



**Research Article**

**PERCEPTION ABOUT STEM CELL TRANSPLANT IN THE EASTERN PROVINCE OF SAUDI ARABIA: A CULTURAL PERSPECTIVE**

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**ABSTRACT**

**Introduction:** Stem cell transplant has become a widely applied modality of treatment worldwide as well as an area of public health concern. It has been shown that there is an improvement of long-term survival for patients with serious conditions who undergo stem cell therapy. The Eastern Province represents the highest prevalence of inherited hematological disorders such as sickle cell disease and thalassemia compared to other regions. Furthermore, about 3,000 SCD patients of the Eastern Province are candidates for hematopoietic stem cell transplant.

**Method:** Data were collected through a cross-sectional study using self-administered questionnaire, which applied from April 2015 to March 2016. The target population is all adults in the eastern province of Saudi Arabia who are above 18 years old (n=386) of both genders in which, 274 male and 112 female subjects are involved. The data was entered and analyzed by SPSS software version 21.

**Result:** Out of total 386 collected subjects, 69.2% have heard about stem cells transplantation, 60.9% support the idea of stem cells donation. Moreover, 42% do see their community lack awareness regarding stem cells. In addition, 37.8% have the idea that stem cells can treat incurable diseases. The majority of the subjects believe there are benefits in stem cell transplantation (75.39%).

**Conclusion:** The results depicted that majority have a positive attitude towards stem cell transplantation. Moreover, the religion strongly enhances the subjects' attitude toward stem cells donation. Nevertheless, the study reveals that subjects who have higher education level tend to have more knowledge. However, overall, knowledge is not satisfactory compared to developed countries.

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**INTRODUCTION**

Stem cell transplant has become a widely applied modality of treatment worldwide as well as an area of global and public health concern.<sup>[1,2]</sup> It has been shown that there is an improvement of long-term survival for the patients with serious conditions who undergo stem cell therapy.<sup>[3,4]</sup> The Hematopoietic stem cell transplantation (HSCT) is a good example of stem cells transplantation, which have applied over a million patient of serious blood cancer and other diseases for more than 50 years and there are nearly 50 thousands of patients undergo HSCT around the world each year.<sup>[5,6]</sup>

Saudi Arabia has relatively high incidence and prevalence of blood diseases such as leukemia, sickle cell disease (SCD), and thalassemia.<sup>[7,8]</sup> Leukemia is the most common cause of cancer in children in both genders.<sup>[8]</sup>

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The estimated prevalence of sickle cell disease is about 6-145 per 10,000 which is associated with huge economic, physical and psychosocial burdens. The country has already established four stem cells transplantation centers. The reported transplants numbering from five hundred to six hundred cases per year for malignant and non-malignant conditions. Moreover, 30-40 cases of SCD patients undergo HSCT each year.<sup>[7]</sup>

The Eastern Province represents the highest prevalence of inherited hematological disorders such as sickle cell disease and thalassemia compared to other regions. Furthermore, about 3,000 SCD patients of the Eastern Province are the candidates for hematopoietic stem cell transplantation, which represent 28.4% of total SCD patients that candidate for hematopoietic stem cell transplantation in Saudi Arabia.<sup>[7]</sup> Therefore, it is essential to look at the community awareness and acceptance before applying this modality of treatment widely in this area.

The aim of the study is to detect the community knowledge about this new modality and the susceptibility of this

community to accept it or refuse it. Furthermore, we tried to assess if there is any influence of their religion on stem cell transplants.

**METHOD**

A cross-sectional study was carried out in the eastern province of Saudi Arabia. A sample of 385 was calculated by the formula of the cross-sectional study  $Sample\ size = \frac{z_{1-\alpha/2}^2 SD^2}{d^2}$ .<sup>[9]</sup> The data was collected from April 2015 to March 2016 by a Self-administered questionnaire, which distributed through systematic sampling manner in health care centers and public areas. The target population consisted of all Saudi adults (above 18 years old) of both genders. Subjects who work or study in a medical field that could give bias result of the research were excluded from the study. Permission to do the study was taken from the medical ethics committee of King Faisal University, College of Medicine. A consent form was given with each questionnaire, and each subject gave consent to participate by signature.

The data were entered and analyzed by SPSS software version 21. The chi-squared test has been used to determine whether there is a significant difference between two categories. With the help of a statistician, the data has been analyzed and reviewed.

**RESULT**

**Table No 1** Demographic characteristics [n = 386]

Characterics	Description	Frequency (%)
Age in years (27.5+9.2)	18-28	243 (63)
	29-39	91 (23.6)
	40-50	40 (10.4)
	51-61	9 (2.3)
	62-70	3 (0.80)
Sex	Male	274 (71)
	Female	112 (29)
Family income (Monthly)	Less than 5000 SR	77 (20)
	5001-12000 SR	144 (37.3)
	12001-25000 SR	109 (28)
	More than 25000 SR	56 (14.5)
	Graduated	71(18.4)
Educational Status	Advanced studies	21(5.4)
	Undergraduate education	195 (50.5)
	Secondary education	77 (20)
	Illiterate	1(0.30)
	Other	21(5.40)
Occupational Status	No job	57 (14.8)
	Student	169 (43.8)
	General section	73 (18.9)
	Private section	87 (22.5)
Marital Status	Single	207 (53.6)
	Married	177 (45.9)
	Divorced	2 (0.50)

The majority of the participants were from the age groups 18-28 (63.00%) and 29-39 (23.60%). The gender distribution was 274 males (71.00%) along with 112 females (29.00%). The educational level shows 195 undergraduates, 77 secondary education, 71 graduated, 21 advanced studies, one illiterate and 21 other. Job status depicts 169 students, 87 who work in private sector, 73 work in the general sector and 57 with no job. In the study, 207 were single, 177 married and two separated.

