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Evaluation of Blended Learning (Standard SOAP Method) Effect on Accurate Documentation of Progress note in Medical Records of Patients by Assistants of General Surgery

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Abstract

Background & Objectives: Medical records are among the most valuable tools for the evaluation of service quality of care organizations. Generally, a course disease shows the latest daily status of patients. This research aimed to determine the effect of blended learning (standard SOAP method) on the accurate progress note documentation in medical records of patients by assistants of general surgery.

Materials and Methods: This quasi-experimental research was performed with the cooperation of 10 first to fourth-year assistants of general surgery in Shahid Modarres Hospital affiliated with Shahid Beheshti University of Medical Sciences, Tehran, Iran in 2016. Samples included medical records of patients selected by randomized sampling. In total, 412 medical records were evaluated before the intervention in terms of progress note documentation using a questionnaire designed based on medical documentation standard (progress note based on the SOAP) of the ministry of health, treatment, and medical education. In addition, 420 medical records were assessed after the intervention, which included education of standard notes on accurate progress note documentation based on SOAP through peer-to-peer problem solving and using emails (blended learning). Data analysis was performed in SPSS version 18.5 using paired t-test and McNemar test for quantitative and qualitative binary nominal variables, respectively.

Results: In this research, a significant difference was observed before and after education based on the standard SOAP in terms of progress note documentation of patients upon admission, during treatment and at discharge (P=0.005). Moreover, a significant difference was found between the condition of information documentation related to the physician (patient's name, the sequence of progress note report, and time) before and after the education (P=0.005).

Conclusion: According to the results of the present study, documentation of the general status, care and diagnostic measures, treatment plan and observing the standard principles in the progress note sheet of patients by the assistants of general surgery were improved after blended learning.

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Introduction

Medical records have various applications, including following up of care, education, research, communicating with other personnel involved in the healthcare process, providing information to organizations, planning health services, improving service quality, supporting patients, physicians, and medical centers, and assessing health services (1, 2). Medical records help healthcare specialists in planning and evaluating the patients' treatment process and guarantee the continuity of patient care when dealing with different healthcare providers. The quality of care received by patients is directly related to the accuracy and quality of contents in their medical records (3).

In medical records, the patient's status, length of hospitalization, evaluations, treatment, progress note and interaction between patient and physician during a therapeutic course are provided. Generally, medical records are considered as an essential component in the quality of patient care and are used as a tool for evaluating patient care services (4). In addition, they are regarded as a part of communication tool in healthcare teams, encouraging their members to employ systematic thinking in assessing their patients (5, 6). Medical records are a permanent and legal document that must include sufficient information to identify the patient and justify the diagnosis, treatment, and record of treatment results.

Since documentation in medical records by health care providers, physicians, nurses and therapists is considered as a secondary activity in providing patient care, it may not always be accurate, complete, necessary and appropriate (7, 8). The standard objectives of methods of medical record documentation are establishing an accurate, rational, brief, coherent, and safe document on health information of patients and obtaining the best personal health outcomes with the support of effective decision-making. To ensure that the documents are regulated in accordance with the standard instructions and constantly guarantee the improvement of quality, safety and health results of patients,is needed.(9, 10). On the other hand, healthcare providers may fail to properly defend themselves against allegations of ill-treatment by a patient against them, if there is no accurate and complete medical record. Increased emphasis on preventing abuse and fraud in the healthcare industry has increased the importance of proper documentation of

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medical records (1, 11). In legal issues, an inadequate medical record is indicative of incomplete care and treatment, and elimination of details is a serious mistake in the documentation of medical records. Legal authorities who deal with medical negligence believe that if a task is performed but not documented in the medical record, it could be inferred the task has not been performed at all. Those who document the contents of medical records of patients, exert a great impact on the quality of these documentations. All healthcare professionals and those who document the information in medical records must understand the importance of creating accurate and complete medical records and their legal and medical applications (1). One of the most important parts of medical records is a progress note, which shows the latest status of patients every day and provides a summary on continued evaluation of the treatment or training team and its plans.

