

# Development and Validation of a Program Logic Model (PLM) to Support "Near Miss Mother"(NMM): A Nominal Group Technique (NGT)

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## Research Article

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## Abstract

**Background:** Mothers who have experienced a near miss event, their normal life is affected by physical, psychological, emotional, social and economic adverse effects. The aim of this study is to develop a supportive program for near miss mothers (NMM), based on a program logical model (PLM) that has been validated using the nominal group technique (NGT).

**Methods:** After conducting qualitative and systematic reviews studies to assess the needs, components of PLM were extracted that provided the framework for the utilization of activities, outputs, outcomes and impact. A Nominal Group Technique method done in a one-day workshop with the participation of 12 professionals was held in November 2020.

**Results:** Eight strategies used in draft support programs based on the logical model, included the following: "psychological", "fertility / childbearing", "information", "care quality improvement", "socio-cultural", "financial", "breastfeeding" and "nutritional". The validation of the program was done based on the five steps of the NGT during the steps of creating ideas, silent generation of ideas, round robin, clarification of ideas, Prioritization. Finally, a final program was presented to support NMM.

**Conclusions:** Simultaneous integration in the PLM and NGT method allowed the first program developed to support NMM to be comprehensive and complete. Using this evidence-based program can help reduce the burden of maternal morbidities in millions of women around the world and prevent long-term complications and shorten their rehabilitation phase.

## Background

Mothers who due to childbirth morbidities have gone close to death, but have had a narrow escape, experience near-miss conditions [1, 2] and experience long-term negative psychological and emotional effects [3, 4, 5, 6, 7], and along with organ dysfunction and physical problems, they experience anxiety, isolation, depression, and trauma childbirth [8, 9]. Other family members and the infant will not be immune to these negative effects, either [7, 10]. It has been shown that psychological interventions can significantly reduce postnatal depression among at-risk women[11]. These interventions include programs and policies such as home visits by a health professional, peer support provided over the telephone, interpersonal psychotherapy, and counseling [11]. In a study conducted in 2016 in the United Kingdom, to support "near-miss" mothers(NMM), Knighte recommended routine application of counseling and other methods that are helpful for the prevention of post-traumatic stress disorder and postpartum depression [12]. Following a delay in resuming sexual activity, there is a higher prevalence of sexual problems among such mothers, too [13]. Sometimes after a baby loss, the mother should be followed up for a shorter or longer time for a subsequent pregnancy [14]. Implementing integrated care, including physical, psychological, social, and spiritual aspects of women, can help reduce the burden of pregnancy complications on millions of women around the world [15]. Standard Six of the World Health Organization's standards for maternal and neonatal care also states that every woman and her family and companions should be emotionally supported and empowered [16]. To prevent depression, this standard also recommends that trained personnel provide high-risk women with psychological support during postpartum care [17].

Due to the physical, psychological, economic, and socio-cultural problems that these mothers tackle, many sources focus on special care and support for them [15, 18, 19]. Unfortunately, there is currently no coherent plan to support such mothers, and the current irregular follow-up may not reflect a complete image of their primary care after discharge from the hospital [20]. A study conducted by Furniss in New Zealand in 2018 recommends that specific programs should be planned, implemented, and evaluated to reduce the burden of mental and physical problems of these mothers [21] and prior to hospital discharge and based on their biography, the information should be elicited from such mothers to make social-psychological support and regular and periodic follow-up possible [21] so that their concerns are mitigated as they know they are cared for [22]. Because these mothers are discharged from the hospital in difficult conditions, they struggle with the problems faced by themselves or their families, a fact which highlights the need for a plan. To this aim, this study used the Program Logic Model (PLM) to provide support for "near-miss" mothers. This use of this model is justified on the account that it is a practical and easily-implemented program which takes all required aspects for goal achievement into account and, furthermore, there is a logical relationship between program resources, activities, outputs, audience, and immediate, intermediate and long-term outcomes of a particular problem or situation [23]. This model has also been used in reproductive health planning [24, 25] and has gained special popularity in the field of midwifery [26, 27]. Therefore, the purpose of this study is to develop a supportive program for near miss mothers, based on a logical model that has been validated using the nominal group technique.

