

Original article

## Effectiveness of the educational interventions on improvement of the performance of burning ward nurses

Hakimeh Hazrati <sup>1</sup>, Leila Vahedi <sup>2</sup>, Firuzeh Shirzad <sup>2</sup>, Reza Khanderooy <sup>2</sup>

<sup>1</sup> Iran University of Medical Sciences, Tehran, Iran

<sup>2</sup> Tabriz University of Medical Sciences, Tabriz, Iran

Received 25 January 2018, Revised 22 July 2019, Accepted 2 November 2019

© 2018, Hazrati H., Vahedi L., Shirzad F., Khanderooy R.

© 2018, Russian Open Medical Journal

**Abstract:** *Introduction* — Burning is one of the most accidents with a higher rate of morbidity and mortality. The aim of this study was to investigate the status of nursing cares in the burning ward to improve the quality of nursing service following the education.

*Methods* — An after-before intervention-educational audit study was conducted on burning ward nurses in Iran. The data were collected using a researcher-made checklist based on the Ministry of Health standards with “Yes/No” questions. The data were analyzed using SPSS software version.16 through descriptive statistics and Mc-Nemar nonparametric metric test.

*Results* — The population consisted of 20 nurses working in the burning ward of the Sina Hospital in Tabriz/Iran. Presentation of nursing services was good in terms of the primary care (80.5%) and during hospitalization (83.4%); and it was weak in terms of the secondary care (42.5%). A significant improvement was observed following the educational intervention according to the results of the Mc-Nemar test performed before and after intervention ( $P < 0.001$ ).

*Conclusion* — Audit education improved the nursing secondary cares and follow-up care after patients discharge. It is necessary to hold educational workshops for improving the nurses’ performance in the other fields.

**Keywords:** education, burn, nursing, audit.

Cite as Hazrati H, Vahedi L, Shirzad F, Khanderooy R. Effectiveness of the educational interventions on improvement of the performance of burning ward nurses. *Russian Open Medical Journal* 2020; 9: e0103.

Correspondence to Leila Vahedi. Phone: +9141042900. Fax: +4133373741. Email: [vahedi.l49@gmail.com](mailto:vahedi.l49@gmail.com).

### Introduction

Burning is one of the common problems, especially in the developing countries followed by the traffic incident and trauma across the world [1]. It has unpleasant effect on the person body and soul. Mortality, inability, pain, physical, mental and economic problems were considered as the effects caused by the burning [2-4]. Providing high quality caring is the right of the patient that depends to the proper management and caring [5]. The results of studies have shown the reduction of the costs related to the effective medical care [6]. Meanwhile, the nurses play an important role in this regard [7, 8]. The nurses who provide care services for the burn patients should obtain adequate knowledge on the physiologic effects after caused burning and possess the rapid analysis and decision-making on trivial changes occurred in the patient status [7]. The beginning of the rehabilitation could establish compassionate and sympathetic relationship with the patients and their families [7, 8]. The audit cycle is a quality improvement intervention used to decrease evidence-practice gaps [9]. Therefore, an educational intervention for purposeful teaching following identified needs seems essential in order to fill the skill gap [7, 8].

The aim of this study was to improve the nurses’ performance on educational auditing of the burning ward and providing the appropriate training for nurses with weaker performance using educational intervention.

### Material and methods

#### Study design

This before-after study was an interventional research with approach to educational audit based on educational audit cycle [10]. This study was conducted at the burning ward of the Educational and Treatment Sina Hospital as a governmental, specialized, and referral hospital in Tabriz/Iran over one-year.

#### Inclusion and exclusion criteria

All nurses working in the burning ward without the limitation of gender, age and type of employment were included into study. The nurses less than one year of work experience in the burning ward were excluded from this study.

#### Data collection

The nurses' performance during nursing service was investigated according to the author-made checklist based on the standards of the Health Ministry. The checklists were consisted of two-section, including the demographic information and the standards of the nursing ward, and three sub-groups, including 6 questions on the triage and primary care (Scope 1), 15 questions on care service during hospitalization (Scope 2) and 6 questions on rehabilitation, consulting and follow up (Scope 3) (*Appendix 1*). The content validity and face validity were confirmed by 10 experts in the burning ward.

The external evaluators assessed the caring of patients during hospitalization using yes/no checklists, including 27 items in a single-blinded study perception without awareness of the nurses. Of notes, the external evaluators were expert in nursing service at the burning ward and familiar with how to the completing of checklists.

