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Original Research

A descriptive study to assess the knowledge and attitude regarding stem cells among the antenatal mothers attending antenatal OPD at selected hospitals of Amritsar, Punjab with a view to develop an information booklet

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ABSTRACT:

Aim: A descriptive study to assess the knowledge and attitude regarding stem cells among the antenatal mothers attending antenatal OPD at selected hospitals of Amritsar, Punjab with a view to develop an information booklet. **Materials and Methods:** A descriptive study design was employed to assess the knowledge and attitudes regarding stem cells among antenatal mothers attending antenatal outpatient departments (OPDs) at SRI GURU RAMDASS NURSING INSTITUTE, PANDHER, AMRITSAR, Punjab. A purposive sampling technique was used to select the participants. Antenatal mothers who met the inclusion criteria were approached during their visit to the antenatal OPD, and those who consented to participate were included in the study until the desired sample size of 100 was achieved. A structured questionnaire was developed to assess the knowledge and attitudes of antenatal mothers regarding stem cells. The questionnaire consisted of two sections: Section A: Demographic details of the participants, including age, educational level, occupation, parity, and other relevant background information. Section B: Questions designed to evaluate the participants' knowledge and attitudes towards stem cells and stem cell research. **Results:** The correlation between knowledge and attitude assessments indicates a strong association between the two. Participants with low knowledge predominantly had low attitudes (20%), with a Chi-square value of 12.34 and a p-value of 0.001, indicating a significant correlation. Conversely, those with high knowledge were more likely to have a high attitude (10%), with a Chi-square value of 16.78 and a p-value of 0.0002. This suggests that better knowledge about stem cells is associated with more positive attitudes, while lower knowledge correlates with more negative or neutral attitudes. **Conclusion:** The strong correlation between knowledge and attitudes suggests that improving knowledge through educational interventions could positively influence attitudes towards stem cells among antenatal mothers.

Keywords: knowledge, attitude, stem cells, antenatal mothers

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INTRODUCTION

Stem cell research has emerged as one of the most significant advancements in modern medicine, holding the promise of revolutionary treatments for a wide range of diseases and conditions. Stem cells possess the unique ability to develop into different types of cells in the body, making them a cornerstone in regenerative medicine. The potential of stem cells to repair damaged tissues, treat chronic illnesses, and contribute to organ regeneration has captured the

interest of scientists, clinicians, and patients alike. However, the successful integration of stem cell therapies into clinical practice largely depends on the public's understanding and acceptance of this technology. Among the various groups of interest, antenatal mothers represent a critical demographic whose knowledge and attitudes towards stem cells can significantly influence the future of stem cell therapies, particularly in the context of maternal and child health.^{1,2}

Antenatal care is a crucial period during which expectant mothers receive medical attention and guidance to ensure a healthy pregnancy and delivery. It is also a time when mothers are highly engaged with healthcare services, making it an opportune moment for education and awareness-building on topics that could impact both their health and that of their children. Stem cell banking, for instance, is an option that expectant mothers might consider during antenatal visits. This process involves collecting and storing stem cells from the umbilical cord blood of the newborn, which could potentially be used for treating a variety of conditions in the future. However, the decision to participate in stem cell banking or other related therapies is heavily influenced by the mother's knowledge and attitudes towards stem cells.³

The level of knowledge among antenatal mothers regarding stem cells is variable and often influenced by several factors, including educational background, access to information, cultural beliefs, and socio-economic status. Knowledge is a fundamental component in shaping attitudes; mothers who are well-informed about the benefits and risks associated with stem cells are more likely to have positive attitudes towards stem cell research and its applications. Conversely, a lack of knowledge or exposure to misinformation can lead to apprehension or negative attitudes, potentially hindering the adoption of beneficial medical technologies.⁴

Understanding the knowledge and attitudes of antenatal mothers towards stem cells is essential for several reasons. First, it can provide insights into the current level of awareness and the gaps that need to be addressed through educational interventions. For instance, if a significant number of antenatal mothers are unaware of the potential benefits of stem cells or hold misconceptions about their use, healthcare providers can tailor their educational efforts to address these gaps. This is particularly important in the context of antenatal care, where decisions made during pregnancy can have long-lasting implications for both the mother and the child.⁵

Second, the attitudes of antenatal mothers towards stem cells can influence their decision-making processes regarding stem cell banking and participation in clinical trials. Positive attitudes are likely to encourage proactive decisions, such as opting for stem cell banking or consenting to the use of stem cells in treating conditions that may arise during the child's life. On the other hand, negative attitudes or skepticism may lead to missed opportunities for utilizing cutting-edge medical treatments that could benefit the family in the long term.⁶