## Methods

The following are the components that the PLM illustrates: assumptions, inputs, activities, outputs, outcomes and impact. The outcomes include three situations immediate, intermediate, and long-term. Resources include personnel, educational facilities, equipment, funding or financial incentives. Activities encompass all activities that cover the extracted needs assessments. Outputs include products resulting from the program, such as the number of participant served in the activities or intervention. Immediate outcomes are changes in the target groups' knowledge. Attitudes or skills are changes in intermediate outcomes. Long-term outcomes relate to behavior. Impact relates to larger scale of overall effects or vision of program.

Based on this model, at the outset, a needs assessment should be done to assess the situation. Therefore, in this study, data sources were performed based on a phenomenological study[28] and a systematic review study [29] so that the resulting program includes the experiences and views of mothers and service providers and the published papers comprehensively reflect the concerns of the target population. We also interviewed 37 experts in the field of NMM to assess the needs of these mothers and then use them in the structural components of the program. After the approval of the university ethics

committee, receiving informed consent and adherence to confidentiality, the assumptions of the program were determined. After the needs were extracted, the relationship between the program inputs and outputs was accounted for using a logical pattern within the "if-then" framework. i.e., "if" resources or inputs are provided, then what activities can be implemented, or "If" the program activities are implemented successfully, "then" what are the outputs and consequences. Then, after a few sessions of brainstorming by the research team, the initial draft of program near-miss mothers' support program was prepared.

Then, the Nominal Group Technique (NGT) was used to validate the program. This technique has repeatedly been used to facilitate decision-making processes in health care and has shown good results [30]. The decision-making process using the nominal group technique consists of five steps [31]. After the approval of the ethics committee of University of Medical Sciences, 12 experts and key people in the field of near-miss mothers were invited to participate in the meeting through official correspondence in accordance with the opinions of professors and members of the research team. The selection of experts was purposeful. This expert panel was formed in October 2020 at the university meeting hall. All methods were carried out in accordance with relevant guidelines and regulations. Also written consents were obtained from those present at the meeting to publish their views.

## Results

The results of developing a support program for near-miss mothers based on a rational model included eight strategies. These strategies are designed based on "psychological", "fertility / childbearing", "information", "care quality improvement", "socio-cultural", "financial", "breastfeeding" and "nutritional" needs. Based on this, the inputs and activities of the program were listed and the results and consequences of these activities were identified. Table 1 summarizes the strategies of the Near-Miss Mothers Support Program. In the next step, the initial draft program was validated through the nominal group technique. For this purpose, 12 experts in the field of near-miss mothers participated in a one-day workshop that lasted about 3 hours. Then the meeting was led based on the following steps:

**Step 1: Creating Ideas:** At this stage, as a facilitator, the researcher introduced the purpose and general topic of the meeting. Then she explained the steps of the nominal group technique and how to announce the results. At this stage, the initial draft program was given to the people at the outset of their attendance.

**Step 2: The silent generation of ideas:** At this stage, the researcher asked the participants to provide clear and straightforward responses to the written questions individually, while maintaining silence in the meeting and without consulting other people. They were asked to generate ideas. In this study, the participants were given half an hour to generate ideas. The questions raised in this meeting were: "What are the shortcomings in the draft program that need to be corrected?" and "What suggestions do you have for upgrading the "Near-miss" mothers support program?". At the end of the idea generation period, the researcher collected the written ideas.

**Step 3: Recording Ideas or Round robin:** In this step, the researcher wrote all the ideas written on the paper on the board. The researcher listed the ideas regardless of their content and evaluation. Sometimes ideas were either for or against each other. In this study, this step lasted for 30 minutes. At this stage, the researcher asked two of her colleagues to help her write ideas so that she would spend less time on this stage.

**Step 4: Clarification of ideas:** This step aims to let all participants have a full understanding of the generated ideas. Therefore, in case there were any ambiguities or questions by any person, they were clarified and the ideas were elucidated. Similar or duplicate ideas were then merged so that clarification could be done with a fewer number of ideas. Some of the ideas were removed after clarification with the permission of the owners of the ideas because they were not properly connected with the purpose of the program. After the owners of the ideas provided sufficient explanations on the remaining ideas, clarification, and specification was done. In this study, this step lasted about 50 minutes.

