AN OBSERVATION OF FACTORS AFFECTING STEM CELL BANKING ADOPTION

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ABSTRACT

Humans immediately didn't welcome new technology/invention or practices that were called as breakthrough in a society. Later as environmental forces favored inventions, adoption of new methods were inevitable. Resistance and protests have resulted in slower adoption and diffusion of innovative practices. One such useful invention is stem cell banking. Scientists have argued that stem cells present in umbilical cord helps to cure many deadly diseases. Though stem cell banking practices were initiated and offered by various hospitals and health care institutes, its adoption has not picked up. Generating customer awareness is the first milestone to be achieved by the marketer to trigger adoption of stem cell banks in the future. Awareness, age and confidence were subjected to correlation. An attempt to determine effect of various factors on creating awareness about stem cell banking was also performed. The results were interesting with variables 'government review' and 'lack of availability' was found playing a key role in stem cell banking awareness.

KEYWORDS: Stem cell, Banking, Adoption, Factors

1.0. INTRODUCTION

Stem cells originate from multi cellular organisms. The specialty of these cells lies in their capability to form more cells that are of various kinds thereby serving as repairing tool. Umbilical cord connects mother and child in all mammals. This cord helps in transfer of food from mother to child. Blood in these cord cells contains stem cells. These cells can be re-engineered as brain and heart cells that possess capability to cure many diseases.

As this practice has gained popularity in western countries, in India the rate of cord blood banking has not picked up. In US every 50 person in 1000 and 250 person in 1000 in Singapore opts for cord blood banking. According to association of stem cell banks of India, over 10 lakh units of cord blood are being stored in 15 private banks across India. Stem cell research was an unfilled gap in the market until 2014. It is projected to be dominant research area by the year 2020 because of failing traditional medicines in curing chronic diseases.

1.1 CONSUMER BEHAVIOR

From marketing perspective the position of stem cell banks are a lot complicated. The question arises on how to sell a service that has not sufficiently diffused. Private stem cell banks in India are in bit of a struggle to find consumers of stem cell banking service as there is no much product /service visibility in media promotion.

Private firms like Reelabs, Cryoviva, Cordlife had no choice except appointing sales force training them to educate on stem cell banking associated advantages as these companies see a future vision in using sales personnel to develop a market that might grow in its size and profitability in future.

As this therapy requires high technical expertise by professionals, stem cell treatment by nature is a specific solution for a particular problem. This makes every customer to ask numerous questions as confidence level would be low to go for stem cell. Stem cell business is not regulated that means there are no conditions for a medical technician to start a stem cell bank as of now. There are certain details a consumer would have to observe before going to treatment like expertise can be measured from years of experience. Moreover the hygiene factor should be given top priority followed by instruments laboratory, teams and transplant facility. The services features like storage process and quality maintained from beginning to end needs to be revealed to customers and even the donors and customers should take a stock of all these points before going for service.

1.2. MARKETS

As this area is a new one, companies are also looking to collaborate intellectual and financial resources to dig deep into this science of stem cell. This helps in inventing new products and

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services. As the market is in a nascent stage, companies can achieve dexterity in various methods of building products. If stem cell banks can be classified, there are two classifications.

1. Public cord blood banks

2. Private cord blood banks.

Public cord blood banks are in very small numbers in India where volunteers can donate the umbilical cord blood free of cost. When the sample is stored by banks, public stem cell banks are in no obligation to give the sample to treat relatives of donor. But instead if they find a match in a stranger they may use it. This kind of donation can be done if an individual would like to help anyone in getting treatment. It might not be a free donation in private stem cell banks as they charge for storing. The donor gets a valuable service in private establishments where he/she can get the cord blood sample to treat a close relative.

The stem cell companies in India can be classified based on functionalities. One is stem cell banking companies that collect the sample of stem cells and stores them. The other is research companies where they do not maintain any service relationships with customers but instead they strive to achieve breakthrough in the field of stem cell research.

1.3. NEED AND DEMAND

World has lost great scientists and artists to deadly diseases being one of them leukemia. Still people are dying as right matches are not available. This calls for imminent need of cord blood samples to be stored. More individuals must volunteer in donating cord blood. There is need for spreading awareness and educating people about valuable purposes that are fulfilled. The research questions were developed are as follows

RQ1. Why there is no adoption of stem cell banking?

RQ2. Is there basic awareness of stem cell banking?

RQ3. What are the factors influencing stem cell banking?

RQ4. Does awareness increase with age and confidence?

The number of stem cell banks is not so impressive. So far only fifteen promising centers can be counted throughout India. These centers are only available in major metropolitan cities in India. Now let us just count on demand and supply in district, taluk and rural areas. There is no supply at all in these areas and unattended issues rise as patients in rural areas suffer and are redirected to metropolitan cities. In future if more awareness is spread on this issue, supply would fail to satisfy the demand.

