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Original Article

The midwifery students' knowledge and clinical decision making skills about preconception care

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Abstract

Background: Midwives are responsible for providing preconception care for couples, they should have adequate knowledge and decision making skill in this regards. This study aimed to determine the knowledge and decision making skill regarding preconception care in midwifery students and also the relationship between the mentioned items.

Methods: In a cross sectional study, all undergraduate midwifery students in their last year of study at "Tehran", "Iran" and "Shahid Beheshti" medical universities were included through headcount sampling (N = 40). A questionnaire with 26 multiple choice questions used to evaluate the level of knowledge; a computerized patient management problem (CPMP) questionnaire with 9 questions, required short answers, was also used in form of a computer software to assess clinical decision making. The results were analyzed using descriptive statistics, Pearson and Spearman's correlation coefficients, and χ^2 tests via SPSS software Regression used to determine the share of each field of knowledge and decision making in the aggregate level.

Results: In a scale of 100, the mean score for knowledge of preconception care was 54.23 (± 9.04) and for clinical decision making 35.62 (± 7.01). All units remained at average in both cases. A significant relationship was seen between the level of knowledge and the decision making skill ($p = 0.017$, $r = 0.36$).

Conclusion: The knowledge and decision making skills of midwives were in an average level. Much attention should be paid to their education and new methods such PMP should be used in training and evaluating them.

Key words: Preconception care, knowledge, clinical decision making, midwifery student, patient management problems

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Preconceptionl care is an important factor in the health of the mother and fetus. In developing countries, pregnancy and delivery side effects are a major cause responsible for the death or disability of women in reproductive age. While each year 515'000 women die because of maternal side effects, for each death 30 more women will suffer from infections or disabilities caused by pregnancy or delivery.[1] According to physicians, suitable counseling and medical examinations before pregnancy will reduce many side effects of pregnancy and delivery.[2] Considering the importance of the organogenesis period, the importance of preconception care as a part of primary care in preventive medicine becomes more evident.[3] Women that have malnutrition, anemia, infection, hypertension, and other complications before pregnancy are more susceptible for complications during pregnancy.[4] The aim of preconception care is to guarantee the health of future parents before and during pregnancy[5] and it can be regarded as the primary and most important method of promoting public health, es-

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pecially in preventing congenital disorders.[6] Midwives and midwifery students who will become the future personnel in a health and clinical system, can be the best people for providing prenatal care for couples in reproductive age. Most midwives can recognize the best time to inform and advise couples in order to assure them for a successful pregnancy and risk evaluation is a basic part of their duty.[3] Knowledge and clinical decision making in the mentioned field can be important factors in offering suitable and accurate care. Analyzing individual's knowledge and interests will give us the opportunity to know how to design an educational program.

Basic information required for preconception care should be vast, accurate and based on research results; so, continuous and up-to-date training of the personnel will assure that midwives will scientifically be able to consult references accurately.[3] Similar to knowledge, quality of clinical decision making is also an important factor in medicine which is of the highest value to success or failure of the executive personnel.[7] A wrong decision will prevent promotion, weaken resources and cause loss or damage. So understanding the concept of decision making and knowing its models and strategies in order to function properly and promptly is a necessity.[8] A medical team must use its own decision-making skills, as decision making is the vital part of evaluation. Clinical decision making is fundamental when it comes to patients and it is considered as an index of a cunning judgment and it is actually a complex stage to diagnose and solve the clinical problems.[8]

Patient management problem (PMP) is a clinical decision making evaluation method. PMP is a reliable method for measuring clinical decision making skills and with it, the instructor can evaluate and score those items which could not have been evaluated through the common clinical methods. PMP might be papered or computerized. In the computerized form, a situation similar to a clinical condition is visualized and it is possible to evaluate the student based on the patient he/she will be faced with.[9]

The goal of this study was to analyze the level of knowledge and clinical decision making skills of midwifery students regarding preconception care and also determine the relationship between knowledge and clinical decision making skills in the mentioned field.