**Table No. 2** Responses on questions related to respondents perception about stem cell transplantation

Item	Yes (%)	No (%)	Don't know (%)
Have you ever heard about stem cells transplantation?	267(69.20)	106(27.50)	13(3.40)
Do you have any chronic disease?	71(18.40)	309(80.10)	6 (1.60)
Is there someone from your family who has chronic disease?	219 (56.70)	155 (40.20)	12 (3.10)
Do you support the idea of stem cells donation?	235 (60.90)	22 (5.70)	129 (33.40)
Have you heard about stem cells transplantation center in Saudi Arabia?	53 (13.70)	270 (69.90)	63 (16.30)
Do you think that there are benefits of stem cells transplantation?	291(75.40)	21(5.40)	74(19.20)
Would you advice your family to donate their stem cells?	169 (43.80)	43 (11.10)	174 (45.10)
Would you advice your family to get benefit from stem cells transplantation?	190 (49.20)	37 (9.60)	159 (41.20)
If you have the chance to donate, would you like to donate?	198(51.30)	59(15.30)	129 (33.40)
Do you want to apply stem cells transplantation widely in Saudi Arabia?	261(67.60)	12 (3.10)	113 (29.30)
Would you accept transplantation as a treatment?	276 (71.50)	19 (4.90)	91(23.60)
Do you think the cost of stem cells treatment will be reasonable?	90 (23.30)	125(32.40)	171(44.30)

Out of total 386 collected subjects, 69.2% have heard of stem cells transplantation and 18.4% have chronic diseases. 60.9% support the idea of stem cell donation. 75.4% of the subjects believe there are benefits from stem cell transplantation. 95.9% of the study population do not know the best age to give stem cell transplantation. Sources of stem cell information vary between Internet (27.5%), media, printed format, family or friends and others. Along with this, 86.2% do not know if there are stem cells centers in Saudi Arabia. Only 51.3% would donate stem cells in near future.

**Table No 3** Reasons for donation or refusal for donation

Item to be responded by participants	Responses	Freq (%)
Reasons for donation	Helping people	108 (28.0)
	Proving a theory	10 (2.60)
	Reward from God	105 (27.20)
	Witout Reasons	49 (12.70)
Reasons for refusal of donation	Fear from parents	9 (2.30)
	Fear from surgery	56 (14.50)
	Religious issues	12 (3.10)
	Without Reasons	90 (23.30)

The Motives vary among the subjects. The majority would donate for the desire of helping other people (28.0%) and getting reward from God (27.20%). Other would like to do it to prove a theory (2.60%) and some without reasons (12.70%). In contrast, some decided to refuse donation because of fear from surgery and parents (14.50% and 2.30% respectively). Other reasons include religious issues (3.10%) and some would refuse it without identifiable reason (23.30%).

The data shows that 43% of the participants agreed with the necessity of having knowledge about stem cells. In contrast, almost the same percent disagreed. Moreover, 42% do see their community lack awareness regarding stem cells. In addition, 37.8% have the idea that stem cells can treat incurable diseases. 166 persons see the need for awareness

campaigns regarding stem cells, and 9.10% do not think there are complications in stem cell transplantations.

**Table No. 4** Attitude towards stem cell transplantation

Statements	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
We should have knowledge	110 (28.5)	56 (14.5)	58 (15)	68 (17.6)	94 (24.4)
Public deficient in awareness	93 (24.1)	69 (17.9)	64 (16.6)	78 (20.2)	82 (21.2)
It can treat rare diseases	75 (19.4)	71 (18.4)	97 (25.1)	76 (19.7)	67 (17.4)
Increase awareness	107 (27.7)	59 (15.3)	63 (16.3)	67 (17.4)	90 (23.3)
No role of religion	56 (14.5)	58 (15)	163 (42)	61 (15.8)	48 (12.4)
Have some complications	34 (8.8)	63 (16.3)	177 (46)	77 (20)	35 (9)

**Table No. 5** Benefit of stem cells transplantation and Educational level

Do you think there are benefits of stem cells transplantation?	Educational Level						Total
	G (%)	AS (%)	U (%)	S (%)	I (%)	Other	
Yes	58 (19.9)	19 (6.5)	158 (54.3)	48 (16.5)	0 (0)	8 (2.7)	291
No	3 (14.3)	0 (0)	6 (28.6)	7 (33.3)	0 (0)	5 (23.8)	21
I don't know	10 (13.5)	2 (2.7)	31 (41.9)	22 (29.7)	1 (1.4)	8 (10.8)	74
Total	71 (18.4)	21 (5.4)	195 (50.5)	77 (19.9)	1 (0.3)	21 (5.4)	386

Key: G=Graduates; AS= Advanced Studies; U=Undergraduates; S= Secondary; I= Illiterate

Since P-value (0.0001) is less than 0.05, there is a significant relationship between the education level and thinking there are benefits from stem cell transplantation. The majority of the subjects do think there are benefits in stem cell transplantation (75.39%). Most of those were undergraduates (158) and graduates (58).

