Health Professionals' knowledge and attitude towards the Umbilical Cord Blood donation in Greece

Hatzistilli H[1], Zissimopoulou O[2], Galanis P[3], Siskou O[3], Prezerakos P[4], Zissimopoulos A[5], Kaitelidou D[3]

[1] Department of Healthcare Management, Faculty of Economics and Management, Open University of Cyprus, Nicosia, Cyprus
[2] Department of Accounting and Finance, Athens University of Economics and Business, Athens, Greece
[3] Department of Nursing, Faculty of Medical Sciences, National and Kapodistrian University of Athens, Athens, Greece
[4] Department of Nursing, Faculty of Human Movement and Quality of Life Sciences, University of Peloponnese, Sparta, Greece
[5] Department of Nuclear Medicine, Medical School, Democritus University of Thrace, Alexandroupolis, Greece

Abstract

Background/aim: In the last years a major emphasis is laid on the Allogeneic Transplantation of Blood Stem Cells from the Umbilical Cord Blood with a simultaneous development of Umbilical Cord Blood bank. The attitude and knowledge of Health Professionals is vital to the success of this attempt as it affects significantly the promotion of Umbilical Cord Blood donation. The aim of present study is the examination of Health Professionals' knowledge and attitudes towards Umbilical Cord Blood in Greece.

Material and Methods: The study was conducted from April 25th 2012 to May 7th 2012. The sample consisted of 109 Health Professionals from 3 provincial hospitals and 2 hospitals in Thessaloniki. In order to collect the data, a questionnaire was used. The questionnaire was designed by the researcher and a group of experts to serve the mission of the present study. From the 130 questionnaires sent, 109 were completely answered (response rate 84%).

Results: Of those who participated to the research, 23.9% were physicians, 34.9% were midwives, and 34.8% were nurses. As far as the Health Professionals' knowledge on the Umbilical Cord Blood is concerned, only 15.6% of the participants declared to be quite or well informed on the collection methods and the usage of Umbilical Cord Blood. The vast majority of the participants (89%), declared that a well-organized program on a continual training is very essential. 93.5% of the participants declared that in the last 5 years received no or very little training regarding the collection, storing and transplantation of Umbilical Cord Blood.

Conclusions: Although according to a relevant research health professionals are considered by the public as the most credible source of information about Umbilical Cord Blood, their level of knowledge on the usage and storing of Umbilical Cord Blood is inadequate. The present study indicates the necessity of creation or reinforcing of effective programs of continual training with the use of technology (i.e. Internet). Hippokratia 2014; 18 (2):110-115.

Key words: Blood Stem Cells, Umbilical Cord Blood, transplantation

Corresponding Authors: Kaitelidou Daphne & Olga Siskou, Nursing Department, Faculty of Medical Sciences, National and Kapodistrian University of Athens, 123 Papadiamantopoulou str, 115 27 Athens, Greece, tel: +302107461470, +306938874326 (Kaitelidou), tel : +302107461471, +306936913937 (Siskou), fax : +302107461473, email: dkaitelid@nurs.uoa.gr, olsiskou@nurs.uoa.gr

Introduction

Allogeneic stem cell transplantation is an established treatment method for bone marrow failure diseases. Embryonic stem cells and adult stem cells have been used for treating blood disorders such as anaplastic anaemia, leukaemia and myelodysplasia, genetic conditions such as Severe Combined Immunodeficiency (SCID), Wiskott-Aldrich syndrome and thalassemia and solid tumours[1]. Sources of hematopoietic cells suitable for transplantation are the bone marrow and the peripheral blood under certain vibration conditions. The basic obstacle faced in transplantations is the rejection of a transplant from the human leukocyte antigen (HLA) molecules. The greatest chance of finding a matching donor is from within the family. Cord blood is a rich source of stem cells, while the collection does not pose any risk to the mother or child. The collection occurs after the birth of a healthy child and infections of the blood from viruses are relatively rare, even from viruses such as the magnocellular virus and Epstein-Barr. Each unit of Umbilical Cord Blood (UCB), frozen and stored in a cryogenic vessel, exists in real-time and is available upon request for patients with unstable disease[2,3].

