

QUALITY IMPROVEMENT INTERVENTION FOR COMPLETENESS OF PATIENT MEDICAL RECORDS IN PRIVATE TEACHING HOSPITALS MASHHAD, IRAN

Nasser Gommami^{1,4}, Muhammad Hanafiah Juni^{1*}, Salmiah MS¹, Syed Tajuddin Syed Hassan², Kadar Marikar³, Kamyar Egbali⁴

¹Department of Community Health, Faculty of Medicine and Health Sciences, UPM

²Nursing Units, Department of Medicine, Faculty of Medicine and Health Science, UPM

³Chief Executive Malaysian Society for Quality in Healthcare (MSQH)

⁴Aria Hospital, Faculty of Medicine, Islamic Azad University, Mashhad Branch

**Corresponding author: Associate Professor Dr Muhamad Hanafiah Juni*

Department of Community Health

Faculty of Medicine and Health Sciences

43400 UPM Serdang, Selanor

Malaysia

Email: hanafiah_juni@upm.edu.my

Abstract

Introduction: Patient record completeness considered as quality indicator of patient medical record by accreditation bodies worldwide. Quality medical patient record facilitated sharing of valuable information for continuing of patient care. Completeness of medical record would reduce medical error, in discipline of forensic medicine quality medical record is the valuable information for policy making. In many private Iranian hospitals did not practiced regular protocol patient medical record quality improvement, except during hospital accreditation. The aim of study was to evaluate the impacts on completeness of patients' medical records before and after quality improvement intervention in private teaching hospital in Mashhad, Iran.

Methods: A quasi experiment study was conducted in two wards of medical and surgical wards respectively. The intervention started with formation of project technical committee and working committee in the hospital to implement the intervention. The Quality Improvement Protocol for Medical Record prepared by researcher based on Ministry of Health and Medical Education (MOH&ME) protocol used in accreditation of hospital by MOH&ME in Iran, and approved by project technical committee to be used in this study. The study protocol consists of 6 types of patient records measurement (admission, consultation request, physician order, progress note, patient history and operation note), under 13 criteria and 56 items examined for completeness of medical record. A workshop conducted to trained members of working committees from selected wards. The protocols were implemented in surgical and medical wards respectively as an

intervention group and another two wards of surgical and medical wards as a control group. A minimum size of 146 respondents consisting of physician in the respective wards was included in the study. Measurement of medical record completeness were taken at baseline, week 20th and week 40th in both intervention and control group.

Results: A total of 979 medical records were completed in two hospitals during the study period. There were 5 month intervals between measurements, the length of stay was less than two days and patient age was 39.21 ± 20.43 . The lowest score for completeness of medical record was measured in progress note 3.11 ± 0.98 and the highest score was in physician order 4.25 ± 0.60 out of 5. The average of completeness in selected documents was 3.82 ± 0.40 out of 5. Statistical analysis of overall completeness of patient medical record at 20th week (post-intervention) revealed no significant difference between intervention hospital and control hospital ($P > 0.05$). However, findings at 40th week (5 months post-intervention) showed significant difference in most of the records ($P < 0.05$) except for consultation request record. The two way analysis of variance conducted in intervention hospital and control hospital showed that at the hospital, time and interaction levels were statistically significant ($F = 12.62$, $P < 0.001$ & $F = 34.93$, $P < 0.001$ & $F = 15.25$, $P < 0.001$). However the completeness of patient history and physical examination were less improved ($P > 0.05$) because involvement of medical students or trainee in completing these section.

Conclusion: Patient medical record completeness important aspect of medical record, it will affect both hospital level and national level of decision making. This study concluded that quality improvement intervention among physician has improved completeness of patient medical record in intervention hospital.

Key word: Completeness, patient medical record, private teaching hospitals, Mashhad Iran

1.0 Introduction

Patient medical record documentation is one of the critical aspects of healthcare quality (Giorda et al., 2009) because hospital data were used for decision making at various level of healthcare management. Patient medical records are as reference for forensic medicine, evidence-based science and applied in research and scientific hypothesis (D'Amore, Sittig, & Ness, 2012). Standard patient medical record documentation was known as provision for clinical process, patient quality of care and safety (Barreto et al., 2008). Medical records were recognized as source of clinical data for documenting quality indicators (Pomey et al., 2010). Completeness of patient records considered to assist policymakers in several levels healthcare system for monitoring the burden of medical conditions and compare quality of care by outcomes and conducted to promote healthcare delivery (Shahraz et al., 2012). Despite the importance, patient medical records are often incomplete (Elder, 2004). Patient medical record had known as key instrument in coordination of patient care; patient medical record were used for diagnosis, information sharing and reduce medical errors.

Incomplete patient record can resulted to poor quality of patient care, because medical record considered as a facilities for relationship of healthcare professional (Setareh, Bagherian, Mahmoodabadi, Amini & Rafati, 2010). Evaluation of completeness of patient medical record is crucial to ensure patient medical record conform with standards of documentation criteria and plan a quality improvement program as in the accreditation standards followed. In this study completeness of patient medical record in two private teaching hospitals in Mashhad, Iran were described, and the study also evaluating impact of quality improvement module to improve completeness of patient medical record in the hospitals.