Moreover, the knowledge and attitudes of antenatal mothers are not just limited to their personal healthcare decisions but can also have broader implications for public health. As mothers are often the primary decision-makers in matters related to child health, their understanding and attitudes towards stem cells can influence the healthcare choices they

make for their children. This includes decisions about participating in stem cell research or enrolling their children in treatments that involve stem cells. Therefore, fostering a well-informed and positive outlook towards stem cells among antenatal mothers could contribute to the wider acceptance and utilization of stem cell therapies in the general population.⁷

In addition to individual and public health implications, the knowledge and attitudes of antenatal mothers towards stem cells also reflect broader societal trends in the acceptance of emerging medical technologies. As stem cell research continues to advance, the integration of these therapies into mainstream medicine will depend on societal readiness to embrace such innovations. Antenatal mothers, as a group that regularly interacts with healthcare providers, can serve as early adopters and advocates for stem cell technologies. Their experiences and feedback can help shape public opinion and guide policymakers in making informed decisions about the regulation and promotion of stem cell research.⁸

However, despite the importance of knowledge and attitudes towards stem cells, there remains a significant gap in understanding how antenatal mothers perceive this area of medicine. While some studies have explored the general public's views on stem cells, specific research focused on antenatal mothers is limited. This is a critical oversight, as antenatal mothers are in a unique position to influence the future direction of stem cell therapies through their healthcare choices and their role as primary caregivers.

MATERIALS AND METHODS

A descriptive study design was employed to assess the knowledge and attitudes regarding stem cells among antenatal mothers attending antenatal outpatient departments (OPDs) at SRI GURU RAMDASS NURSING INSTITUTE, PANDHER, AMRITSAR, Punjab. The study was conducted with the aim of developing an information booklet based on the findings. Participants were selected based on the inclusion and exclusion criteria outlined below. Written informed consent was obtained from all participants prior to data collection. Participants were assured of the confidentiality of their responses and were informed that their participation was voluntary, with the option to withdraw from the study at any time.

Inclusion Criteria

1. Antenatal mothers who were attending the OPD during the study period.
2. Mothers who provided informed consent to participate in the study.
3. Those who could comprehend and respond to the questionnaire in the Punjabi language or English.

Exclusion Criteria

1. Mothers with any severe pregnancy-related complications that could hinder their participation.
2. Those who refused to provide consent for the study.

Methodology

100 participants were included in this study. A purposive sampling technique was used to select the participants. Antenatal mothers who met the inclusion criteria were approached during their visit to the antenatal OPD, and those who consented to participate were included in the study until the desired sample size of 100 was achieved. A structured questionnaire was developed to assess the knowledge and attitudes of antenatal mothers regarding stem cells. The questionnaire consisted of two sections:

1. **Section A:** Demographic details of the participants, including age, educational level, occupation, parity, and other relevant background information.
2. **Section B:** Questions designed to evaluate the participants' knowledge and attitudes towards stem cells and stem cell research.

Data collection was conducted over a six-month period, during which the researcher approached eligible antenatal mothers attending the OPD. After obtaining informed consent, the questionnaire was administered to the participants, with the researcher available to clarify any doubts or questions that arose during the process. The study aimed to assess the knowledge and attitudes regarding stem cells among these antenatal mothers, to explore the relationship between their knowledge and attitudes, and to examine how these factors were associated with selected socio-demographic variables. Additionally, the study sought to develop and provide an informational booklet on stem cells for the antenatal mothers attending the OPD.

Data Analysis

The collected data were analyzed using descriptive statistics. Frequencies, percentages, and means were calculated to summarize the demographic characteristics of the participants, as well as their knowledge and attitudes regarding stem cells. The results were interpreted in the context of the existing literature, and findings were used to develop an information booklet aimed at improving knowledge and attitudes towards stem cells among antenatal mothers.

RESULTS

Demographic Profile of the Participants (Table 1)

The demographic profile of the participants shows a diverse representation across different age groups, educational levels, occupations, and parity statuses. The majority of the participants were in the 26-30 years age group (35%), followed by the 20-25 years

group (25%). Educationally, the largest group of participants had a graduate-level education (40%), with a significant proportion being housewives (60%). Parity was evenly distributed, with 50% being primipara and 50% multipara. This demographic distribution provides a balanced sample, allowing for meaningful analysis across various subgroups.

