



ORIGINAL RESEARCH PAPER

Pharmacology

ASSESSMENT OF KNOWLEDGE AND PERCEPTION OF STEM CELL RESEARCH AMONG SECOND YEAR UNDER GRADUATE MEDICAL STUDENTS IN A TERTIARY CARE HOSPITAL

KEY WORDS: Stem cell, knowledge, perception

Sarguna S*

Department of Pharmacology, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Maduranthagam, Chengalpattu – 603308.

*Corresponding Author

Dr S.Usha Sadasivan

MD Phd, Department of Pharmacology, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Maduranthagam, Chengalpattu – 603308.

ABSTRACT

Background: Stem cell research has been extensively explored worldwide to enhance human health in medical setting. It is paramount for the medical students to advance their knowledge about stem cell research and therapy for the enhancement of health care.

Objective: To assess the knowledge and perception of Stem Cell research among second year medical students in a tertiary care hospital.

Methods: A cross sectional study was carried out by a self-administered questionnaire among 103 second year medical students in a tertiary care hospital. The data was analyzed by descriptive statistical methods and results were expressed in percentage and proportions.

Results: Among 103 (Male 55%, Female 45%) medical students, 79% percentage of students had knowledge about differentiation, 53% extraction, 57% type and 64% about characteristics of stem cell. 76% of the students agreed to conduct research on human embryos, 50% agreed stem cell research on treatment and 60% students agreed that use of Human stem cells for research is ethical.

Conclusion: Majority of the students had knowledge about the stem cell but their perception was less. So, the study suggests that various educational programs on stem cell should be implemented in the medical curriculum for précised treatment.

INTRODUCTION

Stem cells are repair units of the body that serve a central function in maintenance and regeneration of organs and tissues. Their main function is to replenish dying cells and regenerate damaged tissues. These stem cells offer a precious opportunity to learn more about cytopathology, development of diseases and how they can be prevented and treated at cellular level (1). Recent developments in stem cell biology have explained a significant differentiation plasticity of many stem-cell types in human tissue (2). Based on the extensive stem cell research findings, 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 (3). Embryonic stem cells (ESCs) are undifferentiated cells (4); they are not programmed to be specific to any matured cell types found in the human body. Therefore, ESCs are fundamental in developing a diverse supply of tissues in the treatment of various disorders such as Parkinson's disease, Alzheimer's disease, spinal cord injuries and cardiovascular disease. Nonetheless, ESC research has been an issue of ethical, legal, and social controversy because it involves destroying embryos to obtain the cells (5). This has led to the demand of alternative sources of stem cells which do not involve killing of embryo, namely umbilical cord blood stem cells (UCBSCs) and adult stem cells (ASCs). UCBSCs are very much preferred because of the high proliferative potential, increased ability for self-renewal, decreased ability for antigen presentation, and most importantly, the safety and ethical free characteristics (6).

On the other hand, ASCs, which are found in almost all organs of the postnatal human body, provide an option of endogenous cell source for autologous transplantation, reducing the risk of graft rejection and allergenicity problems. ASCs such as cardiac stem cells have been successfully used to repair the damage caused by heart attacks (7). Because of the bright potential of stem cell-based treatment, it is vital for health care providers to acquire knowledge on current advances in stem cell science, particularly when there is an enormous potential of

revolutionizing therapy in the form of cell replacement therapy. Medical students will be professional health care workers and are also the frontline people who will spend more time with the patients. In addition, doctors are patient's advocates in terms of medical knowledge (8). Information given from doctors to patient must be balanced and accurate, so that decision can be made considering the facts and unbiased answers. Therefore, doctor's knowledge on stem cells and their attitude towards stem cell application in medical setting are very important as these could affect the decision on providing appropriate stem cell-based treatments for many diseases including cancer and cardiovascular diseases.

In present study, we aimed to measure the level of stem cell knowledge and attitude of stem cell application in medical setting among undergraduate medical students from tertiary care hospital, Kancheepuram district. In addition, we aimed to correlate knowledge score and perception score among these medical students.

MATERIALS AND METHODS

Study Design: This study is a cross sectional study focused on investigating the knowledge and perception of stem cell research among second year medical students.

Study Period: October 2018

Sampling and Participants: This study was conducted among 103 second year medical students.