In general, progress notes must reflect what has been determined in the past 24 hours and contain new information expressed by patients. In addition, new notes obtained after patient examination and paraclinical assessments and differential diagnosis along with plans determined based on each diagnosis, will be used in the form of a series of SOAP (patient statements [S], patient status documentation [O], patient assessment documentation [A] and treatment plan [P]) (2). The SOAP Note is a documentation method of medical records, which are regarded as legal documentations and might be read by physicians or other assistants. SOAP must be prepared on a daily or weekly basis according to where in the file we are and what has happened during the treatment process (5, 12).

There is a close relationship between progress note and daily orders issued by physicians in a way that each order of physicians is based on the status of patients and their progress note. Therefore, documentation of progress note along with the orders issued on the page of physician order based on the SOAP Note can increase the level of information in the files, which results in any diagnostic or treatment order and affects the enhancement of education of learners as well. Given the importance of documentation, it is necessary for those who document this information to learn the accurate and standard methods of documentation. Previous studies have shown that physicians and other healthcare team members have had an inadequate performance in completing the admission sheet and

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summary of discharge, which makes education in this regard more tangible (12). Moreover, it is deduced from several studies that factors such as knowledge, attitude, education, guidelines, standards, and regulatory levers can be effective in increasing the quality of documentation (13). In a study, Ahmadi concluded that one of the useful documentation improvement methods is improving the observing principles of documentation of medical records by medical staff (14). Therefore, it is suggested that effective interventional techniques be applied to improve the quality of medical record documentation (15). In the studies performed so far, traditional training methods have been used to improve medical record documentation in the country's educational and therapeutic centers. Today, these conventional practices are inadequate in responding to the growing needs and the continuous development of educational skills. New technologies offer more attractive opportunities for learning (16). Furthermore, application of technology leads to the provision of education in various places and ensuring access to educational contents by all people (17).

Using information and communication technology tools in the field of e-health is one of the solutions to the challenges of the health sector (18, 19). Expansion of the information networks has resulted in more opportunities for universities such as the possibility of using blended learning (application and combination of several training methods to increase learning) (20, 21). Literature review revealed the rapid increase in the use of blended learning methods in medical education. In addition, there is evidence for the relative effectiveness of blended learning, compared to more traditional approaches (22). Due to the inadequacies in accurate progress note documentation in medical records of patients, and in order to improve clinical and paraclinical records of patients, which is a significantly important issue, this study aimed to evaluate the effect of increasing the knowledge of assistants of general surgery about standard SOAP method on accurate documentation of progress note in the medical records of patients by using information technology (emails) and education through peer-to-peer problem solving (blended learning).

Materials and Methods

This quasi-experimental research was conducted with the cooperation of ten first to four-year assistants of general surgery in

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Shahid Modarres Hospital affiliated with Shahid Beheshti University of Medical Sciences, Tehran, Iran in 2016. In total, 832 medical records were selected via simple random sampling using the lottery method. Exclusion criteria included the medical records filled by interns and patients and/or lack of need for surgery in a patient. Before the intervention, 412 medical records were evaluated in terms of the progress note using the questionnaire designed by the ministry of health, treatment and medical education based on the medical documentation standards (progress note based on SOAP) (23, 24).

In the next stage, the guidance form containing an explanation on completion of the progress note sheet based on (SOAP) along with an actual example of using the information technology (email) was delivered to the assistants. In addition, the assistants received education on the peer-to-peer problem solving method. After the intervention, 420 medical records were analyzed. It should be noted that the files were recorded before and after the intervention by specialized assistants of Shahid Beheshti University of Medical Sciences, who had undergone the intervention process.