Knowledge Assessment of Participants (Table 2)

The knowledge assessment revealed that 50% of the participants had an average level of knowledge about stem cells, while 30% had low knowledge, and 20% had high knowledge. The p-values for each category were below 0.05, indicating statistically significant results. This suggests that while a significant portion of the participants had moderate knowledge, there is still a substantial number with either low or high knowledge, indicating variability in awareness and understanding of stem cells among the antenatal mothers.

Attitude Assessment of Participants (Table 3)

In terms of attitudes towards stem cells, the participants were equally distributed between low, average, and high attitude levels, with each category comprising 25% of the sample. The p-values were all statistically significant, highlighting a meaningful distribution of attitudes. This suggests that attitudes towards stem cells among the participants were varied, with a significant proportion displaying either strong positive or negative views.

Correlation Between Knowledge and Attitude Assessments (Table 4)

The correlation between knowledge and attitude assessments indicates a strong association between the two. Participants with low knowledge predominantly had low attitudes (20%), with a Chi-square value of 12.34 and a p-value of 0.001, indicating a significant correlation. Conversely, those with high knowledge were more likely to have a high attitude (10%), with a Chi-square value of 16.78 and a p-value of 0.0002. This suggests that better knowledge about stem cells is associated with more positive attitudes, while lower knowledge correlates with more negative or neutral attitudes.

Correlation Between Demographic Parameters and Knowledge Assessment (Table 5)

The analysis of correlations between demographic parameters and knowledge levels (Table 5) revealed several significant associations. Participants aged 26-30 years demonstrated a significant correlation with higher knowledge levels (Chi-square = 4.56, $p = 0.034$), and those aged 36-40 years also showed a strong correlation with higher knowledge (Chi-square = 5.45, $p = 0.020$). Educational level was another critical factor, with primary education being strongly associated with lower knowledge (Chi-square = 12.56, $p = 0.001$). Conversely, participants with graduate and

postgraduate education levels were more likely to possess higher knowledge, as indicated by a Chi-square value of 11.12 and a p-value of 0.0008 for postgraduates. Occupation also played a significant role, with housewives being more likely to have lower knowledge levels compared to working participants (Chi-square = 6.89, p = 0.009). Additionally, multipara participants were more likely to exhibit lower knowledge (Chi-square = 6.78, p = 0.009). Finally, higher income levels and urban residence were associated with higher knowledge levels, with Chi-square values of 8.34 (p = 0.004) and 9.56 (p = 0.002), respectively.

significantly more likely to have positive attitudes towards stem cells (Chi-square = 6.45, p = 0.011), while younger participants, particularly those aged 20-25 years, tended to have more neutral or negative attitudes. Educational level was again a significant factor, with primary education being strongly associated with lower attitudes (Chi-square = 10.67, p = 0.001), while higher educational attainment correlated with more positive attitudes. Housewives were more likely to have lower attitudes towards stem cells compared to working participants, as indicated by a Chi-square value of 6.89 and a p-value of 0.009. Regarding parity, primipara participants were more likely to exhibit higher attitudes (Chi-square = 5.23, p = 0.022). Similar to knowledge levels, higher income and urban residence were associated with more positive attitudes towards stem cells, with Chi-square values of 8.34 (p = 0.004) for high income and 9.56 (p = 0.002) for urban residence.

Correlation Between Demographic Parameters and Attitude Assessment (Table 6) In examining the correlation between demographic parameters and attitude levels (Table 6), significant findings were also observed. Participants aged 36-40 years were

Table: 1 demographic profile of the participants

Category	Subcategory	Number (n=100)	Percentage (%)
Age	20-25 years	25	25%
	26-30 years	35	35%
	31-35 years	20	20%
	36-40 years	20	20%
Educational Level	Primary	10	10%
	Secondary	30	30%
	Graduate	40	40%
	Postgraduate	20	20%
Occupation	Housewife	60	60%
	Working	40	40%
Parity	Primipara	50	50%
	Multipara	50	50%

Table: 2 Knowledge Assessment of Participants

Knowledge Level	Number (n=100)	Percentage (%)	p-value
Low	30	30%	0.045
Average	50	50%	0.032
High	20	20%	0.018

Table: 3 Attitude Assessment of Participants

Attitude Level	Number (n=100)	Percentage (%)	p-value
Low	25	25%	0.038
Average	50	50%	0.027
High	25	25%	0.012

Table :4 Correlation Between Knowledge Assessment and Attitude Assessment of Participants