2.0. LITERATURE REVIEW/IDENTIFICATION OF FACTORS

The present research in the industry on stem cells is aimed at finding more accurate cures for dreadful diseases like multiple sclerosis, diabetes, Parkinson's Alzheimer's, arthritis and heart diseases. As the literature was scarce, certain factors were selected that were related to awareness of stem cell banking among customers. Pharmaion report forecasts that stem cell business category in India would grow at 28% CAGR. It was estimated that government and private institutions would scale up investments in stem cell research and promotions of service. As we have an adoption problem, we started observing and listing factors that leads to awareness on stem cell. Awareness of many issues will be gained as an individual ages, so is confidence. Therefore we hypothesized,
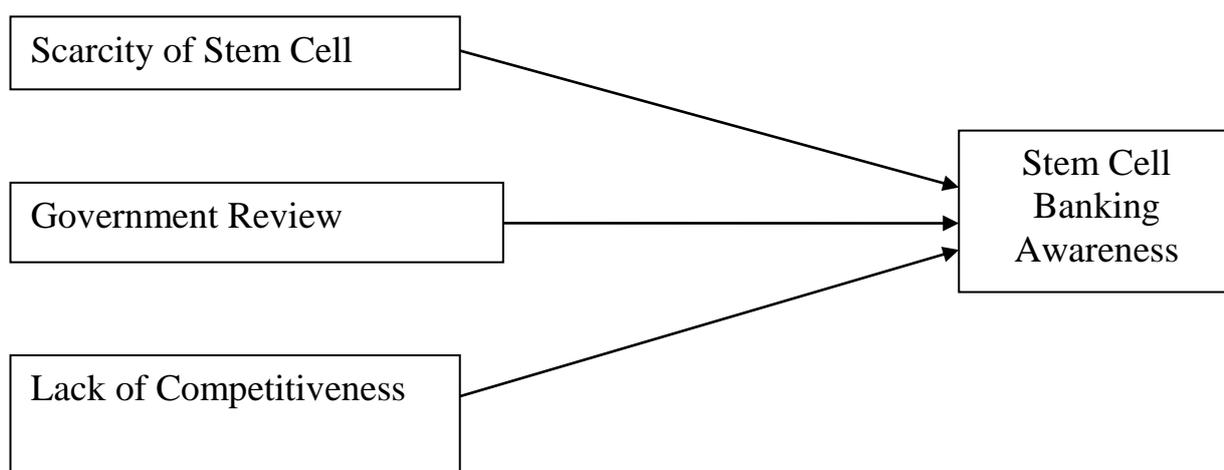
H1N: Age and Awareness are not correlated.

H1A: Age and Awareness are correlated

H2N: Age and confidence are not progressively correlated

H2A: Age and confidence are progressively correlated

Scarcity of stem cell, lack of government review and less competitiveness were factors selected for measuring awareness. Scarcity of stem cell decreases hopes of people thereby demotivating them for spreading good word of mouth. This results in less awareness. No individual would like to recommend a solution that is scarce or not available whenever there is a need. Governments; be it state or Centre have not paid attention towards releasing more fund towards stem cell banking. Less funding initiatives towards stem cell research also hinders more companies to start services finally resulting into less awareness on stem cell banking.

Fig No 1: Hypothetical model

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As stem cell banking is hard to find, apart from educated urbanites, large fragment of people are not in a state of mind to understand the concept of stem cell. Reluctance and the topic complexity may again pose as a big barrier to awareness creation on stem cell research and banking.

2.1. HYPOTHESIS DEVELOPMENT

H3N: Scarcity of stem cell does not enhance stem cell banking awareness

H3A: Scarcity of stem cell enhances Stem cell banking awareness.

H4N: Lack of Government review is not related with stem cell banking awareness

H4A: Lack of Government review is related with stem cell banking awareness

H5N: Lack of competitiveness does not enhance stem cell banking awareness

H5A: Lack of competitiveness enhances stem cell banking awareness.

On the supply side, stem cell banks are aware of their less numbers and they are making big promises to customers (patients) for transactions. But in practice cord blood banking being a highly technical service is not being offered for a reasonable price. The charges start from 60,000 to 1,20,000 rupees for processes. There is also a separate charge per year a customer has to pay for maintenance.

3.0. OBJECTIVES

The main objective of the paper is to observe factors that are contributing towards awareness of stem cell banking. Sub objectives aim at finding influence of Scarcity of stem cell, Government Review, Lack of competitiveness role in development of awareness towards stem cell banking service. The study also makes an attempt to find correlation between age, awareness and confidence on stem cell banking.

4.0. RESEARCH METHODOLOGY

The study makes a descriptive approach towards achieving the stated objectives. Data was collected from a structural questionnaire. The population was very large and no sample frame was available to make a probabilistic approach. Therefore judgmental sampling technique was used to approach respondents. Respondents were qualified only if they had any awareness on stem cell banking practices and issues. A total of 120 responses were collected. After scrutiny 98 were considered eligible for analysis. Multiple regressions were used to measure the factors relativity to awareness of stem cell banking.

5.0. DATA ANALYSIS

Before going for correlation and regression analysis, reliability was checked for all variables like scarcity of stem cell, lack of government review and awareness of stem cell banking.

