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I don't want you to be only
a doctor but I also want you
to be a man
A quotation by His Royal Highness Prince Mahidol of Songkla

the clinical academia

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Our journal is an opened access international journal devoted to peer-reviewed contributions dealing with clinical medicine and medical education from experimental to clinical aspects. Our journal publishes only high quality research, review and other types of original articles, technical and clinical reports every two months. Reviews of various global and Asian aspects will be solicited. Innovation or epidemiological aspects as well as health system research will be addressed. Rigorous systematic review and neglected tropical diseases are our priority

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message from the editor

Dear readers,

I hope this message finds you well. This is the first issue of TCA this year, the beginning of our 45th year. In this issue, there are two very interesting obstetrics and gynecology discipline; one regarding abnormal uterine bleeding and another is about preterm labor. Moreover, you will have a chance to learn more about medical education about using the study guide in medical students and procedural skills for interns in the ministry of public health. Hope you all will benefit from reading our articles as usual.

Enjoy!

Thammasorn Jeeraaumponwat, M.D., Ph.D.
Editor-in-Chief of The Clinical Academia

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All accepted articles are classified into two main categories;
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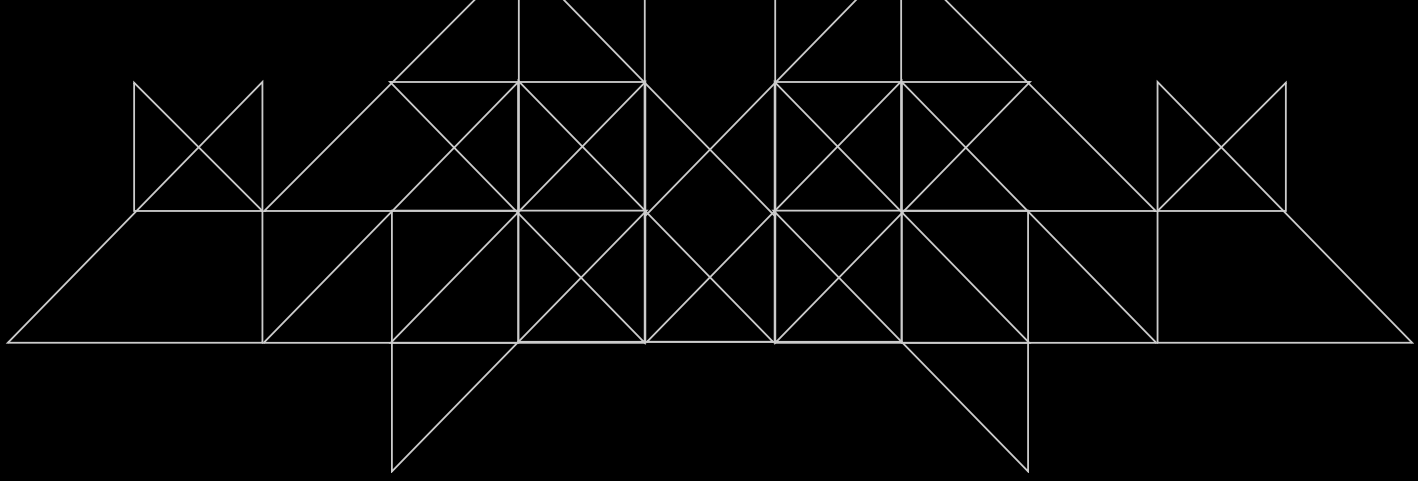
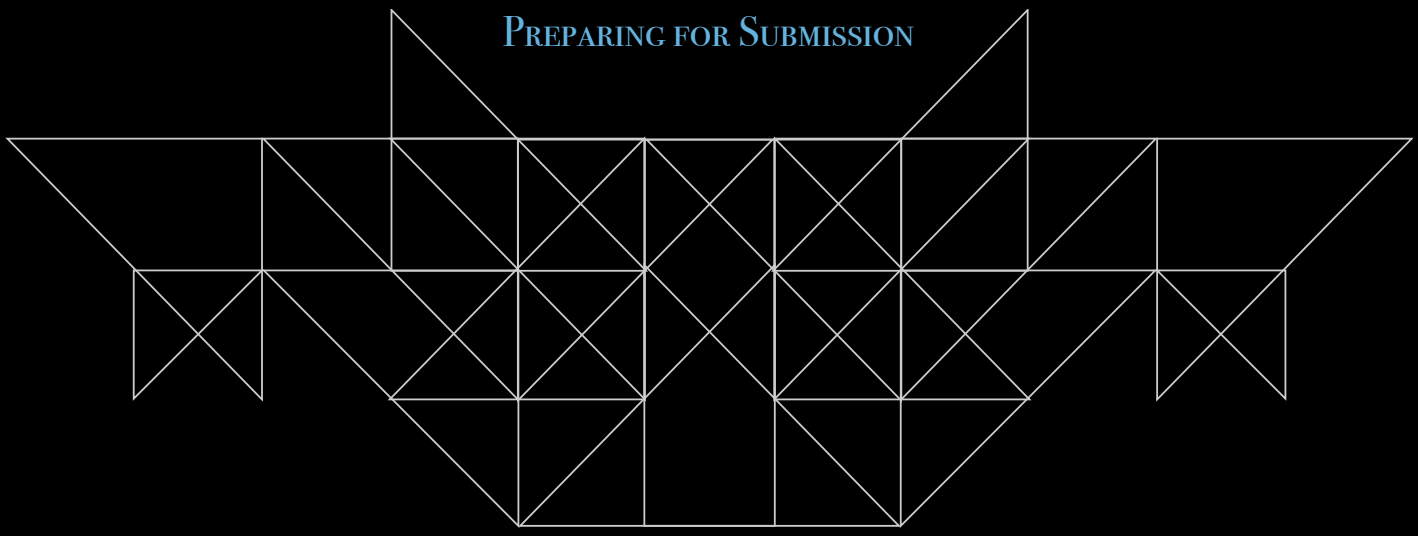
Contents



International Committee of Medical Journal Editors (ICMJE)

Recommendation for Preparing for Submission



1. General Principles

The text of articles reporting original research is usually divided into Introduction, Methods, Results, and Discussion sections. This so-called "IMRAD" structure is not an arbitrary publication format but a reflection of the process of scientific discovery. Articles often need subheadings within these sections to further organize their content. Other types of articles, such as meta-analyses, may require different formats, while case reports, narrative reviews, and editorials may have less structured or unstructured formats.

Electronic formats have created opportunities for adding details or sections, layering information, cross-linking, or extracting portions of articles in electronic versions. Supplementary electronic-only material should be submitted and sent for peer review simultaneously with the primary manuscript.

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Reporting guidelines have been developed for different study designs; examples include CONSORT for randomized trials, STROBE for observational studies, PRISMA for systematic reviews and meta-analyses, and STARD for studies of diagnostic accuracy. Journals are encouraged to ask authors to follow these guidelines because they help authors describe the study in enough detail for it to be evaluated by editors, reviewers, readers, and other researchers evaluating the medical literature. Authors of review manuscripts are encouraged to describe the methods used for locating, select¬ing, extracting, and synthesizing data; this is mandatory for systematic reviews. Good sources for reporting guidelines are the EQUATOR Network and the NLM's Research Reporting Guidelines and Initiatives.

3. Manuscript Sections

The following are general requirements for reporting within sections of all study designs and manuscript formats.

a. Title Page

General information about an article and its authors is presented on a manuscript title page and usually includes the article title, author information, any disclaimers, sources of support, word count, and sometimes the number of tables and figures.

Article title. The title provides a distilled description of the complete article and should include information that, along with the Abstract, will make electronic retrieval of the article sensitive and specific. Reporting guidelines recommend and some journals require that information about the study design be a part of the title (particularly important for randomized trials and systematic reviews and meta-analyses). Some journals require a short title, usually no more than 40 characters (including letters and spaces) on the title page or as a separate entry in an electronic submission system. Electronic submission systems may restrict the number of characters in the title. Author information: Each author's highest academic degrees should be listed, although some journals do not publish these. The name of the department(s) and institution(s) or organizations where the work should be attributed should be specified. Most electronic submission systems require that authors provide full contact information, including land mail and e-mail addresses, but the title page should list the corresponding authors' telephone and fax numbers and e-mail address. ICMJE encourages the listing of authors' Open Researcher and Contributor Identification (ORCID).

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Original research, systematic reviews, and meta-analyses require structured abstracts. The abstract should provide the context or background for the study and should state the study's purpose, basic procedures (selection of study participants, settings, measurements, analytical methods), main findings (giving specific effect sizes and their statistical and clinical significance, if possible), and principal conclusions. It should emphasize new and important aspects of the study or observations, note important limitations, and not over-interpret findings. Clinical trial abstracts should include items that the CONSORT group has identified as essential. Funding sources should be listed separately after the Abstract to facilitate proper display and indexing for search retrieval by MEDLINE.

Because abstracts are the only substantive portion of the article indexed in many electronic databases, and the only portion many readers read, authors need to ensure that they accurately reflect the content of the article. Unfortunately, information in abstracts often differs from that in the text. Authors and editors should work in the process of revision and review to ensure that information is consistent in both places. The format required for structured abstracts differs from journal to journal, and some journals use more than one format; authors need to prepare their abstracts in the format specified by the journal they have chosen.

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registration number is available, authors list that number the first time they use a trial acronym to refer to the trial they are reporting or to other trials that they mention in the manuscript. If the data have been deposited in a public repository, authors should state at the end of the abstract the data set name, repository name and number.

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Specify the study's main and secondary objectives–usually identified as primary and secondary outcomes. Identify methods, equipment (give the manufacturer's name and address in parentheses), and procedures in sufficient detail to allow others to reproduce the results. Give references to established methods, including statistical methods (see below); provide references and brief descriptions for methods that have been published but are not well-known; describe new or substantially modified methods, give the reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used, including generic name(s), dose(s), and route(s) of administration. Identify appropriate scientific names and gene names.