**Step 5: Voting and Prioritization:** The last step in the nominal group technique is to prioritize the remaining ideas. This step has two parts. First, each person selected five ideas she thought were the most important. Second, the selected ideas were scored and ranked. In this method, the number one meant the lowest score and the number five meant the highest score for each idea. After the participants scored the ideas, the scores of ideas were listed and the ten ideas that received the top scores were selected to be used in the near-miss mothers' support program. The final list of top ideas for the near-miss mothers' support program is displayed in Table 2. After the initial draft of the near-miss mothers support program was edited to include the top ideas, the final program was prepared and based on the logic model shown in Table 3.

## Discussion

In this study, the near-miss mothers support program developed based on the logical model was validated using the nominal group technique. In 2011, the World Health Organization published a guide entitled 'Evaluating the quality of care for severe pregnancy complications: The WHO near-miss approach for maternal health' so that the executive teams of the Ministry of Health of each country can collect the required information on a current situation and based on the type and characteristics of the required facilities and resources be able to have a complete and sound plan [32]. In this regard, the manual of the World Health Organization's Regional Office for Europe suggests meetings with the presence of all stakeholders of the health care system to prevent errors. Along these lines, a facilitator who has already reviewed the entire case summary from the beginning of the mother's arrival until her discharge using the door-to-door approach conducts the meeting [33]. Another interesting program running in the UK for near-miss mothers is the UK Obstetrics Surveillance System (UKOSS), which by asking questions assesses the sepsis, identifies avoidable factors, and fixes current problems while revising existing guidelines [34].

A comprehensive review of near-miss mothers' programs in Iran and other countries leads us to conclude that all these programs identified and collected quantitative data of near-miss mothers or evaluated errors based on the patient records. These programs have focused only on the situation and prevalence of these mothers and have ignored their psychological, social, economic, cultural, and nutritional conditions. However, the program designed in this study, aiming at providing near-miss mothers with comprehensive support, emphasizes emotional support and counseling in eight strategies and is fully comprehensive. People involved in the implementation program include gynecologists, hospital midwives, midwives of healthcare centers, health care providers, primary healthcare providers, nurses, university professors, and students and other staff working in healthcare centers such as hospital committee officials, supervisors, hospital managers, senior nursing officers of the obstetrics and gynecology wards and the intensive care units, maternal health experts, etc.

### **Strengths and Limitations**

This program is the first accredited support program in the world, which was based on the aggregation of views of service providers and policymakers in the field of maternal health, and prior to this study there was no comprehensive program focusing on maternal morbidities and especially near-miss mothers in Iran and other countries. Examining the reliability of the program and confirmation of its validity by health experts were other strengths of the study. A further strength of this study was needs of participants such as mothers, spouses, service providers, and policymakers were extensively assessed through qualitative studies that included maximum diversity from all groups in the field of health care who had valuable experiences. This made it possible to assess the needs of mothers from different perspectives and angles, and no points were ignored in the program.

## **Conclusion**

Due to the nominal group technique with maximum diversity of experts and authorities in the field of near-miss mothers and the generalizability of the model, applying the results of the validated program to maternal health policy-making can be very beneficial and significant, and in line with the millennium development goals, these findings can be used not only in Iran but also in most countries and will be a turning point in advancing the goals of maternal health. Informing service providers and families about the support procedure taking the needs of near-miss mothers into account, in addition to empowering and rehabilitating mothers and reducing the burden of childbirth complications for mothers, makes children and spouses enjoy the benefits of the mother's higher quality of life, and prevents from lifelong prevention of women. This program increases the mental readiness of healthcare personnel to provide the support required by near-miss mothers and convinces them not to be negligent for a moment of the thoughts and feelings of someone who has been on the verge of death and undergone conditions different from a low-risk mother. It is recommended that the effects of program implementation be investigated through interventional studies on reducing the burden of morbidities, such as physical, psychosocial.

## **Abbreviations**

Nominal Group Technique (NGT); Near Miss Mothers (NMM); Program Logic Model (PLM)

## **Declarations**

**Declarations heading:** This program is the first accredited support program which was based on the aggregation of views of service providers and policymakers in the field of maternal health that focusing on maternal morbidities and especially near-miss mothers.

