Effect of Audit and Feedback on the Accuracy of Diagnosis Summary for Gynecological Conditions in Songklanagarind Hospital, Songkhla Province, Thailand

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Objective: *To assess the effect of an audit and feedback intervention on the accuracy of the diagnosis summary in the medical records of gynecologic patients in Songklanagarind Hospital.*
Material and Method: *An audit was conducted on the medical records of 468 gynecologic patients that visited between January 2006 and March 2007. They were divided into non-malignant and malignant conditions both before and after the planned intervention.*
Results: *The accuracy of the summary of the diagnosis for non-malignant conditions was better than malignant conditions. The correction to the principle diagnosis in medical records of patients with malignant conditions increased significantly from 16.7% to 42.9% ($p < 0.001$) after the audit and feedback. In medical records of non-malignant conditions, corrections to the principle diagnosis and any complications also significantly increased from 72.0% to 82.0% ($p = 0.01$) and 76.0% to 90.7% ($p = 0.002$), respectively.*
Conclusion: *Audit and feedback is effective for improving the accuracy of the diagnosis summary for gynecological conditions but malignant conditions need more improvement strategies.*

Keywords: *Summary audit, Gynecologic, Audit and feedback*

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An accurate summary of the diagnosis for gynecological conditions is essential to hospital reporting systems because it helps to positively identify the magnitude of gynecological problems and improve the quality of health services; health planning and policies; medical reimbursement and research. Effectiveness when the medical records used depends on the quality of data *i.e.* being correct and complete[1]. The "*International Classification of Diseases, Tenth Revision*" (ICD-10) has been used in Thailand since 1994 and modified to the Thai system in 2001 by the Bureau of Policy and Strategy Office of the Permanent Secretary, Ministry of Public Health, Thailand with the support of the World Health Organization.

The guidelines for reporting the summary of a diagnosis include identifying the principal diagnosis, comorbidity, complications, other diagnoses, Operative room (OR) procedure and non-OR procedure[2]. The summary audit is a method for evaluating the accuracy of a diagnosis in the discharge summary by reviewing the contents of medical records. Previous studies in Thailand have shown problems with diagnoses[3-11] but there have not been any studies regarding the summary audits and medical reimbursement for in-patient gynecological conditions.

Audit and feedback is defined as "*any summary of clinical performance of health care over a specified period of time, given in a written, electronic or verbal format*"[12]. A Cochrane review concluded

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that the effectiveness of audit and feedback varied from mild to moderate for improving professional practices. When the baseline error is high, the effects of audit and feedback are larger. This present study has applied the concepts of audit and feedback and extended them to cover the summary audit with the aims of assessing the effects of audit and feedback on the gynecological summary with reference to ICD-10, Thai Modifications, to determine the factors associated with errors in the summary audits and medical reimbursements.

Material and Method

The present study had the approval of the Institutes Ethics Committee of Faculty of Medicine at Prince of Songkla University. Medical records of gynecologic patients, who were admitted at Songklanagarind Hospital between January 2006 and March 2007, were included for their diagnosis summary review. The exclusion criteria were medical records of patients who had been admitted for less than two days or who were receiving treatment for infertility problems. The key tools of intervention procedures in this experimental study included an audit & feedback via a conference, a set of developed guidelines distributed to all Obstetrics and Gynecological staff and residents.

The sample size was calculated based on the proportion of baseline principal diagnosis errors in diagnosis summary from the initial pilot study. According to the principal diagnosis errors 84% in the malignancy group and 71% in the non-malignancy group with a confidence level of 95%; the power of 80%, and at least 20% difference for improving the summary error, 150 medical records of non-malignant and 84 malignant conditions were needed both before and after the intervention.