Methods

This study was a cross sectional single stage and single group research. Study was done in the medical universities of Tehran, Iran and Shahid Beheshti passing their last year of study. Sampling was done through headcount in October, November and December 2002. The inclusion criteria were the student that was in the last year of study for a bachelor's degree in midwifery, and the beginning of the internship course. Exclusion criterion was the experience regarding preconception care and previous pregnancy. The number of available and qualified units was 40. A papered and a computerized questionnaire were used for data collection. The papered questionnaire consisted of two parts: the first section was about demographic characteristics of participants including age, marital status and the university at which they were studying; the second part included 26 multiple choice questions in order to determine each unit's level of knowledge regarding preconception care. The questions were categorized into three sections as: evaluation of risk factors, Education and counseling, and Intervention. Eight questions were posed in the first category, 14 in the second and 4 questions in third section. The total scale of this questionnaire was a minimum of 0 and a maximum of 26. The total score gained was scaled out of a hundred. Those scores, which had a standard deviation of ±1 from the total average, were categorized as "average", those with a lower standard deviation were categorized as "weak" and those with a higher standard deviation were categorized as "good".

In order to evaluate the participants' clinical decision making skill, the computerized questionnaire was designed in a PMP format. This questionnaire had 9 instances of imaginary patients asked for counseling before pregnancy.

These instances collectively consisted of groups with high risks of pregnancy such as suffering from chronic hypertension, cardiac disorders, diabetes, anemia, urinary infection, epilepsy, history of a child with neural tube defects, history of contact with a person with measles, and Rh and ABO incompatibility between the mother and fetus. The PMP questions were in the following format; first, information regarding the profile and physical examination of the individual receiving advice was given; next, 4 questions were asked regarding the mentioned case in a manner that the answer of the previous question was required for answering the next one. To answer the questions, the students sat in front of the computer and after receiving brief information from the PMP software, they entered the part where questions must be answered. The correct answer of each question was given to the students after they had entered their own answer. This continued until the forth part of each question. Afterwards the next case was presented. The overall score for the PMP questionnaire is at minimum of 0 and at maximum of 36 (each question had 4 parts and 4 points). Similar to the questions regarding knowledge, these questions were also divided into three categories of preconception care. Having in mind that each question had 4 parts, from the total of 36 available options, 17 concerned the evaluation of risk factors, 12 concerned the education and counseling, and 7 concerned the intervention. To score the questionnaire, the common method of PMP scoring was used; a score of +1 was given to items which presenting them to the patient were important and necessary, -1 was given to items which were unnecessary and destructive if expressed and 0 was given to items which were non-beneficial and yet not destructive for the patient if expressed.

Similar to the papered questionnaire, the scores of this questionnaire were also divided into three groups of weak, average and good. To do the sampling, primary procedures such as making arrangements for students to be present at the computer center were made and first the written questionnaires were handed. Based on pilot study, each student should have filled the questionnaire during 20 minutes. In the next stage, students sat in front of the computers and after a brief explanation about the software, the PMP questions were answered through the computer-user interaction. The researcher and a number of typists were present to answer the students' questions regarding the software. The maximum time given for this part was 60 minutes (based on pilot study). For assessing the validity of the questionnaire, the internal and external consistency methods were used and for assessing its reliability, a test-retest method was used. The derived correlation coefficient for the papered questionnaire regarding knowledge was 93.4% and for the PMP questionnaire was 92.8%. Data were analyzed using SPSS software; descriptive statistics, Pearson and Spearman's correlation coefficient tests were used along with the $\chi 2$ test with maximum error of 0.05. Also, multiple-regression model was used to determine the share of each field of knowledge and decision making in the aggregate level.

Results

The majority of the participants (50%) were 22-years old and single (70); Also 20% were 21, 27.5% were 23, and 2.5% were 24 years old. Forty five percent of them were students of Iran University, 32.5% of Shahid Beheshti University, and 22.5% of Tehran University of Medical Sciences.

In the questionnaire, regarding the level of knowledge, the highest number of correct answers was related to the time of referring for preconception care and taking Folic Acid before pregnancy (77.5%). The highest percentage of incorrect answers was related to career and pregnancy, preventing the side effects of Measles in pregnancy (67.5%). Table 1 shows the study units' level of knowledge of preconception care and also of each of the three different fields; evaluation of risk factors, education and counseling, and intervention; Items were divided into three levels of weak, average and good based on the average and standard deviation. The average score of evaluation of risk fac-

tors had the mean of 46.87 (SD = 17.84), education and counseling had the mean of 58.75 (SD = 13.38), and intervention had the mean of 54.37 (SD = 23.26). These scores were calculated in a scale of 100 and the level of knowledge in the majority of the units in all three fields was at average. Also the average of the aggregate level of knowledge of all units was 54.23 (SD = 9.04) and most of them (62.5%) were at an average level (table 1). To determine the share of each of the different fields of knowledge in the aggregate level, using a regression model the following linear equation formula was derived:

