



Review of the Impact of a Modern Model of Midwife-Oriented Continuous Care during Pregnancy, Childbirth and After Childbirth on Maternal Consequences

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Abstract: Introduction: there is a variety of models for providing services during pregnancy, while childbirth and after childbirth. It is obvious that these models are focused on the maximum quality, efficiency and increasing mothers' satisfaction. The health services provision services system in Iran is based on the reinforcement of classification, continuous provision of care and of course eliminating or reducing the additional expenses of treatment. Therefore, a model for providing continuous midwifery services for pregnant women which is based on the purposes of the country's health system was designed and executed and its maternal consequences were compared with the current system.

Research method: this study is a part of the results of an action research which has been conducted at the level of specialized PhD of Reproductive Health. Firstly, by using a qualitative study and a prescriptive pattern of a model of providing team midwife-oriented continuous care during pregnancy, while childbirth and after childbirth was designed. In this model, 5 main themes were considered: continuity of care, caring process based on physiologic delivery, continuous supportive management, continuous education and moral professionalism. In order to execute the model, the clinical trial was used. The sample volume was calculated to be 200 pregnant women (100 in the experimental group and 100 in the control group). For sampling, these pregnant women were firstly evaluated by the central midwife. In case they were willing and there wasn't a risk, they were sent to the continuous care center. In the continuous care center, the continuous care was provided as midwife-oriented and team care and whenever needed, a specialist was used. For each pregnant woman in the sample group, a pregnant woman of the same center was selected as a member of the control group if some of their specifications were the same such as body mass index, age and gravid. The information collection method was a method done through filling out the interview form, questionnaire and check-list which was filled out in various stages from the time of pregnancy to one month after childbirth. Ultimately, information was analyzed by the SPSS21 software.

Results: firstly, 112 persons were registered in the continuous care group and 109 in the control group and finally, 100 of the continuous care group and 104 of the control group gave birth in situations with low risk. According to the results of the study, there was no significant difference in terms of being in a risky pregnancy condition, hospitalization and bleeding during pregnancy ($P=0.43$). according to the research results, women of the experimental group participated in the preparation for childbirth classes ($P<0.001$) and had lower average of the number of visits during pregnancy, lower number of ultrasound, higher age of pregnancy at the time of hospitalization and shorter hospitalization ($P<0.001$). A lower C-Section prevalence ($P=0.025$), less induction, spontaneous beginning of labor and more physiological delivery ($P<0.001$) were seen in them. According to the results of the study, in case of midwife-oriented continuous care, the risk of c-section reduced for 46% and risk of induction reduced for 40% and the probability of the spontaneous beginning of labor increased for 67% and the probability of physiological delivery increased from 63% to 95%. In addition, the results showed that there was no significant difference between the two groups in terms of the rate of consuming anesthesia, narcotic consumption, postpartum hemorrhage, curettage, episiotomy, perforation, urinary incontinence, postpartum infection, mastitis and postpartum depression ($P>0.05$). In addition, all of the mothers lived in the two groups.

Ultimate conclusion: according to the results of this study and by considering the presence of midwives at the first level of providing services of the time of pregnancy at the health centers of the community of the entire country, the midwife-oriented continuous care model can be easily executed during pregnancy, while childbirth and after childbirth at least for pregnant women with low risk and it can improve many of the health indexes such as high rates of c-section with the minimum expenses.

Keywords: Clinical Trial, Continuous Care, Midwife-Oriented Care, Maternal Consequences, Action Research

Introduction:

In many places in the world midwives are the main providers of the preliminary cares of pregnancy and childbirth and numerous studies have confirmed the advantages of midwife-oriented cares and that they are riskless. The midwife-oriented care model means that the leaders of the care team are midwives and they are the ones setting the programs and adjustments and providing care from the time of filing till after the childbirth. Of course, if it is necessary, they will set a visit with the doctor. In these care models, midwives have an active participation in interaction with women and women participate actively in leading care, being responsible, evaluating their need, programming the care and reference [1, 2].