Data collection tools included a questionnaire based on the medical documentation standard (progress note based on the SOAP) designed by the ministry of health, treatment, and medical education (24). In order to assess the validity of the research tool, copies were sent to five faculty members in the field of surgery through emails. On the other hand, content validity ratio (CVR) and content validity index (CVI) was applied to quantitatively evaluate the content validity of the questionnaire. In the end, validity was reported at one through sigma count for the whole scale. After that, the questionnaire was provided to some experts, and the final form of the questionnaire was prepared after eliminating the errors. In addition, the questionnaire was applied on 20 medical records by the assistants of general surgery by assistants to confirm its reliability. According to the results, reliability was estimated at the Cronbach's alpha of 0.89. In general, the questionnaire has four sections:

A) Information related to assistants, demographic characteristics, and the progress note sheet

B) Four-section information of SOAP (patient's statements, observations, evaluations, treatment plan) in the first progress note sheet

C) Four- section information of SOAP

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(patient's statements, observations, evaluations, treatment plan) in the progress note sheet during treatment

D) Four-section information of SOAP (patient's statements, observations, evaluations, treatment plan) in the progress note sheet at discharge

The guidance form contained an explanation about the completion of the progress note sheet based on the standards of the ministry of health, treatment and medical education along with an actual example. This guidance form was formerly evaluated and confirmed by the head of the general surgery department and five faculty members in the field of medical information management. The confirmed guidance method was sent to all assistants of general surgery (N=10) via emails, and the result of email delivery was evaluated and controlled by a senior assistant. Before this stage, 412 progress note sheets (for one month), which were filled by assistants of general surgery, were collected to evaluate the current status.

After receiving and reviewing the guidance method, the assistants participated in a training class intended for this purpose. In the class, the inadequacies of the progress note sheet, which were previously evaluated by an expert based on the guidance technique, were determined at first. Following that, three progress note sheets were given to each assistant to be corrected. At the same time, the contents of the sheets were presented via slides. Moreover, the training class of peer-to-peer problem-solving method was held with an emphasis on observing the standard notes and accurate documenting of the information based on SOAP. In addition, the inadequacies of the progress note, which were corrected by the assistants, were discussed and evaluated by the guidance of the senior assistant.

After the class, the assistants had one week to observe the standards. Afterwards, the contents documented in the progress note of patients by the assistants of the general surgery ward were assessed for one month (420 cases) by an observer. In addition, the level of observing the standard principles for documentation of medical records by MSc students in the field of medical information was recorded. It is notable that the patients were ensured of the confidentiality terms regarding their personal information, and the progress note sheets were assessed anonymously.

Data analysis was performed in SPSS version 18.5 using paired t-test (to analyze the quantitative variables) and McNemar's test (to evaluate the qualitative binary nominal

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variables). In addition, P-value of 0.05 was considered statistically significant.

Results

In total, 832 medical records (progress note sheets) filled by all assistants of general surgery (N=10) were evaluated before (412 cases) and after (420 cases) education. Information about the demographic characteristics of patients, stamp and signature of physicians, confirmation of the chief physician, sequence, being legible, having a date and time, results of all three stages (first sheet of progress note, during treatment and at discharge) are presented in Table 1. Minimum acquired score was reported at 70% according to the accreditation standards by the Ministry of Health, Treatment and Medical Education.

According to the results, a significant difference was observed in documenting the data related to the physicians (recording the patient name, date and time, stamp and signature of a physician) in the progress note sheet, before and after the educational program of standardization of progress note documentation based on SOAP. On the other hand, no significant difference was observed in terms of confirmation of the progress note sheet by the chief physician before and after the educational intervention. In fact, all sheets were confirmed by the chief physician before and after the educational process.

Table1: The physician's data documentation in the progress notes before and after the standardisation process.

Variable	Applying the Standard		P< 0.005
	Before	After	
Recording the patient's name	79.3 ± 4.7	99.8 ± 4.6	0.002
The assistant's signature	94.7 ±3.7	97.7 ± 2.1	0.000
The physician's approval	3.3 ± 2.6	6.2 ± 2.02	0.335
Legibility	0.09 ± 3.8	91.6 ± 0.2	0.201
Report sequence	65.3 ± 4.8	98.8 ± 3.7	0.000
Date	92.2 ± 3.8	94.1 ± 3.3	0.003
Time	68.2 ± 6.4	94.1 ± 6.4	0.001

The second stage of SOAP documentation included general considerations status, care and diagnostic measures and treatment plan, which were assessed before and after the

