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The impact of a three-phase education–support–follow-up program on the mothers' perceptions of the needs of their multiple infants: A protocol study for a clinical trial

Masumeh Bayati, Azam Biabanakigoortani¹, Tahereh Changiz², Mahboobeh Namnabati³

Abstract:

BACKGROUND: Infertility, a problematic issue to the newly married couples, should be treated as no couple should be deprived of having children. The treatment, however, poses new challenges to the multiples and subsequent preterm births, health system, and families. Therefore, the aim of this study is to investigate the effect of an education–support–follow-up program on the mothers' perceptions of their multiples' needs.

MATERIALS AND METHODS: This research is a three-phase interventional study. The first phase develops an educational program through review of the literature and using the opinions of experts. In the second phase, the developed program will be implemented in the neonatal intensive care unit (NICU) for the mothers of multiples. In the third phase, based on the developed plan, the required support will be applied and followed up. The data collection tool is a researcher-made questionnaire which is completed by the mothers ($N = 30$) before and after the intervention. Convenience sampling method will be used, and the mothers will be allocated randomly. Data gathering started from September 2020 and would continue until the sample collection is completed. Data will be analyzed through the descriptive and analytical statistics with Statistical Package for the Social Sciences (SPSS) version 21.

RESULTS: The present study can address the needs of the multiple infants based on the implementation of an education–support–follow-up program for mothers and their families.

CONCLUSION: The mothers of multiple infants are required to specify unique physical and developmental needs of their infants, while their perceptions of these needs may be different based on the education–support–follow-up program. The researchers designed the program to help them define highly specialized needs of multiples and also examined their perceptions of these needs.

Keywords:

COVID-19, Infants, mother, multiple pregnancy, need, perception, support

Introduction

Infertility ranks the fifth highest serious global disability according to the World Health Organization and affects roughly 10% of the world's population.^[1] Infertility is caused through maternal diseases,

environmental factors, and other problems, as well as the coronavirus disease 2019 (COVID-19) pandemic that causes some problems in the male and female fertility.^[2] Therefore, various treatment methods have been developed to solve this problem. The use of assisted reproductive

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Departments of Pediatric and Neonates, Student Research Center, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran, ¹Shahied Beheshti Hospital, Isfahan University of Medical Sciences, Isfahan, Iran, ²Medical Education Research Center, Isfahan University of Medical Sciences, Isfahan, Iran, ³Departments of Pediatric and Neonates, Nursing and Midwifery Care Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Address for correspondence:

Dr. Mahboobeh Namnabati, Hezarjarib Blvd, Isfahan, Iran.
E-mail: namnabat@nm.mui.ac.ir

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technology has increased in the USA during the past two decades. *In vitro* fertilization (IVF) methods also increase the risk of multiple pregnancies. It is estimated that 1% of singletons, 19% of twins, and 25% of triplets and multiples have been fertilized by the IVF method. While normally, the prevalence of multiple pregnancies is 1%, assisted reproductive technology may increase the prevalence up to 16%–40%. Multiple births increase the risk of prematurity and underweight infants.^[1,2] 2% of all births are multiples and mostly twins, 3 out of 10 twin infants are born prematurely and 9 out of 10 triplet babies are premature. Community Verified icon the most common time of birth is at the week of 36 or 37 for the twins and 33 for the triplets.^[3,4]

Since 1980, some countries have reduced the fetal number in order to prevent multiple complications.^[5] However, in Islamic countries such as Iran, this method is considered as killing the fetus and is prohibited, except in cases where the mother's life is in danger. Therefore, special support programs should be designed to reduce the problems for the mothers.