2.0 Material and methods

A quasi-experiment study design with intervention evaluation for intervention hospital and control hospital at pre, post and follow up period. The study were carried out in two private teaching hospitals, namely Aria Hospital and 22Bahman Hospital affiliated to Islamic Azad University Mashhad Branch, Mashhad Korasan-Razavi Province, Iran. The study conducted in September 2012 for 10 months in selected matched men and women wards of surgical and medical discipline. The hospitals were randomly assigned to intervention hospital and control hospital. A technical committee was formed in intervention hospital headed by hospital director and members consist of senior physicians, nurses and management of the hospital. At the wards level, a supervisory committee was form, members of supervisory committee including physician in charge of the ward, nursing manager and medical record officer. Researcher prepared the Quality Improvement Protocol for medical record, and getting approval from technical committee. The protocol was adopted from Ministry of Health and Medical Education (MOH&ME) protocol used in accreditation of hospital by MOH&ME in Iran. Researcher conducted training for supervisory committee on monitoring of the intervention in the ward, and also conducted training for physician included in the study. There are 42 physicians from

intervention hospital involved in the study. The intervention in intervention hospital carried out for 20 weeks. Data collection was carried out in three stages; base-line (before intervention), post-intervention (20th weeks) and follow-up (40th weeks) after intervention.

Minimum sample size requires for each stages of study were 146 patient medical records. The medical records were assessed using pro-forma developed by researcher for this study. The pro-forma consist 6 types of record, 13 criteria and 56 items of completeness measurement. Table 1 below summarize contain of the pro-forma.

Table 1: Summary of Completeness Pro-Forma for Patient Medical Record Assessment

	Records Name	Criteria	Items
1	Admission	6 criteria	23
2	Consultation request	1 criteria	5
3	Physician order	2 criteria	8
4	Progress note	1 criteria	5
5	Patient history	1 criteria	5
6	Operation	2 criteria	10
	Total	13 criteria	56

Four ratters among senior and experience nurse were selected to evaluate patient medical record. The agreement between ratters on pro-forma had shown intra class correlation coefficient (ICC) on medical record quality pro-forma was 0.96. Based on baseline measurement of quality of patient records in two hospitals the researcher prepared an intervention module implemented in intervention hospital. The contents of module reviewed and agreed by technical committee. The intervention consist of guidelines on preparing complete patient record, workshops and feedback to the physicians of monitoring finding by supervisory committee. The control hospital with intention to treat did not receiving any intervention during study period.

3.0 Results

There were 979 completeness pro-forma for medical records collected from intervention (509) and control (470) hospitals at the end of study period. The response rate was 94% and 95% respectively for intervention and control hospitals. 55.5% of patients were in women wards and remains in men wards. Patient Length of Stay (LOS) was ranged 1 to 15 days with total mean \pm SD of 1.84 ± 1.81 , and less than 2 days in three times of measurement in two hospitals. Patient age ranged from 1 to 92 years and mean \pm SD of 39.21 ± 20.43 years. All selected variables were normally distributed. The completeness scale is the progress note with the lowest means score 3.11 ± 0.98 and followed by consultation request of 3.67 ± 0.80 , admission 3.86 ± 0.55 , operation

note 3.86 ± 0.58 , patient history 4.06 ± 1.02 , physician order 4.25 ± 0.60 and average of completeness of all records in two hospitals was 3.82 ± 0.40 . Table 2 showed the descriptive statistics of selected records in three times of assessments in intervention and control hospitals.

Table 2: Descriptive statistics of patient records in three times of assessment in intervention and control hospitals

Records	Baseline		20 th Week		40 th Week	
	Intervention (Mean \pm SD)	Control (Mean \pm SD)	Intervention (Mean \pm SD)	Control (Mean \pm SD)	Intervention (Mean \pm SD)	Control (Mean \pm SD)
Admission	3.76 \pm 0.51	3.75 \pm 0.60	3.85 \pm 0.54	3.92 \pm 0.61	4.17 \pm 0.39	3.75 \pm 0.55
Consultation	3.50 \pm 0.65	3.65 \pm 0.95	3.70 \pm 0.85	3.30 \pm 0.63	3.85 \pm 0.83	4.33 \pm 0.62
Physician order	3.90 \pm 0.63	4.20 \pm 0.55	4.37 \pm 0.53	4.30 \pm 0.56	4.46 \pm 0.56	4.27 \pm 0.61
Progress Note	3.10 \pm 0.85	3.06 \pm 1.14	3.26 \pm 0.91	2.80 \pm 0.90	3.43 \pm 0.96	3.01 \pm 0.99
Patient History	3.91 \pm 0.94	4.10 \pm 1.03	4.03 \pm 1.16	3.87 \pm 1.07	4.23 \pm 0.960	4.25 \pm 0.95
Operation Note	3.83 \pm 0.50	3.75 \pm 0.54	3.56 \pm 0.47	3.90 \pm 0.52	4.27 \pm 0.56	3.86 \pm 0.62
Completeness	3.69 \pm 0.33	3.76 \pm 0.39	3.80 \pm 0.47	3.72 \pm 0.37	4.09 \pm 0.33	3.83 \pm 0.32

3.1 Admission record

There were 6 criteria in admission record, including: patient name in full with two other specification, patient address and phone number in full, gender, age, next of kin identification and identification card (IC) number. The results revealed that the means of completeness for admission records were equal in intervention and control hospitals at baseline (3.76 ± 0.51 and 3.75 ± 0.60 , $P > 0.05$), but at week 40th the means of admission records was higher in intervention hospital (4.17 ± 0.39) compared to control hospital (3.75 ± 0.55). The two way analysis of variance revealed that assessment at 20th week and 40th week showed statistically significant difference ($F(1, 973) = 12.72$, $P < 0.001$) within and between hospitals ($F(2, 973) = 11.72$, $P < 0.001$). Bonferroni post hoc test revealed that mean of completeness score for admission record in intervention hospital between baseline and 20th week assessment was not significantly difference $P = 0.31$, but there were statistically differences between baseline and 40th week assessment, and also significant different between 20th week and 40th week assessment in intervention hospital ($P < 0.001$). Comparison between intervention hospital and control hospital showed that there was no significant difference at baseline and 20th week ($P > 0.05$), but for 40th week assessment the mean of completeness for admission record was significantly higher in intervention hospital than control hospital ($P < 0.001$) (Figure 1).