The questions on the triage and primary care were completed during accepting patients in the hospital triage ward. The questionnaires were completed during hospitalization.

Regarding to the caring of five patients by each nurse, the performance of the 20 nurses on 100 patients was assessed.

### Data analysis

The next step, data were analyzed according to the educational audit cycle [10], (*Figure 1*) to design educational programs using educational workshops and pamphlets for the familiarity of nurses based on nursing standards in the burning ward. The educational workshops were performed during the study for nurses as theoretical and practical training by emphasizing on the weaknesses of nurses based on the results of the checklist

After 45 days, the nurses' performance were assessed according to the primary checklist, again. The results of the after-before intervention were compared using Mc-Nemar nonparametric test.

### Results

#### Demographic characteristic

The statistical population consisted of 20 nurses working in the burning ward of the Sina Teaching and Treatment Hospital which is a governmental, specialized, and referral hospital in Tabriz/Iran that has three sections including men, women and children that each section includes 14 beds with 20 nurses 16 female (80%) and 4 male (20%).

#### Before intervention

In general, the criteria including scope 1 (triage and primary care), scope 2 (care service during hospitalization), and scope 3 (rehabilitation, consulting and follow up) were considered approximately 80.5%, 83.46% and 42.5%, respectively (*Figure 2*).

The results of the primary investigation on care services providing by the nurses showed that in the scope 1 (triage and primary care), the highest and lowest considered criteria were related to the control of living signs and the evaluation of the urine system, respectively (*Table 1*).

In the scope 2 (caring during hospitalization), the highest and lowest considered criteria were associated with the evaluation of the coronary system for liquid therapy, assessment of the wound and wound bandage, removing the dead layers of the skin and biopsy of the wound and excretions; and determining the pain level by measurement tool for using pain relief methods, respectively (*Table 1*).

In the scope 3 (secondary cares), the highest and lowest considered criteria were related to the assessment of the mental-psychological status regarding the imagination of persons about his/her future face and consulting with the patient and family for self-caring (physiotherapy, bandage exchange, starting of activity, adhere to diet and the proper medicine and return to natural life), respectively (*Table 1*).

#### After intervention

In comparison of the scopes, the highest amount of the improvement regarding the quality care of nursing was related to the scope 3, while all three scopes were improved after the intervention (*Figure 2*).

In the scope 1, the criteria related to the evaluation of the urine system, as the lowest criteria, was increased by 8% after the intervention (*Table 1*).

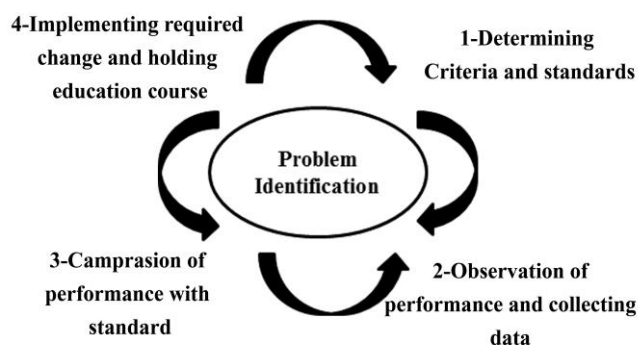


Figure 1. A diagram of educational audit cycle.

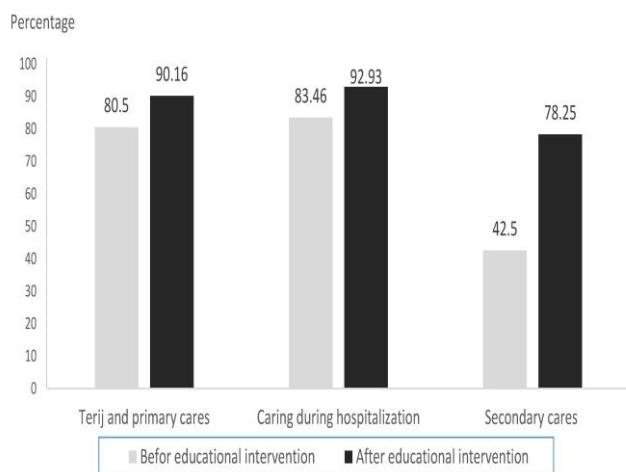


Figure 2. The nursing ward caring before and after educational intervention in three scopes of primary, during hospitalization and secondary cares in Tabriz Sina Burning Ward.