The first public cord blood bank was established in the USA in 1992, The New York Cord Bank[4], and until today is the world's largest with 30,000 transplants worldwide ready for use. Today UCB units are stored in more than 140 public banks in at least 32 countries. The number of registered units in international registries exceeds 450,000.

In Greece, the first attempts to collect, process and store UCB units began in 1995 and the summer of 2003 the Biomedical Research Foundation (Academy of Athens) established the first Greek UCB bank. An 'extension' opened in 2009 in a hospital blood clinic in Thessaloniki which now hosts the second UCB bank. In 2000, there were 233 transplants while in 2007 the number reached was 368, of which 247 autologous and 121 allogeneic[5,6].

In Greece, apart from the 2 state banks, 22 private banks operate, storing UCB units for future private, family use.

This study focuses on the investigation of the factors that may affect health care staff (midwives, gynaecologists, personnel in haematology and blood donation departments, heads of hospital departments) occupied in public hospitals, in supporting the development of UCB donation and informing their environment on its use as a new and particularly important source of haematopoietic stem cells. The necessity of UCB banks' support, the mapping of the Greek reality using the international standards and the determination of the appropriate actions to enable health professionals to convince the Greeks to consent in donating cord blood specify the framework of our study.

Methods

Data Collection

The study was conducted in five hospitals in Northern Greece. Two of them are located in Thessaloniki while the other three are rural general hospitals with 120 to 200 beds each. One of the two General Hospitals of Thessaloniki was selected as suitable for this research because it has a public umbilical cord blood bank as well as a transplantation centre which collaborates with the Gynaecology-Obstetrics Clinics operating in the other selected hospital in Thessaloniki.

The study population was comprised of nurses (n=29), midwives (n=47), gynaecologists-obstetricians and anaesthesiologists (n=28) and other workers in public hospitals, mainly nurses holding administrative positions (n=26). The sample consisted of health professionals in the above mentioned disciplines that were working from April 25, 2012 to May 7, 2012 and were willing to voluntarily contribute to the study. The sample was selected in a way to increase reliability through diversity in terms of working conditions and continuing education of health professionals.

The researchers developed a questionnaire for data collection, since there was no questionnaire available neither in the Greek nor in the international literature to fully meet the demands of this research. The questionnaire relied mainly on the basic model of Horton and Horton[7], which has confirmed its validity in several studies with different backgrounds and refers mainly to bone marrow donation. To assess the internal consistency of the questionnaire the Cronbach coefficient was used.

The purpose was to investigate health professionals' level of knowledge, their attitudes about UCB donation and the sources providing information on UCB donation.

The questionnaires were administered after obtaining consent from the hospitals' Scientific Councils and then the approval of the relevant Health Region Authority. After a meeting with the department directors and supervisors, 130 questionnaires were handed out and 109 were fully completed, leading to a response rate of 84%. The responding volunteers completed the questionnaire manually in a space provided by their service in the presence of the researchers and after completion they handed it back to them. The demographic and occupational characteristics of the participants are presented in Table 1. The vast majority of the participants were women and married. One third of the participants were working in hospitals located in Thessaloniki and the average working experience of all participants was estimated to be about 19 years.

Table 1: The demographic and occupational characteristics of the 109 health professionals who participate in the current study investigating knowledge and attitude towards the umbilical cord blood donation in Greece.

Characteristic	Number (%)
Sex	
Men	21 (19.3)
Women	88 (80.7)
Age	44.3 (6.5)[a]
Marital status	
Married	83 (76.1)
Single	26 (17.4)
Children	
Yes	80 (73.4)
No	29 (26.6)
Occupation	
Midwives	38 (34.9)
Nurses	24 (22)
Physicians	26 (23.9)
Nurses of blood donation	14 (12.8)
Others (diagnostic laboratories technicians, administrative staff)	7 (6.4)
Years of working experience	19.1 (7.7)[a]
Administrative position	
Yes	29 (26.6)
No	80 (73.4)
Location of Hospital	
Province	75 (68.8)
Thessaloniki	34 (31.2)