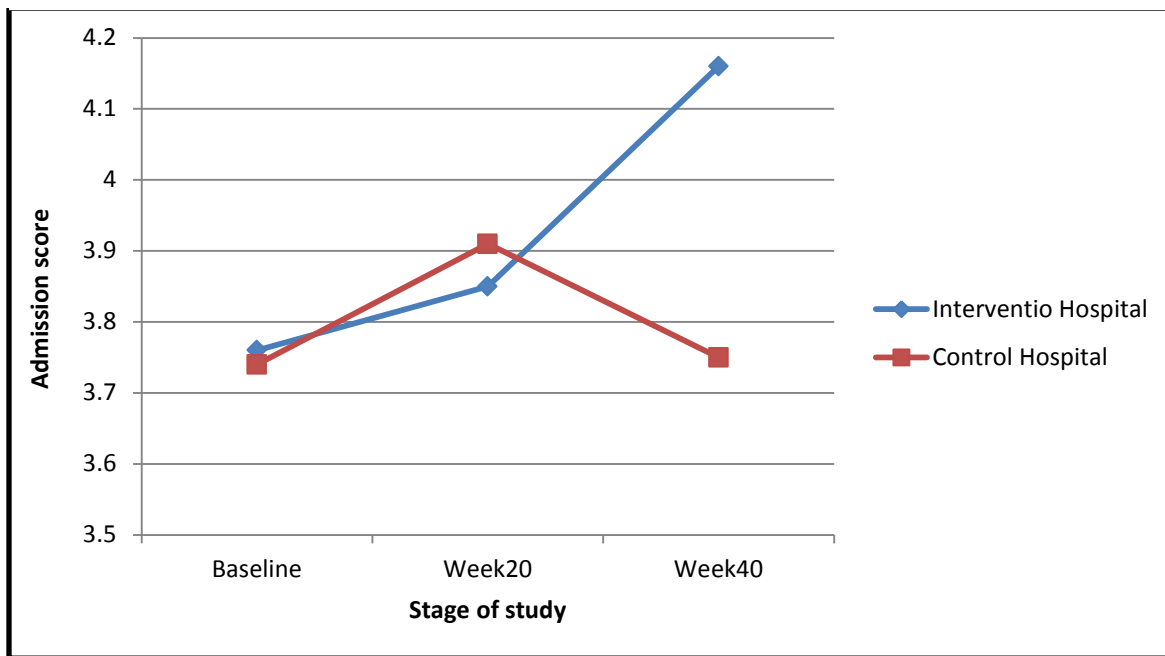


Figure 1: Admission record score in intervention and control hospital at three stage of assessment

3.2 Consultation request

In consultation request the measured items were patient name, time and date of consultation request, exist of clinical report, consultation report and sign and seal of physicians. The consultation request was not used in all records. Totally 160 patient records in intervention hospital and 69 in control hospital had consultation request at baseline, 20th week and 40th week of assessments. It seems that comparing the consultation request for two hospitals were not achievable. But the trends of improving completeness within intervention hospital were noticeable and the mean of completeness for consultation request was improved but the difference was not statistically significant (Table 2).

3.3 Physician order

The physician order for patient medical record completeness measured eight items, that include: physician name, patient name in full and two other of patient specification, date of admission, date of order, time of order, sign and chop of physician. The two way analysis of variance showed that at the time levels and interaction of time and hospital levels, there were statistically significant, ($F=25.89$, $P<0.001$, & $F=12.99$, $P<0.001$), but at the hospital levels, the effects was not significant ($F=0.001$, $P=0.98$). Bonferroni post hoc test results revealed that the mean of physician order score within the intervention hospital between baseline and 20th week of assessment, and between baseline and 40th week of assessment were statistically significant ($P<0.001$). These results for control hospital showed that there was no significant difference

between three times of assessments ($P>0.05$). Comparison between the hospitals levels in all three stages of assessments showed that there was significant differences at baseline, and control hospital was higher score ($P<0.001$), but at 20th week showed no differences ($P=0.19$). The last assessment at 40th week described that physician order score in intervention hospital were higher score compare to control hospital and it was statistically significant ($P=0.006$) (Figure 2).

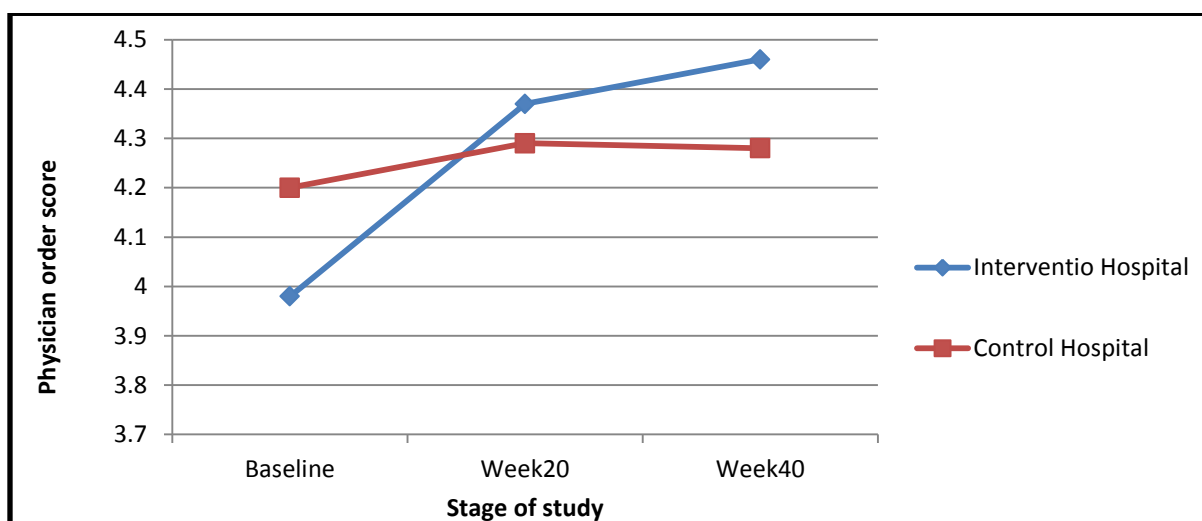


Figure 2: Physician order score in intervention and control hospital at three stage of assessment