**Table 1. Comparison standards before and after educational in Tabriz Sina Hospital Burning Ward**

Items	Criteria	Pre-intervention, %	Post-intervention, %	P-value
Triage and primary care (Scope 1)	Evaluation type of burns, type of substance burn, the place of burning, surface, depth and severity and grade of burns	83	95	<0.001
	Evaluation of the physical and mental conditions such as coronary, consciousness, respiratory edema, and other disorders	81	93	
	Monitoring of living signs	90	96	
	Monitoring of inhalation burning and registration of the number and depth burns	76	89	
	Evaluation of respiratory system, and collaboration with therapeutic team over conducting intubation and tracheostomy	80	87	
	Examining the urinary system	73	81	
Caring during hospitalization (Scope 2)	Evaluation collaboration over conducting periodical experiments for monitoring the electrolytes, acids and bases balances	75	83	<0.001
	Evaluation the validation of liquid therapy	93	98	
	Evaluation the coronary system in order to liquid therapy	100	100	
	Evaluation collaboration over scarectomy and faciotomy and post operation caring	75	86	
	Evaluation the blood circulation, numbness and ischemia of the nerve, muscle and pain in burn areas for diagnosis and the prevention of Compartment Syndrome	82	92	
	Determining the pain level by measurement tool	45	85	
	Evaluation the pain level and the performance of nurses in pain management	80	92	
	Prevention from wound infection by bandage and wound culture	95	98	
	Assessment the manifestations of infection	86	96	
	Assessment the condition of wound and wound bandage	100	100	
	Removing dead skin layers	100	100	
	Evaluation the wound biopsy and discharge	100	100	
	Evaluation the nutritional conditions using treatment regimen	75	91	
	Evaluation the nutritional care using NGT and TPN	60	78	
Secondary cares (Scope 3)	Evaluation the digestive system by stomach discharge, blood in the stool, abdominal pain and abdominal dilatation	86	95	<0.001
	Evaluation mental health and mental images and reclaiming a positive self-concept	65	80	
	Evaluation education and training to enhance end-of-life care	45	76	
	Evaluation the performance of rehabilitation team in order to accepting new status, self-confidence, independence, family relationship patients	35	82	
	Evaluation patients' self-care, (physiotherapy, bandage discharge, start up an activity, adherence to a diet, life back with the using drugs.)	25	75	

**Table 2: Educational intervention effects by observing the standards of the burning ward according to the Mc-Nemar test**

Mc-Nemar	Mean Rank	P-value	Z Test	Conclusion
305.6	207.50	<0.001	398	Post<pre
		<0.001	16	Post<pre
			686	Post=pre

In the scope 2, the criteria related to determining the pain level by measurement tool for using pain relief methods, as the lowest criteria, was increased by 40% after the intervention (Table 1).

In the scope 3, the criteria related to consulting with the patient and family for self-caring (physiotherapy, bandage exchange, starting of activity, adhere to diet and the proper medicine and return to natural life), as the lowest criteria, was improved by 50% after the intervention (Table 1).

We investigated the educational intervention using Mc-Nemar nonparametric test (305.6). The results showed that there is a significant relationship in terms of the nurses' performance pre-intervention and post-intervention ( $P<0.001$ ) and 398 cases were observed found that they were not observed before intervention (Table 2).

## Discussion

In this research we investigated the effect of the educational programs on improving the quality of nursing care in burning ward

before and after intervention. In the first scope the lowest attention was related to the control of the inhalation caused in the burn injuries and the evaluation of the patient urinary system and in the second scope, the lowest attention was related to the determination of the level of pain by the tools. The measuring of pain level is very important for hospitalized patients; however, burn patients had experienced severe pain during wound bandage and treatment. Severe pain caused by burning is accompanied by affective responses, severe anxiety and acute stress disorders [10]. Therefore, measuring the pain level and applying pain relief options is required for the burn patients [10]. This function has improved following interventional programs in 85% of cases. Attention to the wound and wound culturing is one of the notable subjects that must be performed before the beginning of antibiotic treatments [11]. The prescription of antibiotics without wound culturing leads to unpleasant effects and delay in the treatment [12]. Mograbazar et al. in a study conducted in Birjand observed that wound culturing has been not done in 98% of subjects [13]. Investigations have demonstrated that 75% of deaths occur due to infection caused after burning [14]. In addition, they observed that the start of antibiotics without antibiogram [13] leads to the drug resistance and the increase in the infection [15]. In current study, the wound culturing and antibiogram have been improved during post-intervention.