Using this evidence-based program can help reduce the burden of maternal morbidities in millions of women around the world and prevent long-term complications and shorten their rehabilitation phase.

### **Ethical considerations**

The study was approved by the Ethics Committee of Mashhad University of Medical Sciences (IR.MUMS.NURSE.REC.1398.009). All participants were given oral information about the goal of study, and informed consent was obtained from all of the participants. Anonymity were secured, and participants were informed that they could withdraw from the study at any time.

### **Consent for publication**

Consent for Publication-NA/Not Applicable.

### **Availability of data and material**

Data could be available upon a reasonable request and with the permission of Mashhad University of Medical Science ethical committee. The interviews used in this study are taken from a part of the doctoral dissertation work.

### **Competing statement**

The authors declare that they have no conflicts of interest.

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### Authors' contributions

SA, AH and TKH contributed to the study conception and design, Data analysis and interpretation, and Critical revision of the article.

SA, AH, HE and TKH conducted the interviews and collect the data. SA, AH, FF and TKH wrote and revised the first draft. All authors read and approved the final manuscript.

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## Tables

<b>Table 1: Strategies of near-miss mothers' support program</b>
<b>Goal:</b> Promoting the life quality of near-miss mothers
<b>Target population:</b> Near-miss mothers based on the WHO definition
<b>Program Vision:</b> The main commitment of this program is to support near-miss mothers, which is possible through the promotion of physical, mental, fertility/childbearing, social, cultural, financial, breastfeeding, and nutritional health. Improving the quality of care in hospital care and post-discharge health care is the main prerequisite for the implementation of the program.
<b>Strategy 1: Psychological counseling:</b> Psychological support of the mother at the time of the incident, psychological counseling of the mother in the hospital, psychological counseling of the mother at the time of discharge, psychological counseling of the mother in post-discharge health care, psychological counseling of the spouse, psychological counseling of previous offsprings of the family
<b>Strategy 2: Fertility / childbearing counseling:</b> Counseling in cases of loss of fertility, childbearing counseling in high-risk pregnancies, childbearing counseling for future pregnancies
<b>Strategy 3: Information Support:</b> Fulfilling information needs about the current problem, fulfilling the information needs of family members, sexual counseling, and marital education
<b>Strategy 4: Socio-cultural support:</b> Counseling to reduce social isolation by a mental health expert, maternal support by peers, correspondence with the Welfare Organization for referring mothers before hospital discharge, risk assessment of mothers in terms of socio-cultural dimensions
<b>Strategy 5: Improving financial/geographical access:</b> Assigning a monthly budget for near-miss mothers, insurance coverage for childbirth complications of near-miss mothers stated in the promotion package of the health system reform plan, financial accountability for legal negligence in the health system, charity support, scheduling a pre-arranged visit to the clinic at the time of the mother's discharge, identifying mothers with poor financial status
<b>Strategy 6: Breastfeeding counseling:</b> Facilitating mother-infant communication to start breastfeeding, facilitating the process of using formula/milk bank
<b>Strategy 7: Nutritional counseling:</b> Performing nutritional counseling at the time of hospitalization/health care
<b>Strategy 8: Promoting the care quality in near-miss mothers:</b> Empowering staff/managers in terms of legal accountability, empowering staff in terms of ethics and professional behavior, empowering staff in terms of clinical skills, reviewing educational curricula, providing intensive care for near-miss mothers in health care, reviewing existing programs to prevent or physically rehabilitate mothers, establishing a coherent relationship between health care and treatment, forming a focus working group of mothers' follow-up team, and improving processes

<b>Table 2: Final list of top ideas ordered based on points</b>		
<b>No.</b>	<b>Idea</b>	<b>points</b>
1	Inclusion of home care for maternal mental health in post-discharge care as a team composed of a midwife and psychologist	55
2	Supplementary insurance coverage of near-miss mothers to cover long-term maternal expenses	52
3	Preparation of a service package for near-miss mothers in health care, depending on the type of organ dysfunction	53
4	Socio-economic and cultural assessments of mothers from the beginning of pregnancy to implement preventive support	52
5	Forming centralized special working groups for near-miss mothers and registering of mothers in this working group for long-term follow-up	60
6	Supervision of maternal treatment processes by an experienced midwife in the field of near-miss mothers who is not assigned by the hospital for accurate and direct monitoring	58
7	Using a 24-hour hospital IVR as an information source to answer questions from mothers and their families	48
8	Forming organizational associations for near-miss mothers	53
9	Using standard back-breaking cost tools in financial access strategy	50
10	Using the word childbearing alongside a fertility counseling strategy	49