3.4 Patient history and physical examination

Patient history and physical examination assessment consist of 5 items: patient name, patient complains patient sensitive, physical examination and write up the summary. The two way analysis variance described that only time of assessment was statistically significant ($F=7.31$, $P=0.001$). The trends of mean in intervention hospital improved in three assessment but comparison of within intervention hospital described that at baseline and 20th week was statistically significant ($P=0.01$). The results of comparison between intervention and control hospital showed that there was no significant difference at baseline ($P=0.10$), 20th week ($P=0.14$) and 40th week ($P>0.89$) (Figure3).

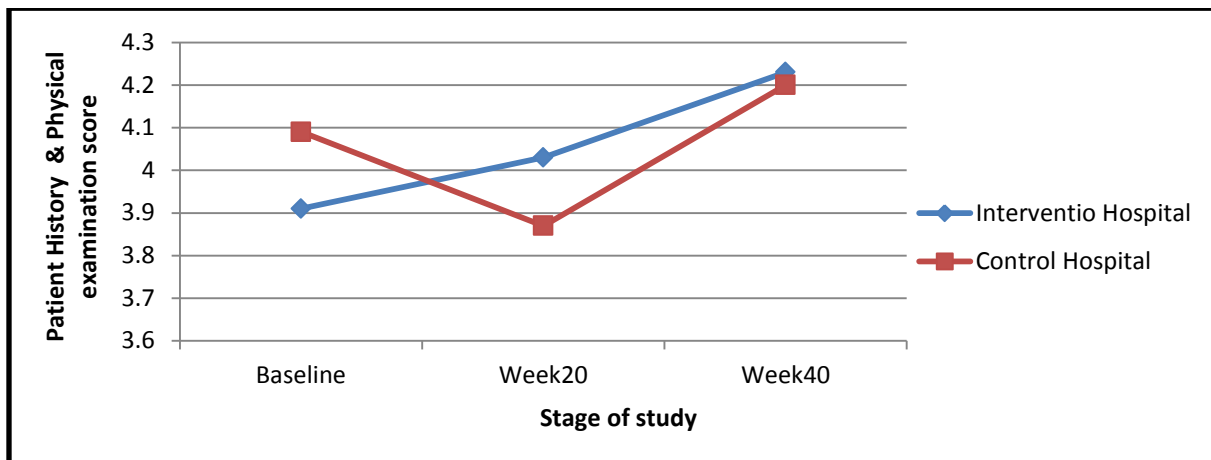


Figure 3: Patient history and physical examination score in intervention and control hospital

3.5 Progress note

Progress note of patient medical record assessment covering 5 items, include; time, date, daily note, diagnosis of disease, and sign and seal of physician. The primary comparison for mean in intervention and control hospital showed no statistically differences between the hospitals at baseline ($P>0.05$). Bonferroni post hoc test results defined that intervention for progress note at 20th week and 40th week showed statistically significant between two hospitals ($P<0.001$). The trends of means in three time assessments revealed improvement in progress note, but only comparison at baseline and 40th week within intervention hospital was statistically significant ($P<0.001$) and comparison between hospitals showed, significant differences between 20th week and 40th week ($P<0.001$)(Figure 4).