[a] Mean (standard deviation)

Statistical Analysis

Statistical analysis was performed using the SPSS program, version 19.0 (SPSS Inc., Chicago, IL, USA). Categorical variables are presented as absolute (n) and relative (%) frequencies while quantitative variables are presented as mean (standard deviation). The Kolmogorov–Smirnov test was used to test for normality of the distribution and it showed that the quantitative variables follow a normal distribution. To investigate the re-

lationship between a quantitative variable and a dichotomous variable the student's t-test was used, while in order to investigate the relationship between a quantitative variable and a categorical variable with > 2 categories the analysis of variance was conducted. To study the correlation between two quantitative variables following a normal distribution the Pearson's correlation coefficient was introduced. In order to examine the correlation between an ordinal variable and a quantitative variable the Spearman's rank correlation coefficient was used. Analysis included the use of chi-square for categorical variables. Finally the two sided statistical significance level was set at 0.05.

After investigating the relationship between different variables we concluded that age and years of service were highly correlated (r=0.85, p<0.001). Therefore, years of service was the variable chosen for the analysis.

Results
Knowledge regarding UCB donation
Univariate analysis
The knowledge regarding the donation of umbilical cord blood was evaluated according to the percentage of correct responses in 14 related statements. 15.6% of the respondents declared to be enough/well informed on the collection, storage and use of UCB (Table 2). The Cronbach coefficient was 0.73 which implies a sufficient level of internal consistency.

Bivariate analysis
The average percentage of correct responses was 55.2%, the standard deviation was 18.5, the median was 57% and the interquartile range was 25. It should be noted that only 2 participants answered correctly in all 14 formalities regarding the donation of cord blood. In examining the relationship between demographic characteristics and percentage of correct answers, no significant correlation was found between the percentage of correct answers and gender, marital status, presence of kids, holding an administrative position, the district of the hospital and the voluntary donation of blood, organs and bone marrow. Furthermore, no statistically significant relationship has been found between the percentage of correct responses and years of service.

On the other hand, there was statistically significant relationship between the percentage of correct answers and the professional specialty (p=0.002). Physicians provided more frequent the correct answers (62.6%), followed by blood nurses (59.2%) and midwives (59%), while last were non-specialist nurses (45.2%).

Sources of information regarding UCB donation
Univariate analysis
Promotional brochures in various places as well as in Obstetrics / Gynaecology clinics were considered quite good/good source of information (33%) and so did entries in the press, or in websites, sponsored by private UCB banks (22%). Articles in non-scientific magazines

Table 2: Investigating participants (n=109 health professionals of public hospitals) level of knowledge about umbilical cord blood (UCB) donation.

	Correct Answers Number (%)
1) The procedure of UCB collection poses serious risks for both mother and child	103 (94.5)
2) Decision for UCB donation is taken mainly by mother after being informed before the delivery and it is followed by her written consent	100 (91.7)
3) Parents who choose to donate UCB units to public blood banks have to pay a fee	84 (77.1)
4) Every UCB unit, is submitted to quality control	80 (73.4)
5) UCB compared to other sources of stem hematopoietic cells (bone marrow and peripheral blood) reports a lot of advantages	77 (70.6)
6) In order a parent to have the ability to donate UCB, the delivery has to take place in big public hospitals' special clinics	73 (67)
7) There is a probability for a collected UCB unit, not to be stored and consequently to be damaged	71 (65.1)
8) In Greece there are two public UCB banks	66 (60.6)
9) UCB unit after its collection is ready for storage	45 (41.3)
10) A UCB unit may be used for transplantation even after 25 years	43 (39.4)
11) UCB storage in private and public banks for personal and family usage represents a "biological safety option"	42 (38.5)
12) The preservation of UCB units for autologus usage has limited value, taken in mind the current level of knowledge	25 (22.9)
13) In Greece there is a "pool" of UCB units which is located in National Organization for Transplantations	20 (18.3)
14) Autologous graft is used as source of hematopoietic cells for the treatment of childhood leukaemia	18 (16.5)

and newspapers (19.2%), academic studies in bachelors and masters level, scientific brochures in the working place (18.4%), seminars and conferences (13.7%) and finally National Organization of Transplantations (EOM) website and information brochures or other volunteering organisations were also mentioned as sources of information(11%). 89% of the people questioned responded that a well organised program for continuous education of specialists on the development and prospects of UCB transplantation. 93.5% of the participants declared that in the last 5 years they have had received little or none official governmental education regarding the collection, storage and transplantation of UCB (Table 3).