The diagnosis summary guideline was developed by a group of auditors and the experienced medical coder from the study hospital respected to ICD-10[2]. The eligible medical records were reviewed and the summary of the diagnosis on the summary sheet was recorded in the data collection form following the modified ICD-10 guidelines that developed by process that described prior. Two auditors independently reviewed the details in each medical record and completed the reviewed diagnosis summaries following the same guidelines. The agreement of two auditors on the audit of principal diagnosis errors was perfect. The kappa coefficient was 0.98 ($p < 0.001$). However, if the reviewed diagnoses could not be agreed upon by the auditors, the experienced medical coder from the study hospital discussed the case and gave advice after which they jointly made the final diagnosis. Finally, the audit was performed by comparing the reported and reviewed diagnosis summaries.

In October 2006, the results of the audit were given as feedback and disseminated through a conference. The contents of the conference were an explanation of the present study; the results of the summary; the common errors of summary audit, and the training methods used for correct and complete reporting of a diagnosis summary without pretest or posttest. In addition, the problems and suggestions were shared among the participants and auditors. After the conference, the authors developed guidelines of how to report a summary diagnosis and contributed them to all related health personnel. Then the medical records from November 2006 to March 2007 were re-evaluated for diagnosis summary using the same methods and criteria. Finally, the relative weight (RW) and medical reimbursement were also evaluated by using the data from reported and reviewed summary diagnosis both before and after the intervention and the difference was calculated as baht per 100 persons.

The accuracy of a diagnosis summary was graded as correct, incomplete, incorrect and missing diagnosis as defined in Table 1 both before and after the intervention. The accuracy was described as the percentage and the changes of accuracy to a diagnosis summary after the intervention were analyzed by univariate analysis and adjusted for age, length of stay, and gynecological conditions using multiple logistic regression. Significant level was defined at a p-value of less than 0.05.

Results

During the two periods of the medical records audit, 168 medical records were for malignant and 300 for non-malignant conditions. As a result, 234 medical records from before and after intervention were reviewed. The mean age of the patients before and after intervention was 45 and 47 years, respectively, which was also found to be the same for the length of stay of the patients. The most common malignancies were cervical, ovarian and uterine cancer and non-malignancies were benign ovarian tumor and leiomyoma.

The feedback of the audit and training program was conducted through an hour conference, which was held once and consisted of 80% of the gynecological staff, all the gynecologic residents who were training, working and had responsibility in summarizing a diagnosis of medical records in the

Table 1. Guidelines for the summary audit

Criteria	Definition
Principle Diagnosis	
Correct	1) Only one diagnosis 2) Non-malignancy group identified specific organ, histological type, and status of the disease. In malignancy group include only organ and histological type
Incomplete	Organ or histological type or status is not specified
Incorrect	1) More than one diagnosis or 2) Incorrect principle diagnosis or 3) Incorrect organ, histological type or status
Comorbidity/complication/OR procedure/non OR procedure	
Correct	Complete and correct diagnoses or reports
Incomplete	Correct but incomplete
Incorrect	Incorrect diagnoses or reports
Missing diagnosis	No diagnoses or reports in summary sheet though it is documented in medical record

Table 2. Diagnosis summary audit before and after the intervention

	Correct n (%)		Incomplete n (%)		Incorrect n (%)		Missing diagnosis n (%)		p-value
	Before	After	Before	After	Before	After	Before	After	
Principle diagnosis	122 (52.1)	159 (67.9)	64 (27.4)	44 (18.8)	48 (20.5)	31 (13.3)	0	0	<0.001
Comorbidity	37 (20.6)	65 (33.7)	66 (36.7)	62 (32.1)	29 (16.0)	23 (11.9)	48 (26.7)	43 (22.3)	0.022
Complication	9 (12.3)	16 (29.6)	6 (8.2)	8 (14.8)	14 (19.2)	5 (9.3)	44 (60.3)	25 (46.3)	0.054
OR procedure	122 (74.0)	119 (68.0)	39 (23.6)	50 (28.6)	4 (2.4)	5 (2.9)	0	1 (0.5)	0.540
Non-OR procedure	25 (26.0)	41 (41.4)	21 (21.9)	29 (29.3)	1 (1.1)	0	49 (51.0)	29 (29.3)	0.010

Department of Obstetrics & Gynecology in the hospital and included some rotated extern & intern. There was a statistically significant improvement in the accuracy of the summary of the diagnosis after the intervention except in OR procedure (Table 2). The common errors of the summary diagnosis; were similar both before and after intervention and were a missing diagnosis of complication and non-OR procedure as well as incomplete diagnosis of comorbidity and OR procedure.