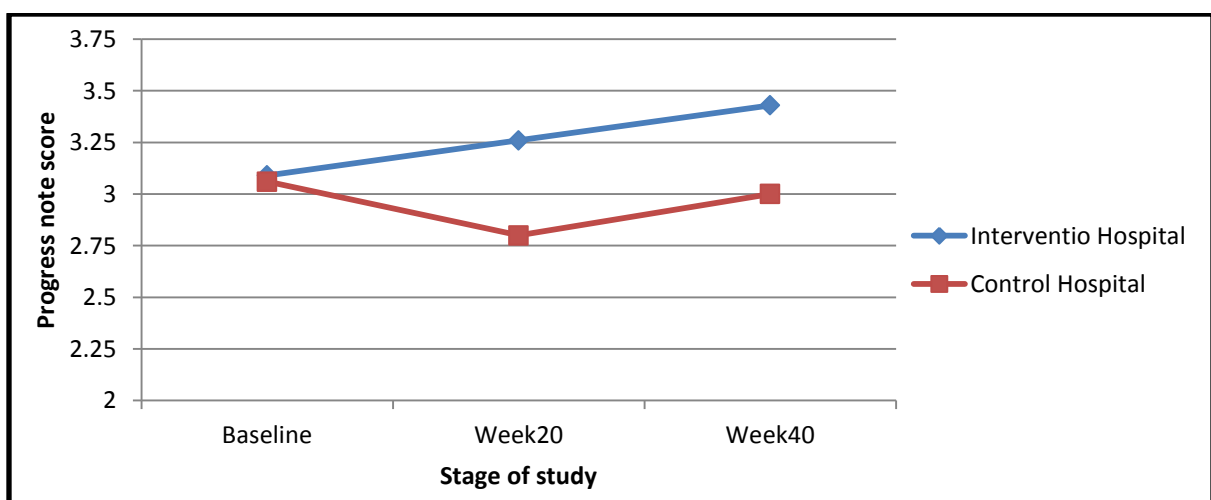


Figure 4: Progress note score in intervention and control hospital

3.6 Operation Note

The operation note have ten items in the completeness patient medical record assessment, the items include; patient name, physician name, anaesthetist name, signature and chop of surgeon, procedure, diagnosis, prosthesis or tissue used or removed, control of gas used and the California code of surgery. The two way analysis of variance showed that at the hospital levels the effects was not significant ($P=0.2$), but at time of assessment at hospital levels showed statistically significant ($F=28.38$, $P<0.001$ & $F=31.83$, $P<0.001$). The Bonferroni post hoc test results indicated that operation note score within intervention hospital in all three stages assessments were statistically significant ($P<0.05$), but comparing three assessments within control hospital were not statistically differences ($P>0.05$). Comparison between two hospitals in three stage of assessments indicated that there was no significant difference at baseline ($P=0.28$). At 20th week assessments was statistically significant for intervention hospital and control hospital, and control hospital was higher than intervention hospital ($P<0.001$). The last assessments at 40th week showed that intervention hospital score was higher than control hospital and it was statistically significant ($P<0.001$) (Figure 5).

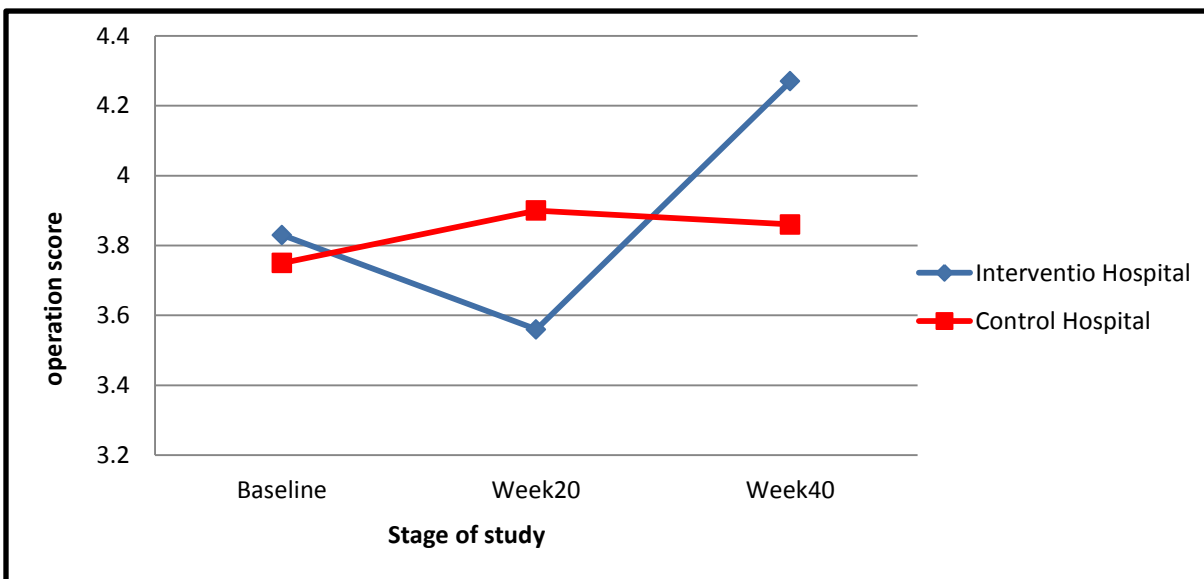


Figure 5: Operation record score in intervention and control hospital

3.7 Overall Completeness Score

The study showed that the mean score of completeness of patient medical record had indicated an improvement in all three stages of assessment. The two way analysis of variance conducted and the results revealed that at the hospital, time and interaction levels were statistically significant ($F=12.62$, $P<0.001$ & $F=34.93$, $P<0.001$ & $F=15.25$, $P<0.001$). Bonferroni post hoc test results

described that the mean of completeness score within intervention hospital between baseline and 20th week of assessment, and between baseline and 40th week of assessment were statistically significant ($P < 0.001$ & $P = 0.01$). These results for control hospital showed that there were no significant differences between baseline and 20th week of assessment, and between baseline and 40th week of assessment ($P > 0.05$), but comparison between 20th week and 40th week of assessment was statistically significant ($P = 0.03$). The comparison between two hospitals in all three stages of assessments levels revealed that there were no significant differences between baseline and 20th week ($P = 0.07$ & $P = 0.6$), but at 40th week the completeness score was statistically significant between two hospitals ($P < 0.001$) (Figure 6).