Bivariate analysis

No statistically significant relationship was found between demographic characteristics and the information on collecting, storing and using UCB. What should be mentioned nevertheless is that there is statistically significant correlation between level of information and marital status. More explicitly, married individuals declared being more

informed as opposed to single/divorced or widowed individuals. There is no statistically significant found relationship between the knowledge acquired through studies or scientific magazines and gender, marital status, existence of children, profession and years of service. A significant negative correlation was found between continuous education programs and years of service (rs=-0.2, p=0.05).There was also significant correlation found between knowledge acquired through discussions with patients who required transplantation/ patients' families and the acts of blood donation or organ or bone marrow donation. More explicitly, individuals who were donors stated that they gained further knowledge from conversations with patients and their families in comparison to those who were not (p=0.002).

Finally, a statistically significant correlation was found between the participation to state provided courses the last 5 years regarding UCB donation and occupational status (p=0.004). Nurses in blood donation units had received relatively more information from continuing education programs on UCB donation than the other professionals.

Table 3: Sources of health professionals' (n=109) information about umbilical cord blood (UCB) donation.

	Nothing n (%)	Little n (%)	Moderate n (%)	Fairly n (%)	Very Much n (%)
How much information do you think you have about the collection, storage and usage of UCB	9 (8.3)	40 (36.7)	43 (39.4)	15 (13.8)	2 (1.8)
Your knowledge was gained during under graduate /post graduate programs or/and through special written reports provided at your work place	29 (26.6)	45 (41.3)	15 (13.8)	17 (15.6)	3 (2.8)
Your knowledge was gained through continuing education programs / conferences/ seminars	38 (34.9)	34 (31.2)	22 (20.2)	13 (11.9)	2 (1.8)
Your knowledge was gained through specific emissions or reportage on TV	19 (17.4)	29 (26.6)	37 (33.9)	23 (21.1)	1 (0.9)
Your knowledge was gained through published articles in non scientific journals	21 (19.3)	28 (25.7)	39 (35.8)	19 (17.4)	2 (1.8)
Your knowledge was gained during discussions with patients or relatives who were in need of a transplantation	54 (49.5)	32 (29.4)	15 (13.8)	7 (6.4)	1 (0.9)
Your knowledge was gained through brochures available in obstetrical outpatient surgeries or through UCB private banks' websites or through publications on newspapers	17 (15.6)	25 (22.9)	31 (28.4)	29 (26.6)	7 (6.4)
Your knowledge was gained through informative brochures or through the website of National Organization for Transplantations or through other organizations	25 (22.9)	42 (38.5)	30 (27.5)	10 (9.2)	2 (1.8)
In the last five years, did you follow any public educational course regarding the collection, storage and transplantation of UCB	88 (80.7)	14 (12.8)	6 (5.5)	1 (0.9)	0 (0)
Do you consider a well structured program of continuing education focused on new developments in your scientific area and especially on new developments of UCB transplantations, as necessary?	1 (0.9)	5 (4.6)	6 (5.5)	35 (32.1)	62 (56.9)

UCB: umbilical cord blood.

Discussion and conclusions

An important element highlighted in this study at this point is the lack of knowledge in basic clinical information regarding UCB transplantation. There is considerable confusion since only 18 out of the 109 subjects reportedly knew that the autologous graft is not used as a source of hematopoietic stem cells for the treatment of childhood leukaemia. This could be related to the resources that are used by the health professionals for updating their knowledge as well as to potential misinformation from private banks which mistakenly present UCB as the treatment of childhood leukaemia.

In contrast, while 66 participants were aware of the existence of the two state UCB banks, only 20 knew of the existence of National Transplant Organization's bank. This highlights the ignorance of essential elements which are part of the organizational process in our country, relating to UCB.