The philosophy of the midwifery care models indicates that all women have a natural ability to experience childbirth without any intervention or with minimum intervention. In the midwife-oriented models, care includes continuous care, monitoring physical, mental, spiritual and social health of the woman and her family during pregnancy and childbirth which is done through providing services, preparing women through individual education, counseling, pre-birth cares, continuous presences during childbirth, after it and beginning support after childbirth and preventing unessential interventions and reference if needed. Care models have mostly been done with the purpose of continuity in care during a period [2].

In some countries, they consider the role of midwives to be greater; for instance, in New Zealand, more than 70% of the women select a midwife for their preliminary health care and in Netherland, all of those pregnant women with low risk are visited by midwives and 90% of childbirths are done with the presence of a midwife and one third of them are done at home [3]. In Iran, care of pregnant mothers has been combined in the system of governmental preliminary health services and it has been years that midwives provide the first level of services to pregnant women in health centers of the urban and rural societies [4]. Nonetheless, the responsibilities and filing are cooperative in such a way that although care is done by midwives but the specialists are responsible for all stages. Sometimes responsibilities, from cares during pregnancy to labor, suddenly change and care is not provided consistently [1]. Despite the fact that one of the purposes of this project is continuous provision of cares, this section of purposes has not been reviewed as much and women have complained about the low quality and inconsistency of the cares during pregnancy, childbirth and after childbirth [5] and in some studies, stopping keeping in touch with the mothers in the delivery section has been mentioned as a factor in selecting c-section [6].

Numerous and valid studies have shown that midwife-oriented cares have desirable effectiveness, cost and safety which lead to lesser interventions in labor and delivery including labor induction, augmentation of labor, electronic fetal monitor, consumption of sedatives, epidural anesthesia, consumption of narcotic analgesics, c-section and childbirth through tools and has had less episiotomy. Of course sometimes the rate of c-section and neonatal outcomes have been equal and ultimately, mothers' satisfaction, especially satisfaction with the cares during pregnancy has been more in the midwifery care model than other models [7, 11]. Even a study in Iran showed that it only reviewed continuous care during labor and it has reported the reduction of c-section under its influence [6, 7, 9, 10, 12, 13]. In the midwifery care models, women have had more preparation for childbirth [14]. More self-confidence, more self-esteem and lower rate of postpartum depression have been reported. Lower cost for the service provision system has also been mentioned as the advantages of this model [15, 16].

Many of the service provision systems today are changing their care model to the continuous care model in which women are able to receive care consistently of a known midwife [17]. In Iran, in the recent years, by executing the family doctor projects and evolution of healthy in the domain of health care and projects of the promotion of natural childbirth, the accompanying midwife physiological childbirth and natural childbirth by the private midwife, a special emphasis has been put on the provision of midwifery services in the health system of the country [4, 18]. However, evidences show that we have faced some problems in the continuation of cares and maintenance of their consistency from before pregnancy to after it and some of these projects have not been executed well and have belonged to a certain interval of time. In addition, the projects that review the continuous midwifery care from pregnancy to after childbirth have not been done as much; therefore, by considering the high potential of midwifery in the country, a team midwife-oriented continuous care program was designed and its maternal consequences were compared with the current system in the city Kashan.