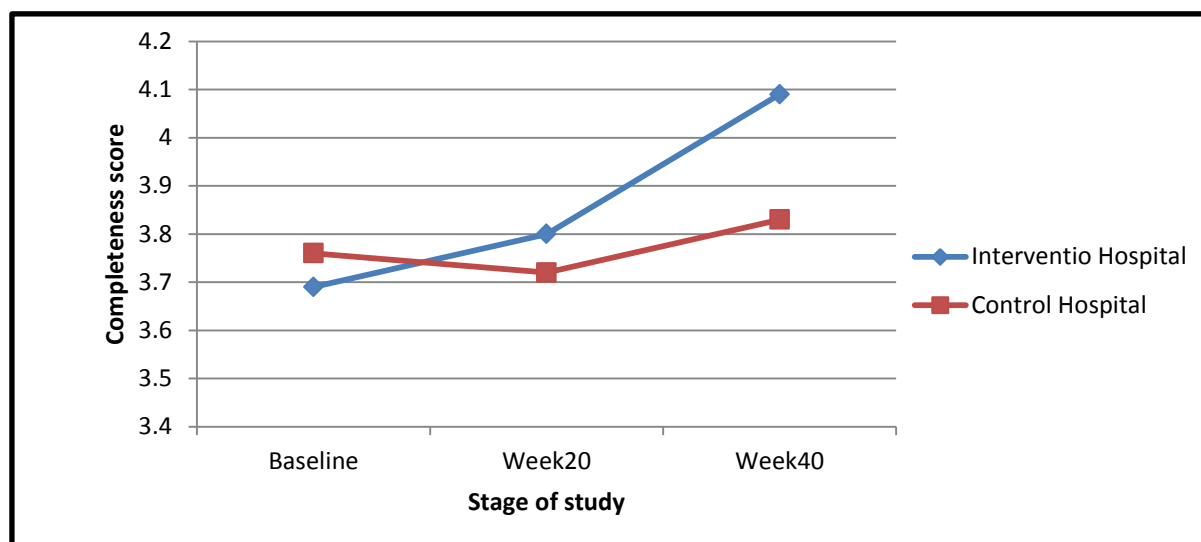


Figure 6: Completeness score in intervention and control hospital

4.0 Discussion

Completeness of patient medical record is a basic approach to assessment of patient medical record quality. Several assessments protocol was used in completeness assessment of patients' medical record, but most of studies go through restricted records or special disease. The most common record for study completeness of patient medical record is admission record, because it has critical data related to patient identification, primary and final diagnosis, treatment results and patient's condition in discharge. In this study completeness of admission record was improved from 75.2% to 83.4% in intervention hospital. Henderen study completeness of admission record among cancer patient showed completeness score of 79.5 % (Hendren et al., 2014), and in another study by Somi in Iran reported completeness score of 40% for admission record in selected items (Somi et al, 2004). Hospital in this study scored higher completeness score in admission record may be due to insurance payment mechanism requiring complete admission record for insurance claim.

The finding on completeness of consultation request record was not statistically conclusive. Descriptively the findings showed improvement 70% to 77% at 20th week and 40th week assessment. This findings were comparable with other study, such as study to compare between completeness of consultation request in manual and EMR record in University of Nottingham was 87.55% and 55% respectively (Pringle, Ward, & Chilvers, 1995).

Cisneros 2013 did a quasi-experiment study on completeness of patient medical record with epilepsy; items studied include aetiology, diagnosis, physical examination, EEG and counselling, had showed the improvement from 63% to 94% (Cisneros-Franco et al., 2013) as shown in Figure. Kern did study of 10 items for completeness of diabetic patient medical record, and found that 67% completeness in patient history (Kern, Edwards, & Kaushal, 2014). Miller (2010) in another study described that 95 of the 681 notes (13.4%) did not document physical examination and patient history results. These 95 notes were equally distributed among the 18 physicians, with a mean undocumented percentage of 13.1% (Miller & Velanovich, 2010). The findings of our study on items such as The two way analysis of variance conducted and the results revealed that at the hospital, time and interaction levels were statistically significant ($F=12.62$, $P<0.001$ & $F=34.93$, $P<0.001$ & $F=15.25$, $P<0.001$) were comparable with findings of other studies. The improvement for patient history and physical examination in present study was from 78.2% to 84.6% and improvement was low, but the completeness was acceptable. The improvement in term of completeness score in intervention hospital (at baseline and 40th week were 3.91 ± 0.94 & 4.23 ± 0.96 respectively) is higher than control hospital (at baseline and 40th week were 4.10 ± 1.03 & 4.25 ± 0.95 respectively). It was concluded that the intervention had improved completeness of patient history and physical examination record. Low improvement in this section may be due to practice of the record for patient history and medical examination done by medical students or trainee (under supervision of physician).

Miller retrospective study on progress note found that 86.6% of physicians completed the items (Miller & Velanovich, 2010). Ganz in his intervention study on quality improvement for completeness of progress note found an increased from 61.5% to 84.5% for seven measured items (Ganz, Almeida, Roth, Reuben, & Wenger, 2012). In this study the progress note record increase from 62% to 68.6% and Bonferroni post hoc test, the trend of mean in three assessment (baseline, 20th week and 40th week) and comparison between hospital (intervention hospital and control hospital) had showed statistically significant results ($P<0.001$).

Dentler study on operation record audited 14 items include; operation date, year of birth, procedure, primary location and diagnosis, cancer stage, CT scan score, colonoscopy data, follow up date, radiotherapy start date and some others. The average of completeness was computed 86% (Dentler et al., 2014). In our study completeness of operation record had shown improvement from 76.6% to 85.4%. Statistically the findings also showed significant difference between intervention hospital and control hospital, and between stages of assessment ($P>0.001$).