Mothers who become pregnant through induction methods may experience high-risk pregnancies, especially in COVID-19 pandemic.^[6,7] Multiple pregnancies can cause complications for mothers, fetuses, and infants. Maternal complications include cardiovascular risk, metabolic disorders, preeclampsia, placental abruption, urinary tract infection, and preterm delivery.^[8] Fetal complications include prematurity, intrauterine growth retardation, congenital anomalies, and twin-to-twin transfusion syndrome.^[9] Neonatal complications and outcomes include neonatal death, prematurity, low birth weight, respiratory distress, hypocalcemia, and hypoglycemia, which increase compared to singleton pregnancies.^[10,11] In addition, artificial infertility may lead to premature twins and multiples with short-term and long-term disorders of cerebral palsy as well as cognitive and developmental disabilities.^[12] In a retrospective cohort study conducted in the Netherlands over two decades, 1305 twin pregnancies were examined which had unpleasant outcomes. Interestingly, these outcomes were more in spontaneous twin pregnancies than in fertility stimulation pregnancies.^[13]

Premature infants have special physical and developmental needs such as nutritional, respiratory, health, sleep, cuddling, and developmental needs. These needs are more evident in multiples than in preterm singletons, and mothers of multiples face not only the crisis of multiple pregnancies, but also the crisis of giving birth to multiples and their admission to the neonatal intensive care unit (NICU). According to studies, the mothers of preterm infants are more prone to anxiety and fatigue than the mothers of term infants. Furthermore,

mental disorders and postpartum depression are far more common in the mothers of multiple infants.^[14-18]

The mothers' perception of the needs of their infants is significant. Many mothers think that they are not able to meet the needs of their infants. Thus, it is necessary to develop a program for the support and follow-up the mothers of multiple infants. They should be professionally cared through pregnancy and after giving birth. The needs of these mothers include adapting to pregnancy, preparing for motherhood, feeding multiple infants, improving mother–infant relationship.^[19,20]

Accordingly, these mothers should be paid special attention, so that they can play their motherly role as good as possible. Therefore, implementation of the it means that interventional education–support–follow-up program seems to be necessary. Educational intervention refers to a process in which behaviors and factors that improve the condition of mothers in different dimensions are taught.^[21] The effect of educational support program on breastfeeding of mothers showed the effectiveness of the program on increasing the mothers' knowledge about breastfeeding for children under 2 years and improving their performance.^[22] The spouses' support and their simultaneous education with the mother plays an important role in increasing their awareness of the benefits of breastfeeding and this, in turn, leading to increased continuity of breastfeeding by the mothers.^[23,24] This means that emotional support of the spouse will increase the mother's breastfeeding. Therefore, the support of fathers will lead to an increase in breastfeeding and increase the health of society.^[25]

Mothers' perceptions of the needs of infants influence the needs being met by the mothers. Given the large number of infants in multiples, it is difficult for the mother to meet these needs. This study will be conducted to investigate the effect of a mixed education–support–follow-up program on mothers' perceptions of the needs of multiple infants. Hypothesis of this study based on its aim is as follows: the mean score of mothers' perceptions of meeting the physical–developmental needs of multiples is different in the two groups before and after the intervention.

Materials and Methods

Study design and setting

This study is an interventional study of a randomized controlled clinical trial that examines the effect of the independent variable of the education–support–follow-up program on the dependent variable of mothers' perceptions of the needs of twins and multiples.

Additionally, demographic variables such as the age and field of study, underlying disease, job, and age of the mothers, together with the weight and sex of newborns, the received support, and economic status will be evaluated.

Study participants and sampling

Convenience sampling method and random allocation were used in this study. Thirty mothers with twin or multiple infants who were hospitalized and admitted in the NICU participated in the study. The mothers were randomly allocated to two groups – interventional and control ($n = 15$) – by drawing cards. The number of samples, based on the formula, should be 30 subjects. In this formula, Z as the 90% confidence interval is equal to 1.64 and d as the accuracy rate is 5%.

Data collection tool and technique

Data were collected through the questionnaire completed by mothers of multiples admitted to the NICU from September 2020 to June 2021. This researcher-made questionnaire constructed through review of the literature consisted of 37 questions in different areas of the needs of multiple infants (health, nutrition, developmental needs, etc.). It measured the perceptions of mothers through the Likert scale with answers ranging from strongly agree to strongly disagree. The validity of the questionnaire was confirmed by nine faculty members of the School of Nursing and Medicine and nurses of the NICU. The reliability of the questionnaire was obtained by Cronbach's α test with a coefficient of 0.83.