Research method: this study is a part of the results of an action research which has been conducted at the level of specialized PhD of Reproductive Health. Firstly, by using a qualitative study and a prescriptive pattern of a model of providing team midwife-oriented continuous care during pregnancy, while childbirth and after childbirth was designed. In this model, 5 main themes were considered: continuity of care, caring process based on physiologic delivery, continuous supportive management, continuous education and moral professionalism which was extracted from a preliminary qualitative study. Then this continuous midwifery care model during pregnancy, childbirth and after childbirth was executed as a clinical trial in the fields under the authority of Kashan University of Medical Science and its consequences were compared with the current system in the country. The results presented in this article are associated with the executive and quantitative section of this study and the final stages, which are the improvements of the team midwife-oriented continuous care being done, will be published in the upcoming articles. In order to collect the information, firstly Kashan was divided based on the regions covering the health care centers and by considering the ratio of the population covered in each of these regions and then the number of all of the samples needed was distributed among these regions. In the next stage, in each of these regions, a list of the covered health care centers was prepared and a number of centers were randomly selected. In the last stage, in the selected centers, the necessary sample with the needed number was selected through convenience and non-probable sampling. The volume sample was calculated to be 200 pregnant women (100 in the experimental group and 100 in the control group). For sampling, these pregnant women were firstly evaluated by the central midwife. In case they were willing and there wasn't a risk, they were sent to the continuous care center. In the continuous care center, the continuous care was provided as midwife-oriented and team care and whenever needed, a specialist was used. For each pregnant woman in the sample group, a pregnant woman of the same center was selected as a member of the control group if some of their specifications were the same such as body mass index, age and gravid. The data collection tools include three questionnaires (demographic information, consequences during pregnancy and postpartum consequences) and two check-lists were filled out in various stages from the time of pregnancy to one month after childbirth in order to review the maternal consequences during labor and childbirth. In order to confirm the validity of the forms of the interview and the content validity check-list, they were reviewed and confirmed by using the opinions of 20 experts and faculty members of Shahid Beheshti University of Medical Sciences and Kashan University of Medical Sciences. Reliability of the check-list was determined by using the test retest method in a way that

forms were filled out by the researchers for 10 pregnant women in two stages at two times (a week apart). Then, the correlation of the data was calculated and reliability was confirmed. Ultimately, information was analyzed by the SPSS21 software.

Results

a) Demographic findings

Of the total of 240 women being studied (120 in the continuous care group, 120 in the control group), some of them were eliminated due to many reasons such as being far away, transportation, where they lived or unwillingness and ultimately, 112 remained in the continuous care group and 109 remained in the control group. The average age of women of the two groups (27.84 versus 27.04) and their husbands (32 versus 31.31) showed no significant statistical difference. Also, frequency distribution of the mother's education, father's education, gravidity or number of pregnancies, job, habitat, body mass index and economical conditions were the same in both groups.

b) Comparing maternal consequences in the continuous care and the control group

(b-1) Comparing maternal consequences before childbirth

Of the total of 221 women for whom pregnancy files were adjusted and finally, 100 of the continuous care group and 104 of the control group gave birth in situations with low risk. 12 of the continuous care group and 5 of the control group were eliminated from the study because of abortion, uncontrolled hypertension, and uncontrolled diabetes. According to the results of the study, the majority of women in the continuous care group were only supervised by the responsible midwife (64.3%) but the majority of the women in the control group were supervised by both a midwife and a doctor (67.9%) and there was no significant difference between the two groups in terms of being in risky conditions, hospitalization and hemorrhage during pregnancy.

Most of the women in the continuous care group (63%) participated in the classes; whereas only 14 percent of the women in the control group participated in the classes and according to the results of the study, the two groups had a significant difference with one another in terms of participating in the childbirth preparation classes (table 1).

Table 1 – comparing distribution of frequency of participating in childbirth preparation classes in the experimental and the control group

Group	Continuous care	Control	Total	Chi-square test
Participation in classes				
Yes	63 (63)	14 (13.5)	77 (37.7)	P<0.001
No	37 (37)	90 (86.5)	127 (62.3)	
Total	100 (100)	104 (100)	204 (100)	

Results showed that the average of the number of visits during pregnancy in the control group has been significantly higher. The majority (62%) of the continuous care group has had less than 9 visits during

pregnancy; whereas the majority of the control group (58%) have had more than 12 visits during pregnancy (table 2).