**Table 3: Finalized near-miss mothers' program after applying validation changes**

<b>Strategy 1: Psychological counseling</b>						
Inputs	Activities	Results	Short-term outcome	Medium-term outcome	Long-term outcomes	Reducing the psychological burden following a lifelong complication
<b>Human resources:</b> A midwife, holding an MSc degree in counseling, a clinical psychologist, a psychiatrist, staff capable of providing initial counseling  a team including a midwife, a psychologist, to do mental counseling at home	Psychological support of mother at the time of the incident	The ratio of counseled individuals at any given time to total near-miss mothers	Awareness and skill of coping with the incident	Mother's attitudes for attempting to keep calm	Proper behavior for higher adaptability with organ dysfunction in life	
	Psychological counseling of mother at the hospital	The ratio of mothers satisfied with psychological counseling to total counseling mothers	Improving awareness in alleviating concerns and identifying barriers in the mental health of mothers	Creating a positive attitude in the early diagnosis of mental problems	Preventing stress, anxiety, and depression	
	Psychological counseling of mother at the time of discharge		Improving mother's awareness of mental disease symptoms	Mother's readiness for psychological self-care with the new life situation	Proper behavior for mother's discharge based on a standard checklist of psychological screening	
	Psychological counseling of mother at post-discharge health care at home		Improving awareness in early diagnosis of depression, anxiety, and post-stress trauma	Sensitizing mothers for visiting a mental health expert or psychiatrist	Timely treatment of psychological problems and resolution of conflicts in life in case the mother cannot attend for health care	
	Psychological counseling of the husband		Awareness and readiness of the husband of the mother's problems	Changing husband's attitudes for supporting and dealing with the problems	Reducing stress and anxiety levels in the spouse	
Psychological counseling of previous offsprings of the family		Alleviating mental concerns created after the mother's disease	Assigning importance to the identification and screening of psychological problems in children	Preventing emotional damages based on standard tools		
<b>Strategy 2: Fertility / childbearing counseling</b>						
<b>Human resource:</b> A midwife skilled at childbearing	Counseling in for the loss of fertility	The ratio of people consulted to all high-risk mothers	Mental readiness of the family for uterine dysfunction	Creating a positive attitude in the mother for accepting the number and gender of children	Counseling for accepting infertility and deciding to adopt children	Reduction of severe labor morbidity
	Childbearing Counseling in high-risk pregnancies		Increasing mothers' awareness of the complications of future pregnancies	Creating a conscious intention for a planned pregnancy based on the type of organ dysfunction	providing pre-pregnancy counseling for all mothers near death	
	Childbearing Counseling for future pregnancies		Increasing the mother's awareness of the risks of future pregnancies	Developing a responsible attitude towards re-pregnancy	Success in planning the number of children based on the mother's physical condition	
<b>Strategy 3: Information Support</b>						

<b>Human resources:</b> Skilled midwife in hospital/health center, use of 24-hour hospital IVR depending on the type of organ dysfunction of mothers as an information reference	Fulfilling information needs about the current problem	Percentage of mothers who are fully aware of their problem	Increasing awareness of mothers and families about the accident	Correcting the mother's negative attitude and misinformation about the disease	Performing mother self-care activities based on written information received in any type of dysfunction	Providing complete coverage for the mother and family in different complication situations
	Fulfilling the information needs of family members		Increasing awareness and empathetic understanding of the mother by the spouse and family members	A positive effort for full support of the mother by the husband	Emphasizing the role of the spouse in the supportive-caring activities of the mother	
	Sexual counseling and marital education	The ratio of counseled mothers / to total near-miss mothers	Increasing husband's awareness of how to have a sexual relationship again	Creating an efficient attitude for identifying sexual problems based on screening with standard tools	Counseling and skill behaviors for strengthening the marital relationship of the joint life	