The inclusion criteria of the study were as follows: 1. the mothers of twins, triplets, quadruplets, and quintuplets who are considered as the main caregivers and have all the responsibilities; 2. being able to speak, read, and write in Persian; 3. not addicted to drugs and any psychiatric medication; and 4. their newborns should have been hospitalized in the NICU for at least 4 days. The exclusion criteria were the occurrence of physical and mental problems in mothers, such as postpartum depression, making them unable to communicate and take care of their infants, and preterm infants with any underlying disease in need of surgery.

Intervention done through three phases includes the following phases:

Phase 1: Reviewing the literature, the researchers extracted the needs of infants, especially those of premature infants. Then, the mothers of multiples were interviewed about the needs of their infants and a program was developed based on their physical and developmental needs. Moreover, the content of the

questionnaire was prepared considering their needs. Using the opinions of faculty members of the School of Nursing and Midwifery, as well as nurses working in the NICU and neonatologist, the questionnaire was completed, optimized, and evaluated in terms of scientific validity and reliability.

Phase 2: In this phase, the developed program was implemented for the mothers. Initially, with coordination from the educational supervisor, the researcher referred to the internal ward and NICU to hold educational sessions according to the developed program if there were any hospitalized infants meeting the inclusion criteria. Practical education sessions were held beside the infants' beds in the form of individual education (face-to-face and practical training) for the mothers of the eligible twins and multiples. Teaching aids such as educational booklets and pamphlets were also used in this intervention. The mothers were required to declare their possible education and support at any stage. The questionnaires are given to both groups for completing before the intervention.

Phase 3: In this phase, the researcher refers again to the NICU and examines the ability of mothers to care for their infants and meet their needs, and if necessary, they will be re-educated. Financial and social support will be given and the necessary follow-ups will be done in terms of providing the needs of newborns, such as powdered milk and nutritional equipment, clothing, and medicines with the help of donors. Additionally, telephone, virtual, or face-to-face follow-ups will be done as well. Moreover, a summary of educational content in the form of booklets and pamphlets will be provided to the intervention group at the end of each session. The mothers' perceptions of the needs of their infants will be assessed at home for a week and, finally, the questionnaire will be completed again by the mothers after a week. In order to obey the ethics issues, a summary of educational content in the form of booklets and pamphlets will also be given to the control group at the end of the study [Table 1].

Data were analyzed using descriptive statistics (mean, standard deviation, absolute and relative frequency distribution, and their percentages) and inferential statistics such as paired t -test, repeated measures analysis of variance (ANOVA), and independent t -test.

Ethical consideration

For ethical considerations and confidentiality of the information, the questionnaires were used anonymously. After obtaining the permission of the vice chancellor for research and technology of Isfahan University of Medical Sciences, the researcher referred to the selected hospital. The consent of the nurses was obtained, and the

Table 1: Education-support-follow-up program

Sessions	Description of actions
First session	Introducing the program and its goals, conscious attention to reactions, thoughts, and feelings, and talking and discussing with mothers about determining their problems and challenges Proper communication with mothers Obtaining the mother's consent for participating in the study Completing the questionnaire on the needs before the intervention
Follow-up	Contact the mother to arrange the time of the next session and announce readiness to help her
Second session	The education sessions begin based on the mothers' needs. Education sessions will be face to face. Practical education sessions will be performed beside the newborn's bed. The educational booklet is provided to the mother in person or through social network
Follow-up	Twenty-four hours after the intervention, follow-up is done using telephone, social network, or in person
Third session	Introducing supporters and donors and referring mothers to them to solve some of their problems
Follow-up	Following the mothers' communication with the charities and how they have treated her and knowing about the mother's feelings
Fourth session	Feedback and evaluation, completing the questionnaire of the needs after the intervention
Follow-up	Follow-up after discharge of newborns from the ward for the first visit, vaccination, as well as eye and hearing examination

study was approved by the ethics committee of Isfahan University of Medical Sciences (R.MUI.RESEARCH.REC.1399.408).