Table 2 – distribution of frequency of visits during pregnancy in the experimental and the control group

Group	Continuous care	Control	Total	Results of Mann-Whitney test
Number of visits				
<8	62 (62)	16 (15.4)	78 (38.2)	P<0.001
8-12	31 (31)	30 (28.8)	61 (31.9)	
>12	7 (7)	58 (55.8)	65 (31.9)	
Total	100 (100)	104 (100)	204 (100)	

The results indicated that there was no significant difference in terms of the number of the experiments done during pregnancy between the two groups (P=0.079). However, the number of the ultrasounds has been significantly higher in the control group (p<0.001). The majority of the women of the of the continuous care group (61%) has had less than 3 ultrasounds; whereas the majority (50%) of the women in the control group has had more than 3 ultrasounds done (table 4).

Table 4 – distribution of frequency of visits during pregnancy in the experimental and the control group

Group	Continuous care Number (percentage)	Control Number (percentage)	Total Number (percentage)	Results of Mann-Whitney U test
Ultrasound				
1-2 times	37 (37)	22 (21.2)	59 (28.9)	P=0.002
3 times	60 (60)	70 (67.3)	130 (63.7)	
More than 3 times	3 (3)	12 (11.5)	15 (7.4)	
Total	100 (100)	104 (100)	204 (100)	

(b-2) Comparing maternal consequences during and after childbirth

The results of the study showed that most of the women in the continuous care group (61%) were of more than 39 weeks old of pregnancy at the time of hospitalization; whereas most of the women in the control group were of less than 40 weeks old of pregnancy at the time of hospitalization (table 5) and a significant difference was seen in terms of the age of pregnancy at the end of pregnancy and women of the continuous care group had higher average of pregnancy age (P=0.01). The most common reason for hospitalization at the end of pregnancy in the continuous care group (49%) was the spontaneous beginning of childbirth; whereas the most common cause of hospitalization in the control group was the end of pregnancy (47%). The χ^2 test showed that the causes of hospitalization at the time of pregnancy have had a significant difference between the two groups (P<0.001).

Table 5 – comparing distribution of frequency in the two groups in terms of age of pregnancy at the end of pregnancy

Group	Continuous care	Control	Total	Results of the independent t-test
Age of pregnancy				
<39	39 (39)	58 (55.8)	97 (47.5)	P=0.01
39-40	60 (60)	29 (27.9)	60 (29.4)	
>40	30 (30)	17 (16.3)	47 (23)	
Total	100 (100)	104 (100)	204 (100)	

The results of the study show that prevalence of c-section has been significantly lower in the continuous care group (p=0.025); although most of the women of the two groups (86% in the continuous care group and 77% of the control group) had natural childbirth. According to the results of the study, in case of continuous care during pregnancy the risk of doing c-section reduces for 46% with a 95% probability and it is reduced in the confidence distance of 0.3-0.9 (table 6). The most common reason for c-section in the continuous care group (50%) was heart failure and detachment; whereas lack of improvement of pregnancy (51.9) was the most common cause of c-section in the control group.

Table 1 – comparing distribution of frequency of participating in childbirth preparation classes in the experimental and the control group

Group	Continuous care	Control	Total	Results of the Chi-square test and risk calculation

Type of childbirth				
Natural childbirth	86 (86)	77 (74)	163 (79.9)	P=0.025 RR=46%
C-section	14 (14)	27 (26)	41 (20.1)	
Total	100 (100)	104 (100)	204 (100)	

According to the results of the research, most of the women of the control group (70.2%) went through induction to start their childbirth; whereas only 44% of the women in the continuous care group went through induction and no significant difference was seen between the two groups ($P < 0.001$). According to the results of the study, in case of continuous care during pregnancy 40% of the risk of doing induction reduces with the probability of 95% and in the confidence distance of 0.5-0.8 (table 7).