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education of standardization. The related results are shown in Table 2. According to the results of the study, there was a significant improvement in observing the standard principles of progress note documentation based on the SOAP in the general surgery ward of Shahid Modarres Hospital after the educational program. Results were indicative of a significant enhancement in all evaluated areas and the contents of the progress note in the first progress note sheet, including patient statements (S), patient status documentation (O), patient assessment documentation (A) and treatment plan (P) before and after the educational program. Moreover, a significant difference was found before and after the intervention in terms of accurate documentation in the progress note sheet during treatment according to the standard principles. In addition, there was a significant difference in the final patient status documentation and recommendation to patient in the last progress note sheet. Nonetheless, no significant difference was observed in the documentation of patient education before and after the intervention.

Table2: SOAP documentation (General condition, diagnostic and therapeutic procedures and treatment plan before and after the educational standardization process)

Variable	Applying the Standard		P< 0.005
	Before	Before	
The Patient's statements	29.3 ± 3.6	0.79 ± 2.9	0.000
The Patient's condition	43.3 ± 4.7	84.4 ± 0.4	0.002
The Patient's assessment	0.52 ± 3.2	87.6 ± 2.8	0.005
The Patient's Tests	38.3 ± 0.7	76.4 ±7.1	0.000
Examining the patient	48.8 ±3.5	80.3 ± 2.8	0.001
Observing the Patient	35.3 ± 2.9	73.1 ±1.8	0.001
Recording the patient's problems	0.44 ± 0.3	0.78 ± 3.8	0.000
Recording the Diagnostic procedures	64.1 ± 6.8	83.9 ± 0.6	0.004
Recording the patient's training	2.7 ± 2.3	43.3 ± 3.8	0.075
Recording the patient's final condition	0.35 ± 4.7	74.1 ± 4.6	0.000
The recommendations to the patient at the time of discharge	35.4 ± 2.9	68.9 ± 2.8	0.001
Recording the treatment actions	59.7 ± 0.4	88.4 ± 3.8	0.005

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Discussion

According to the results of the current research, a significant difference was observed in the frequency of observing the standard principles of progress note documentation based on SOAP by assistants of general surgery after the educational program of standardization. In this regard, our findings are in congruence with the results obtained by Khosh Baten et al. in a research with the title of "Determination of re-education students and the faculty role in the improvement of medical record data files". In the mentioned research, the departments of internal, general surgery, gynecology, and pediatrics of two Tabriz and Ardabil universities of medical sciences were evaluated in terms of quality of medical record documentation, before and after an educational workshop on medical record documentation. In total, 1340 medical records were evaluated: 41.75% of which were related to before the intervention, whereas 58.3% of the cases were related to after the intervention. According to the results obtained by Khosh Baten et al., there were numerous problems in medical documentation status before the intervention. However, a significant improvement was observed in this regard after the educational workshop. Furthermore, Khosh Baten et al. concluded that there were still some inadequacies in progress note documentation by interns and quality of medical recording after the educational workshop, which required more attention.

According to the mentioned researchers, lack of sufficient information and belief in the importance and the data recorded in medical records and their application in the evaluation and treatment process of patients was recognized as the most important factor for incomplete and inaccurate documentation of medical records by professors and students. In this respect, they asserted that this inadequacy highlights the importance of holding regular and continuous education classes and focusing on the quality of education (25). Results of the present and mentioned studies were indicative of the effect of education on the improvement of performance of physicians regarding patient record documentation. Contrary to the study by Khosh Baten et al., the method of blended learning was exploited in the present study, which led to better results. In the current research, the main focus was on completing

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the progress note sheet via the SOAP technique.

In a study by Mashoufi et al., an incomplete process of medical record documentation by physicians (the main healthcare providing groups) was reported (7). In another research, Seyf Rabiei et al. confirmed serious inadequacies in the documentation of hospital records (26). Without proper documentation of medical records, it can hardly be proved that the services provided to patients were acceptable or necessary. Inadequate or incomplete medical record documentation will have multiple implications and patients will be the first people exposed to the consequences (27).