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Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to judge its appropriateness for the study and to verify the reported results. When possible, quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Avoid relying solely on statistical hypothesis testing, such as P values, which fail to convey important information about effect size and precision of estimates. References for the design of the study and statistical methods should be to standard works when possible (with pages stated). Define statistical terms, abbreviations, and most symbols. Specify the statistical software package(s) and versions used. Distinguish prespecified from exploratory analyses, including subgroup analyses.

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Present your results in logical sequence in the text, tables, and figures, giving the main or most important findings first. Do not repeat all the data in the tables or figures in the text; emphasize or summarize only the most important observations. Provide data on all primary and secondary outcomes identified in the Methods Section. Extra or supplementary materials and technical details can be placed in an appendix where they will be accessible but will not interrupt the flow of the text, or they can be published solely in the electronic version of the journal.

Give numeric results not only as derivatives (for example, percentages) but also as the absolute numbers from which the derivatives were calculated, and specify the statistical significance attached to them, if any. Restrict tables and figures to those needed to explain the argument of the paper and to assess supporting data. Use graphs as an alternative to tables with many entries; do not duplicate data in graphs and tables. Avoid nontechnical uses of technical terms in statistics, such as "random" (which implies a randomizing device), "normal," "significant," "correlations," and "sample."

Separate reporting of data by demographic variables, such as age and sex, facilitate pooling of data for subgroups across studies and should be routine, unless there are compelling reasons not to stratify reporting, which should be explained.

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It is useful to begin the discussion by briefly summarizing the main findings, and explore possible mechanisms or explanations for these findings. Emphasize the new and important aspects of your study and put your finings in the context of the totality of the relevant evidence. State the limitations of your study, and explore the implications of your findings for future research and for clinical practice or policy. Do not repeat in detail data or other information given in other parts of the manuscript, such as in the Introduction or the Results section.

Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not adequately supported by the data. In particular, distinguish between clinical and statistical significance, and avoid making statements on economic benefits and costs unless the manuscript includes the appropriate economic data and analyses. Avoid claiming priority or alluding to work that has not been completed. State new hypotheses when warranted, but label them clearly.

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Authors should provide direct references to original research sources whenever possible. References should not be used by authors, editors, or peer reviewers to promote self-interests.Although references to review articles can be an efficient way to guide readers to a body of literature, review articles do not always reflect original work accurately. On the other hand, extensive lists of references to original work on a topic can use excessive space. Fewer references to key original papers often serve as well as more exhaustive lists, particularly since references can now be added to the electronic version of published papers, and since electronic literature searching allows readers to retrieve published literature efficiently.

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References should follow the standards summarized in the NLM's International Committee of Medical Journal Editors (ICMJE) Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals: Sample References webpage and detailed in the

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Tables capture information concisely and display it efficiently; they also provide information at any desired level of detail and precision. Including data in tables rather than text frequently makes it possible to reduce the length of the text.

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Inadequate tissue sampling from uterine curettage between standard and transabdominal ultrasound-guided procedure in women with abnormal uterine bleeding

SYSTEMATIC REVIEW

ORIGINAL ARTICLE BY

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ABSTRACT

OBJECTIVE

To identify the rates of inadequate tissue for pathological diagnosis between the standard endometrial sampling procedure with and without transabdominal ultrasound guidance in women with abnormal uterine bleeding.

METHODS

A prospective, randomized controlled clinical trial was carried out on 144 women, aged ≥ 35 years who were admitted to the Udonthani Hospital, Thailand with abnormal uterine bleeding from October 2019 to August 2020. The participants were randomly allocated to either a standard endometrial sampling procedure with an ultrasound guidance group (n=72) or a control group without ultrasound guidance (n=72). The primary outcome was the comparison of the rate of inadequate endometrial tissue sampling between control and intervention groups. Secondary outcomes were the comparison of the procedure's duration and immediate complications.

RESULTS

The rate of inadequate tissue for diagnosis from the pathological report was not significantly different between the two groups (14.1% in the intervention group vs.16.7% in the control group). The procedure's duration also showed no statistically significant difference. The immediate complications included uterine perforation, or severe hemorrhage were not observed in both groups.

CONCLUSION

Ultrasound guidance during endometrial sampling did not reduce the rate of inadequate tissue for pathological diagnosis in endometrial sampling in abnormal uterine bleeding women.

INTRODUCTION

Abnormal uterine bleeding is a common gynecologic problem around the world.[1] Endometrial tissue pathological evaluation is an important step in the management of abnormal uterine bleeding.[1] Some conditions such as endometrial carcinoma, endometrial hyperplasia, need pathological tissue to confirm the diagnosis.[1] The tissue collection can be done by many techniques such as endometrial biopsy, endometrial curettage by manual vacuum aspiration, or sharp curettage. The prevalence of inadequate tissue sampling is between 6.3-28.8%[2-5] of pathological reports which presents a management problem. The risk factors for inadequate tissue included menopausal status, advanced age, training level, and endometrial thickness.[3,6,7] Additionally, uterine flexion, intracavitary fibroid, or a cesarean section scar defect may prevent the clinician from applying the sampling device deep enough resulting in a scant endometrial sample.[8]

The diagnostic ultrasound had been widely used in clinical medicine for many years with no deleterious effects.[9] The epidemiological evidence is reassuring as to the safety of routine ultrasound scanning.[9] Dua et al. reported that endometrial sampling guided ultrasound could reduce the rate of inadequate tissue in previously failed attempted cases.[10] The other existing evidence for ultrasound guidance during endometrial sampling was not indicated.[11-13] This study aimed to identify the rates of inadequate tissue for pathological diagnosis between the standard procedure and transabdominal ultrasound guidance during endometrial sampling in women with abnormal uterine bleeding.

METHODS

A prospective, randomized controlled clinical trial was carried out on 144 women, aged 35 years who were admitted to the Udonthani Hospital, Thailand with abnormal uterine bleeding from October 2019 to August 2020. Abnormal uterine bleeding was defined as abnormal in amount, duration, or schedule of menstruation[14] without a lower genital tract cause. Patients were initially enrolled based on clinical diagnosis.

This study was approved by the Udonthani Hospital Research Ethics Committee for research with human subjects, Udonthani Hospital (No. 64/2562). The objective and process of the study were explained to the patients on admission. All patients gave their written informed consent before participating in this study.

The inclusion criteria were women aged ≥ 35 years with abnormal uterine bleeding. The exclusion criteria were; declined to participate, pregnancy, pethidine or analgesics allergy, had a history of analgesics adverse side effect, arrhythmia, had a sensory abnormality, lower genital tract malignancy, coagulopathy, lower genital tract infection, pelvic inflammatory disease and could not identify cervical os.

The participants were randomly allocated to either a standard procedure group or an ultrasound guidance group for endometrial curettage. Computer-generated randomization was done and its sequence number was kept in an opaque envelope. The physicians and patients were not blinded due to the nature of the intervention. The endometrial sampling was done by endometrial biopsy, manual vacuum aspiration or sharp curettage according to patient's and physician's preference after a counseling process.

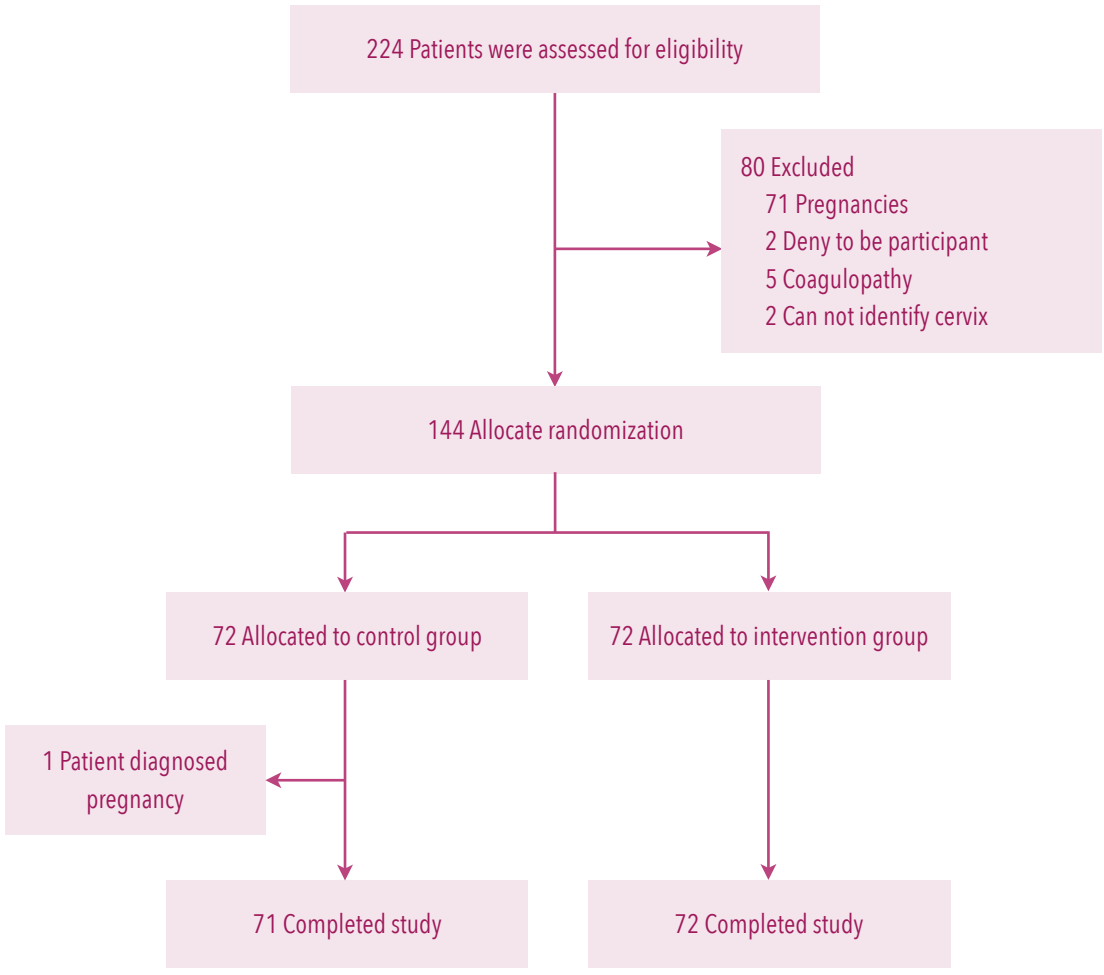

Figure 1. Consort diagram

Preoperative evaluation was performed for all cases including full history, physical examination and laboratory investigations (i.e. hemoglobin (Hb) level, platelet count, urine pregnancy test, prothrombin time, international normalized ratio, and prothrombin concentration). All included patients were randomly allocated into two groups: controlled group (n=72) undergo standard procedure and intervention group (n=72) undergo standard procedure with ultrasound guidance during endometrial sampling.