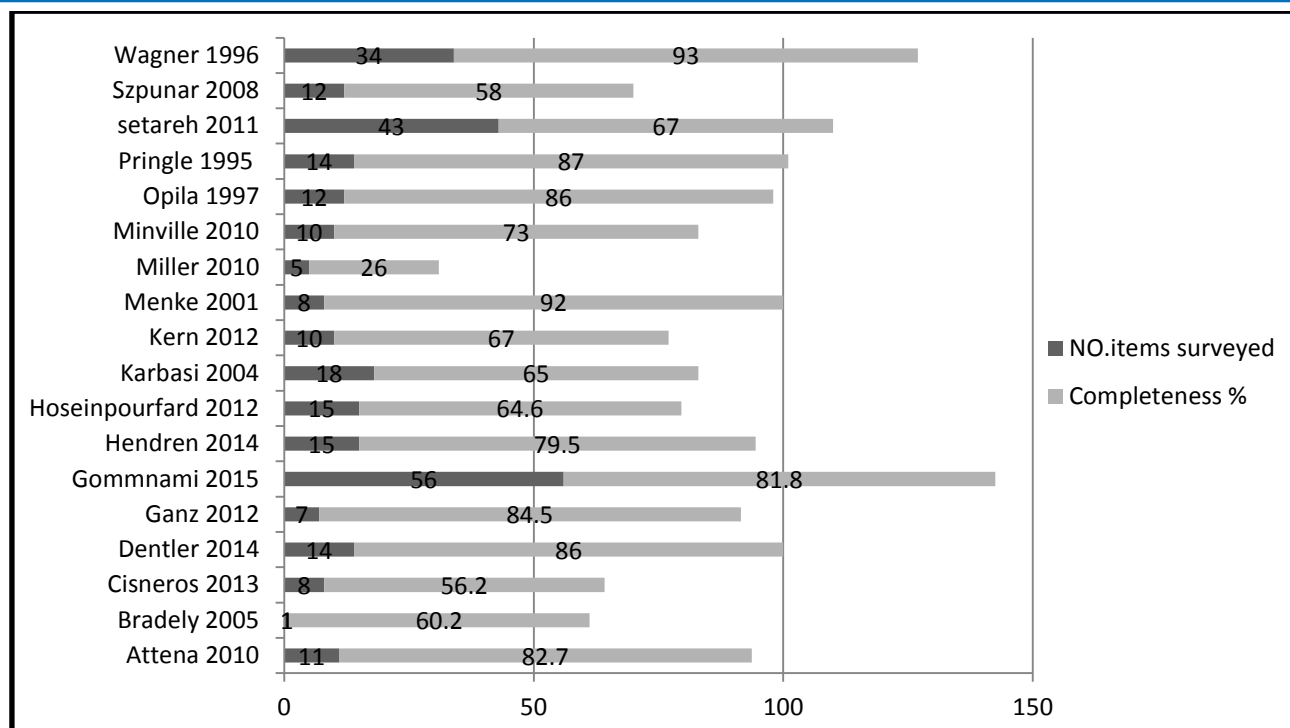


Figure 7: The number of selected items and completeness in certain studies

Source: Adopted and edited from 'a systematic review of quality components of patients' medical record in Iranian hospital' (Gomnami, MH Juni, Said, Hassan, & Arya, International Journal of Public Health and Clinical Sciences, 2015)

Overall completeness score of patient medical records in this study was the average of total score records of admission, physician order, consultation request, patient history and physical examination, progress note and operation note. This study showed mark improvement of overall completeness of patient medical record from 73.8% at baseline (mean score 3.69 ± 0.33) to 81.8% at 40th week post-intervention (mean score 4.09 ± 0.33), as compare to control hospital also showed slight improvement from 75.2% at baseline (mean score 3.76 ± 0.39) to 76.6% at 40th week (mean score 3.83 ± 0.32). A study in Pitsburg University found that 93% of patient records were completed (Wagner & Hogan, 1996). Another study, an intervention study showed that for completeness of nursing record has improvement from 8% at baseline to 91% after intervention (Chellis, Olson, Augustine, & Hamilton, 2001), while Somi's in evaluation study of completeness of medical record found 67.5% of completeness (Somi et al, 2004). In another evaluation of completeness of medical record by Setareh (2010) found that completeness of only 67% (Setareh, Bagherian, Mahmoodabadi, Amini, Rafati, 2010). In our study finding showed that the mean score of completeness of patient medical record had indicated an improvement in all three stages of assessment; the finding support by previous researchers.

5.0 Conclusion

Patient medical record is considering as critical aspects of healthcare quality and hospital management. Medical record outcomes effects on two levels of healthcare system; first level at patient treatment, disease prevalence, awareness of physician, patient satisfaction, decrease medical errors and patient discharge delay at hospital level. The second at country level, its outcome were used for clinical research, health system management, health service planning, quality improvement, risk management, decision making and health policy. The quality of patient care was enhanced by complete and accurate patient medical record documentation. Physicians are key building for creating and maintaining patient medical record of highest quality, therefore it is important to ensure physician to document complete patient medical report. This study showed the positive impacts of quality improvement intervention in form of guidelines, reminders and feedbacks to encourage physician to complete patient medical record.

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References

- Attena, F., Di Palma, M. A., Esposito, S., Galdo, V., Gimigliano, A., Parmeggiani, C., & Agozzino, E. (2010). Quality improvement of medical records in a teaching hospital. *Journal of Preventive Medicine and Hygiene*, 51(2), 53–6. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21155405>
- Barreto, E. A., Bryant, G., Clarke, C. A., Cooley, S. S., Owen, D. E., & Petronelli, M. (2008). Strategies and tools for improving transcription and documentation. *Healthcare Financial Management : Journal of the Healthcare Financial Management Association*, 62(8), 1–4. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18709861>
- Chellis, M., Olson, J., Augustine, J., & Hamilton, G. (2001). Evaluation of missed diagnoses for patients admitted from the emergency department. *Academic Emergency Medicine : Official Journal of the Society for Academic Emergency Medicine*, 8(2), 125–30. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11157287>
- Cisneros-Franco, J. M., Díaz-Torres, M. A., Rodríguez-Castañeda, J. B., Martínez-Silva, A., Gutierrez-Herrera, M. A., & San-Juan, D. (2013). Impact of the implementation of the AAN epilepsy quality measures on the medical records in a university hospital. *BMC Neurology*, 13(1), 112. doi:10.1186/1471-2377-13-112