$$Y = 0.335\ X_1 + 0.44\ X_2 + 0.225\ X_3$$

In this linear equation, X_1 shows the level of knowledge in the evaluation of risk factors, X_2 shows the level of knowledge concerning education and counseling and X_3 represents the level of knowledge concerning intervention. Y shows the study units' aggregate level of knowledge concerning preconception care. According to this equation, 33% of the aggregate level of knowledge was related to knowledge of the evaluation of risk factors, 44% was related to the level of knowledge concerning education and counseling and 22% was related to the level of knowledge of intervention. In the questionnaire related to clinical decision making, the highest score derived was belonged to pregnancy in the class II cardiac diseases (1.66 points of the total score of 4) and the lowest score was related to epilepsy and pregnancy and also history of a child with neural tube defects (1.16). Categorizing the ability of decision making in the three different fields of preconception care, the average level of score was with mean of 40.17 (SD = 9.14) for evaluation of risk factors, 31.87 (SD = 10.23) for education and counseling, and 31.42 (SD = 13.77) for intervention; the majority of the units were at an average level of decision making in all three fields. The average score of the study units' aggregate ability of decision making was 35.62 (SD = 7.01) and the majority of the units (67.5%) were at an average level of decision-making (table 2).

To determine the share of each of the different fields of decision making in the aggregate level of decision making, the following linear equation formula was derived using a regression model: $Y = 0.413\ X_1 + 0.331\ X_2 + 0.225\ X_3$

In this linear equation, X1 shows the ability of decision making in the evaluation of risk factors, X_2 represents the decision making skill in education and counseling and X_3 shows the decision making skill in intervention. Y is the aggregate decision making skill in all three fields of preconception care. According to this equation, 41% of the aggregate decision making is related to decision making in the field of the evaluation of risk factors, 33% to decision making concerning education and counseling, and 25% to intervention.

The relationship between the level of knowledge and clinical decision making skill both in their aggregate sense and in the three different fields of prenatal care was also analyzed. With a Spearman's correlation coefficient test, with a $p = 0.32$ and $r = 0.15$ no significant relationship was observed between the level of knowledge and the clinical decision making skill.

Table 1. Study units' level of knowledge of preconception care.

Level of Knowledge	Risk factor assessment N(%)	Education and Counseling N(%)	Intervention N(%)	Preconception care N(%)
Low	8(20)	8(20)	7(17.5)	8(20)
Moderate	27(67.5)	27(67.5)	30(75)	25(62.5)
High	5(12.5)	5(12.5)	3(7.5)	7(17.5)
Total	40(100)	40(100)	4(100)	40(100)

Table 2. Clinical decision making skill of preconception care.

Level of clinical decision making	Risk factor assessment N(%)	Education and counseling N(%)	Intervention N(%)	Preconception care N(%)
Low	7(17.5)	8(20)	6(15)	7(17.5)
Moderate	26(65)	25(62.5)	28(70)	27(67.5)
High	7(17.5)	7(17.5)	6(15)	6(15)
Total	40(100)	40(100)	4(100)	40(100)

In the field of education and counseling, with p = 0.03 and r = 0.35 a significant relationship was observed between the two mentioned factors but for intervention, with p = 0.08 and r = 0.28 no significant relationship was seen. In assessing the relationship of the aggregate levels, with the use of Pearson's correlation coefficient and with p = 0.017 and r = 0.36, a significant relationship was seen between knowledge and clinical decision making. There was no significant relationship between the knowledge and age, marital status, the university at which the units studied, and also between the clinical decision making and the three former factors.

Discussion

Preconception care is an important factor in assessing and rectifying the before pregnancy side effects.[10] The knowledge and clinical decision making status are two important indices in evaluation of the status of health personnel. The results of this study showed that most of the participants were at average level of knowledge regarding preconception care. Only a small percentage of the studied units were belonged to the group "good". Having in mind that counseling before pregnancy will lead to a successful pregnancy[2] and also giving assurance of a safe progress during pregnancy and safe delivery,[3] we should pay more attention to education, regarding prenatal care, to all members of a medical team involved in presenting facilities to mothers in reproductive age. Besides knowledge, decision making is also an important factor in providing medical services. The status of clinical decision making of the study units was not at a satisfactory level. The score gained in each of the questions was less than 50% of the full mark for each question and the majority of the units were at an average level of decision making.