Table 1: Cronbach Alpha Value

Variable	Cronbach Alpha
Scarcity of Stem cell Research	0.79
Government Review	0.83
Less Competitiveness	0.65
Stem Cell Banking Awareness	0.85

Source: Primary Data

By the rule of thumb, Cronbach alpha should be more than 0.50 to be taken for analysis. All variables displayed encouraging results more than 0.50. Overall average Cronbach alpha score stood at 0.78. This prompted us to go for further analysis

5.1. PEARSON CORRELATION

An attempt to measure the correlation between age, awareness and confidence levels of customers was made. Age was selected because of its interesting characteristic. With age increasing a human being gains knowledge. Age, awareness and confidence levels were subjected to Pearson correlation.

Table 2: Correlations

		Age	Aware	Confidence
Age	Pearson Correlation	1	.624**	.143
	Sig. (2-tailed)		.000	.159
	N	98	98	98
Aware	Pearson Correlation	.624**	1	.252*
	Sig. (2-tailed)	.000		.012
	N	98	98	98
Confidence	Pearson Correlation	.143	.252*	1
	Sig. (2-tailed)	.159	.012	
	N	98	98	98

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Data Analysis

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By the above table 2, we can observe that age and awareness were correlated. The r value was 0.624 with statistically significant value. Awareness increased with age. Age and confidence were not related with only small strength of 0.143 with no statistical significance. Thereby H1A was satisfied and H2N was satisfied.

5.2. MULTIPLE REGRESSION ANALYSIS

The result of correlation was a motivation to go for multiple regressions where we were anxious to test factors for their relationship with awareness. Factors like scarcity of stem cell, lack of government review and less competitiveness as independent variables and awareness on stem cell banking as dependent variable were subjected to multiple regression analysis.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.526[a]	.277	.253	.84391

a. Predictors: (Constant), LessCompetitiveness, ScarcityofStemCell,

LackofGovernmentRev

Source: Data Analysis

Table 4: ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.585	3	8.528	11.975	.000[a]
	Residual	66.945	94	.712		
	Total	92.531	97			

a. Predictors: (Constant), LessCompetitiveness, ScarcityofStemCell, LackofGovernmentRev

b. Dependent Variable: Aware

Source: Data Analysis

Table 5: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.331	.722		1.843	.068
ScarcityofStemCell	.894	.149	.574	5.986	.000
LackofGovernmentRev	-.366	.194	-.196	-1.888	.062
LessCompetitiveness	-.040	.164	-.024	-.245	.807

a. Dependent Variable: Aware

Source: Data Analysis

In table 3, 4 & 5 includes the output of SPSS. In table 3 model summary R value stood at 0.526 and R Square fared at 0.277. ANOVA was significant in table 4. An interesting observation was made as scarcity of stem cell was related to awareness with the strength of 0.894.
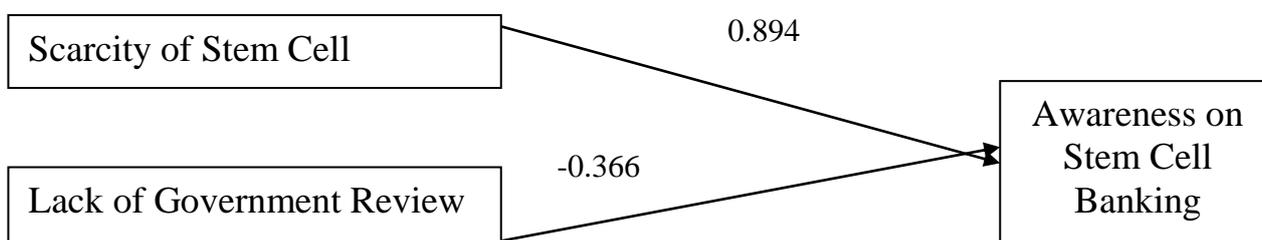
Fig No: 2

Source: Data Analysis

The nature of relationship was positive that meant more scarcity would only spread more awareness. Lack of government review was negatively related to stem cell awareness. That meant increased lack of government review would result in to less awareness creation of stem cell in the society. Less competitiveness was not related with awareness as there was no statistically significant value.

CONCLUSION

By the data analysis we can observe that lack of stem cells would contribute more for awareness of stem cell banking. Scarcity of stem cells is just a phenomenon. It depends on how much noise is made on scarcity of stem cells. The variable was capable enough to garner interesting response from respondents. We can conclude that awareness of stem cell banking can be realized by scarcity of stem cell. Lack of government review was negatively related with awareness of stem cell banking

which meant increase in lack of government attention would result in decreased awareness of stem cell banking. Out of two factors one was positively related and the other was negatively related.

SCOPE FOR FUTURE RESEARCH

Future studies can attempt to survey the number of stem cell banking institutions and facilities being availed by people. As more descriptive studies help in building strong literature, then factors play crucial role in adoption of stem cell banking can be observed. As researchers arrive at a perfect set of data, then these factors can be tested for relationship with dependent variable. This study is one of first of its kind many more studies can be conducted in this area.

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