Instrument: A self-administered questionnaire was developed comprised of two parts. Part 1, with five questions focused on knowledge of stem cell research and part 2 had three questions regarding respondent's perception towards stem cell research.

Ethical consideration: The approval to conduct this study was obtained from the Institutional ethics committee, Karpaga Vinayaga Institute of Medical Sciences & Research Centre (KIMS & RC). The guidelines stated in the Ethics Research Board were completely followed before conducting the study.

Prior to taking part in the study, all respondents were asked to sign on a written consent form confirming their willingness to participate. They were also explained about the purpose and objective of the study by the researcher. This research provided autonomy, allowing respondents the freedom to decide whether to participate and give information. All respondents of the study were assured that confidentiality would be maintained.

Data Collection: Once the ethical approval was granted from the academic and ethical department, data collection resumed as the next stage of study using structured questionnaires with the undergraduate medical students in KIMS & RC. Each respondent was given a questionnaire, respondent information, and research information, which was to explain the purpose of the study, its voluntary nature, and the anonymity of the responses. The participants were explained about the study and obtained the consent to complete the survey. The questionnaire, information sheet, and consent form to the respondents, and they were given approximately 15–20 minutes to complete the questionnaire. Upon completion, questionnaire was collected. The questionnaire consists of 2 sections:

Section 1, was about the knowledge regarding the different types of stem cells and

Section 2, was regarding their knowledge towards the stem cells in the application of medical field.

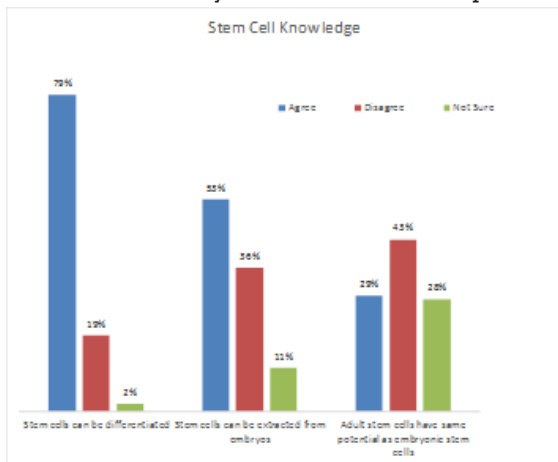
Each respondent was asked to select their view either to agree, disagree, not sure, agree, or strongly agree to the statements given to them.

Data Analysis: Data were entered and analyzed using the Statistical Package Social Sciences (SPSS) software program version 20.0. The numbers of correct answers for each question were quantified in percentages.

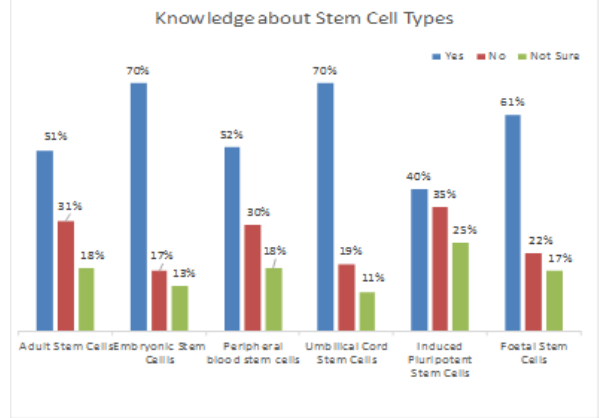
RESULTS

A total of 103 completed questionnaires were received from undergraduate second year medical students in KIMS & RC. Among them 55% were male and 45 % were female.

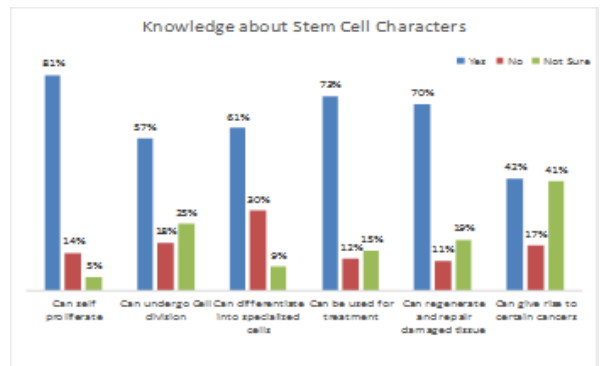
Stem cell knowledge: Among 103 second year medical students, 79% of them had knowledge about stem cells that can be differentiated, 53% of them had knowledge about stem cells that can be extracted from embryos, 43% of agreed that adult stem cells & embryonic stem cells have same potential.