The endometrial sampling procedure was done in a lithotomy position. Preoperative medications were meperidine 50 mg with/without diazepam 5-10 mg intravenously. After application of povidone-iodine solution for sterilization, a speculum was inserted and visualized the cervix. Tenaculum might be used depending on the

cervical os narrowing and the physician's experience. The sample device (sharp curettage, manual vacuum aspirator, or Pipelle endometrial biopsy) was inserted through the cervical os by applying steady and moderate pressure and stopped when resistance was met. In the intervention group, transabdominal ultrasound guidance was done using Samsung ultrasonic machine model HS40 with a 3.5-5 MHz convex probe by Gynecologists, residents, or interns. If the sampling device did not pass through the cervix os, a tenaculum was attached, and a Hegar dilator was used to gently dilate the canal. The sampling device was moved in the uterine cavity until the tissue was obtained. The tissue was preserved in formaldehyde and was sent to the pathologists. The procedure's duration was defined as the time (minute) between speculum insertion and removal. All pathological diagnosis was made by the boarded pathologist.

After the procedure, all participants were observed for vital signs, pain score, and amount of vaginal bleeding for 2 hours. If no complication was detected, the patient was discharged and was given a follow up appointment in 2 weeks for a check-up and pathological result.

The primary outcome was the comparison of the rate of inadequate endometrial tissue sampling (defined by pathologists as suboptimal or a scanty tissue specimen)[15] between control and intervention groups. Secondary outcomes were the comparison of procedure duration and immediate complications (such as uterine perforation and hemorrhage).

The sample size was calculated using the formula for a randomized controlled trial for binary data by N4studies program. The proportion of inadequate endometrial sampling was 0.3 in the control group and 0.1 in the intervention group from a pilot study. An α was 0.05 and the power was 80%. The calculated sample size was 62 per group and 10 cases per group were added. The total cases were 144 cases with 72 cases in each group.

STATISTICAL ANALYSIS

The patients' characteristics are presented as a number and percentage, range, mean $\pm$ standard deviation, or median with an interquartile range. The normality of distribution was tested by Skewness and Kurtosis test. The rates of adequate and inadequate tissue sampling of both groups were compared. Student t test or Mann Whitney U rank sum test were used for comparison of continuous variables. Logistic regression analysis was used for categorical variables. The risk ratio and adjusted risk ratio with a 95% confidence interval were calculated for the magnitude of effect. Statistical analysis was performed using Stata version 13. A P-value <0.05 was considered statistically significant.

RESULTS

This study included 144 participants who were randomly allocated with 72 participants for a control group (standard technique), and an intervention group (standard technique with ultrasound guidance). After the study was completed, 1 participant in the control group was excluded due to pregnancy. A study flow diagram is presented in Figure 1. Baseline characteristics of the two groups are shown in Table 1. They were comparable with no significant differences in terms of age, body mass index, parity, menopausal status, history of previous vaginal delivery, history of previous uterine surgery, indication for endometrial sampling, endometrial thickness, method, and history of previous inadequate tissue except uterine sound and training level. However,

Table 1. Comparison of baseline characteristics between two groups

Characteristics	Intervention group (N = 72)	Control group (N = 71)	P Value**
Age(year), median(IQR)	46.00 (41.5,51.0)	46.50 (42.5,51.0)	0.555
BMI(kg/m2), median(IQR)	24.14 (22.19,27.14)	25.34 (22.05,29.09)	0.187
Nulliparity, n(%)	11 (15.28%)	9 (12.68%)	0.654
Menopause , n(%)	13 (12.1%)	11 (15.49%)	0.682
Previous vaginal birth, n(%)	55 (76.39%)	51 (71.83%)	0.534
Previous uterine surgery, n(%)	13 (18.06%)	12 (16.90%)	0.609
Indication for sampling, n(%)			
AUB	25 (34.72%)	36 (50.73%)	0.217
AUB with myoma	30 (41.67%)	24 (33.83%)	0.217
AUB with adenomyosis	4 (5.56%)	4 (5.63%)	0.217
Others	13 (18.06)	7 (9.86%)	0.217
Endometrial thickness (cm.), median±SD	0.76±0.57	0.81±0.53	0.641
Training level, n(%)			
Staff & Resident	64 (88.89%)	54 (76.06%)	0.043*
Intern	8 (11.11%)	17 (23.94%)	0.043*
Method, n(%)			
MVA	15 (20.83%)	18 (25.35%)	0.811
F&C	54 (75%)	50 (70.42%)	0.811
Endometrial biopsy	3 (4.17%)	3 (4.23%)	0.811
Uterine sound (cm.), mean±SD	7.60±1.43	8.13±1.19	0.017*
Previous inadequate tissue sampling, n(%)	2 (2.78%)	2 (2.82%)	0.989

* statistically significant

** P value was tested by unpaired t test or logistic regression analysis or Wilcoxon rank sum test, depend on data characteristics.

the control group tended to have participants with longer uterine sound (P=0.017), and less experience staff to perform the procedure (P=0.043)

Comparison of primary and secondary outcomes between the two groups are shown in Table 2. The rate of inadequate tissue from a pathological report was not significantly different

Table 2. Comparison primary and secondary outcome measurement between two groups

Outcome	Control group (n=71)	Intervention group (n=72)	Risk ratio	95%CI	P Value
Inadequate tissue, n(%)	10 (14.08%)	12 (16.67%)	1.18	0.55-2.56	0.669
Duration of procedure (min), median(IQR)	13.00 (7.00,15.00)	10.00 (10.00,15.00)			0.605
Uterine perforation, n(%)	0	0	NA	NA	NA

between the two groups (14.1% in the intervention group versus 16.7% in the control group; P=0.669). The procedure's duration was not significant different (P=0.605). The immediate complications included uterine perforation, or severe hemorrhage were not found in both groups.

DISCUSSION

The inadequate tissue for pathological diagnosis from endometrial tissue sampling is a significant problem which can cause difficulty in the management of an abnormal uterine bleeding patient.[1] It can be caused by either thin or scanty endometrial thickness or the improper placement of the device that is used to obtain the endometrial tissue.[8] The improper positioning of the device's tip can be caused by cervical stenosis, previous cesarean delivery, extreme uterine flexion, or intracavitary fibroid.[8] These can mislead by giving the sensation that the tip of the sampling device touched the fundus.[8] Too short device insertion into the uterine cavity, a higher rate of inadequate tissue is supposed.[8] However, data from this study demonstrated that the incidence of inadequate tissue sampling was not decreased in the ultrasonic guidance group during the sampling procedure compared with the standard procedure without ultrasound guidance group which is compatible with the guideline in previous studies that was not recommended routine ultrasonic guidance during endometrial sampling.[1-16]

The result of this study was not compatible with the Dua A., et al study which reported that after a failed blind biopsy, 83% of cases had subsequently successful US−guided endometrial sampling.[10] Recent literature supported the use of ultrasound by clinicians to guide a wide variety of procedures that were previously done "blindly". The advantages of ultrasonography in safety, time, and cost savings.[17] Intraoperative ultrasound also reduced both operative time and complication rates.[18] A study with a larger sample size still needs to determine the benefit of ultrasonic guidance in the high-risk group of endometrial sampling.

A retrospective review of our hospital data before this trial found the incidence of inadequate tissue sampling was 23.9% compared with 15.38% from this study. The "Hawthrone effect" is a possible explanation of this difference. During the study, the gynecologists who performed the sampling procedure knew about the objective of the study, so it was possible they might have increased their awareness of the sampling.

The immediate complication of endometrial sampling included uterine perforation, and hemorrhage.[16] Most cases of uterine perforation are associated with the use of

sound or cervical dilators and occur in patients with acute anteflexion or retroflexion uterus.[16] In this study, the immediate complication was not found. A larger sample size study in this specific group is still needed because of the low immediate complication rate of this procedure.

The strength of this study is its prospective randomized controlled trial with an adequate sample size. There are some limitations of this study. First, this study was not a blinded trial, therefore the observational effect, that was previously described, could have happened. Second, the criteria of inadequate tissue sampling were subjective and depended on the pathologist's opinion since there is no existing standard criteria for diagnosis[19], an inter-rater reliability problems can happen. However, Breijer et al. (2016) study reported that a structured reassessment of endometrial biopsies samples classified as inconclusive due to insufficient material did not change the conclusion.[20] Therefore, the pathological results of inadequate tissue should be reliable.

CONCLUSION

Ultrasound guidance during endometrial sampling did not reduce the incidence of inadequate tissue for pathological diagnosis in endometrial sampling in abnormal uterine bleeding women. The procedure's duration was also not statistically significant difference between the standard technique with or without ultrasound guidance.