Table 7 – distribution of frequency of doing induction in the continuous care group and the control group

Group	Continuous care	Control	Total	Results of the Chi-square test and risk calculation
Induction				
Yes	44 (44)	73 (70.2)	117 (57.4)	P=0.0001 RR=40%
No	56 (56)	31 (29.8)	87 (42.6)	
Total	100 (100)	104 (100)	204 (100)	

The results of the study showed that there was a statistically significant difference in the two groups in terms of spontaneous beginning of labor ($p < 0.001$). Labor in most women of the continuous care group (57%) had started spontaneously but in the control group that was the case for only 24% of women. According to the results of the study, in case of continuous care during pregnancy 67% of the probability of spontaneous beginning of labor increases with the probability of 95% and in the confidence distance of 0.4-0.7 (table 8).

Table 8 – distribution of frequency of spontaneous beginning of labor in the continuous care group and the control group

Group	Continuous care	Control	Total	Results of the Chi-square test and risk calculation
Spontaneous beginning				
Yes	57 (57)	25 (24)	82 (40.2)	P<0.001 RR=67%
No	43 (43)	79 (76)	122 (59.8)	
Total	100 (100)	104 (100)	204 (100)	

The results of the study showed that 35% of the women of the continuous care group experienced physiological childbirth; whereas only 12.5% of the women in the control group experienced physiological childbirth. Therefore, there was a statistically significant difference between the two groups in terms of prevalence of physiological childbirth ($p < 0.001$). According to the results of the study, in case of continuous care during pregnancy 67% of the probability of physiological childbirth increases with the probability of 95% and in the confidence distance of 0.5-0.8 (table 9).

Table 9 – distribution of frequency of physiological childbirth in the continuous care group and the control group

Group	Continuous care	Control	Total	Results of the Chi-square test and risk calculation
Physiological childbirth				
Yes	35 (35)	13 (12.5)	48 (23.5)	P<0.001 RR=63%
No	65 (65)	91 (87.5)	156 (76.5)	
Total	100 (100)	104 (100)	204 (100)	

In addition, the results showed that there was no significant difference between the two groups in terms of the labor induction ($p = 0.3$), consumption of anesthesia ($p = 0.28$), consumption of narcotic analgesics ($p = 0.29$),

postpartum hemorrhage ($p=0.49$), curettage ($p=0.74$), episiotomy ($p=0.40$), mastitis ($p=0.13$) and postpartum depression ($p=0.24$). In addition, all of the mothers lived in the two groups.

Ultimately, average time of hospitalization for labor ($P<0.0001$) and duration of hospitalization in the continuous care group (23.91 hours) was significantly shorter than the control group (32.66 hours) ($p=0.002$).

Discussion and conclusion:

Since there was not the probability of blinding in the continuous care group and sample were aware of a special care model being executed for them, like the majority of the clinical trial studies, there is the probability of tendency in this field.

The purpose of this study is to evaluate the impact of a team midwife-oriented continuous care model on maternal consequences. The results showed that the midwife-oriented continuous care model during pregnancy, while childbirth and after childbirth at least for pregnant women with low risk, leads to the reduction of c-section, increase of the spontaneous beginning of labor, reduction of induction and ultimately considerable increase of physiological childbirth. Although some studies have confirmed reduction of c-section and interventions during childbirth under the influence of midwife-oriented continuous care model [12, 13, 19, 20]; the great overview meta-analysis study published in Cochran, along with other studies, showed that the midwife-oriented continuous care model does not have an influence on c-section and interventions such as induction and augmentation [1, 21] but it seems that the probability of achieving this result in the present research is associated with a few issues. The first issue is that currently c-section's approximate prevalence of 50% in our society has created a long distance from the standard and a midwife-oriented interventional execution, which was focused on the naturalness of pregnancy and physiological childbirth, has easily shown this difference. The next issue which has led to the reduction of c-section is that women in the care model being studied participated in the preparation for childbirth classes and midwives providing care supervised these classes and they controlled the subjects presented in the class especially exercises at the time of pregnancy in the visiting sessions and they reviewed them and in case it was not possible women to be present in the classes, the main issues of the visiting sessions would be emphasized by the supervising midwife. Ultimately, in this care model, pregnant women were constantly keeping in touch with the supervising midwife and after confirmation of the real pains and contractions of childbirth, the women were hospitalized by the midwife. The average age of the age of pregnancy at the time of hospitalization was significantly higher in the sample women of the control group and the most common reason for hospitalization in this group was beginning of the real pains of childbirth; whereas most of the women in the control group were hospitalized for the end of pregnancy. It seems that these are linked chains which can lead to the increase of physiological and natural childbirth and reduction of c-section. On the other hand, this has been mentioned in other studies as one of the factors which lead to the reduction of doing c-section [1]. In our country, this is not basically done and its necessity, possibility and effectiveness require more studies.