- D'Amore, J. D., Sittig, D. F., & Ness, R. B. (2012). How the continuity of care document can advance medical research and public health. *American Journal of Public Health, 102*(5), e1–4. doi:10.2105/AJPH.2011.300640
- Dentler, K., Cornet, R., ten Teije, A., Tanis, P., Klinkenbijn, J., Tytgat, K., & de Keizer, N. (2014). Influence of data quality on computed Dutch hospital quality indicators: a case study in colorectal cancer surgery. *BMC Medical Informatics and Decision Making, 14*(1), 32. doi:10.1186/1472-6947-14-32
- Elder, N. C. (2004). The Identification of Medical Errors by Family Physicians During Outpatient Visits. *The Annals of Family Medicine, 2*(2), 125–129. doi:10.1370/afm.16
- Ganz, D. a, Almeida, S., Roth, C. P., Reuben, D. B., & Wenger, N. S. (2012). Can structured data fields accurately measure quality of care? The example of falls. *Journal of Rehabilitation Research and Development, 49*(9), 1411–20. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/23408222>
- Giorda, C. B., Guida, P., Avogaro, A., Cortese, C., Mureddu, G. F., Corsini, A., ... Riccardi, G. (2009). Association of physicians' accuracy in recording with quality of care in cardiovascular medicine. *European Journal of Cardiovascular Prevention and Rehabilitation : Official Journal of the European Society of Cardiology, Working Groups on Epidemiology & Prevention and Cardiac Rehabilitation and Exercise Physiology, 16*(6), 722–8. doi:10.1097/HJR.0b013e3283317c3f
- Gommami, N., Juni, M. H., Said, S. M., Hassan, S. T. S., & Arya, E. (2015, April 20). A SYSTEMATIC REVIEW OF QUALITY COMPONENTS OF PATIENTS' MEDICAL RECORD IN IRANIAN HOSPITAL. *International Journal of Public Health and Clinical Sciences*. Retrieved from <http://publichealthmy.org/ejournal/ojs2/index.php/ijphcs/article/view/179>
- Hendren, S., McKeown, E., Morris, A. M., Wong, S. L., Oerline, M., Poe, L., ... Birkmeyer, N. J. (2014). Implementation of a hospital-based quality assessment program for rectal cancer. *Journal of Oncology Practice / American Society of Clinical Oncology, 10*(3), 120–9. doi:10.1200/JOP.2014.001387
- Hoseinpoufard, M., Abbasi Dezfouli, S., Ayoubian, A., Izadi, M., & Mahjob, M. P. (2012). Hospital Compliance with Clinical Documentation Standards: A Descriptive Study in two Iranian Teaching Hospitals. *International Journal of Hospital Research, 1*(2), 121–125. Retrieved from http://ijhr.iuims.ac.ir/article_3870_1.html
- Karbasi H. Ziai, M. H. M. (2006). Evaluation of data recording at teaching hospitals. *Journal of Medical Education, 9*(2).
- Kern, L. M., Edwards, A., & Kaushal, R. (2014). The patient-centered medical home, electronic health records, and quality of care. *Annals of Internal Medicine, 160*(11), 741–9. doi:10.7326/M13-1798
- Menke, J., Broner, C., Campbell, D., McKissick, M., & Edwards-Beckett, J. (2001). Computerized clinical documentation system in the pediatric intensive care unit. *BMC Medical Informatics and Decision Making, 1*(1), 3. doi:10.1186/1472-6947-1-3

- Miller, J. M., & Velanovich, V. (2010). The natural language of the surgeon's clinical note in outcomes assessment: a qualitative analysis of the medical record. *American Journal of Surgery*, 199(6), 817–22. doi:10.1016/j.amjsurg.2009.06.037
- Pomey, M.-P., Lemieux-Charles, L., Champagne, F., Angus, D., Shabah, A., & Contandriopoulos, A.-P. (2010). Does accreditation stimulate change? A study of the impact of the accreditation process on Canadian healthcare organizations. *Implementation Science : IS*, 5(1), 31. doi:10.1186/1748-5908-5-31
- Pringle, M., Ward, P., & Chilvers, C. (1995). Assessment of the completeness and accuracy of computer medical records in four practices committed to recording data on computer. *The British Journal of General Practice : The Journal of the Royal College of General Practitioners*, 45(399), 537–41. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1239405&tool=pmcentrez&rendertype=abstract>
- Setareh, Bagherian, Mahmoodabadi , Amini, Rafati, F. & A. (2010). A Study on the Frequency of Medical History Sheet, Operation Report Sheet and Physician Order Sheet Completeness by Different Documentaries in Isfahan Teaching Hospitals, 2007-8. *Legal Medicine Journal*.
- Shahraz, S., Barzanjeh, A., Bahari, A., Nadery, Y., Farzadfar, F., Beyranvand, M. R., & Stason, W. B. (2012). The completeness of medical records to assess quality of hospital care: the case of acute myocardial infarction in a district-level general hospital in Iran. *Arch Iran Med*, 15(10), 592–595. Retrieved from <http://www.mendeley.com/research/completeness-medical-records-assess-quality-hospital-care-case-acute-myocardial-infarction-district/>
- Somi, M.H., Piri, Z., Delgoshaei, B. & Mahmoodi, Z. (2004). Are the Medical Records of High Quality in Teaching Hospital? *Journal of Medical Education Summer*, 2004;5(2):51-54.
- Wagner, M. M., & Hogan, W. R. (1996). The accuracy of medication data in an outpatient electronic medical record. *Journal of the American Medical Informatics Association : JAMIA*, 3(3), 234–44. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=116305&tool=pmcentrez&rendertype=abstract>