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Digital cervical examination, transabdominal, and transperineal sonographic cervical length measurement in the management of threatened preterm labor

SYSTEMATIC REVIEW

ORIGINAL ARTICLE BY

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ABSTRACT

OBJECTIVE

To evaluate the correlation and diagnostic performance of digital cervical examination (cervical effacement, digital estimation of cervical length (DE-CL), Bishop score), transabdominal (TAS-CL), transperineal (TPS-CL) sonographic cervical length measurement compared with standard transvaginal measurement (TVS-CL).

METHODS

The study's participants were 107 women with suspected preterm labor whose cervical dilatation was < 3 cm. Digital cervical examination, TAS-CL, TPS-CL, and TVS-CL were performed. Short cervical length (CL) was diagnosed when CL was $\leq$ 3 cm. The correlation and diagnostic performance of cervical effacement, Bishop score, DE-CL, TAS-CL, and TPS-CL with TVS-CL were evaluated.

RESULTS

Short CL (CL $\leq$ 3cm) was found in 52.3% by standard TVS-CL and 81.9%, 47.4%, 49.1% by DE-CL, TAS-CL, and TPS-CL, respectively. Cervical effacement, Bishop score and DE-CL had low correlation with TVS-CL (r = -0.4, -0.5, and 0.4) while TAS-CL and TPS-CL had moderate correlation with TVS-CL (r= 0.7 and 0.8, respectively). The sensitivity and specificity of effacement $\geq$ 25%, Bishop score $\geq$ 4 to detect short cervix were 32.7% and 93.4%, 80.0% and 75.4%, respectively. The sensitivity and specificity of DE-CL, TAS-CL and TPS-CL to detect short cervix were 87.3% and 23.0%, 60.0% and 63.9%, 80.0% and 78.7%, respectively.

CONCLUSION

TAS and TPS-CL had moderate correlation with TVS-CL. Bishop score $\geq$ 4 and DE-CL also had a high sensitivity and specificity for the short cervix diagnosis. In case of TVS-CL is unavailable, Bishop score $\geq$ 4, DE-CL, TAS-CL and TPS-CL can be used as a screening test in preterm labor management.

INTRODUCTION

Preterm birth is a global problem, the estimated prevalence of preterm birth is 15 million babies annually with many sequelae both mortality and morbidity, especially in low socioeconomic countries.[1] The lack of equipment and medical personnel causes high mortality rates in those countries.[2-3] The diagnosis of early threatened preterm labor is sometimes difficult to differentiate from false labor pain or Braxton-Hick contraction.[3] In many guidelines from developed countries, the cervical length measurement has a significant role in the diagnosis of preterm labor and the decision of treatment plan.[4-7] The short cervical length by transvaginal ultrasound has been used for early diagnosis of preterm labor.[1] However, in the developing countries, the ultrasound machine with a transvaginal probe, which is essential for standard cervical length measurement, is still unavailable in many areas.

Digital cervical examination, to evaluate cervical conditions, is a basic examination for all obstetricians and midwives.[1] The thinness of the cervix is measured in terms of cervical effacement that is a significant part of diagnosis of labor.[1] The cervical condition is also evaluated in terms of Bishop score, which compose of cervical dilatation, effacement, consistency, position, and fetal head station. This can be practiced at low cost and it is familiar to all doctors and midwives. The ultrasonographic cervical length (CL) measurement, by transabdominal (TAS) and transperineal (TPS) approach, can be practiced in some hospitals where the transabdominal convex ultrasonic probe is available.[8] The previous studies regarding the accuracy of Bishop score, TAS, and TPS CL measurement, in the diagnosis of preterm labor, were done with different outcomes.[8-11] This objective of this study is to study the correlation and diagnostic performance of digital cervical examination (cervical effacement, digital estimation of cervical length (DE-CL), Bishop score), transabdominal (TAS-CL), and transperineal (TPS-CL) sonographic cervical length measurement compared with standard transvaginal measurement (TVS-CL) for early preterm diagnosis in the low resource setting which the TVS-CL is unaffordable.

METHODS

This diagnostic test study was conducted in a tertiary care regional hospital from December 2018 through May 2019. The study protocol was approved by the Ethical Research Committee of Udonthani Hospital (No.39/2561). The inclusion criteria were women with singleton live preterm pregnancies with gestational age between 25 and 36 weeks, and women with a painful and regular uterine contraction of at least one time every 10 minutes persisting for more than 30 minutes.[12] The exclusion criteria were cervix dilated $\geq$ 3 cm, placenta previa, abnormal vaginal bleeding, preterm premature rupture of membranes, dead fetus in utero, fetal anomaly, uncertain gestational age, history of previous cervical or uterine surgery, a clear image of TVS-CL could not be obtained or unwilling to participate in the study.

The eligible participants were counseled and invited to participate in the present study. Written informed consent was obtained after the explanation of study methods to the participants. Then, all participants were examined by digital cervical examination, performed by experienced nurses who have worked in the labor room for at least 5 years, to rule out advanced labor (cervical dilatation $\geq$ 3 cm). Later, these following steps

Table 1. Basic characteristic of study group

Characteristics	Total (N = 107)	Percentage (%)
Maternal age (years), n(%)		
Mean±SD	25.6±7.0	
< 20	26	24.3%
20 – 34	69	64.5%
≥ 35	12	11.2%
Gestational age at admission (weeks), n(%)		
Mean ±SD	33.2±2.5	
< 34 weeks	46	43.0%
≥ 34 weeks	61	57.0%
Primigravida, n (%)	47	43.9%
Body mass index (kg/m2)		
Mean ±SD	25.4± 4.1	
< 18.5	4	3.7%
18.5 – 22.9	27	25.2%
23 – 24.9	21	19.6%
25 – 29.9	40	37.4%
≥ 30	15	14.0%
Previous preterm birth, n(%)	8	7.5%
Previous term birth, n(%)	42	39.3%
Initial dilatation of cervix (cm)		
Closed	63	58.9%
Dilate ≥ 1 cm	44	41.1%
Bishop score		
Mean ±SD	3.8±2.5	
< 6	80	74.8%
≥ 6	27	25.2%

Table 2. Sensitivity and specificity of effacement to detecting short cervix (TVS-CL ≤ 3 cm)

Effacement Cutpoint (%)	Sensitivity	Specificity	Correctly classified	Positive likelihood ratio	Negative likelihood ratio
0	100%	0%	47.4%	1.0	NA
≥ 25	32.7%	93.4%	64.7%	5.0	0.7
≥ 50	14.5%	96.7%	57.8%	4.4	0.9
≥ 75	5.5%	98.4%	54.3%	3.3	1.0

were performed; first, the cervical dilatation, effacement, consistency, position, and fetal head station were assessed, then CL was measured digitally by examining as the effacement examination but was evaluated in centimeters. In the case of closed external cervical os, the external CL was estimated[13] and noted in the record form. The transabdominal, transperineal, then transvaginal ultrasonic CL measurements were done by trained obstetricians or residents, using a GE Voluson P6 ultrasound machine with a 3.5-5 MHz convex probe and a 7-10 MHz transvaginal probe. The patient was examined transabdominal then they were asked to void for empty bladder and transperineal and transvaginal CL measurement were performed.

Transabdominal CL measurement was done by applying a convex ultrasonic probe vertically at the suprapubic area.[9] The transperineal measurement was done by applying a convex ultrasonic probe, which was covered by a sterile plastic bag, at the anterior perineum and between labia majora.[9] The ultrasonic probe was moved until a clear image was found. The CL was obtained by measuring from external to internal os in a longitudinal axis. Three measurements were taken, and the shortest values were taken as the final CL in all ultrasonic measurements. The cut-off value for short CL diagnosis was ≤ 30 mm.[7,13] All staff and residents, who participated in this study, were

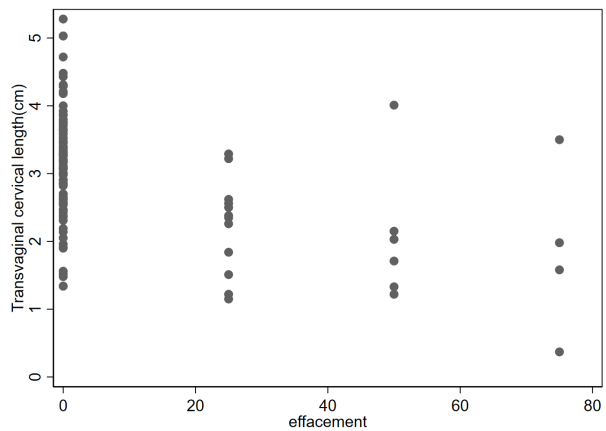

Figure 1. Scatter plot of result of effacement and transvaginal ultrasonic cervical length measurement (TVS-CL)

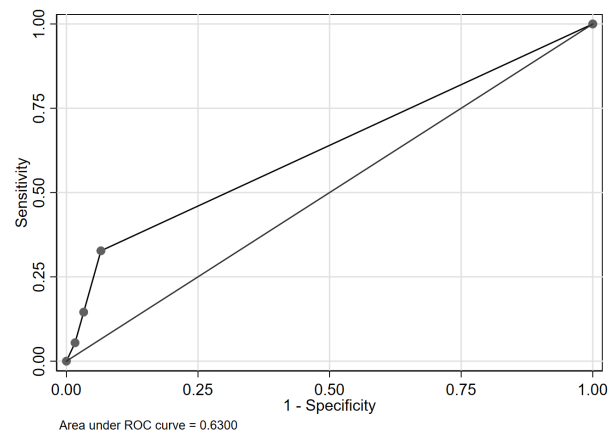

Figure 2. Receiver operating curve of effacement to detecting short cervix (TVS-CL ≤ 3 cm)