**Strategy 4: Socio-cultural support**

<b>Human resources:</b> Mental health expert, social worker, midwife	Counseling to reduce social isolation by a mental health expert	The ratio of counseled mothers / to total near-miss mothers	Increasing the mother's awareness of the reason for her isolation from society	Increasing the positive attitude of the mother to start former social activities	Having positive social activities to reduce the social burden of the disease	Reducing the socio-cultural burden of the complication on mother and baby
	maternal support by peers	Percentage of mothers who have joined peer/therapy groups.	Increasing knowledge in forming peer groups	Motivate the mother to reduce the feeling of loneliness and isolation	Guiding and referring mothers to peer associations and groups	
	correspondence with the Welfare Organization for referring mothers before hospital discharge	Percentage of mothers covered by welfare through hospital referrals	Informing the welfare organization of the existence of mothers close to death	Measures to reduce social pressures on near-miss mothers by other organizations	Allocating special conditions facilities for near-miss mothers by welfare	
	Risk assessment of mothers in terms of socio-cultural dimensions	Percentage of mothers assessed in terms of socioeconomic class based on standard tools	Increasing knowledge in early identification of high-risk cases in terms of the socio-economic and cultural level	Readiness to plan for increased follow-up care of the vulnerable	Appropriate behavior for more socio-cultural support	

**Strategy 5: Improving financial/geographical access:**

<b>Facilities:</b> Increasing insurance coverage, Infrastructure for receiving in-person/automated appointments from the clinic	Assigning a monthly budget for near-miss mothers	Percentage of mothers who have received the allowance.	Increasing knowledge on how to reduce the costs imposed following the complication	Supportive attitude to long-term nutritional costs and follow-up treatment	Reduced convalescence from illness due to financial barriers based on hospitalization days	Improving mothers' financial/geographical access to equitable services
	<b>Facilities:</b> Increasing insurance coverage, Infrastructure for receiving in-person/automated appointments from the clinic	insurance coverage for childbirth complications of near-miss mothers stated in the promotion package of the health system reform plan/ Supplementary insurance for morbidities	Percentage of discount to the total cost	Helping to reduce treatment and paraclinical costs	Efforts to reduce financial barriers leading to a lack of timely diagnostic care	
<b>Human resources:</b>	financial accountability for legal negligence in the health system	Percentage of cases for which compensation	Mother's feeling of financial support in	Sensitization of medical staff to be responsible for lack of	Legal accountability of the health justice system	

Social worker		for legal negligence has been paid	response to medical malpractices	professional accountability		
Arrangement:						
Charity	charity support/social working	The ratio of mothers who have used social work support costs to total mothers	Increasing knowledge on how to reduce hospital costs  Reducing family financial bankruptcy	A supportive attitude of institutions in reducing the loss of living capital due to medical expenses	Contributing to the financial well-being of mothers based on measures taken based on standard tool of backbreaking costs	
	scheduling a pre-arranged appointment to the clinic at the time of the mother's discharge	Percentage of mothers whose clinic appointment is pre-arranged	Increasing knowledge about the benefits of reducing the cost/time of follow-up after discharge	Ensuring that all mothers are followed up and returned to the clinic for follow-up	Providing timely treatment and care if needed	
	Identifying mothers with poor financial status	Percentage of mothers identified with poor socioeconomic status to all mothers	Increasing awareness in segregation and evaluation of mothers with financial problems	Planning on financial support to improve care	Correct behavior for timely diagnosis and treatment for low-income families based on scientific guidelines	
<b>Strategy 6: Breastfeeding counseling</b>						
<b>Human resources:</b> Midwife in the health care center Milk expert	Facilitating mother-infant bonding to start breastfeeding	Percentage of mothers who met the baby at the first opportunity / Total near-miss mothers	Increasing awareness in strengthening maternal feelings by starting early breastfeeding	Creating an effective attitude in employees to provide the possibility for mother and baby to meet to strengthen the emotional bond	Helping the mother to breastfeed successfully based on the hours and frequency of breastfeeding	Promoting baby feeding and breastfeeding
	Facilitating the process of using formula/milk bank	Percentage of mothers who have used the formula to total near-miss mothers	Increasing awareness to start proper and timely feeding of the baby	Positive efforts to prevent the effects of not breastfeeding	Improving the growth and development of the baby based on the booklet of health charts	
<b>Strategy 7: Nutritional counseling</b>						
<b>Human resources:</b> Nutrition expert	Performing nutritional counseling at the time of hospitalization/health care	Percentage of mothers visited by a nutritionist to total near-miss mothers	Increasing awareness in the use of diet appropriate for the physical problem	Improving staff attitude for improving physical condition and shorter convalescence from illness through nutritional counseling	Reduction of nutritional deficiencies and micronutrients caused by an improper diet based on experiments	Improving nutritious and proper nutrition
<b>Strategy 8: Promoting the care quality in near-miss mothers</b>						
<b>Infrastructures</b> <b>Human resources:</b> Forming a working group of all specialties depending on the type of organ dysfunction Hospital non-assigned experts in the field of mothers to supervise the activities, a skilled midwife as a supervisor of the obstetrics and	Empowering staff/managers for legal accountability	Percentage of employees participating in workshops to total staff	Making mothers aware of their rights	Creating a positive attitude in finding the root of avoidable negligence by using RCA files	Accountability of the health system for its mistakes	Improving the quality of care in near-miss mothers
	Empowering staff in terms of ethics and professional behavior		Increasing awareness and effective communication skills in line with the spirit of near-miss mothers	Increasing staff's supportive motivation for respecting and paying attention in the most critical living conditions	Respectful and ethical behavior of employees	
	empowering staff in terms of clinical skills		Increasing the knowledge and awareness of staff in	Increasing sensitivity of staff/service providers to the	Careful and sufficiently skilled behavior	

