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Virgin unmarried scientist Elnaz Ghaffari is a volunteer to give birth in space on her space mission design: Ensuring safety during space missions

Elnaz Ghaffari *

Iran University of Medical Sciences, Tehran, Iran.

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Abstract

The title "Virgin, Unmarried Scientist Elnaz Ghaffari is a Volunteer to Give Birth in Space on Her Space Mission Design: Ensuring Safety During Space Missions" compellingly captures the groundbreaking nature of this mission and highlights Elnaz Ghaffari's unique commitment to advancing space science. It not only underscores the scientific and exploratory aspects but also brings a personal touch by mentioning her volunteerism and detailed design for safety. This title is clear, informative, and intriguing—sure to grab attention and spark curiosity about the mission, making it a great choice for communicating the innovative and inspirational goals of the project. The resuscitation and care of a mother-astronaut during space missions present unique challenges that necessitate meticulous planning and precise execution. This article outlines a comprehensive plan for managing maternal cardiopulmonary arrest, addressing critical steps such as high-quality CPR, advanced cardiac life support (ACLS), airway management, and preparation for potential cesarean sections. Additionally, it discusses the importance of fitness, nutrition, and fetal weight control for the mother-astronaut. The presence of a Crew Medical Officer (CMO), who is a trained astronaut with medical expertise, significantly enhances the safety and success of the mission. The article concludes with a detailed overview of the space mission program, emphasizing pre-flight, in-flight, and post-flight activities to ensure the safe return of both mother and neonate to Earth.

Keywords: Space; Childbirth; Multi-planet; Pioneering; Midwifery; Ethics

1. Introduction

The resuscitation of a mother-astronaut during space missions introduces a range of challenges that require well-defined protocols and training. Given the unique environment of space, it is crucial to have a detailed plan for immediate and effective maternal resuscitation to ensure the survival and health of both mother and neonate. This article outlines the essential steps and considerations for maternal resuscitation, fitness, nutrition, and the management of complications during space missions. The inclusion of a Crew Medical Officer (CMO) trained in both astronautics and medical care is a pivotal initiative that ensures comprehensive in-flight medical support. Elnaz Ghaffari, a virgin, non-married scientist, volunteers for this groundbreaking mission to conduct childbirth in space as part of her research(1-16).

2. Maternal Resuscitation Procedures

2.1. Continuation of ACLS/BLS

- Perform high-quality CPR.
- If defibrillation is indicated, proceed accordingly.

* Corresponding author: Elnaz Ghaffari

- Administer other ACLS interventions, such as epinephrine.
- Invite the cardiac resuscitation team for pregnant mothers.
- Address the cause of cardiopulmonary arrest.

2.2. Airway Management

- Manage the airway effectively, ensuring 100% oxygen delivery and avoiding excessive ventilation.
- Establish an IV line.
- If receiving intravenous magnesium, stop it and prescribe calcium chloride or calcium gluconate.
- Use endotracheal intubation or advanced supraglottic airway management equipment.
- Employ waveform capnography or capnometry to confirm and monitor the tracheal tube position.
- After establishing an advanced airway, give one breath every 6 seconds (10 breaths per minute) along with continuous chest compressions.

2.3. Preparation for Premature Cesarean

- If no delivery has occurred, continuously move the uterus and connect fetal monitors.
- Prepare for a premature cesarean if necessary.

3. Fitness and Nutrition of the Mother-Astronaut

3.1. Fitness Before Pregnancy:

- The mother-astronaut's BMI should be within the normal range (18.5-24.9 kg/m2).
- The permissible range for weight gain during pregnancy is 11.5-16 kg, with a weekly increase of 0.4 kg from the 13th week onward.

3.2. Fetal Weight Control:

- The ideal fetal weight for delivery in space is 2900 to 3100 grams. Babies with lower weights generally have easier deliveries.
- The fetus should not be IUGR, macrosomic, LBW, VLBW, or preterm to avoid complications such as RDS and premature lungs.
- The mother should follow a controlled diet with the help of nutritionists to maintain the ideal fetal weight.

4. Crew Medical Officer (CMO)

4.1. Role and Training

A doctor trained as an astronaut, capable of performing other tasks such as research, is considered for in-flight care. In long-duration missions such as those to the moon or Mars, the presence of such personnel becomes increasingly crucial. This initiative helps in many ways, ensuring comprehensive in-flight medical support.

4.2. Training Timeline

- Three months of astronaut training for the candidate.
- Nine months of pregnancy and first delivery, with pregnancy exercises and astronautics theory lessons.
- Three months of rest, followed by another nine months of astronaut training.
- The second pregnancy should be planned, with labor induced from 37 weeks and 1 day onwards to carry out the mission.

5. Back to Earth

5.1. Safe Landing

- After giving birth, both mother and neonate must survive the landing.
- The mother-astronaut should perform Kangaroo Mother Care (KMC) during the return to Earth.

5.2. Spacesuits

Design two spacesuits for the mother-astronaut (one for launch and one for return) and one for the neonate.

6. Space Mission Program

6.1. Pre-flight Activities

- Selection screening and health stabilization.
- Detailed medical tests before the flight.

6.2. In-flight Activities

- Provide necessary medical care and measures.
- Arrange for the safe landing of the mother and baby, ensuring both return to Earth alive and well.

6.3. Post-flight Activities

- Rescue after a safe landing.
- Rehabilitation.
- Prepare an ambulance equipped for the mother and baby with a medical team for quick transfer to the hospital.
- Plan B: Have a field mobile operating room at the landing site with a medical team ready.

7. Personal Information and Background

7.1. Personal Details

- **Date of Birth:** 1995/10/21
- **Marital Status:** Virgin & not married
- **Lifestyle:** No history of alcohol or drug use, no history of smoking
- **Medical Certification:** Aviation medical certificate

7.2. Education

- PhD candidate in Aerospace Engineering
- Master of Health Education
- Bachelor of Midwifery
- Bachelor of Medical Engineering
- Bachelor of Law
- Ultralight Pilot Course

7.3. Sports

- Pistol Shooting
- Horse Riding
- Karate

7.4. Occupations

- Two years of work experience as a midwife (delivery room, women's emergency room, women's operating room)
- Two years of work experience as a midwife-nurse during the COVID-19 pandemic (in all departments of the hospital - rotation)

7.5. Research Activities

- Two years freelance researcher with Iran Aerospace Research Institute
- Two years as a freelance researcher with Shahid Beheshti University of Medical Sciences
- One year as a volunteer researcher in Spaceborn United, Netherlands, Eindhoven
- Publication of more than 7 articles with an h-index of 2 Google Scholar Profile

8. Conclusion

The resuscitation and care of a mother-astronaut during space missions require meticulous planning and precise execution. By following the outlined procedures, including high-quality CPR, ACLS interventions, airway management, and preparation for potential cesarean sections, the health and survival of both mother and neonate can be ensured. The inclusion of a Crew Medical Officer (CMO) significantly enhances the mission's safety and success. Additionally, maintaining the mother-astronaut's fitness and nutrition, controlling fetal weight, and preparing for safe landing and post-flight activities are crucial components. As humanity continues to explore space, these protocols will be essential for addressing the unique challenges of maternal and neonatal care in a microgravity environment.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

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