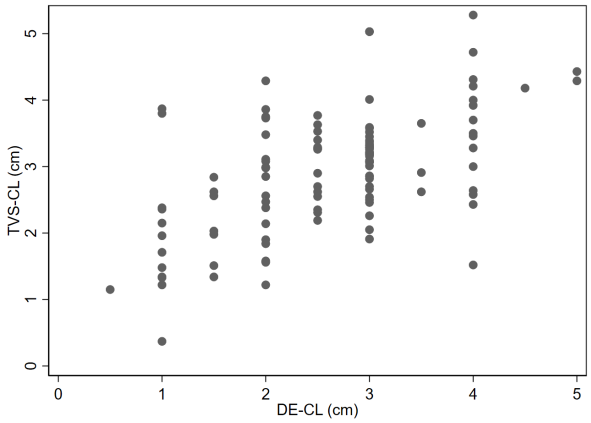

Figure 3. Scatter plot of result of digital estimation cervical length (DE-CL) and transvaginal ultrasonographic measurement cervical length (TVS-CL)

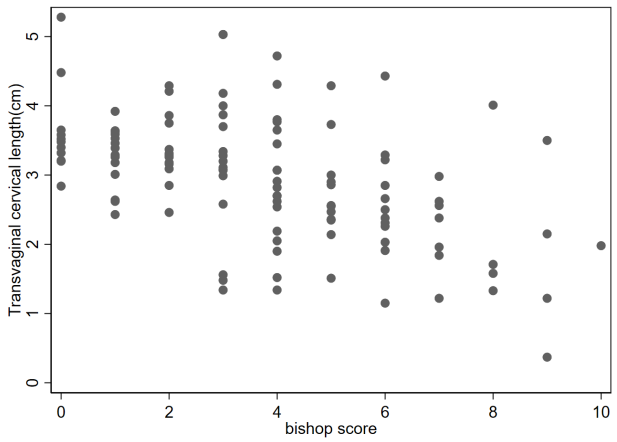

Figure 4. Scatter plot of result of Bishop score and transvaginal ultrasonic cervical length measurement (TVS-CL)

trained for standardization of CL measurement in a 1-day course. After the measurement procedure the participants were managed according to the hospital protocol and the Royal Thai College of Obstetricians and Gynecologists (RTCOG) guideline.[15]

The sample size was calculated using the formula for a diagnostic test study, by using TVS-CL measurement as a standard test for the diagnosis of short CL. The estimated sensitivity of DE-CL, TAS-CL, and TPS-CL was 60, 60, and 80%,[16,17] respectively, with 0.1 acceptable error and 5% significance were used. The calculated sample size was 93, to which a 20% dropout rate was added resulting in total sample size was 113.

The participants' characteristics are presented in terms of frequency and percentage for categorical data. The skewness and kurtosis test were used for the normality tests of data. Mean, standard deviation or median with interquartile range were used for continuous data. TVS-CL $\leq$ 3 cm was used as the standard diagnosis of short CL. The correlation of cervical effacement, Bishop score, DE-CL, TAS-CL, and TPS-CL with TVS-CL and their diagnostic performance for diagnosis of the short cervix were assessed including Pearson's R correlation coefficient, sensitivity, specificity, positive and negative predictive value with their 95% confidence interval. Statistical analysis was performed using Stata program version 13. P <0.05 was considered statistically significant.

RESULTS

There were 116 participants with suspected threatened preterm labor who were examined by digital cervical examination, DE-CL, TAS-CL, TPS-CL, and TVS-CL. The participants' mean age was 25.6 (±SD 7.0) years and 47 (43.9%) women were primigravida. Their mean gestational age was 33.2 (±SD 2.5) weeks. Baseline characteristics are presented in Table 1.

TRANSVAGINAL CERVICAL LENGTH MEASUREMENT (TVS-CL)

There were 116 (100%) successful TVS-CL measurement in participants with suspected threatened preterm labor. The mean ± standard

Table 3. Sensitivity and specificity of different Bishop score to detecting short cervix (TVS-CL ≤ 3 cm)

Bishop score Cutpoint (cm)	Sensitivity	Specificity	Correctly classified	Positive likelihood ratio	Negative likelihood ratio
≥ 1	98.2%	16.4%	55.2%	1.2	0.1
≥ 2	92.7%	34.4%	62.1%	1.4	0.2
≥ 3	89.1%	55.7%	71.6%	2.0	0.2
≥ 4	80.0%	75.4%	77.6%	3.3	0.3
≥ 5	60.0%	88.5%	75.0%	5.2	0.5
≥ 6	41.8%	91.8%	68.1%	5.1	0.5
≥ 7	25.5%	96.7%	62.9%	7.8	0.8

deviation of TVS-CL was 3.0 ± 0.9 (range 0.4-5.3). The CL <2 cm was detected in 18 cases (15.5%), CL 2-3 cm in 37 cases (31.9%) and CL > 3 cm in 61 cases (52.6%).

DIGITAL EXAMINATION OF A CERVIRAL CONDITION

CERVICAL EFFACEMENT

Cervical effacement was examined in all 116 threatened preterm patients by more than 5 years-experienced nurses in the labor room. The scatter plot of cervical effacement and TVS-CL is shown in Figure 1. The Pearson R correlation between cervical effacement and TVS-CL was -0.4. The receiver operating curve (ROC) of effacement to detect short cervix (TVS-CL ≤ 3 cm) is shown in Table 2 and Figure 2 with an area under the curve was 0.6. By using the cutpoint at 25% effacement, the sensitivity and specificity to detecting the short cervix (TVS-CL ≤ 3) was 32.7% and 93.4%, respectively with 64.7% correctly classified. (Table 2)

DIGITAL ESTIMATION OF CERVICAL LENGTH (DE-CL)

Digital estimation of cervical length was done in all 116 threatened preterm patients by more than 5 years-experienced nurses in the labor room. The mean ± standard deviation of DE-CL was 2.6 ± 1.0 (range 0-5). The DE-CL <2 cm was detected in 23 cases (19.8%), DE-CL 2-3 cm in 72 cases (62.1%) and DE-CL > 3 cm in 21 cases (18.1%). The

Table 4. Diagnostic performance of digital estimation cervical length (DE-CL), transabdominal (TAS-CL), and transperineal ultrasonic cervical length (TPS-CL) measurement for short cervical length (≤ 3 cm) compare with standard transvaginal measurement (TVS-CL)

		TVS-CL	
		Short CL (≤ 3cm)	**CL > 3 cm**
DE-CL	Short CL(≤ 3cm)	48	47
	CL > 3 cm	7	14
TAS-CL	Short CL(≤ 3cm)	33	22
	CL > 3 cm	22	39
TPS-CL	Short CL(≤ 3cm)	44	13
	CL > 3 cm	11	48

Diagnostic performance	**DE-CL (%, 95%CI)**	**TAS-CL (%, 95%CI)**	**TPS-CL (%, 95%CI)**
Sensitivity	87.3% (75.5-94.7)	60.0% (45.9-73.0)	80.0% (67.0-89.6)
Specificity	23.0% (13.2-35.5)	63.9% (50.6-75.8)	78.7% (66.–88.1)
Positive predictive value	50.5% (40.1-60.9)	60.0% (45.9-73.0)	77.2% (64.2- 87.3)
Negative predictive value	66.7% (43.0-85.4)	63.9% (50.6-75.8)	81.4 (69.1-90.3)
Positive likelihood ratio	1.1 (1.0-1.3)	1.7 (1.1-2.5)	3.8 (2.3-6.2)
Negative likelihood ratio	0.6 (0.2-1.3)	0.6 (0.4-0.9)	0.3 (0.2-0.4)

comparison between DE-CL and TVS-CL is shown in Figure 3. The Pearson R correlation between DE-CL and TVS-CL was 0.4.

BISHOP SCORE

Cervical Bishop score was evaluated in all 116 threatened preterm patients by more than 5 years-experienced nurses in the labor room. The mean ± standard deviation of Bishop's score was 3.8 ± 2.5 (range 0-10). Most patients had Bishop score less than 6 (Table 1). The comparison between Bishop score and TVS-CL is shown in Figure 4. The Pearson R correlation between Bishop score and TVS-CL was -0.5. The ROC curve of varied cut-off points is demonstrated in Figure 5 with the AUC= 0.8, the highest correctly classified cutpoint of Bishop score to detect short cervix was ≥ 4 which had 80.0% sensitivity and 75.4% specificity (Table 3).

TRANSABDOMINAL CERVICAL LENGTH MEASUREMENT (TAS-CL)

The transabdominal ultrasound cervical length measurement was done in 116 participants. There were 17 participants (14.7%) that could not obtain a clear image of TAS-CL. The mean ± standard deviation of TAS-CL was 3.1 ± 0.9 (range 1.2-5.7). The TAS-CL <2 cm was detected in 8 cases (6.9%), TAS-CL 2-3 cm in 47 cases (40.5%) and CL > 3 cm in 61 cases (52.6%). The comparison between TAS-CL and TVS-CL is shown in Figure 6. The Pearson R correlation between TAS-CL and TVS-CL was 0.7.

TRANSPERINEAL CERVICAL LENGTH MEASUREMENT (TPS-CL)

The transperineal ultrasonic cervical length measurement was done in all 116 participants. There were 9 participants (7.8%) that could not obtain a clear image of TPS-CL. The mean ± standard deviation of TPS-CL was 3.0 ± 0.9 (range 1.1-5.9). The TPS-CL <2 cm was detected in 13 cases (11.2%), TPS-CL 2-3 cm in 44 cases (37.9%) and TPS-CL > 3 cm in 59 cases (50.9%). The comparison between TPS-CL and TVS-CL is shown in Figure 7. The Pearson R correlation between TPS-CL and TVS-CL was 0.8.

The prevalence of short CL (TVS-CL ≤ 3 cm) was 47.4% (95% CI: 38.1 to 56.9). The sensitivity, specificity, positive, and negative predictive value and accuracy of DE-CL, TAS-CL, and TPS-CL for short CL were demonstrated in Table 4.