The results showed a poor performance of the nurses in secondary care, including, a low attention to the collaboration with rehabilitation team and offering the consultation to the patients and their families on self-caring. Udo C et al. showed the interest of nurses to medical and physical aspects without

considering the emotional needs of the patients and their families due to ignoring them as tasks [16].

Presenting the essential trainings and enhancing the patients' awareness prevent from the secondary side effects resulted from the lack of awareness on wound bandage, physiotherapy, and improving the nutrition. Because of the lack of awareness, infection, scar, deformation, pain and deviation in movement are observed [17]. Affective support of these patients plays an important role in reduction of anxiety [18]. Several reports have mentioned the wound bandage and rehabilitation services as families' major concerns [19]. In a research conducted by Halajizadeh et al. in Iran, the least score was associated with a perfect offering of consulting and teaching for the patients [20]. Chan JNH et al. have obtained the similar results [21]. In a study by Negarand R et al. the poor educational programs offered to the patient by the staffs has been reported [22]. It seems that the reason for a lower attention to the secondary care is due to the shortage in the number of nurses, lack of training for nurses at the onset of employment, lack of management of the nurses by the heads or supervisors during patient care services, Job dissatisfaction and the overwhelming attention of nurses to special cares in these wards [23]. However, the burn patients need for special and several cares over hospitalization and at home [24] so, it is necessary to consider the number of nurses relative to the hospital beds, and the difficulty of their work in burning wards, receiving important trainings on physical and psychomotor problems [25].

## Conclusion

The educational audit to burning ward nurses was an effective function in improving the nurses' performance. Despite receiving the necessary skills over academic courses, sometimes the nurses will be inefficient in their duties due to a high load of jobs or a lack of updating regarding the nursing knowledge that influence on the three scopes, including the primary care, during hospitalization and secondary care. Evaluation and audit by emphasizing on all caring and educational indicators can be effective in improving the nurses' performances and the presentation of nursing services. It is suggested to investigate the burn patients in the follow -up at home after-before the presentation of educational programs to nurses as well as comparing the burning effects.

## Ethical approval

This study has been approved by the Ethics Committee of the university (No IR.Tbzmec.rec.1392.247). Ethical subjects were considered. The questionnaires were kept confidential and no names were mentioned in them. The evaluation of the nurses' performance, completion of the checklist and holding the educational programs have been done with via coordination and supervisor.

## Conflict of Interest

The authors declare that they have no conflict of interest.

## Acknowledgments

We would like to thank the manager and supervisors Sina's Hospital of Tabriz Universities of Medical Sciences in Iran

