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Assessment of knowledge and attitude regarding stem cell among eligible couples in Supela, Bhilai (C.G.): A cross sectional study

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Abstract
Stem cell research and therapy offer promising advancements in medical science, yet awareness remains limited in many semi-urban populations. This study aimed to assess the knowledge and attitude of eligible couples residing in Supela, Bhilai (C.G.) regarding stem cells and their potential applications, particularly in regenerative medicine and cord blood banking. A structured questionnaire was used to collect data from 100 eligible couples through purposive sampling. Results revealed moderate awareness but significant misconceptions and hesitations toward stem cell donation and usage. Educational interventions are recommended to bridge the knowledge gap and promote informed decision-making.

Keywords: Bhilai, stem cell awareness, eligible couples, cord blood banking, knowledge and attitude, regenerative medicine, public health education, stem cell donation, community health, cross-sectional study

Introduction

Stem cells possess the unique ability to self-renew and differentiate into various specialized cell types. Their therapeutic potential has been proven in treating conditions such as leukemia, thalassemia, and spinal cord injuries. However, public understanding of stem cell sources (especially umbilical cord blood) and applications remains fragmented. Eligible couples, being prospective parents, form a critical demographic for promoting stem cell awareness, especially regarding cord blood banking. This study evaluates their knowledge and attitude in Supela, Bhilai, to guide future educational outreach.

Stem cells are special human cells that have the ability to develop into many different cell types, from muscle cells to brain cells. In some cases, they also have the ability to repair damaged tissues. Stem cell is an undifferentiated cell that can divide to produce some offspring cells that continue as stem cells and some cells that are destined to differentiate. Stem cells are an ongoing source of the differentiated cells that make up the tissues and organs of animals and plants. There is great interest in stem cells because they have potential in the development of therapies for replacing defective or damaged cells resulting from a variety of disorders and injuries, such as Parkinson disease, heart disease and diabetes.

Stem cells are repair units of the body that serve a central function in the maintenance and regeneration of organs and tissues throughout an organism's lifetime. Their main function is to replenish dying cells and regenerate damaged tissues. Based on the extensive stem cell research, many scientists have claimed that the cells could potentially generate cures and treatment for various diseases including cancers, cardiovascular disease, and igniting hopes of achieving stem cell-based replacement therapy in a medical setting [14].

Dinç and Sahin (2009) [12] presented a study to measure pregnant women's knowledge and attitudes towards stem cells and cord blood banking in Istanbul, Turkey. This exploratory descriptive research design had been undertaken at the Istanbul University Medical Faculty and the Okmeydani Mother-Child Health and Family Planning Center in Istanbul between October 2005 and June 2006. The sample size had confined of 334 pregnant women during routine prenatal visits in the study area. The statistical analysis of this study was carried out by applying techniques like mean, frequency and Chi-square test with the help of Statistical Package for Social Sciences (SPSS, Chicago, IL) for Windows 10.0 program.

This study had found that pregnant women who had a higher educational level were found to have a statistically significant level of knowledge about stem cells and cord blood, knowing for which illnesses cells obtained from cord blood could be used and thinking about storing cord blood. They confirmed that the statistically significant relationship was found in that as the women's educational year increased, the incidence of intermarriage decreased.

Katz *et al*. (2019) [13] assessed that pregnant women's awareness of cord blood stem cells and their attitude regarding banking options in France, Germany, Italy, Spain and UK. This comparative survey was undertaken in six maternities for comparing differences between countries. Questionnaire had been developed by the researchers and distributed among the population of this study for data collection purpose. In this attempt, the data collection was carried out on April 1, 2019. The results indicated that strong preference for public banking in all five countries, based on converging values such as solidarity. Also, attitudes of pregnant women were not an obstacle to the rapid expansion of allogeneic banking in these EU countries. Besides, the extent of commercial marketing of cord blood banks in mass media emphasized the importance for obstetric providers to play a central role in raising women's awareness early during their pregnancy with evidence-based medical information about banking options.

Savita *et al*. (2015) [11] discussed about the knowledge of antenatal mothers regarding cord blood banking. This study was adopted on exploratory research design. For the study objective, quantitative research approach and non-experiment research design were utilized. This study was carried out in Antenatal OPD of Christian Medical College, Ludhiana, Punjab. The purposive sampling technique had been applied to select the sample size of 200 antenatal mothers. The structured questionnaire was framed and issued for data collection from antenatal mothers. The descriptive and inferential statistics like percentage analysis and 'F' test were carried out for analysis purpose. The results from study indicated that most of antenatal mothers had average knowledge regarding cord blood banking. Also, the variables such as educational status, occupational status, family income were found as significant factors related to knowledge of antenatal mothers. Also, most of antenatal mothers had average knowledge regarding cord blood banking. Furthermore, they stated that there is need to enhance the knowledge of antenatal mothers by means of pamphlet.