DISCUSSION

Preterm labor is sometimes difficult to differentiate from false labor pain or Braxton-hicks contraction, especially in cases of minimal cervical dilatation. CL measurement has been recommended by many obstetric guidelines as a part of preterm labor management in developed countries.[7,17,18] However, there are many hospitals in low and middle-income countries without an ultrasound machine with transvaginal probes and trained personnel. Some hospitals have an ultrasound with a convex probe without a transvaginal probe. Data from this study demonstrated that CL measurement by TAS-CL and TPS-CL had a moderate correlation with TVS-CL and can be used with good sensitivity and specificity when compared with TVS-CL. Therefore, it can be used in situations where a vaginal ultrasonic probe is unavailable for evaluating the cervical condition of suspected preterm labor patients.

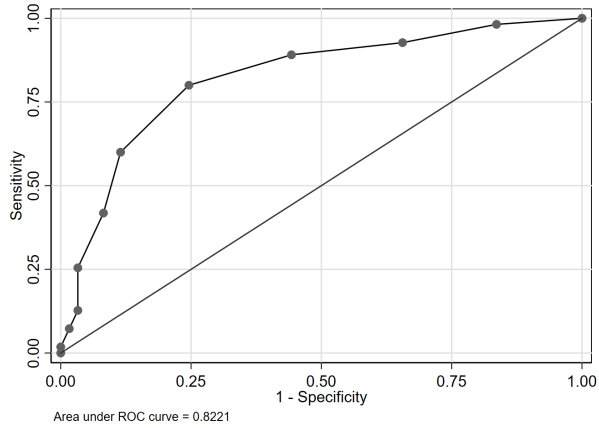

Figure 5. Receiver operating curve of different Bishop score to detecting short cervix (TVS-CL ≤ 3 cm)

This data is compatible with Saul LL, et al study[13] which reported a high correlation (r=0.824) between TAS-CL and TVS-CL nevertheless it is different from the Larscheid P study (14) which reported low correlation (Lin's rho = 0.578) between these two measurement methods.

A common problem for TAS-CL measurement is the need for some urine in the bladder for clear vision of the cervix. A study by To MS, et al[15] reported 42% visualization of CL if urine in the bladder was less than 50 ml and 73% if urine in the bladder more than 150 ml. The overdistended bladder can change the CL, Hermandez-Andrede E, et al[16] reported that TAS-

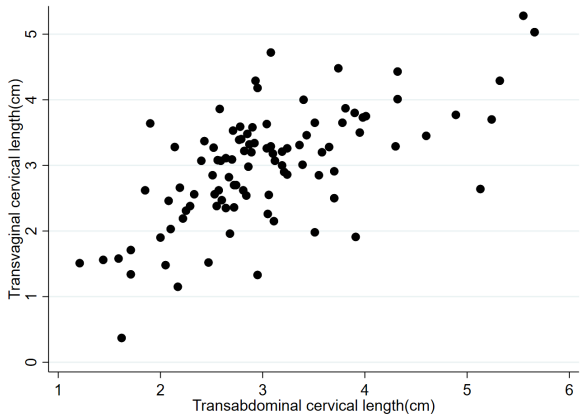

Figure 6. Scatter plot of result of transabdominal (TAS-CL) and transvaginal ultrasonic cervical length measurement (TVS-CL)

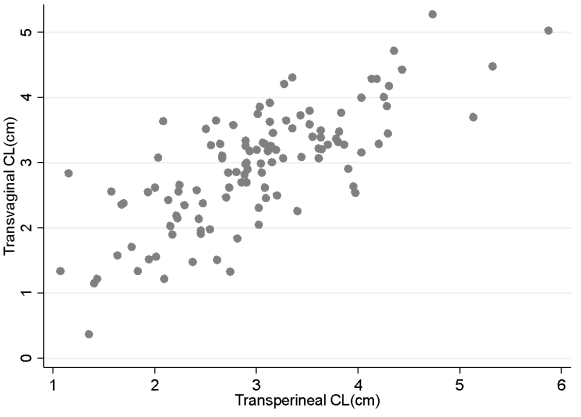

Figure 7. Scatter plot of result of transperineal (TPS-CL) and transvaginal ultrasonic cervical length measurement (TVS-CL)

CL had an overestimation of about 8 mm which caused a 57% error in diagnosis. Friedman AM, et al[17] reported the use of TAS-CL as the screening test by using TAS-CL cut-point < 35 mm for TVS-CL which had 100% sensitivity and 41% specificity for the diagnosis of TVS-CL < 20 mm. Data of TPS-CL from this study is compatible with Raungrongmorakot K, et al study[9] which found a significant correlation between TPS-CL and TVS-CL (r = 0.73), Meijer-Hoogeveen M, et al study which found strong correlation with r =0.85, Larscheid P, et al study which found high correlation with Lin'rho =0.922. However, this is the first study that reports the diagnostic performance of TPS-CL in the diagnosis of short CL for preterm labor management.

Digital cervical examination is a routine practice in suspected preterm labor patients. The cervical length is usually assessed in terms of cervical effacement. The Royal Thai College of Obstetricians and Gynecologists (RTCOG) used the clinical diagnosis of cervical dilatation of more than 1 cm with the effacement of more than 80 % and the presence of uterine contraction for the diagnosis of preterm labor[15], while the American College of Obstetricians and Gynecologists has recommended the cervical length $\leq$ 3 cm for evaluation of fetal fibronectin and < 2 cm for the initial treatment of preterm labor.[7] Data from this study found cervical effacement had a low correlation with TVS-CL (r = -0.4) with low sensitivity but high specificity for short cervix detection, this data is compatible with Gomez R, et al study.[19] Bishop's score had a higher correlation with TVS-CL (r = -0.5) than effacement and DE-CL. Bishop score $\geq$ 4 and DE-CL $\leq$ 3 cm had moderate sensitivity and specificity for the diagnosis of a short cervix. This data is compatible with Sharvit M, et al study which reported CL and Bishop score had similar value in predicting preterm birth.[1] Therefore, in case of no TVS-CL available, the Bishop score $\geq$ 4 and DE-CL $\leq$ 3 cm can be used as a screening test to detect the short cervix in preterm labor management.

This study's definition of a short CL was $\leq$ 3 cm in accordance with ACOG guidelines and Ness A, et al study.[7,13] Different CL cut-off lengths

were used in other recommendations. National Collaborating Centre for Women's and Children's Health (NICE) guideline,[20] Tsoi E, et al,[6] and Alfirevic Z, et al[21] study recommends that if the CL is > 1.5 cm, the diagnosis of preterm birth is unlikely. Palacio M, et al study[22] reported a cut-off length of 25 mm in gestational age less than 32 weeks and 15 mm in 32 weeks or later. Therefore, the diagnostic performance of DE, TAS, and TPS-CL will be different if other cut-off lengths are used.

There are some limitations with this study; first, the observer standardization was done by a workshop but the inter and intra-observer reliability of cervical effacement, Bishop score, DE, TAS, TPS, and TVS-CL were not measured, therefore the reliability problem could have occurred. Second, the TAS, TPS, and TVS-CL were done by the same operator which could have a measurement bias. A further study should be done to compare the outcome of preterm management using Bishop score, DE-CL, TAS-CL, TPS-CL, and TVS-CL in suspected preterm labor cases.

CONCLUSION

TAS and TPS-CL had a moderate correlation with TVS-CL. Bishop score $\geq$ 4 and DE-CL also had high sensitivity and specificity for the short cervix diagnosis. In case TVS-CL is unavailable, Bishop score $\geq$ 4, DE-CL, TAS-CL, and TPS-CL can be used as a screening test in preterm labor management.

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Study guide encouraging medical students to achieve learning objectives

SYSTEMATIC REVIEW

ORIGINAL ARTICLE BY

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ABSTRACT

OBJECTIVE

To evaluate the effectiveness of the study guide (SG).

METHODS

This retrospective study was conducted for all 65 fourth-year medical students in 2016 and 2017 at Medical Education Center, Ratchaburi Hospital, Thailand. The SG was implemented particularly for fourth-year students in 2017 only. The grade point in family medicine (FM) was determined as an achievement of learning objectives.

RESULTS

FM grade point average of the students using SG was significantly higher than that of the students without SG (3.5±0.3 vs. 3.2±0.5; P=0.003). Subgroup analysis for (i) examination, (ii) medical report, and (iii) home visit skills were presented outcomes of students using SG better than outcomes of students non-using SG in the percent-scores of (i) 78.2±6.0 vs 70.5±6.0; p<0.001, (ii) 86.8±10.6 vs 78.5±15.2; p=0.013, and (iii) 97.0±3.4 vs 92.9±4.5; p<0.001, respectively. In contrast, teamwork skills of students non-using SG was better than another (94.4±1.4 vs 86.3±4.5; p<0.001).

CONCLUSION

The SG encouraged medical students to improve FM knowledge including development in the skills of home visit which was individual skills, but it reversed the result of teamwork skills.

INTRODUCTION

Medical students encounter many challenges in their education; for instance, potential information overload, curriculum change, the complexity of spiral curriculum, required independent learning, increased work-based learning, and a variety of learning sites and contexts.[1] Therefore, the study guide (SG) is an essential tool to assist students in the educational process to achieve their learning objectives. The composition of SG depends on its purpose by a triangle model which is categorized into three roles in facilitating learning: (i) management of learning, (ii) provision of students' activities, and (iii) provision of content information. SG provides the students with a tool for learning which helps students engage with the course content in interactive deep and meaningful learning and allows them to access their learning.[2,3] It promotes enthusiasm, improves organization and communication as well as encourages feedback and evaluation by providing a welcoming learning environment. It also develops higher-level thinking by leading the student from theoretical knowledge to practical application and clinical performance.[4] The well-designed SG is highly appreciated and satisfied by students for encouraging them to achieve the learning objectives.[5,6] It helps students easily and clearly follow instructions in covering course content.[7] It motivates students to spend time searching the textbook for filling out the answer, but little time reading for content.[8] On the contrary, too much or unclear information is the potential pitfall in SG writing, which discourages students from using SG.[9] However, almost evidence reveal subjective perception on SG; this study aims to evaluate the objective effectiveness of SG on learning objectives.