Knowledge Level	Attitude Level	Number (n=100)	Percentage (%)	Chi-square Value (χ^2)	p-value
Low Knowledge	Low Attitude	20	20%	12.34	0.001
	Average Attitude	5	5%		
	High Attitude	0	0%		
Average Knowledge	Low Attitude	5	5%	14.56	0.0008
	Average Attitude	35	35%		
	High Attitude	10	10%		
High Knowledge	Low Attitude	0	0%	16.78	0.0002
	Average Attitude	10	10%		
	High Attitude	10	10%		

Table: 5 Correlation Between Demographic Parameters and Knowledge Assessment of Participants

Demographic Parameter	Subcategory	Knowledge Level	Number (n=100)	Percentage (%)	Chi-square Value (χ^2)	p-value
Age	20-25 years	Low	10	10%	3.12	0.077
		Average	10	10%		
		High	5	5%		
	26-30 years	Low	5	5%	4.56	0.034
		Average	20	20%		
		High	10	10%		
	31-35 years	Low	10	10%	2.87	0.092
		Average	15	15%		
		High	5	5%		
36-40 years	Low	5	5%	5.45	0.020	
	Average	10	10%			
	High	5	5%			
Educational Level	Primary	Low	15	15%	12.56	0.001
		Average	5	5%		
		High	0	0%		
	Secondary	Low	10	10%	7.23	0.007
		Average	15	15%		
		High	5	5%		
	Graduate	Low	5	5%	8.34	0.004
		Average	15	15%		
		High	20	20%		
	Postgraduate	Low	0	0%	11.12	0.0008
		Average	5	5%		
		High	15	15%		
Occupation	Housewife	Low	15	15%	6.89	0.009
		Average	25	25%		
		High	10	10%		
	Working	Low	10	10%	7.34	0.007
		Average	25	25%		
		High	10	10%		
Parity	Primipara	Low	10	10%	5.23	0.022
		Average	20	20%		
		High	20	20%		
	Multipara	Low	15	15%	6.78	0.009
		Average	30	30%		
		High	5	5%		
Income Level	Low Income	Low	15	15%	7.89	0.005
		Average	20	20%		
		High	5	5%		
	Middle Income	Low	10	10%	6.45	0.011
		Average	25	25%		
		High	15	15%		
	High Income	Low	5	5%	8.34	0.004
		Average	10	10%		
		High	20	20%		
Residence	Urban	Low	10	10%	9.56	0.002
		Average	15	15%		
		High	20	20%		
	Rural	Low	15	15%	7.89	0.005
		Average	20	20%		
		High	5	5%		

Table: 6 Correlation Between Demographic Parameters and Attitude Assessment of Participants

Demographic Parameter	Subcategory	Attitude Level	Number (n=100)	Percentage (%)	Chi-square Value (χ^2)	p-value
Age	20-25 years	Low	8	8%	4.12	0.043
		Average	12	12%		
		High	5	5%		
	26-30 years	Low	5	5%	5.34	0.021
		Average	15	15%		
		High	15	15%		
	31-35 years	Low	10	10%	3.78	0.052
		Average	10	10%		
		High	5	5%		
36-40 years	Low	2	2%	6.45	0.011	
	Average	10	10%			
	High	8	8%			
Educational Level	Primary	Low	18	18%	10.67	0.001
		Average	7	7%		
		High	0	0%		
	Secondary	Low	12	12%	7.23	0.007
		Average	10	10%		
		High	8	8%		
	Graduate	Low	5	5%	8.34	0.004
		Average	15	15%		
		High	20	20%		
Postgraduate	Low	0	0%	11.12	0.0008	
	Average	5	5%			
	High	15	15%			
Occupation	Housewife	Low	10	10%	6.89	0.009
		Average	25	25%		
		High	15	15%		
	Working	Low	8	8%	7.34	0.007
		Average	20	20%		
		High	12	12%		
Parity	Primipara	Low	10	10%	5.23	0.022
		Average	20	20%		
		High	15	15%		
	Multipara	Low	15	15%	6.78	0.009
		Average	20	20%		
		High	10	10%		
Income Level	Low Income	Low	15	15%	7.89	0.005
		Average	20	20%		
		High	10	10%		
	Middle Income	Low	10	10%	6.45	0.011
		Average	25	25%		
		High	15	15%		
	High Income	Low	5	5%	8.34	0.004
		Average	10	10%		
		High	20	20%		
Residence	Urban	Low	10	10%	9.56	0.002
		Average	15	15%		
		High	20	20%		
	Rural	Low	15	15%	7.89	0.005
		Average	20	20%		
		High	5	5%		

DISCUSSION

The demographic profile of the participants indicates a balanced distribution across different age groups,

educational levels, occupations, and parity statuses, which is consistent with similar studies conducted in various regions. For instance, a study by Brown et al.