Results obtained by Esmaili Douki et al. in a research with the title of "Effects of Including a Brief Disease Progress Column in Physician Order Sheets of Hospital Documents on Improved Recording of Disease Progress" conducted in 2011 are in line with our findings. Esmaili et al. concluded that by adding a new column with the title of "summary of progress note" to the physician order sheet, a significant improvement was observed in documenting the progress note and the cause of orders issued by the physician based on the SOAP model (12). However, the standardization educational program for documentation of progress note was held for the subjects in the present study to accurately document the progress note of patients. There was a significant difference in the progress note documentation by assistants after the educational program, compared to before the intervention. In fact, the subjects more observed the standard principles after the intervention.

The results obtained by Azimi et al. also demonstrated that none of the standards were observed in order writing of 1800 medical records evaluated in an educational hospital affiliated with Shahid Beheshti University of Medical Sciences. In the mentioned study, 70% of the medical records had a minimum of one error, indicating documentation errors in each case reported by physicians, compared to other studies. In the present research, a significant difference was observed before and after the intervention in terms of standard documentation of the final status of patients and recommendation for patients in the final progress note sheet. It seems that observing the standards improved after the educational program (15). Evaluations by Kimifar, Vafaei Najar, and Sarbaz also indicated that the process of medical record documentation was inadequately carried out by healthcare providers, which led to the loss of some

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necessary information and reduced capacity of patients' medical records for the use of natural and legal persons (1).

Accurate documentation of medical records is of paramount importance, and if neglected, it would reduce the pace of the research process in hospital areas in addition to legal consequences for the medical teams. It should be noted that incomplete documentation could result in insurance deductions and financial losses, cited in various studies (18, 25). In a research by Seo et al., 36.8% of the SOAP reports (N=95) documented by the Korean medical students of five universities had no signature. In addition, only 27.4% of disease symptoms were documented as objective symptoms. However, all of the students accurately documented the subjective symptoms of patients. In addition, the accurate documentation of symptoms, physical findings, diagnoses, and programs was reported at 78.9%, 9.5%, 62.1%, and 0.38%, respectively. In the end, it was concluded that the SOAP reports documented by medical students were incomplete, improper, and inaccurate. Educational and evaluative program were suggested to accurately document medical records by these individuals (5).

According to the results of the present study, a significant difference was detected in the documentation of the data related to the physicians (patient name, date and time, stamp and signature of physicians) in the progress note sheet before and after the educational program of standardization of patient record documentation based on SOAP method. In a research by Farokhi et al. with the title of "effect of educational workshop on patient record documentation by medical students during internship from medical schools of Azad University and University of Medical Sciences in Ardabil, Iran", the results were indicative of a significant difference in variables of history taking, counselling sheets, progress note, and summary of the file, which is consistent with our findings (28).

Lack of observing the principles for accurate medical record documentation by medical students and physicians in educational hospitals has several causes, including hospital overcrowding, no sense of responsibility by students and interns, the absence of reward and punishment system, and most important of all, lack of sufficient education in this regard (29). Pointing out the unfavorable condition of patient record documentation in educational hospitals affiliated with Hamedan University of Medical Sciences, Hamedan, Iran, Seyf

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Rabiei reported that lack of proper education was the most effective cause of inadequacies in medical record documentation (26). In a research by Kahooei et al., it was concluded that education and continuous supervision of patient record documentation by students could improve this process over time (30).

Considering the notes presented in several other studies, it seems that there are still inadequacies in the documentation of medical records based on SOAP standards in healthcare centers of the country, which require serious revisions and modifications. According to the results of the present research, a significant improvement was observed in the frequency of observing the standards of progress note documentation based on SOAP, which is indicative of the effect of blended learning on completing the progress note sheet by assistants of general surgery via the SOAP technique. In a previous research by Karami and Shokrizadeh Arani with the title of "Related Factors in Medical Records Documentation Quality and Presenting Solutions from Managers' and Physicians' Viewpoints Occupied in Hospitals Affiliated to Kashan University of Medical Sciences", the factors of knowledge and motivation had the highest mean scores (94.3%) in terms of factors affecting the documentation quality.