METHODS

STUDY DESIGN

This retrospective study was conducted in 2016 and 2017 at Family Medicine (FM) department, Medical Education Center, Ratchaburi Hospital, Thailand, but the SG was implemented particularly for the fourth-year students in 2017 only.

PARTICIPANTS

The participants were all 65 fourth-year medical students at Medical Education Center, Ratchaburi Hospital, Thailand; 30 students in 2016 and 32 students in 2017. The students from both years were similar in relation to age, gender, and grade point average.

MATERIALS

The SG was designed in a combination of functions emphasized on both management of learning and student activities, by the Department Committee consisting of three family physicians and one pediatrician. It also provided content information, but was not highlighted. These functions of SG were appropriate for fourth and fifth-year medical students followed by Association for Medical Education in Europe (AMEE) Guide.[2] It was comprised of the overview of the course, learning outcomes, prerequisites, timetable, learning strategies, learning opportunities, assessment, staff contacts, and personal comments by authors that were categorized to management-orientated SG. There were many student activities guides such as interaction with lectures and resource material, application of theory to clinical practice, self-assessment exercises, a record of achievement, personal information bank, and student comments on the guide that were categorized to activities-

orientated SG. In addition, it provided the core information of the course, reference to texts and journals, and longer extracts from texts and journals that were categorized to information-orientated SG. The SG was implemented to all fourth-year students in 2017 before the beginning of the FM course one week. All students were required to complete SG as an assignment for passing and scoring to the FM course.

ASSESSMENT TOOLS

FM grade point was determined as an achievement of learning objectives. It was similar criteria for assessment between 2016 and 2017 including medical report, home visit, and teamwork skills; except 10% addition in scoring SG and 10% diminishing in examination part in 2017. Learning outcomes regarding knowledge and skills were assessed by subgroup analysis.

The Student's knowledge was evaluated by examination and medical report. The standard examination relation to multiple-choice questions and constructed response questions were approved by the Department Committee. The student's FM grade point was also given by the committee. The medical report reliability calculated with Cronbach's Alpha was 0.889. The students' skills including a home visit and teamwork skills were assessed by analytic rubrics. The reliability by Intra and Inter Observer Reliability were 0.876 and 0.912, respectively. All assessment tools were verified their contents by three family physicians and three nurse practitioners in Ratchaburi Hospital.

STATISTICAL ANALYSIS

An independent t-test was used to compare the mean FM grade point and the percent scores of examination, medical report, home visit skills, and teamwork skills.

ETHICAL APPROVAL

The ethical approval was acquired from Ratchaburi Hospital in December 2016 (protocol number: COA-RBHEC 029/2016).

RESULTS

All 65 fourth-year medical students in 2016 and 2017 at FM department, Medical Education Center, Ratchaburi Hospital, Thailand were included in this study. There were 33 students in 2016 and 32 students in 2017; female students nearly 22 years old with fair grade point average were the most (Table 1).

All 32 students in 2017 using SG earned an FM grade point of about 3.5, which was significantly better than 33 students in 2016 non-

Table 1. Characteristics of the students

Characteristic	Student non-using SG (N=33)	Student using SG (N=32)	P Value
Age (years)	21.8±0.5	21.7±0.4	0.543
Gender: Female, n (%)	18 (54.5)	21 (65.6)	0.510
Grade point average	3.1±0.4	3.3±0.4	0.197

Plus minus values are mean plus minus standard deviation

Table 2. Learning outcomes

Learning outcome	Student non-using SG (N=33)	Student using SG (N=32)	P Value
FM grade point	3.2±0.5	3.5±0.3	0.003
Knowledge			
Examinations (%)	70.5±6.0	78.2±6.0	0.000
Medical report (%)	78.5±15.2	86.8±10.6	0.013
Skills			
Home visit (%)	92.9±4.5	97.0±3.4	0.000
Teamwork (%)	94.4±1.4	86.3±4.5	0.000

Plus minus values are mean plus minus standard deviation

using SG who earned an FM grade point of about 3.2 (Table 2). Subgroup analysis for learning outcomes in the domain of knowledge and skills was assessed. Knowledge outcomes were assessed by examination, and a medical report revealed the students with SG got both significantly better scores than that of without SG. With regard to the individual home visit skills, the better score in students using SG was significantly represented. On the other hand, the teamwork skill of students non-using SG was better than another (Table 2).

DISCUSSION

The SG which emphasized the functions of student learning management and activities, including encouraging medical students to achieve FM learning objectives represented by FM grade points. It improved student's learning outcomes including knowledge and skills in home visit which was individual skills, but it reversed the result of teamwork skills.

The results were largely consistent with the earlier research that SG was the essential tool for medical students to achieve learning objectives. Especially, the outcomes were objectively shown in grade point and scores. The inclusion of self-assessment exercises as a component of SG could have led to better academic performance and the development of critical skills for analysis of their own work.10 However, the findings could not represent the outcomes of any different format of SG.[11] Well-designed SG consumed time and required several experiences and skills in medical education, instructional designing, and layout.[5]

A previous study done in students non-using SG by the author revealed good learning outcomes by integration and optimization of both learners' and teachers' knowledge and experience.[12] In this study, the students learned the same method and required to complete SG for credit that enhanced student's performance on multiple-choice exams.[13] They had to intend to follow and complete SG individually, so they might

ignore the team activities. These were shown as the results of this study. The effectiveness of SG was not only for undergraduate student, but also for postgraduate education including curriculum development for FM specialist training and board examination preparation.[14,15]

There were several strengths of this study. All assessment tools and SG were provided by the FM department committee. The learning objectives were assessed and evaluated objectively by FM grade point and scores. The limitations of the present study were also identified. There were only two from three domains of learning outcomes assessed, without the attitudes domain. Student perceptions of SG and what aspects were most useful would also be explored. There was not a 360-degree assessment for both home visits and teamwork skills evaluations. The SG might be implemented in different settings; different formats in different educational strategies and different batches. Although, this SG was beneficial, beware of too much or unclear information that could be a student's burden of workload.

CONCLUSION

The SG encouraged medical students to achieve learning objectives that depended on the purpose of SG. The further development of this SG is more emphasized on the students teamwork activities and learning management for teamwork. To implement the SG in different settings may need educational strategies to design the proper form and functions of SG.

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Intern Perceptions of Procedural Skills in Trauma Patients in Regional and General Hospitals of Ministry of Public Health, Thailand

ORIGINAL ARTICLE BY

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ABSTRACT

OBJECTIVE

This research aimed to evaluate the perception procedural skills and essential knowledge required in trauma patient care of medical internship in the regional and general hospital of the Ministry of Public Health (MOPH), Thailand.

METHODS

This is an observational questionnaire-based survey study. The assessments were made through a series of electronic questionnaires for the medical internship in Thailand. This study was made throughout medical interns after the first year of postgraduate during 1997– 2017.

RESULTS

A total of 792 medical internships were complete the survey questionnaires. There were 578 (74.1%) medical internships that had one 1-year experience. There were 467 (59%) who graduated from university hospitals and 431 (54.4%) working at regional hospitals. Three essential procedures consist of surgical cricothyroidotomy, needle cricothyroidotomy, and central venous catheter insertion which were significant differences in the necessity requirement between workplace-based groups. The percentage necessary procedural requirement in the regional hospital group compare to the general hospital group in surgical cricothyroidotomy were 19.7% VS 13.2%, ($P=0.011$), needle cricothyroidotomy 43.5% VS 35.1%, ($P=0.025$) and central venous catheter 42.1% VS 26.1%, ($P<0.001$) respectively.

CONCLUSION

The procedural skill is important and necessary for medical internships in the improvement of the performance of trauma patient care. The development of surgical skills would be beneficial for improved trauma patient care outcomes. Improvement of medical program training adding the essential requirement procedures to the program is warranted.

INTRODUCTION

Essential trauma care is considered a state of life-saving management.[1] Currently, trauma is increasing effect burden on global health. All trauma injuries could be range from minor injury to major injury which complexity with multiple organs involvement with permanent sequelae.[2] This condition requires immediate emergency intervention and a systemic approach for best outcomes to a reduced risk of undiscovered injuries.[3] The main challenge for reduced this burden is to prevent and control the violence. Knowledge of trauma care is essential for appropriate treatment for patient safety to reduce complication-related morbidity and mortality.[4-6] The knowledge about trauma patient performance improvement and patient safety programs have been standard practice driven in part by the trauma center in all hospitals verification requirements of the medical internships.[7-9]

The standard guideline for essential trauma care is established by the World Health Organization (WHO) and the International Association for the Surgery of Trauma and Surgical Intensive Care (IATSIC) which develops for improvement care of trauma patients.[2] Nowadays the essential procedures in trauma patient care of a doctor of medicine curriculums are determined by the Thai medical council.[10, 11] Current and updated emerging evidence-based with advanced technology are the requirement for trauma patient care.[12-14] This updated evidence-based clinical knowledge is widely used in university hospitals, regional hospitals including general hospitals. Nevertheless, some of the essential procedures of trauma patient care are not included in medicine programs. There is a lack of current and updated information and knowledge which is a requirement for the essential procedure of trauma care for interns after the medical internships were graduating from the doctor of medicine program. Procedural skill in trauma patients is one of the vital parts of trauma patient care. After they graduated from medical school they had to face practical procedural skill practice. This research aimed to evaluate the perception procedural skills and essential knowledge required in trauma patient care of medical internship in the regional and general hospital of the Ministry of Public Health (MOPH) throughout the country of Thailand. Our research will identify the necessity of clinical operative procedural skills which was essential in trauma patient care.

