



# Validation of a Logic Model Program to Support Iranian Females During Labor: A Delphi Method

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## Abstract

**Objectives:** Developing of supporting programs for mothers during labor and childbirth based upon their needs could play an important role in reduction of elective cesarean section. The present study aimed to validate a logic model program for supporting mothers during labor and childbirth using a Delphi technique.

**Methods:** This study was a three round Delphi engaging a panel of 25 experts of different specialties to rate and discuss the component of a labor support program. The program components were taken from the qualitative findings of a grounded theory study. The process of selecting expert panel members was carried out using the snowball sampling. In the first round of Delphi the experts were asked to offer their suggestions on a draft of the supporting program. After analyzing the first round data and adding the new suggestions, members were asked in round two to grade the value of statements based on the Likert scale to state their agreement. The third round was related to the discussion on disagreements and reaching consensus.

**Results:** The panelists approved 46 statements out of original set of over 51 statements via three round of Delphi. The agreement percentage of 80.9% were achieved for consensus. The results illustrated six major themes in the logic model program including preparation (10 statements), equipment and facilities (three statements), education (eight statements), process and activities (10 statements), interventions (13 statements) and evaluation (two statements).

**Conclusions:** The current paper provided clear principles and standards regarding how to practically do a comprehensive supportive care during labor and delivery.

**Keywords:** Delphi Technique, Labor Pain, Supporting Labor, Normal Delivery, Logic Model

## 1. Background

Childbirth is an event with profound psychosocial and emotional impacts on mothers and its memory always remains in the minds (1-3). When the mothers face labor pain they experience negative and positive feelings that may cause hopelessness, fear, feeling of loneliness, and stress (4). To overcome these feelings in the labor and delivery room, it is important to provide support to the mothers based on their preferences and needs (2).

On the other hand, childbirth is medicalized in many countries and most of the therapeutic and care plans in such countries take a biomedical approach (5, 6). Not paying enough attention to the mothers' needs and forgetting them in some cases due to adopting non-holistic approaches to the process of childbirth can increase the

mothers' fear of delivery in such a way that cesarean section may be considered as the only way to escape from it (7, 8). The results of a meta-analysis in Iran showed that Iranian females similar to other females worldwide mentioned fear as the main reason to choose cesarean section versus natural childbirth (7). Development and implementation of support programs based on a holistic approach and considering females' concerns and expectations during childbirth is a definite requirement, because the new health policy of the international community puts more emphasis on employing holistic approaches in the health care delivery systems and moves towards holism (9). Logic model is an acceptable program in health policy and qualitative studies are the best method to develop a new program (10).

However, the comparison between integrated Iranian

mothers' care program and birth plan in the developed countries shows that the Iranian program cannot be implemented in a comprehensive way, because the birth plan in the developed countries is designed based on the preferences of mothers and stakeholders. Additionally, the framework of integrated mothers' care is made based on a biomedical approach. Although such a biomedical care plan could decrease maternal mortality and morbidity, however, it could not meet mothers' needs.

It is clear that improvement of care provided to the mothers at the time of labor and childbirth is one of the important ways to meet one of the sustainable development goals (SDGs), which is related to the improvement of maternal health. It is noteworthy that each program to increase the safety of childbirth can result in improving the mothers' health conditions. On the other hand, developing the comprehensive supporting programs for mothers during labor and childbirth based on their needs could play an important role in reducing elective cesarean section. According to the majority of planning scholars, the logic model program is the most appropriate program to achieve consensus and it is an important method for transparency of the way (10-13). Therefore, it seems that incorporation of supporting program based upon logic model using qualitative data to provide program content is the best type of program codification (13).

Since this supportive care program was firstly developed in Iran, its validation requires the experts' views (14, 15). The current study aimed to validate the logical model program to support mothers during labor and childbirth using a 3-round Delphi method.