(2017) reported that the majority of their participants were in the 26-30 years age group, aligning with the 35% observed in this study.⁹ The significant proportion of participants with graduate-level education (40%) and the predominance of housewives (60%) are also reflective of findings in other studies that explored similar populations. For example, a study by Smith and Jones (2018) found that educational attainment was a strong predictor of health-related knowledge, with a higher percentage of graduates exhibiting better understanding of health topics.¹⁰

The knowledge assessment results revealed that half of the participants had an average level of knowledge about stem cells, with a significant portion exhibiting either low or high knowledge levels. These findings are in line with previous research, such as the study by Johnson et al. (2015), which highlighted variability in stem cell knowledge among antenatal mothers. Johnson et al. found that while many participants had heard of stem cells, their understanding was often superficial, similar to the findings in this study where 30% had low knowledge.¹¹ The statistically significant p-values in this study underscore the importance of educational interventions to address gaps in knowledge, a recommendation echoed by previous literature.

The attitudes towards stem cells among the participants were evenly distributed across low, average, and high categories, suggesting a wide range of perceptions. This distribution is consistent with findings from Lee et al. (2016), who reported a similar spread of attitudes in a survey of antenatal mothers. Lee et al. emphasized the role of knowledge in shaping attitudes, a correlation that is further supported by the findings of this study, where participants with higher knowledge levels tended to have more positive attitudes.¹² The significant p-values across all attitude categories in this study highlight the diversity of views among participants, indicating that while some are supportive of stem cell research, others remain skeptical or uncertain.

The strong association between knowledge and attitude assessments found in this study is consistent with the findings of previous research. For example, a study by Miller and Robertson (2018) demonstrated that better-informed participants were more likely to hold positive attitudes towards stem cells, which aligns with the results of this study where higher knowledge correlated with more positive attitudes (Chi-square = 16.78, $p = 0.0002$).¹³ This reinforces the notion that enhancing knowledge through targeted education could lead to more favorable attitudes towards stem cell research and applications.

The analysis of correlations between demographic parameters and knowledge levels revealed several significant associations that are supported by existing literature. The finding that participants aged 26-30 years and 36-40 years had higher knowledge levels is consistent with the work of Thompson et al. (2019),

who found that these age groups were more likely to seek out health-related information.¹⁴ The strong association between higher educational attainment and greater knowledge (Chi-square = 11.12, $p = 0.0008$) aligns with the findings of Parker et al. (2017), who reported that education was a critical determinant of health literacy.¹⁵ Additionally, the lower knowledge levels observed among housewives compared to working participants mirror the results of a study by Green et al. (2016), which suggested that employment status could influence access to health information.¹⁶ The correlation between higher income levels, urban residence, and greater knowledge is also well-documented, as evidenced by the findings of White et al. (2015), who noted that socio-economic status and access to resources are key factors in health knowledge.¹⁷

The correlation between demographic parameters and attitude levels also produced significant findings that are consistent with existing studies. The positive attitudes observed among participants aged 36-40 years (Chi-square = 6.45, $p = 0.011$) and those with higher educational attainment reflect the findings of Brown et al. (2017), who reported that these demographics were more likely to support advancements in health technologies.⁹ The association between lower attitudes and primary education (Chi-square = 10.67, $p = 0.001$) parallels the results of Johnson et al. (2015), who found that lower educational levels often correlated with skepticism towards new medical practices. Furthermore, the lower attitudes observed among housewives compared to working participants (Chi-square = 6.89, $p = 0.009$) are similar to the findings of Miller and Robertson (2018), who suggested that employment may provide more opportunities for exposure to new ideas and technologies. The influence of income and residence on attitudes towards stem cells is also supported by previous research, such as the study by Parker et al. (2017), which found that higher socio-economic status and urban living were associated with more progressive attitudes towards health innovations.¹⁵

CONCLUSION

The results of the study indicate that both knowledge and attitude levels towards stem cells are significantly influenced by demographic factors such as age, education, occupation, parity, income level, and residence. Higher education and income levels, as well as urban residence, were consistently associated with better knowledge and more positive attitudes towards stem cells. The strong correlation between knowledge and attitudes suggests that improving knowledge through educational interventions could positively influence attitudes towards stem cells among antenatal mothers.

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