**Table no 6** Knowledge vs Educational Level

We should have knowledge about stem cells	Educational Level						Total
	G (%)	AS (%)	U (%)	S (%)	I (%)	Other	
Strongly Agree	18 (16.4)	3 (2.7)	43 (19.1)	35 (31.8)	1 (0.9)	10 (9.1)	110
Agree	10 (17.9)	0 (0)	19 (33.9)	23 (41.1)	0 (0)	4 (7.1)	56
Neutral	13 (22.4)	8 (13.8)	31 (53.4)	3 (5.2)	0 (0)	3 (5.2)	58
Disagree	14 (20.6)	2 (2.9)	39 (57.4)	11 (16.2)	0 (0)	2 (2.9)	68
Strongly Disagree	16 (17.0)	8 (8.5)	63 (67.0)	5 (5.3)	0 (0)	2 (2.1)	94
Total	71 (18.4)	21 (5.4)	195 (50.5)	77 (19.9)	1 (0.3)	21 (5.4)	386

Key: G=Graduates; AS= Advanced Studies; U=Undergraduates; S= Secondary; I= Illiterate

Since P- value (0.0001) is less than 0.05, there is a significant relationship between the education level and thinking about the necessity of having knowledge about stem cells. In this study, 63 strongly disagree that they should have some knowledge about stem cells, while, on the other hand, 43 strongly agree.

## DISCUSSION

The current study aimed to explore the Eastern Province community's knowledge, acceptance, and attitude toward stem cells transplantation. The perception toward stem cells transplantation among lay people can be influenced besides knowledge about transplantation by a variety of factors, including age and education status.

The government has already established a number of umbilical cord blood banks and biomedical research centers, giving priority to genomics research and biotechnology and to the use of advanced techniques.<sup>[10,11]</sup> Since Cord blood transplantation is encouraged in *Islam* and supported by a *Fatwa* and some

*Islamic* principles, the public acceptance and awareness are significant factors to break the barrier between the public and the transplantation centers.<sup>[11]</sup> The survey showed that almost 69% participants have heard about stem cell transplantation. Furthermore, they are in favor of having more information about stem cells transplantation. The public is aware but needs more awareness and education as compared with other studies conducted in developed countries the U.S and Germany.<sup>[12,13]</sup> The main source of the information about stem cells transplantation varies among participants from the Internet and followed by family or friends, Media Or Printed format and other. The Internet was the main source of information. It may attributed to the fact that the majority of Saudi public use the Internet for health-related information.<sup>[14]</sup> More than 75% of the participants agree that there are many benefits of stem cells transplantation and about two-thirds of the participants would accept stem cells transplantation as a treatment.

The majority of the participants were belonging to a young age group and males have participated more as compared to females in the survey as it was difficult to access to the female in Saudi closed tribal system.<sup>[15]</sup> More than one-third of the participants were in favor that they should have more knowledge about stem cells transplantation. The results depicted that the subjects might be afraid of complications, as they are not fully aware of the process and benefits of this modality of management. However, about 60% of respondents support the idea of stem cells donation. In addition, more than one-half of the subjects would like to donate if they have a chance, and the most motivating reasons were the desire to help other people and getting the reward from God. This may be explained by the influence of the religion and ideological thoughts in public opinion, which was in a positive way.<sup>[11,16]</sup> Indeed, there is a significant relationship between the benefit of stem cells transplantation and education level. Our study indicates that the undergraduate population does think that there are benefits for this treatment. This is similar to other studies conducted in the USA and European countries. However, overall knowledge is not satisfactory compared to developed countries.<sup>[15,16]</sup>

## CONCLUSION

The results depicted that majority have a positive attitude towards stem cell transplantation. Moreover, religious beliefs of the participants strongly enhance the attitude toward stem cells donation. Nevertheless, the study reveals that subjects who have higher education level tend to have more knowledge. However, overall knowledge is not satisfactory compared to developed countries. Therefore, is essential to educate lay people about this modality through health campaigns and visual media, especially by the Internet, as it is considered the main source for information in this study's population.

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## Conflicts of interest

The authors declare no potential conflicts of interest

### Authors' contributions

#### Ahmad Essa Alhejji

Study conception and design  
Drafting of manuscript

#### Mohammed Abdullah Alsultan

Analysis and interpretation of data  
Drafting of manuscript

#### Mohammed Wasel Alsimail

Acquisition of data  
Analysis and interpretation of data

#### Abdul Sattar Khan

Critical revision for important intellectual content

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