Midwife-oriented continuous care in this study did not have an impact on the rate of consumption of anesthesia and sedatives, postpartum hemorrhage and during pregnancy, curettage, episiotomy, perforation, continuous backache, urinary incontinence, postpartum infection, mastitis, postpartum depression, and immature childbirth; although many studies report that midwife-oriented continuous care leads to a lower rate of episiotomy, lesser consumption of sedatives and anesthesia and even lesser immature childbirth [1, 12, 21, 22]. It seems that some of these interventions' being routine along with limited range of performance of midwives, especially in our educational and governmental hospitals, make achieving these purposes difficult; therefore it is recommended to make efforts to reform the executive instructions of physiological childbirth in the country as well as increase of the abilities of the midwives for doing physiological childbirths and controlling labor. In order to make decisions about how the continuous care influences immature childbirth, by considering the existing conflicts, studies with a larger number of samples are needed in our country.

According to the results of this study, team midwife-oriented continuous care leads to the average of visits to the doctor, a lower number of ultrasound and shorter duration of labor and hospitalization; where as in many studies, a longer labor has been reported in the midwife-oriented care group [14, 16, 21]. Perhaps the reason

for duration of labor and hospitalization being shorted in this study in the women of the continuous care group is their on time visits and hospitalization in comparison with the control group. In addition, visiting the doctor more and a larger number of doing ultrasound and longer stay in the hospital along with a larger number of surgeries are issues which will certainly lead to the higher cost of health either in spending their own money or spending national budgets and costs of per capita health. Thus, by executing the natural childbirth promotion programs and continuous cares of midwifery, it can be expected that the duration of staying in the hospital and costs associated with it will decrease. Some studies have confirmed the lower costs needed for midwife-oriented cares than those that are doctor-oriented [23].

Finally, no death or serious illness was seen in the two studied groups on the part of mothers and the percentage of mothers' being put in risky groups was similar and therefore, the safety of the team midwife-oriented continuous care during pregnancy, childbirth and after childbirth and its being riskless, in addition its low cost, efficiency and effectiveness can be confirmed. Any studies which have reviewed the impact of midwife-oriented care models with other care models such as standard and doctor-oriented models and midwife and doctor cooperative models have also confirmed this [1, 10, 21, 24].

Conclusion: given the presence of midwives at the first level of pregnancy cares in the health centers of the community of the entire countries, pregnant women's access to midwifery services even in the farthest places through the family doctor project, high potential of the academically educated midwifery force on the one hand and necessity of promotion of some of the indexes of the health of mothers including reduction of c-section on the other, it is suggested to merge the team midwife-oriented continuous care during pregnancy, at the time of childbirth and after childbirth which is easily executable with other models in the health system of the country and if it is done so, it will lead to the increase of the quality of services, satisfaction and improvement of many health indexes such as high rate of the statistics of c-section with the minimum cost by maintaining the continuity of the chain of care from the level of health care to various treatment levels.

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