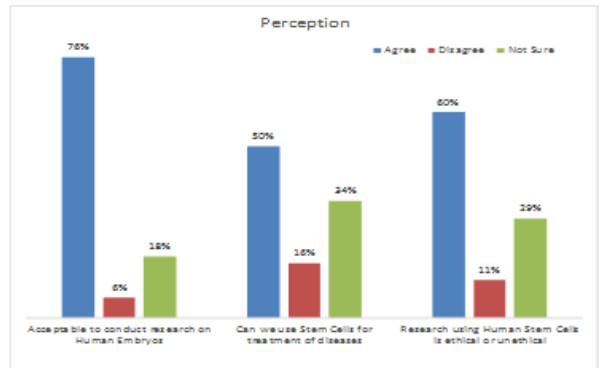
Knowledge about stem cell types: Among 103 medical students, 51% of them had knowledge about adult stem cells, 70% of them had knowledge about embryonic stem cells, 52% of them had knowledge about peripheral blood stem cells, 70% of them had knowledge about umbilical cord stem cells, 40% of them had knowledge about induced pluripotent stem cells, 61% of them had knowledge about fetal stem cells.



Knowledge about stem cell characters: 81% of second year medical students said that stem cells can self-proliferate, 57% agreed that stem cells can undergo division, 61% were of opinion that stem cells can differentiate into specialized stem cells, 73% of students were aware that stem cells can be used for treatment, 70% were knowing that stem cells can regenerate and repair damaged tissues and 42% of medical students assumed that stem cell transplantation can lead to development of certain types of cancers.



Perception about stem cells: 76% of them agreed that, it is acceptable to conduct research on human embryos that are few days old for the future of medicine, 50 % of them said we can use stem cells for research on treatment for various disorders including Parkinson’s disease, Alzheimer’s disease, Diabetes and heart disease while 60% of them agreed that it is ethical to use human stem cells for research.



DISCUSSION

Second year undergraduates had knowledge about stem cells differentiation (79%), extraction (53% responded) from embryo. Among them 43% agreed that adult stem cells had the same potential as the embryonic stem cells. In the previous study done in 2016, 89 % of them had knowledge about stem cells that can be differentiated, 48% of them said that stem cells can be extracted from embryos and 40% of them said that adult stem cells have the same potential as embryonic stem cells.

Umbilical cord stem cells and embryonic stem cells had the highest votes amongst the other types of stem cells (70%). This finding is similar to survey conducted among Malaysian medical students where 81.5% of them had knowledge about umbilical cord stem cells.

This finding is similar to survey conducted in Canada, US, EU and Australia where majority of all countries showed greater support for umbilical cord stem cells (9).

Regarding stem cell characteristics, 81% of them said that stem cells can self-proliferate and 73% of them expressed their views that stem cells can be used for treatment and 70% of them told that stem cells can regenerate and repair damaged tissues.

In the previous study, 73% said that stem cells can self-proliferate and 81% of them expressed their views that stem cells can be used for treatment and 78% of them told that stem cells can regenerate and repair damaged tissues (10).

About perception of stem cells, 76% of them said that it is acceptable to conduct research on human embryos. In the previous study 78% of them accepted to it (11).

50% of students agreed that stem cells can be used for treatment of diseases such as Parkinson's, Alzheimer's, Diabetes and heart disease and 60% of them agreed that it is ethical to use human stem cells for research. In the previous study, 67% of them agreed that stem cells can be used for treatment of diseases such as Parkinson's, Alzheimer's, Diabetes and heart disease and 47% of them agreed that it is ethical to use human stem cells for research (12).

CONCLUSION

Majority of the students had knowledge about the stem cells. The students had highest knowledge about the umbilical cord stem cells possibly due to public commercial resources and stem cell banking services. But their perception about the use of stem cells for research on treatment was less. So, the study suggests that various educational programs on stem cell should be implemented in medical curriculum.

LIMITATION: The limitation of our study is that the sample size was small which can be biased. Future studies can involve a large population to obtain a more generalized conclusion.

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Conflict of interest: None declared

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