The present study showed non-malignancy conditions and the intervention significantly reduced the risk of summary of diagnosis errors odd ratios, OR (95%CI) 0.12 (0.07-0.18) and 0.42 (0.27-0.65), respectively after being adjusted for age and length of stay ($p < 0.001$). The percentages of accuracy of the principal diagnosis, comorbidity, complication, OR procedure, and non-OR procedure comparing before and after the intervention in malignancy and non-malignancy conditions are shown in Fig. 1 and 2. The error in malignancy conditions was still high after intervention. The common causes of incorrect principal diagnosis in the malignancy group were due to incorrect identification of organ or histological type, symptoms instead of a definite diagnosis reported or more than one diagnosis reported. For example, from the review of the medical record; the principal diagnosis was serous cystadenocarcinoma of the ovary. However, from the report in the diagnosis summary it was identified as either uterine carcinoma.

Discussion

The accuracy of the summary of a diagnosis was significantly improved by the audit and feedback intervention through a conference, training program,

Table 3. The benefit of audit and feedback intervention

	Relative weight (RW)			Reimburstment loss (Baht/100 person)
	Summarize by Physician	Corrected by Auditor	Difference	
Before	1.39	1.54	+0.15	154,500
		Intervention		
After	1.40	1.47	+0.07	72,100

* Calculation based on relative weight (unit/person) and medical reimbursement (10,300 Baht/unit)