Discussion

Multiple births reduce the mother's ability to care for the infants. So, these mothers need very special attention from the health system and their families. Infant is a vulnerable baby that needs the attention of parents and the health system. Premature infants require more special attention and if they are twins, triplets, quadruplets, or quintuplets, their needs equal the needs of a NICU with medical and nursing staff, highly accurate and specialized equipment, and motherly interactions. Therefore, providing education, support, and routine care in the neonatal ward does not meet the needs of these mothers and they should be given extra attention. Accordingly, this study was designed to use a three-stage education-support-follow-up program [Figure 1]. To do this, the mothers will receive not only routine educational and supportive family care, but also specialized education and adequate support.

The needs of mothers of twins and multiples are based on the physical, developmental, and care needs of the newborns. Meeting the needs of newborns will change the mothers' perceptions. Researchers have found that although these mothers receive scattered help and support from family and some supporters, they do not receive enough attention from the health system. Accordingly, the mothers of triplets in the NICU cannot breastfeed their infants properly, and family supporters are also not able to be present at the maternity ward, leading to the mother's feeling of loneliness. As such, developmental care as one of the most important cares for the development of premature infants is ignored. Therefore, the development and implementation of

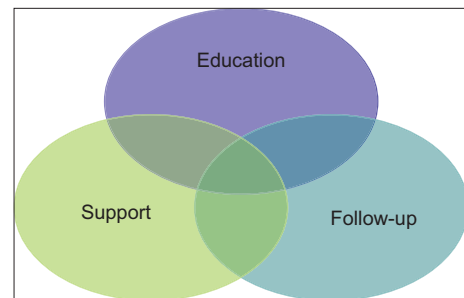


Figure 1: The education-support-follow-up program

a three-stage mixed program seems to be necessary to combine education with the empowerment of the mother, the presence of strong supporters, and continuous follow-up, so as to meet the needs of newborns and improve the mothers' perceptions of these needs.

Education is one of the requirements in empowering and enabling the mothers of multiple infants. Education is the means of enhancing learning and effective care in order to change the behavior of the mothers and empower them. Education of the mothers of multiples should be an interdisciplinary and collaborative process designed and implemented to meet the needs of clients during the care program. Appropriate educational content should be provided to individuals as an educational resource to enhance learning and make education more effective. We believe that a mixed program can play a more effective role in the mothers' perceptions of the needs of their infants, and education alone, without support for these educational programs and parental empowerment, cannot increase the mothers' perception of the needs of multiples. Similarly, financial support of the supporters together with the emotional and mental support of the family without education and follow-up cannot contribute

to the successful implementation of the program and will not increase the mothers' perceptions of the needs of multiples. Therefore, combining education and empowerment of the mothers with financial, emotional, and psychological support, as well as follow-up for meeting these needs will lead to a full perception of the needs of multiples.

Care plans and programs for the mothers of multiples should be provided during pregnancy. The results of studies showed that pregnancies caused by artificial insemination require specialized interventions, models, and designs to decrease the consequences of pregnancy, multiples, prematurity, and death.^[26,27] Bose *et al.*^[28] also believe that pregnancies with adverse outcomes in some countries should be registered in a health system for pregnant women, so that programs can be designed for preventing further problems.

Limitations and recommendation

One of the limitations of the present study is the low number of multiple infants in the study period and the researcher got to wait for new multiple births.

Lack of cooperation of medical centers, especially private centers, in carrying out the project, especially during the corona pandemic, was another limitation.

It is suggested that based on the results of the study, the health providers develop a program to better help mothers meet the needs of premature infants in the NICU. In addition, a service package could be developed by policymakers of the Ministry of Health and Medical Education for meeting the needs of multiple infants.

Conclusion

The meeting of the physical and developmental needs of the twins, triplets, quadruplets, and quintuplets is important for their parents and families. An education-support-follow-up program can help the mothers of multiples to meet the highly specialized needs of multiple infants.

Ethics approval and consent to participate

This study has been approved by Isfahan University of Medical Sciences with the ethics code IR.MUI.RESEARCH.REC.1399.408. Upon receiving this permission, the researcher will refer to the management of the medical centers and after presenting a letter of introduction and explaining the objectives of the research, will begin sampling. In the first meeting with the mothers, the researcher will explain the objectives of the research and a written informed consent will be obtained from the mothers.

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Conflicts of interest

There are no conflicts of interest.

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