## References

- Costa B, Engrav L, Holavanahalli R, Lezotte D, Patterson D, Kowalske K, et al. Impairment after burns: a two-center, prospective report. *Burns* 2003; 29(7): 671-675. [https://doi.org/10.1016/s0305-4179\(03\)00153-0](https://doi.org/10.1016/s0305-4179(03)00153-0).
- Anlatıcı R, Ozerdem OR, Dalay C, Kesiktaş E, Acartürk S, Seydaoglu G. A retrospective analysis of 1083 Turkish patients with serious burns. *Burns* 2002; 28(3): 231-237. [https://doi.org/10.1016/s0305-4179\(01\)00095-x](https://doi.org/10.1016/s0305-4179(01)00095-x).
- Alaghebandan R, MacKay Rossignol A, Rastegar Lari A. Pediatric burn injuries in Tehran, Iran. *Burns* 2001; 27(2): 115-118. [https://doi.org/10.1016/s0305-4179\(00\)00083-8](https://doi.org/10.1016/s0305-4179(00)00083-8).
- Ansari-Lari M, Askarian M. Epidemiology of burns presenting to an emergency department in Shiraz, South Iran. *Burns* 2003; 29(6): 579-581. [https://doi.org/10.1016/s0305-4179\(03\)00066-4](https://doi.org/10.1016/s0305-4179(03)00066-4).
- Rafeey M, Ghojizadeh M, Sheikhi S, Vahedi L. Caustic ingestion in children: a systematic review and meta-analysis. *J Caring Sci* 2016; 5(3): 251-265. <https://doi.org/10.15171/jcs.2016.027>.
- Posnenkova OM, Kiselev AR, Gridnev VI, Popova YV, Shvartz VA. View on the problem of managing of medical care quality. *Oman Med J* 2012; 27(3): 261-262. <https://doi.org/10.5001/omj.2012.63>.
- Smeltzer SC, Bare BG, Hinkle JL, Cheever KH. Brunner & Suddarth's textbook of medical-surgical nursing. 12th ed. Lippincott Williams & Wilkins; 2010; 2368 p. [https://www.academia.edu/40014727/Brunner\\_and\\_Suddarths\\_Textbook\\_of\\_Medical-Surgical\\_Nursing\\_12th\\_ed](https://www.academia.edu/40014727/Brunner_and_Suddarths_Textbook_of_Medical-Surgical_Nursing_12th_ed).
- Taylor AG, Haussmann GM. Meaning and measurement of quality nursing care. *Appl Nurs Res* 1988; 1(2): 84-88. [https://doi.org/10.1016/s0897-1897\(88\)80007-7](https://doi.org/10.1016/s0897-1897(88)80007-7).
- Vratsistas-Curto A, McCluskey A, Schurr K. Use of audit, feedback and education increased guideline implementation in a multidisciplinary stroke unit. *BMJ Open Qual* 2017; 6(2): e000212. <https://doi.org/10.1136/bmjopen-2017-000212>.
- Gillam S, Siriwardena AN. Frameworks for improvement: clinical audit, the plan-do-study-act cycle and significant event audit. *Qual Prim Care* 2013; 21(2): 123-130. <https://www.ncbi.nlm.nih.gov/pubmed/23735693>.
- Schultz G, Bjarnsholt T, James GA, Leaper DJ, McBain AJ, Malone M, et al. Consensus guidelines for the identification and treatment of biofilms in chronic nonhealing wounds. *Wound Repair Regen* 2017; 25(5):744-757. <https://doi.org/10.1111/wrr.12590>.
- Petermann U. Laser acupuncture and local laser therapy in veterinary medicine with overview of applied laser types and clinical uses. *AUTCVM* 2017; 12(1): 89-101.
- Mogharab M, Sabzekar F, Sharifzadeh G, Azani M. An epidemiological study of hospitalised patients with burns in Imam Reza hospital in Birjand between 2007 and 2013. *J Birjand Univ Med Sci* 2014; 21(2): 228-236. Persian. <http://journal.bums.ac.ir/article-1-1404-en.html>.
- O'Keefe GE, Hunt JL, Purdue GF. An evaluation of risk factors for mortality after burn trauma and the identification of gender-dependent differences in outcomes. *J Am Coll Surg* 2001; 192(2): 153-160. [https://doi.org/10.1016/s1072-7515\(00\)00785-7](https://doi.org/10.1016/s1072-7515(00)00785-7).
- Ghorbani F, Seifi B, Mohammad ZS, Zare M. Microbiological factors in burn wound infection in patients hospitalized in Zanjan. *Iranian Journal of Nursing Research* 2011; 6(22): 65-72. Persian. <http://ijnr.ir/article-1-883-en.html>.
- Udo C, Danielson E, Melin-Johansson C. Existential issues among nurses in surgical care – a hermeneutical study of critical incidents. *J Adv Nurs* 2013; 69(3): 569-577. <https://doi.org/10.1111/j.1365-2648.2012.06032.x>.
- Lo SF, Hayter M, Hsu M, Lin SE, Lin SI. The effectiveness of multimedia learning education programs on knowledge, anxiety and pressure garment compliance in patients undergoing burns rehabilitation in Taiwan: an experimental study. *J Clin Nurs* 2010; 19(1-2): 129-137. <https://doi.org/10.1111/j.1365-2702.2009.03030.x>.

