutrition Training Program on Knowledge and Practice of Nurses in NICU. Global Journal of Health Science, 2016; 8(10): 135.
31. Scheiber-Case LM. A Clinical Pathway Education Program for Pediatric Nurses. ScholarWorks: Walden University, 2015.
32. Rahmani A, Mohammadi A, Moradi Y. Effectiveness of Scenario-based Education on the Performance of the Nurses in the Critical Cardiac Care Unit for Patients with Acute Coronary Syndrome. Health Sciences, 2016; 5(8): 218-24.
33. Xavier B. Effectiveness of Self Instructional Module regarding Emergency Management of patient with Myocardial Infarction on Knowledge among Staff Nurses. IOSR Journal of Nursing and Health Science, 2(6): 14-9.
34. Jansson M. The Effectiveness of Education on Critical Care Nurses Knowledge and Skills in Adhering to Guidelines to Prevent Ventilator-Associated Pneumonia. Finland: University of Oulu Graduate School, 2014.
35. Dautremont JF, Rudmik LR, Yeung J, Asante T, Nakoneshny SC, Hoy M, et al. Cost-effectiveness analysis of a postoperative clinical care pathway in head and neck surgery with microvascular reconstruction. Journal of otolaryngology-head & neck surgery, 2013; 42(1): 59.
36. El-Baz NE-SH. Effect of clinical pathway implementation and patients' characteristics on outcomes of coronary artery bypass graft surgery: University Library of Groningen][Host], 2009.
37. Verdu A, Maestre A, Lopez P, Gil V, Martin-Hidalgo A, Castano J. Clinical pathways as a healthcare tool: design, implementation and assessment of a clinical pathway for lower-extremity deep venous thrombosis. Quality and Safety in Health Care, 2009; 18(4): 314-20.
38. Chen W, Ji G, Pu F, Hao H. Analysis of Clinical Pathway on Impacting Length of Stay and Hospitalization Expenses for Five Diseases. Chinese Medical Record English Edition, 2013; 1(7): 289-94.
39. Frei CR, Bell AM, Traugott KA, Jaso TC, Daniels KR, Mortensen EM, et al. A clinical pathway for community-acquired pneumonia: an observational cohort study. BMC infectious diseases, 2011; 11(1): 188.
40. Yue X, Zhou R, Chen T, Pu C, Wu Y. Evaluation of the Effect of Implementation of Clinical Pathway in a 3A Hospital in Shenzhen. Chinese Medical Record English Edition, 2014; 2(8): 368-71.
41. Zhang L, Gong J-F, Dong J-N, Zhu W-M, Li N, Li J-S. Effectiveness of a Clinical Pathway for Inpatients Undergoing Ileal/Ileocecal Resection for Chronic Radiation Enteritis with Intestinal Obstruction. The American Surgeon, 2015; 81(3): 252-8.
42. Rotter T, Kinsman L, James E, Machotta A, Willis J, Snow P, et al. The effects of clinical pathways on professional practice, patient outcomes, length of stay, and hospital costs: Cochrane systematic review and meta-analysis. Evaluation & the health professions, 2012; 35(1): 3-27.
43. Burgers PT, Van Lieshout EM, Verhelst J, Dawson I, de Rijcke PA. Implementing a clinical pathway for hip fractures; effects on hospital length of stay and complication rates in five hundred and twenty six patients. International orthopaedics, 2014; 38(5): 1045-50.
44. DeSomma M, Divekar A, Galloway AC, Colvin SB, Artman M, Auslender M. Impact of a clinical pathway on the postoperative care of children undergoing surgical closure of atrial septal defects. Applied Nursing Research, 2002; 15(4): 243-8.
45. Tarin T, Feifer A, Kimm S, Chen L, Sjoberg D, Coleman J, et al. Impact of a common clinical pathway on length of hospital stay in patients undergoing open and minimally invasive kidney surgery. The Journal of urology, 2014; 191(5): 1225-30.