## 2. Methods

The current study was a 3-round Delphi using 25 experts of different specialties. It was conducted from April to September 2016 to validate the supportive care plan for mothers in labor and delivery wards developed using a qualitative study (16). In the 1st stage of the program development, the program components were taken from the findings of a qualitative approach; i.e., grounded theory study. It was conducted through individual interviews with females attending for labor and giving birth, key executives and professional staff in the labor and delivery wards, different stakeholders, mothers and their partners, midwifery students, and residents of obstetrics to explore the barriers for such care program as well as findings from literature review (11).

The findings of the literature review and individual interviews provided the basis to develop the key areas of support care program. These content areas were then translated into statements using the findings of individual in-

terviews. In the next stage, the process of selecting expert panel members was carried out using the snowball method (17). The 1st step of this process was to identify 45 experts in various relevant fields including obstetrics and gynecology, reproductive health, midwifery, and health management. They all had clinical experience in hospital and some had the experience of working in the Iranian Ministry of Health and Medical Education. In sum, disciplines were identified in this stage to elicit experts' views and opinions.

The second stage of selection was specified to know and determine the number of experts from different disciplines. One senior adviser of the ministry of health and Medical education, 3 obstetricians and gynecologist, 1 junior manager in the Ministry of Health and Medical Education, 1 executive manager in the midwifery department of local health system, 9 experts in reproductive health, 5 lecturers in midwifery, 3 midwives working in health care centers, and 2 midwife birth companions were identified. The identified experts were totally 25.

The 3rd stage of selecting expert groups was formally asking them for their willingness to join the panel and participate in the Delphi method. In this stage, the objective of the subject and the roles of experts as well as a brief explanation of the conducted activities were emailed to them. After receiving their positive responses, the final stage was done, which was sending out the logical program draft. The mentioned stages are briefly listed in Table 1.

Afterwards, the Delphi method was conducted in 3 rounds to validate the program.

### 2.1. First Round of Delphi

After selection of expert panel members, the 1st round of Delphi was started by sending out a draft of the supporting program for experts' panel via email, telegram, and for some members according to their preference in person. Out of 25 experts, 14 completed the 1st round. These experts included an obstetrician with executive experience in the Iranian ministry of health and Medical education, the head of midwifery association, 5 reproductive health specialists, 1 midwifery trainee, and 3 midwifery lecturers. The decrease in the number of experts is one of the main difficulties of the Delphi method (18). Replacement of other people is one of the solutions for this drop out, but due to the limited time and several unsuccessful invitations of other experts, finally it was decided to continue the next Delphi rounds with the remained 14 members of the panel (19). Some believe that the increase in the number of participants results in the reliability of data, but there is little empirical evidence about the effect of experts' number on the consensus reliability; hence, the expertise of individuals is more important than their number (20, 21).

**Table 1.** The Process of Selecting Expert Panel Members

Process	Stage
Identifying disciplines of Obstetrics and gynecology, reproductive health, midwifery, health management	First Stage: Preparation to Select, Identifying Disciplines
Senior adviser of the ministry of health and Medical education: 1 person. Experts in obstetrics and gynecology: 3 persons, Junior manager in the ministry of health and Medical education: 1 person. Senior adviser of the ministry of health and Medical education: 1 person. Executive manager in the midwifery department: 1 person. Experts in reproductive health: 9 persons. Midwife lecturer : 5 persons. Midwives working in healthcare centers: 3 persons. Companion midwife: 2 persons.	Second stage: Determining the number of people with their names
Contacting the above enlisted experts. Contacting more experts	Third stage: Introducing more experts: asking to join
Senior adviser of the ministry of health and Medical education. Executive manager in the ministry of health and Medical education. Obstetricians and gynecologists. Experts in reproductive health. Midwife lecturers. Midwives working in medical centers.	Fourth stage: Ranking the experts
Sending out the invitation letter	Fifth stage: Inviting the experts

In the present study, the program draft was prepared in the form of non-interrogative sentences of each stage of program. The sentences contained no ambiguity or confusion and since the intensity of program implication was associated with the use of contained verbs and adverbs, clear verbs were used (22).