In a study carried out by Conway et al (1995) on residents of internal medicine and family physicians regarding preconception care, it was shown that when evaluating the level of knowledge, from an overall score of 18, the mean score gained by residents was 5 and by family physicians was 7.5. Considering the ability of clinical evaluation, from a total score of 14, the mean score of residents was 6 while of family physicians was 7. Overall, the mean score of both, regarding the mentioned issues, were low.[2] In a study carried out by Bernstein et al (2000), concerning preconception care, it was shown that from 6 questions posed in this area, most of the units answered 3 to 4 questions correctly and they were mostly at an average level of knowledge.[11]

Paying attention to the coefficients of the equation in the three different fields mentioned for knowledge and their aggregate level, it was shown that knowledge regarding education and counseling took up the greater part of the aggregate level of knowledge. The level of knowledge regarding the evaluation of risk factors was at second place, and knowledge of intervention was the last. Thus to increase the aggregate level of knowledge, it is necessary first to enhance knowledge regarding education and counseling, and at the next stage to increase knowledge in the fields of evaluating risk factors. Intervention should be taken under consideration as well.

The coefficients of the three different fields of decision making and their aggregate levels showed that decision making concerning intervention makes up a greater part of the ability of decision making. Thus to promote the ability of decision making in preconception care, first it is necessary to increase the ability of decision making in the evaluation of risk factors. In the next stage, attention should be focused on the promotion of the ability of decision making regarding education, counseling and intervention. The positive coefficients indicated the positive relationship between the three different fields and the aggregate decision making.

According to the mentioned results and considering the fact that preconception care is an excellent chance for amending medical, social and behavioral disorders which have effects on the outcome of a pregnancy, accurate education of such care should be a part of the basic and important educational programs of preventive medicine and primary medical and health care. The beneficial and profound effects of preconception care on the outcome of pregnancy will not be achieved unless the primary care team takes preconception routinely for all women in the reproductive age and has their important role in executing this matter in mind.[2]

Study results showed that a weak positive relationship lies between the level of knowledge regarding prenatal care and the ability of clinical decision making in the mentioned field amongst students of midwifery. So, those who have a higher level of knowledge, have a higher ability of clinical decision making. But overall, their average level of clinical decision making was less than their level of knowledge. As correct decision making can reduce costs, help greater advancements, facilitate, increase the use of human resources and materials, and enhance the quality of care.[12] Thus it is necessary to focus on educational programs so that they become more profound and at a higher level of recognition. Education should be companied with practical training in the form of case studies using methods such as OSCE (Objective Structural Clinical Evaluation), PMP and simulation; and also with the help of modern and technological educational methods in order to promote the individual's decision making skill. Overall, it is necessary for educational planners in universities to pay more attention to more accurate education regarding preconception care in the medical educational system and similarly the same goes for students and lecturers of medical groups involved in presenting care to couples in the reproductive age. The involved personnel should be more sensitive about preconception care and more attentively participate in regular educational programs; they should take part in the improvement and enhancement of scientific and practical information in the relative fields through using educational resources in order to offer more qualitative care.

According to the importance of clinical decision making and regarding the fact that PMP is one of the evaluation methods, it is necessary to use these methods for education and evaluation by teachers, health personnel and students.

Because of the broad fields of preconception care and considering the required time for answering each question, posing more questions in the papered and PMP questionnaire was not possible and this was one of the limitations of this study.

Considering the fact that a similar study focusing on all aspects of this study has not been already undertaken, the comparison of the study results with a similar research was not fully possible and further studies in this field seem necessary. The followings are suggested for future research; studying the effective factors on the level of knowledge and decision making skill of students of midwifery concerning preconception care; a comparative study of the level of knowledge and clinical decision making skill regarding preconception care in midwifery and medical students and also obstetrician residents.

Because preconception care is an important factor in the reduction of infant mortality and it will promote the physical and physiological health of the mother and fetus and that a healthy mother will guarantee the safe progress of pregnancy and also the delivery of a healthy

individual, it is necessary for university executives, responsible for educational planning, to pay more attention to accurate theoretical and practical education of different medical groups involved in providing services to women in the reproductive age, especially midwifery students and midwifery personnel. So that with the use of modern educational resources, the scientific and practical knowledge of students will enhance and improve.

Also the researchers declare they have surveyed under the research ethics.

Competing interest

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