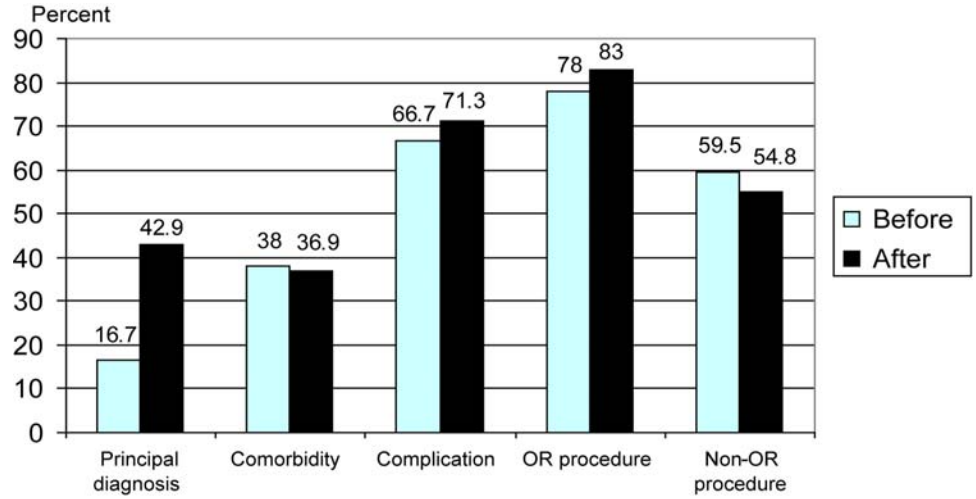

Fig. 1 The accuracy of diagnosis in malignancy condition

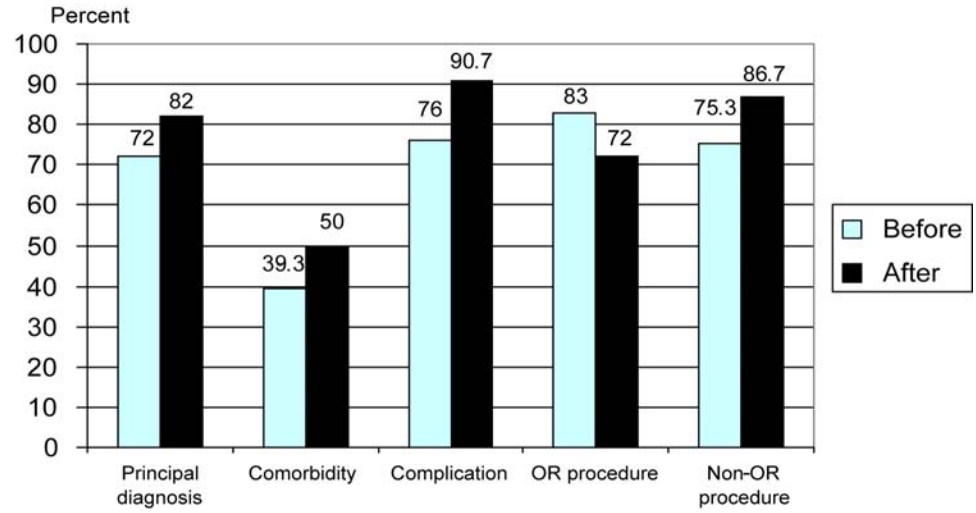

Fig. 2 The accuracy of diagnosis in non-malignancy condition

and the contribution of guidelines. However, the rate of errors was still high, mostly due to incomplete or missing diagnosis in comorbidity, complication and non-OR procedures.

The report on the summary accuracy varied according to the methods of the present study, the groups of evaluated diseases and the criteria used. The previous studies on the accuracy of a summary of diagnosis had been descriptively reported but the effect of the intervention has not been evaluated[7,10]. A retrospective study on the effect of the errors of the discharge summary on the health care reimbursement in 348 pediatric medical records at Songklanagarind Hospital showed that the error rate was 25.7%. The majority of the errors were incomplete report of the diagnosis and the most erratic change of relative weight (RW) per patient came from a wrong selection of procedure[10].

A cross-sectional study using 112 pediatric medical records was conducted in Pattani Hospital, southern Thailand where the criteria of evaluation included the severity of errors which was divided into mild (unjustified or missing code), moderate (incorrect other diagnosis) and severe (incorrect principal diagnosis). The rate of error was 66.1% rating as mild 25%, moderate 36.9%, and severe 38.1%. The coding errors were found in 78.8% in 1999 and 84.6% in 2000[7].

The effect of audit and feedback through a seminar was reported in an experimental study but it was evaluated in 1,629 medical records with obstetric conditions admitted to one provincial and nine district hospitals in Pattalung Province, southern Thailand[11]. The errors of the diagnosis summary were improved after the audit and feedback particularly among the obstetric women with normal conditions. The error of diagnosis summaries among obstetric women with abnormal conditions was still high. These results supported the findings of the present study that the improvement of accuracy was better in non-malignancy conditions than malignancy conditions after intervention. However, the changes of improvement could not be comparable due to the difference of audit criteria and not only a conference of audit and feedback but also the training program and provision of guideline disseminated were launched in the present study.

The audit and feedback through the conference, one of audit practices[13], is a method for sharing the results and was chosen to be one part of the intervention in the present study since it has been proven to improve professional practice[12]. The reduction of the summary errors was found to be statistically significant but the clinical significance was questionable especially in the reporting of comorbidity, complication, and non-OR procedure because it remained high (over 50%) and the most common errors were incomplete and missing diagnosis. The causes of diagnosis summary errors might be explained by the following reasons. Firstly, patients often have multiple and complex medical problems since Songklanagarind Hospital serves as the tertiary center for the south. A second cause is more than 50% of the physicians who have primary responsibility for the summaries of diagnoses are externs and interns who were notincluded in the audit & feedback process via a conference or the training program. Moreover, attending physicians may have insufficient knowledge even though one audit & feedback process and training program had been organized and undertaken. Finally, attending physicians may potentially have a lack of motivation to correct the diagnosis summary. The present result was supported by the result from a systematic review showing that the effects of audit and feedback are larger when the compliance of correct practice is low[12].