<p>gynecology block, an inspector of high-risk mothers with background experiences from different fields of work</p> <p><b>Educational environment:</b> holding classes and workshops, having a standard room for classes and workshops</p> <p><b>Financial costs:</b> Costs allocated for holding classes, workshop teacher salaries, purchase of accessories and educational aids, preparation of pamphlets and educational materials,</p> <p><b>Infrastructure:</b> reviewing the guidelines of the Ministry of Health, the integrated national system of maternal health</p>			midwifery emergencies	initial complaint in all areas of the mother's physical and mental health	
	reviewing educational curricula	Percentage of parts changed and revised in the educational curriculum	Increasing knowledge about the educational content for near-miss mothers	Basic midwifery training on specific skill / behavioral attitudes in near-miss mothers	Increasing the number of skilled graduates to provide services to near-miss mothers
	providing intensive care for near-miss mothers in health care,	Percentage of near-death mothers who are in intensive care	Increasing knowledge to care intermittently  Maternal awareness of ongoing care	Adopting an insistent attitude to provide home care tailored to the specific flowchart of each type of dysfunction	Reducing late-diagnosed events which are due to medical team availability
	reviewing existing programs to prevent or physically rehabilitate mothers	Percentage of programs revised to meet the needs of near-miss mothers / total current programs	Eliminating the implementation of polyvalence plan in midwives to provide efficient care	Increasing the cost/effectiveness of care based on research	Increasing the achievement of the desired result of care based on indicators and including the type of special care for these mothers in the service package for adolescents, the middle-aged, and the elderly
	establishing a coherent relationship between health care and treatment	Percentage of universities that provide prenatal care within the integrated health care system.	Awareness of hospital staff of the condition and number of high-risk mothers referred to by the healthcare center	Effective preparation for the implementation of appropriate hospital care based on proper systemic records and history	Integrated health care through ongoing communication using the knowledge of the mother's condition
Establishment of a provincial working group for near-miss mothers through the centralized registry of mothers and covering several sub-hospitals	Percentage of near-miss mothers followed by the working group / total mothers  Percentage of professional errors occurred to total occupational errors based on cases in mothers' morbidity committees	Increasing the knowledge and awareness of service providers about the identification, treatment, and follow-up of near-miss mothers  Decreasing the number of avoidable maternal professional errors/faults	Increasing the motivation and sensitivity of employees related to the field of mothers to prevent avoidable factors  Increasing the supervising attitude and process improvement of managers to be more accountable	Improving clinical processes using behavior change associated with work conscience in service providers  Reduction of multiple complications associated with maternal organ dysfunction caused by lack of proper follow-up	