METHODS

This is an observational questionnaire-based survey study and the assessments were made through a series of questionnaires for medical internship. After the first postgraduate year (1997– 2017), 792 medical interns throughout the country of Thailand were eligible for enrollment in the study. All medical interns came from various hospitals consisted of university hospitals, regional hospitals, and general hospitals. An electronic questionnaire survey via electronic mail was distributed to all medical internship in Thailand. All responders were anonymously recorded. The survey focused on the medical intern's experience. The questionnaires consist of the opinion about knowledge and essential procedural skill requirements for trauma care patients by using a rating scale for assessment. The first category was a survey in general information of the medical interns, demographic information, years after graduation, clinical experience, medical program graduate, and current workplace hospital types. The second category was surveyed in detail about the requirement of the operative skill and classified the additional operative skill requirement consist of initial assessment and management in trauma,

Table 1. Characteristics of the medical internship

Characteristic	The medical internship profile (N=792)
Gender: Female, n (%)	436 (55.1)
Mean age (years±SD)	25.58±2.33
Working experience n (%)	
1-year experience	587 (74.1)
2-years experience	175 (22.1)
3-years experience	8 (1)
4-years experience	5 (0.6)
>5-years experience	17 (2.2)
Graduate program	
University hospitals	467 (59)
Regional and general hospitals	325 (41)
Current workplace	
Regional hospitals	431 (54.4)
General hospitals and community hospitals	361 (45.6)

orotracheal intubation, nasotracheal intubation, surgical cricothyroidotomy, needle cricothyroidotomy, venous cutdown, central venous catheter insertion, needle thoracostomy, tube thoracostomy, spinal immobilization, Focal Assessment Sonography for Trauma (FAST), compression dressing for hemorrhagic control and tourniquet application. Essential procedural skills requirement was compared between the regional hospital and the general hospital workplace base. This study is to evaluate current workplaces affect the requirement of essential procedural skills in trauma care patients. The study was approved by the ethics committee and the Institutional Review Board. The medical interns have informed of the purpose of the study and informed consent was obtained for evaluation.

All the results were analyzed using statistical software, SPSS 15.0. The descriptive data were expressed as frequencies, percent, and mean

Table 2. Classification categories of the requirement of the operative skill

Operative Skills	Less necessary n(%)	Very necessary n(%)
Initial assessment and management in trauma	11 (1.4)	781 (98.6)
Orotracheal intubation	56 (7.1)	736 (92.9)
Nasotracheal intubation	557 (70.3)	235 (29.7)
Surgical cricothyroidotomy	530 (66.9)	262 (33.1)
Needle cricothyroidotomy	171 (21.6)	621 (78.4)
Venous cutdown	446 (56.3)	346 (43.7)
Central venous catheter insertion	255 (32.2)	537 (67.8)
Needle thoracostomy	171 (21.6)	621 (78.4)
Tube thoracostomy	117 (14.8)	675 (85.2)
Spinal immobilization	79 (10.0)	713 (90.0)
Focal Assessment Sonography in Trauma (FAST)	20 (2.5)	772 (97.5)
Compression dressing for hemorrhagic control	64 (8.1)	728 (91.9)
Tourniquet application	174 (22)	618 (78)

± standard deviation ($\chi \pm s$) as appropriate. In a case where the data were normally distributed, Pearson's Chi-square test was used for making explained the association comparison of the essential procedure between the current workplace. P values less than 0.05 were considered statistically significant.

RESULTS

A total of 792 medical internships were complete the survey questionnaires. There were 356 males (44.9%) and 436 females (55.1%). The mean age of male medical internship was 25.62 years in males and 25.55 years in females. The working experience after graduating from medical internships was classified by years of graduation. There were 578 (74.1%) medical internships that had the 1-year experience, 175 (22.1%) had the 2-year experience, 8 (1%) had the 3-year experience, 5 (0.6%) had 4-year experience and 17 (2.2) had 5 or more years of experience. The longest experience was a 21-year experience after graduation. There were 467 (59%) medical

internships that have graduated from medical programs from university hospitals. The others were 325 (41%) who graduated from regional and general hospitals. Currently, medical internships working at regional hospitals were 431 (54.4%) and general hospitals and community hospitals 361(45.6%). The profile of the medical internship was summarized in table 1. The necessary requirement of the operative skill was classified in percent as shown in table 2.

The additional requirements of operative skill for essential procedures in trauma patient care were classified in table 3. The classification of the essential procedure grading by requirement level. Their level of the requirement was the range from least to extreme need.

When performing analysis by the current workplace between central hospital and general hospitals. Three essential procedures consist of surgical cricothyroidotomy, needle cricothyroidotomy, and central venous catheter insertion which were significant differences in the necessity requirement between workplace-based groups. The regional hospital group address that surgical cricothyroidotomy is a very necessary procedure from 146 of 395 physicians (19.7%) compare to the general hospital group, 98 of 348 physicians (13.2%), (P =0.011). The needle cricothyroidotomy also addressed that it is a very necessary procedure in which 323 of 395 physicians (43.5%) from the regional hospital group compare to the general hospital group, 261 of 348 physicians (35.1%), (P=0.025). The central venous catheter insertion is one of the very necessary procedure address from 313 of 395 physicians (42.1%) from the regional hospital group compare to the general hospital group, 194 of 348 physicians (26.1%), (P<0.001).

In the part of procedures that requires additional learning skill, when comparing in the level hospital found that the spinal immobilization is the skill that has the most requirements in general hospital group, which has p-value 0.009. Besides, the central venous catheter insertion and compression dressing for hemorrhage control in the regional hospital group has higher requirement rates than the general hospital group with statistical significance with a p-value of 0.025 and 0.040 respectively.

DISCUSSION

Trauma is a leading cause of morbidity and mortality worldwide.(1, 2) Trauma patient care is very indispensable for responding to patients to optimal treatment outcomes.(3, 4) For providing the best care to patients in health care systems the knowledge and clinical skill are very important.(6, 11) The goal of trauma patient care performance improvement is to decrease disability and death. This study aimed to analyze the perception of knowledge requirement in medical internships with essential components of trauma patient care and opportunities to improve the healthcare system. At present the clinical operative skill and essential procedure had rapidly progress development to advance technology which related to the mechanism of injuries. The ultrasound, helical computed tomography, and endovascular balloon aorta are used for resuscitation is the advanced technology for the management of trauma patients.(15) The medical internships work as a major role in providing initial optimal treatment to trauma patients. The practice of clinical operative skills and essential procedures could improve treatment effectiveness to reduce disability, morbidity, and mortality. Thai medical council established the medical curriculum and the requirement procedure of the medical internships. There were various essential procedures for patient trauma care which was not registered for requirement procedure in the medical curriculum.

Table 3. Classification of the additional requirements of operative skill for essential procedures in trauma patient care

Procedures	Additional requirements of operative skill defined by percent					
	Quite not important	Less important	Moderate	Slightly important	Quite important	Extremely important
Initial assessment and management in trauma	0	6.2	14.1	23.0	27.0	29.7
Orotracheal intubation	3.0	11.6	21.5	20.3	21.5	22.1
Nasotracheal intubation	5.4	12.0	27.8	26.4	19.4	9.0
Surgical cricothyroidotomy	3.0	7.3	21.0	29.9	23.0	15.8
Needle cricothyroidotomy	0.9	5.8	16.5	29.8	28.0	18.9
Venous cutdown	3.5	7.8	17.8	28.2	25.4	17.3
Central venous catheter insertion	1.1	3.7	9.1	25.8	31.4	28.9
Tube thoracostomy	1.1	5.9	17.3	27.0	23.9	24.7
Spinal immobilization	1.8	8.2	20.1	28.9	23.2	17.8
Focused Assessment Sonography in Trauma (FAST)	1.1	4.2	10.4	18.6	25.6	40.2
Compression dressing for hemorrhagic control	1.6	8.7	17.7	25.5	26.8	19.7
Tourniquet application	2.7	8.7	18.9	28.2	26.6	14.9

(16) This study has proved the benefit of essential procedures in trauma care patients for medical internships and further registration is warranted.

This study shows that clinical operative skills and essential procedures are very important for the general requirement of life-saving. Initial assessment and resuscitation of trauma patients in airway, breathing, and circulation using orotracheal intubation, cricothyroidotomy and focus assessment sonography is life-saving essential procedures that all medical internships should emphasize to practice to be specialized.[17] Thus, ultrasonography should provide to all hospitals use for initial resuscitation of focus assessment sonography for trauma patients. The graduate medical program even from university or regional hospital base was no significant difference in knowledge requirement in initial assessment and

management in trauma, focus assessment sonography for trauma. Represent that these knowledge procedural skills were very important. The medical council contained these procedural skills in the basic requirement for the medical internship program. Conversely, the internship in South African reported their lack of competency in basic surgical skills. [16] The knowledge procedure of airway management both needle and surgical cricothyroidotomy were highly required especially in the regional hospitals because these procedures were emergency life-saving.[18] In the regional hospital was plenty of equipment for the procedure than the general hospital, the requirement of the procedure may relate to the immediate of the equipment. In the vascular assessment procedure, they were required for central venous catheter insertion more than venesection because the venesection procedure had greater disadvantage complications.[19] The current workplaces were effective in the requirement necessary for clinical operative skills and essential procedures. The surgical cricothyroidotomy, needle cricothyroidotomy, and central venous catheter insertion were more required in regional hospitals than general hospitals with a statistically significant difference. Clinical operative skills and essential procedures are important to a medical internship program apply to current situations.[20] A concentrated course in procedural skills significantly improved proficiency, confidence, and anxiety levels.[21] Most importantly, the development of trauma patient care guidelines has the potential to make a significant improvement in professionalism.

CONCLUSION

In conclusion, the clinical operative skill and the essential procedure are important and necessary for medical internships for the improved performance of trauma patient care. The development of surgical skills would be beneficial for improved trauma patient care outcomes. All internships should be continued in training and participate in trauma skill courses regularly because some of the procedures are rarely performed in routine clinical practice. Therefore, providing overall knowledge and clinical operative skill to medical internships is emphasized. There is a considerable issue for improvement of medical program training adding the essential requirement procedures to the program.

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"I shall either find a way or make one"

-Hannibal Barca


I don't want you to be only
a doctor but I also want you
to be a man