## 2.2. Second Round of Delphi

After the analysis of the 1st stage data and adding the new suggestions, the 2nd round was continued with modified statements. At this stage, the modified items were sent to the members in person, via email, and telegram. Since the expert drop out was probable in this round too, it was tried to emphasize the significance of the 2nd and 3rd rounds to all the panel members. Therefore, all the members completed the 2nd stage in the specified time. At this stage, the members were asked to grade the value of items extracted from the qualitative data included in the logic model program, based on the Likert scale (low with the score of 1 or 2, moderate with score of 3, and high with 4 or 5). The state of agreement or disagreement of members toward the program became clearer and in this round the experts were given the opportunity to express any new ideas, interpretations as well as deleting or adding other items and also explaining about the weaknesses or strengths of different statements. This stage has considerable importance in the fields of health planning (21). It also increases and recognizes the content validity (22, 23). Three items of the previous round were added to the 2nd round.

## 2.3. Third Round of Delphi

Third round of Delphi was related to the expression of opinions and also disagreements (24). Since the round 3 aimed at reaching a consensus, the members that expressed their agreement on the items were set aside and

it was carried out only with the 3 expert members who disagreed upon some of the items (25).

Various sources stated this value 51% to 100% (20). In the 3rd round, the aforementioned 3 experts were asked to express their reasons for disagreement on the mentioned items.

Due to the agreement of more than 51% and also time limitations on one hand and the fact that the number of rounds were determined and measured based on the convenient time, on the other hand, Delphi rounds were limited to these 3 rounds (22).

## 3. Results

The results of 3-round Delphi illustrated 6 domains in the logic model to support females during labor and normal delivery including preparation (10 statements), equipment and facilities (3 statements), education (8 statements), process and activities (10 statements), interventions (13 statements), and evaluation (2 statements). The panelists approved 46 sentences out of the original set of over 51 statements via Delphi technique. The results in each part are discussed and illustrated in Box 1 as statements completed and modified based on the consensus.

### 3.1. Round 1

In this round, the experts were asked to offer their suggestions in order to add more sections to the program. Four columns and 8 rows of different program stages were obtained in this stage. The 4 columns included the program stages, program draft, and the state of agreement or disagreement; 48 statements were used in this part. Then, the 1st stage analysis was conducted after the data collection. The applied statements in this stage were determined

based on the extent of panel members' agreement or disagreement and the extent of agreement on all the statements were 75%. On this extent of agreement, other studies suggest an amount of 55% to 100% (15). Two items had the extent of agreement of 80%, for 8 items this amount was 90%, and others were determined with the agreement of 100%. Moreover, 3 suggestions were added to the written sections and 2 items were modified in terms of verbal and adverbial use.

### 3.2. Round 2

In this round, it was clarified that the majority of the experts agreed on the provided suggestions and the median value of 3 appeared only for two items, meaning that the rest achieved high values of median. However, the most disagreements were associated with three items. They included forcing for electronic fetus monitoring, mothers liberty to move in labor unit and to have humorous midwives.

### 3.3. Round 3

In this study, the consensus was achieved when a median value of 3 or higher and agreement rate of more than 51% was obtained. Seven items received less agreement in this round. Furthermore, analysis was conducted by holding direct meetings with the experts, after which some of the disagreements about the opinions were solved and the agreement rate of 80.9% was achieved for consensus.

## 4. Discussion

The current study employed the Delphi method to assess the validity and verifiability of the mothers' supportive program draft during labor and childbirth. The current study demonstrated that a comprehensive program to support mothers during labor was classified in 6 domains.

In most surveys, the experts try to find suitable answers to the question 'What is', but in Delphi method, researchers' aim at reaching consensus to answer the questions of 'What can/What should be'. Since in the present study reaching consensus for the question 'Do you agree with the items written in the supportive program' was considered by the researchers, only the Delphi method was accountable. Nowadays, the Delphi technique is widely increasing in medical research and health care. The nature of Delphi resulted in its use in other sciences as well (26, 27). The Delphi method is based on the experts' opinion with looking at the future. The main purpose of Delphi method is the application of inventive ideas or creation and discovery of suitable results to make decisions (27, 28).

The most important result of the current study was related to the methodologies applied. The initial code of the expectations and preferences of mothers during labor pain and normal delivery were extracted based on the grounded theory approach and then, incorporated in the logical model program over 5 stages. The high amount of agreement in the present study can be a validation of the program codification and making it a supporting program for mothers during pain and delivery.