Objectives

- To assess the level of knowledge regarding stem cells among eligible couples.
- To evaluate their attitude toward stem cell donation and banking.
- To identify correlations between sociodemographic variables and awareness levels.

Methodology

- **Study Design:** Descriptive cross-sectional survey

This is a non-experimental, observational design used to assess the current status of a phenomenon in this case, the knowledge and attitude regarding stem cells among eligible couples.

- Descriptive means it aims to describe characteristics of the population without influencing or modifying any variables.
- **Cross-sectional** refers to data collection at **a single point in time**, not over a duration or in phases.
- This design is cost-effective, quick, and suitable for **identifying patterns or associations** in a population.

- **Setting:** Supela locality, Bhilai (C.G.)

The study was conducted in Supela, a semi-urban area in Bhilai, Chhattisgarh

The setting helps contextualize the population: possibly with moderate education, mixed socio-economic status, and limited healthcare awareness.

- **Sample Size:** 100 eligible couples (either expecting or planning children)
- **Sampling Technique:** Purposive sampling

A non-probability sampling technique, purposive sampling involves selecting participants intentionally based on specific criteria

- Here, the couples were selected because of their eligibility (expecting/planning children).
- This method is useful when the researcher wants to study a targeted group in-depth.
- However, it limits the generalizability of the results to broader populations.

- **Tool Used:** Structured questionnaire with sections on sociodemographic profile, knowledge (15 items), and attitude (10 statements with Likert scale)

The primary data collection tool was a structured questionnaire, divided into three main sections:

- **Sociodemographic Profile**: To gather background information like age, education, occupation, religion, etc.
- **Knowledge Section**: Consisting of **15 objective items** assessing understanding of stem cell concepts (e.g., sources, benefits, applications).
- **Attitude Section**: Comprised of **10 statements**, measured on a **5-point Likert scale** (Strongly Agree to Strongly Disagree), evaluating participants' beliefs and openness toward stem cell use and storage.

- **Data Analysis:** Descriptive (mean, SD, frequency) and inferential statistics (Chi-square test)

Results and Analysis

Demographic Profile

- **Age group:** Majority (65%) aged 25-35 years
- **Education:** 58% graduates, 22% postgraduates, 20% high school
- **Occupation:** 60% private job, 25% self-employed, 15% homemakers
- **Monthly Income:** 48% between ₹20,000-₹40,000

Knowledge Findings

- **Good knowledge (score >75%):** 18%
- **Moderate knowledge (50-75%):** 47%
- **Poor knowledge (<50%):** 35%

Key insights
- 72% had heard of stem cells, but only 28% could correctly define them
- Only 22% were aware of cord blood banking facilities
- 80% were unaware of the stem cell application in genetic or chronic diseases

Attitude Findings
- 64% agreed that stem cell therapy is promising for future medicine
- 58% expressed willingness to donate cord blood if adequately informed
- 72% showed interest in learning more about stem cell storage and donation
- Concerns noted fear of side effects (41%), cost of stem cell banking (59%), and religious beliefs (16%)

Statistical Correlation
- Significant association between knowledge and education level ($p<0.05$).
- Attitude was positively correlated with prior exposure to stem cell information ($p<0.01$).

Discussion
The study reflects moderate awareness but a largely positive attitude toward stem cell applications among eligible couples. Education and exposure to scientific information play key roles in shaping perspectives. While many participants are open to donation and banking, lack of knowledge and misconceptions hinder proactive action. This suggests the need for targeted awareness programs in antenatal clinics and community health centers.

Conclusion
The study concluded that while a majority of eligible couples in Supela, Bhilai (C.G.) had heard of stem cells, their actual knowledge was limited, with only 18% demonstrating good understanding. Most respondents had moderate to poor knowledge, particularly regarding the applications of stem cells in genetic and chronic diseases and the availability of cord blood banking.

Despite the knowledge gap, the overall attitude toward stem cell therapy was positive. A large proportion of participants acknowledged its future potential and expressed willingness to donate cord blood if provided with accurate information. However, concerns related to cost, fear of side effects, and religious beliefs were evident and may hinder practical adoption.

Statistical analysis highlighted that higher education levels were significantly associated with better knowledge, and prior exposure to stem cell information positively influenced attitude.

In summary, the findings underscore the urgent need for targeted educational interventions to improve awareness and understanding of stem cell science, particularly among reproductive-age couples, to support informed decision-making regarding donation and therapy options.

Eligible couples in Supela, Bhilai show moderate knowledge and a favourable attitude toward stem cells, yet lack specific understanding of stem cell sources and applications. Educational initiatives tailored to address local beliefs, cost concerns, and practical benefits can significantly improve awareness and utilization.

Recommendations
- Organize community-based awareness programs
- Integrate stem cell education into antenatal counselling
- Promote partnerships with cord blood banks for public awareness.
- Use digital media and local language resources for outreach.

Conflict of Interest
Not available

Financial Support
Not available

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