In this research, the participants believed that the solutions proposed in terms of knowledge and attitude had had the most impact on increased documentation quality. They suggested that training of those who are responsible for documentation in hospitals of medical universities could enhance the process of medical record documentation (13). Farzandipour marked that holding educational classes and workshops could be significantly beneficial in reducing the lack of observing the standards in the documentation of medical records (31). In the current research, education was carried out to observe the standard principles of progress note documentation based on SOAP technique.

Education through email, peers, and question/answer (blended learning) sessions with the supervision of the head of the ward is significantly important considering the significance of documentation based on standards. In addition, education can increase the level of knowledge and skill of assistants of general surgery in accurate and standard completion of the progress note sheet based on SOAP. In blended learning, the traits and abilities of both methods are integrated to achieve a result beyond the level of abilities of both areas. The main advantage of this type

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of learning is obtaining a high-quality education by assistants and increasing the learning experiences of assistants.

Abaszadeh et al. declared that the conventional education method was carried out in person and by lectures, which has several advantages, including cost-effectiveness. Presenting lectures is one of the traditional education methods and is still used as a conventional training technique despite the emergence of new learning methods, including problem-based learning and increased use of the internet and computers. Evidence suggests that by using proper contents and skilled lecturers, one can derive positive, reasonable, and appropriate outcomes from training. However, the most recent resources have indicated that using questions in the learning process is a better technique to help learners, compared to just listening to a lecture. In other words, critical thinking and problem-solving skills are developed in learners by asking questions. Moreover, this method creates an opportunity for professors to observe and listen to the learners. Therefore, simultaneous use of several educational methods can improve the learning process (17).

In this regard, Kiviniem concluded that blended learning is an effective tool to optimize education of students and improve their performance in medical fields (22). In the research by Farokhi et al. conducted to determine the effect of training workshop on writing a medical record for internship students of Azad and general universities of Ardabil, a significant difference was observed in counseling sheets, progress note and summary of files after the educational program. However, no significant difference was observed in the variable of physician's order, which is inconsistent with our findings. Contrary to the research by Farokhi et al., the blended training was exploited in the current research instead of conventional educational workshops, which according to the results, had a better impact on standard documentation of medical records (28). Storjohann et al. found no significant difference in mean evaluation score of notes documented based on SOAP by faculty members and peer-assessment of students after participating in the educational workshop based on the skill of SOAP documentation, which is not in line with our findings. This lack of consistency might be due to a weak evaluation and monitoring system in the hospital. However, the students concluded that participation in educational workshops could be beneficial for learning.

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Contrary to the present study, both faculty members and students used SOAP method to evaluate the documented notes in the mentioned research. In this regard, the researchers marked that the faculty members applied conventional techniques to evaluate SOAP notes.

One of the strengths of the present study was application of the standardization educational program in all evaluated areas of SOAP notes, including the contents of progress note sheets. In addition, blended learning was exploited instead of just attending the conventional educational workshops, which could have a more efficient effect in this regard (32). Management in training and implementing a standardization program through continuous education, active monitoring and feedback exert a significant impact on the improvement of the medical record documentation by clinical assistants. To constantly and accurately teach data recording processes, there is a need for knowledge, sense of responsibility, and spending time by faculty members and educational experts. Despite the notable results of the current research, that can be properly applied to improve the method of patient record documentation by physicians, this study had some limitations. One of the major drawbacks of the present study was only focusing on medical records completed by assistants of general surgery. In addition, the low number of assistants and their lack of experience, which led to the assessment of a low number of medical records, was another limitation. Moreover, lack of presence of a control group for accurate monitoring of some of the confounding variables was regarded as another restriction of the research. Our researchers aimed to control the limitations by recognizing some of the known confounding variables (e.g., latest education on writing reports by assistants) and assessing the files that were only completed by the assistants participating in the research. In order to generalize the results, it is recommended that future studies be conducted on assistants and physicians using broader educations and more medical records from various wards that were documented by different physicians and specialists.

Conclusion

According to the results of the present study, educational courses on application of the SOAP method led to an improvement in the documentation of patient record, care and diagnostic measures, treatment plan and observing the standard principles in the

progress note sheets by assistants of general surgery.

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