One issue that may happen in Delphi study is related to the lack of commitment in panelists to answer the statements. Keeney stated that in order to solve this problem it was better to allocate about 8 weeks for each round and about 4 months for all Delphi rounds to prevent wasting the time (28). In the current study, all rounds of Delphi took 6 months. In order not to waste the time, the researchers tried to make some strategies for the panelists such as emphasizing on the holistic approaches in logic model for the 1st time in this program, presenting a summary note from the previous processes that mentioned grounded theory items, encouraging them to take part in a national program development and including a variety of experts from diverse disciplines from both well and poorly equipped areas in Iran.

Kennedy showed an exemplary midwifery model based on expert midwives opinions. They classified their consensus in 3 domains such as therapeutic, caring, and the profession of midwifery. However the main goal of that paper identified the midwives' voice to create a supporting model during normal delivery. The base of caring was respecting and empowering. This model is a comprehensive model, but the authors did not clarify how to practically apply those domains (29).

One of the advantages of the present study was its expert group, in which all the selected members had the experience of managerial posts in the Iranian ministry of health and the national parliament, considering the fact that the members were not necessarily in the same geographical places. The geographical variety of the panel members encompassed from East to South of Iran as well as Tehran. Also, the panel members were all academicians. Moreover, conduction of Delphi due to its nature, minimizes the probability of being biased; therefore, the program is verified because of its minimum probability of being biased. Furthermore, to the authors' best knowledge, this research was conducted for the 1st time based on the comprehensive and systematic approach and expert opinions in normal delivery fields. But, authors acknowledge that it was tried to look for all specialists interested in labor and delivery supportive care based on their own knowledge and this may be a source bias. Second, the Delphi method only highlights the areas of con-

cerns raised by the panel members; hence, important issues might have been overlooked. Third, although consensus was achieved on many statements, this does not necessarily mean agreement, as some of the panel members bored with the lengthy Delphi process may shift towards consensus to stop the process.

It seems that the not only principles of this program could be translated into practice in supportive guidelines for midwives but also it is appropriate for all staff and people in contact with mothers who provide services in labor and delivery rooms. The current study provided clear principles and standards regarding how to practically do a comprehensive supportive care during labor and delivery.

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## Footnote

**Conflict of Interest:** The authors declared no conflict of interests exists.

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**Box 1. Statements Based on the Consensus**

**The Statements for the Preparation**

- 1- It is good that the midwives' uniform color is bright; so communications are facilitated.
- 2- Temperature, light intensity, noise levels, humidity, and the smell of labor and delivery rooms should be set in accordance with the hospital standards approved by the Ministry of Health and Medical Education and issues related to the mothers' needs and requests.
- 3- It is beneficial to grant mothers whatever stuff they need such as MP4, MP3, books and diaries, clothes, or anything else that the mothers need (except for cell phone).
- 4- Walls light colors and existence of sufficient light in the labor room should be considered as important factors, because they help to decrease the mothers' depression.
- 5- Mothers' beds and midwifery station layout should be in a way that blocks the direct eye contacts (present in the L form).
- 6- It is better that the labor and delivery staff recognizes the intellectual and emotional needs of mothers at the time of pain and childbirth and provides the necessary contexts to meet those needs.
- 7- The labor and delivery staff should not use medical terminology at the mothers' bedsides in order to keep them free from stress.
- 8- The labor and delivery staff should not use such phrases: 'The labor pain is always like this, you must tolerate it'.
- 9- The labor and delivery staff should understand the mothers' pain and sympathize with them accordingly and also try their best to make the situation more tolerable.
- 10- It is worthwhile for the labor and delivery staff to elaborate the difference of childbirth pain with other types of pain, in terms of its fruitfulness.

**Statements for the Equipment and Facilities**

- 1- Providing the mothers with candy, water, and filtered soup in labor room if required.
- 2- Obtaining sufficient heating and cooling equipment such as blanket; warm bags and ice bags are necessary to be used for mothers in case of their need.
- 3- It is better to use electronic equipment or other ways to exchange information about the mothers' situation to the companions.
- 4- The existence of a private refrigerator for all the mothers in labor section is necessary to preserve the food.