As the result for malignant condition's summary of diagnosis is complex, it strongly influences the error of summary diagnosis especially in the report of comorbidity thus more effort and other strategies should be used to improve the correction especially in this condition compared to a benign disease. The common causes of error in a principle diagnosis from the present study, especially in the malignancy group, were the lack of specification in organ and histological report. For example, a diagnosis should have been serous cystadenocarcinoma of the ovary but the report showed ovarian tumor. The most common errors of missing diagnosis and incomplete reporting of any complications were electrolyte imbalance, anemia due to acute blood loss from the operation and hospital acquired infection.

The effects of audit and feedback might be larger when health professionals are actively involved and have specific and formal responsibilities for implementing change[12]. Moreover, the interactive workshops can result in moderately large changes in professional practice and instructive sessions alone are unlikely to change professional practice[14]. Therefore, the present study has emphasized the importance of the performance, concerns and attitude of all health professionals working directly on diagnosis summary. Regarding the benefit of the present study apart from improving the accuracy of the diagnosis summary is that it can make the difference of relative weight (unit/

person) and medical reimbursement (10,300/unit) decreased after intervention.

The audit and feedback was found to be effective for improving the accuracy of the principle diagnosis in medical records but the clinical significance of error reduction was marginal as it was still high, thus an intensive intervention as well as evaluation and monitoring are necessary. On the other hand, the present study does represent that either more effort or other strategies are needed to improve the quality of a diagnosis summary.

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ผลของการเสนอข้อมูลแบบสะท้อนกลับต่อความถูกต้องของการสรุปการวินิจฉัยโรคในกลุ่มผู้ป่วยนรีเวช โรงพยาบาลสงขลานครินทร์

เขมวรรณ พงศานนท์, กรัณฑรัตน์ ปิยนันท์จรัสศรี, ทิพวรรณ เลียบสื่อตระกูล, สาธนา ทัศศรี, ณัฐพงศ์ บุรพงศ์, ชัชปวิตร เกตุพุก

วัตถุประสงค์*: ประเมินผลของการนำเสนอข้อมูลแบบสะท้อนกลับต่อความถูกต้องของการสรุปการวินิจฉัยโรค*

รูปแบบการศึกษา*: การศึกษาเชิงทดลอง*

วัสดุและวิธีการ*: ประเมินความถูกต้องของการวินิจฉัยโรคหลัก โรคร่วม และโรคแทรก จากการสรุปเวชระเบียนผู้ป่วยใน นรีเวชจำนวน 468 ฉบับ ตั้งแต่เดือนมกราคม พ.ศ. 2549 ถึงเดือนมีนาคม พ.ศ. 2550 โดยแบ่งเป็นกลุ่มมะเร็งและไม่ใช่มะเร็ง เปรียบเทียบผลก่อนและหลังการนำเสนอข้อมูลแบบสะท้อนกลับ*

ผลการศึกษา*: การสรุปการวินิจฉัยโรคในกลุ่มผู้ป่วยที่ไม่ใช่มะเร็งมีความถูกต้องมากกว่ากลุ่มมะเร็ง โดยพบว่าการเสนอข้อมูลแบบสะท้อนกลับมีผลให้ความถูกต้องของการวินิจฉัยโรคหลักในกลุ่มผู้ป่วยมะเร็งเพิ่มขึ้นอย่างมีนัยสำคัญจากร้อยละ 16.7 เป็น 42.9 ($p < 0.001$) ส่วนกลุ่มที่ไม่ใช่มะเร็งนั้น พบความถูกต้องเพิ่มขึ้นอย่างมีนัยสำคัญ ทั้งการวินิจฉัยโรคหลักและโรคแทรก จากร้อยละ 72 เป็น 82 ($p = 0.01$) และ ร้อยละ 76 เป็น 90.7 ($p = 0.002$) ตามลำดับ*

สรุป*: การนำเสนอข้อมูลแบบสะท้อนกลับมีผลให้ความถูกต้องของการสรุปการวินิจฉัยโรคผู้ป่วยในนรีเวชเพิ่มขึ้นอย่างไรก็ตามยังคงต้องการมาตรการอื่นเพื่อความถูกต้องที่มากขึ้นในกลุ่มผู้ป่วยมะเร็งนรีเวช*