18. Wiechman SA, Ehde DM, Wilson BL, Patterson DR. The management of self-inflicted burn injuries and disruptive behavior for patients with borderline personality disorder. *J Burn Care Rehabil* 2000; 21(4): 310-307. <https://doi.org/10.1067/mbc.2000.108147>.
19. Goyatá SL, Rossi LA. Nursing diagnoses of burned patients and relatives' perceptions of patients' needs. *Int J Nurs Terminol Classif* 2009; 20(1): 16-24. <https://doi.org/10.1111/j.1744-618X.2008.01109.x>.
20. Jolaei S, Hajibabae F, Jalal A, Bahrani N. Evaluation of patients' satisfaction with nursing care provided in hospitals. *Hayat* 2011; 17(1): 35-44. Persian. <http://hayat.tums.ac.ir/article-1-69-en.html>.
21. Chan JN, Chau J. Patient satisfaction with triage nursing care in Hong Kong. *J Adv Nurs* 2005; 50(5): 498-507. <https://doi.org/10.1111/j.1365-2648.2005.03428.x>.
22. Negarandeh R, Mohammadi S, Zabolypour S, Arazi Ghoghagh T. Relationship between quality of senior nursing students' caring behaviors and patients' satisfaction. *Hayat* 2012; 18(3): 10-21. Persian. <http://hayat.tums.ac.ir/article-1-19-en.html>.
23. Booth RZ. The nursing shortage: a worldwide problem. *Rev Lat Am Enfermagem* 2002; 10(3): 392-400. <https://doi.org/10.1590/s0104-11692002000300013>.
24. Wallace DL, Hussain A, Khan N, Wilson YT A systematic review of the evidence for telemedicine in burn care: with a UK perspective. *Burns* 2012; 38(4): 465-480. <https://doi.org/10.1016/j.burns.2011.09.024>.
25. Standards and strategy for burn care: a review of burn care in the British Isles. The National Burn Care Review Committee Report, Manchester: NBCR Committee. 2001; 82 p. <http://79.170.40.160/britishburnassociation.org/wp-content/uploads/2017/07/NBCR2001.pdf>.

#### Authors:

**Hakimeh Hazrati** – PhD Student of Medical Education, Center for Educational Research in Medical Sciences, Department of Medical Education, School of Medicine, Iran University of Medical Sciences, Tehran, Iran. <https://orcid.org/0000-0001-9736-5652>.

**Leila Vahedi** – MD, PhD of Medical Genetics, Assistant Professor, Liver and Gastrointestinal Diseases Research Center, Tabriz University of Medical Sciences, Tabriz, Iran. <https://orcid.org/0000-0003-0661-5885>.

**Firuze Shirzad** – MSc of Medical Education, Shohada Hospital, Research Center of Medical Education, Tabriz University of Medical Sciences, Tabriz, Iran. <https://orcid.org/0000-0002-9372-4395>.

**Reza Khanderoy** – MD, Student of Physical Medicine and Rehabilitation, Shohada Hospital, Tabriz University of Medical Sciences, Tabriz, Iran. <https://orcid.org/0000-0001-6753-8436>.



## Appendix 1. Full text of chek list

Name of nurse: _____ Gender of nurse: _____ Name of patient: _____
--

Items	Criteria	Yes	No
Triage and primary care (Scope 1)	Evaluation type of burns, type of substance burn, the place of burning, surface, depth and severity and grade of burns		
	Evaluation of the physical and mental conditions such as coronary, consciousness, respiratory edema, and other disorders		
	Monitoring of living signs		
	Monitoring of inhalation burning and registration of the number and depth burns		
	Evaluation of respiratory system, and collaboration with therapeutic team over conducting intubation and tracheostomy		
	Examining the urinary system		
Caring during hospitalization (Scope 2)	Evaluation collaboration over conducting periodical experiments for monitoring the electrolytes, acids and bases balances		
	Evaluation the validation of liquid therapy		
	Evaluation the coronary system in order to liquid therapy		
	Evaluation collaboration over scarectomy and faciotomy and post operation caring		
	Evaluation the blood circulation, numbness and ischemia of the nerve, muscle and pain in burn areas for diagnosis and the prevention of Compartment Syndrome		
	Determining the pain level by measurement tool		
	Evaluation the pain level and the performance of nurses in pain management		
	Prevention from wound infection by bandage and wound culture		
	Assessment the manifestations of infection		
	Assessment the condition of wound and wound bandage		
	Removing dead skin layers		
	Evaluation the wound biopsy and discharge		
Secondary cares (Scope 3)	Evaluation the nutritional conditions using treatment regimen		
	Evaluation the nutritional care using NGT and TPN		
	Evaluation the digestive system by stomach discharge, blood in the stool, abdominal pain and abdominal dilatation		
	Evaluation mental health and mental images and reclaiming a positive self-concept		
	Evaluation education and training to enhance end-of-life care		
	Evaluation the performance of rehabilitation team in order to accepting new status, self-confidence, independence, family relationship patients		
	Evaluation patients' self-care, (physiotherapy, bandage discharge, start up an activity, adherence to a diet, life back with the using drugs.)		