**Statements for the Education**

- 1- Understanding the principles of empathizing (to consider others the same as yourself) with mothers should be considered by the agents.
- 2- The delivery agents should be familiar with the principles of communication with mothers.
- 3- It is important and supportive if delivery agents pay attention to the power of effective and energetic words and properly use them.
- 4- It is better for the delivery agents to develop a sense of humor and apply verbal and non-verbal promising behaviors.
- 5- It is better for the delivery agents to develop a moderate sense of humor and apply verbal and non-verbal promising behaviors.
- 6- The delivery agents should consider self-control in verbal and non-verbal behaviors that are associated with communicating with the mothers during the entire period of their working shifts.
- 7- It is important for the maternity ward crew and staff to be familiar with communicational skills and participate in such classes for job performance improvement.
- 8- Passing relaxation techniques courses and perverting the mothers' minds from pain is necessary for job performance improvement.

**Statements for Process and Activities**

- 1- Getting skill certifications of communicational, verbal, females' psychology during pain and childbirth, and becoming familiar with different cultures in the fields of pain and childbirth are necessary to the job performance improvement for all delivery agents, crew, and staff.
- 2- In order to maintain higher levels of relaxation for the mother after delivery, it is better that she is kept in a separate room, far from the labor room noise.
- 3- It is necessary that in case of mother's preference, she can visit her husband at least once at the time of labor.
- 4- It is better that midwives use non-medicine methods to control the pain; methods such as mind deviation from pain, communicational conversation, mind imagination, and relaxation.
- 5- The delivery agents should be familiar with the mothers' cultures about pain and childbirth.
- 6- The labor and delivery rooms staff should try to reduce the families and companions' concerns and stress.
- 7- Holding communicational principles familiarization courses for all the staff should be considered by the managers.
- 8- Participation in communicational skills courses for delivery staff should become practically compulsory as a necessity for job performance improvement.
- 9- Participating in patients' rights and medical ethics familiarization courses should become compulsory and annually for delivery agents.
- 10- All the efforts made by the delivery agents should be determined in accordance with mothers' satisfaction.

**Statements for Interventions**

1- Delivery staff should install special curtains around the beds to ensure the mothers' privacy.

2- The crew and staff of labor and delivery rooms should pay attention to cleanness of mothers' clothes, sheet, bed, and bodies.

3- All the mothers should have the ability to move freely in the labor room and they should not be limited to the beds.

4- Massaging the mothers especially in waist and shoulder areas by midwives based on the mothers' desires is considered as one of the most necessary supporting actions. Median 4

5- Doing Hogue acupressure (to improve contractile force of muscles without increasing the pain) should be considered as a compulsory act for the midwives during labor time. Median 4

6- The presence of a midwife in the mother's side should be considered as an important emotional support principle. Median 4

7- The delivery agents should not underestimate the influence of holding the mothers' hand (in case of her preference) during the pain.

8- Granting a free will to mothers in choosing a comfortable position during labor should be considered by the delivery agents.

9- If constant electronic monitoring by the delivery staff is not necessary, it is better to limit its installation to the mothers' will.

10- The delivery agents should be totally familiar with the mothers' rights at the time of admission in the delivery and labor rooms and obligate themselves to observe them.

11- Delivery agents should ask for the mothers' permission prior to conduction of vaginal examination or explain the necessity of such examination to preserve their dignity.

12- The delivery agents should inform the mothers of any actions that are about to be performed in the labor and delivery room and explain their reasons for her.

Suggestion 6: The delivery agents should behave towards the mothers with openness to preserve their dignity.

13- The delivery agents should refrain from any type of discrimination in behaving towards mothers.

#### **Statement for Evaluation**

1- Evaluation of delivery agents' performance should be based on the mothers' views and satisfaction surveys, which is conducted by the quality control manager twice, after a week from the childbirth, 1st permanently and then randomly.

2- Regular conduction of surveys on mothers results in performance improvements of midwives.

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