We acquired more correct answers on topics of general interest. Most of the subjects knew that the mother decides whether to consent to the donation and the collection process has no risk for her, it is costless for the family, the blood is subjected to quality control after collection and finally the many advantages of UCB compared to other sources of HSC.

The results of this study are consistent with the findings of the study conducted in five European countries[8] and indicate that to achieve the goal- increasing the number of UCB donations- intensive training programs for medical staff and health professionals must be organized to ensure greater consistency of information possessed, and to comply to national and international certification standards for UCB to ensure quality of service. The fact that health professionals ignore specific issues and have knowledge of general interest agrees with the figure in the investigation of Abdullah[9], which refers to what health professionals and nurses in UCB banks should be aware of. The survey gives attention to the kind of knowledge they should possess and indicates the need to acquire expertise, to know the advantages and disadvantages of both private and public banks, the practice of extracting the stem cells and the indications for their use to be able to provide accurate and complete information to interested citizens. In conclusion, ignorance of health staff involved in UCB donation is substantial. In three critical questions (No 12, 13, 14 of Table 2) the cumulative percentage of ignorance exceeds 70% and in two others (No 10 and 11 of Table 2) 60%. The results corroborate with the finding of a study[10] that few parents and health professionals have the necessary information to understand the difference between public and private banks and even fewer health professionals have adequate information-education to provide citizens with independent and accurate information necessary to ensure informed consent for umbilical cord blood storage.

Finally, a statistically significant relationship was found between correct answers and the professional role. Physicians answered in more questions correctly. Nurses

in blood donation centres, midwives and non-specialist nurses followed. It should be noted here that physicians organize and continuously monitor a significant number of training programs and also a large number of blood donation nurses from the sample participated in the awareness campaign of EOM in 2010 with the subject: "You also take part in the chain of life." The positive results of these programs are shown from the correct answers of the sample and are consistent with the findings of studies that argue that the continuing education of health professionals will be the driving force for the development of excellence in storing UCB in Europe[8,11,12]. Employees are able to judge the adequacy of their knowledge as emerged compared to the results of the questionnaire. As it was expected, married individuals proved to be more aware while increasing years of service were associated with reduced learning from continuing education programs, workshops and conferences.

The results of the current study about sources of information are similar to the results of previous studies and the sources of information were public knowledge[8,11-13] mainly obtained from the internet. The lack of clear evidence-based guidelines and common practice throughout Europe obstructs as well the development of a worldwide UCB network.

The country is evidently not utilizing the available health professionals to bring the desired results of donated UCB as only 13.7% felt their continuing education programs are pretty good source of information and very few (11%) considered the brochures of EOM. The state should reinstate health professionals in their roles as guides and specialists by giving them the necessary "tools" through its support and continuing education. It should be noted that a very high percentage of the subjects (93.5%) had no formal public education concerning UCB collection, storage and transplantation in the last 5 years (2007-2012).

Remarkable is however the statistically significant relationship between the knowledge gained from conversations with patients or relatives of patients requiring transplantation and the act of volunteering (blood, organs, bone marrow). This confirmed the argument that people who have already developed altruistic behaviour are sensitive to incentives such as offering to other humans and their attitude towards UCB donation is positively influenced by knowledge through discussions with patients and relatives of patients. The assumption that altruism is an important incentive to donate organs and tissues is also confirmed in other studies and it applies to our study as well[11,13,14].

Medical and paramedical professionals should also be considered potential donors. Therefore, sufficient education should be provided in the early stages of their career thus implying provision of information within the universities. The knowledge and attitude of employees toward donation and transplantation will improve, thus increasing the number of donors and simultaneously preparing a whole generation with complete knowledge and skills

in this procedure.

This study highlights the necessity in taking immediate action in training health personnel involved in UCB donation. In this effort, EOM should take on the role of coordinator - arranger. The objectives of the training program should be the provision of information concerning UCB donation and the advances made on the field, the promotion of positive attitude of the employees with direct reference to real stories involving UCB transplantations and the motivation of these employees in taking immediate action. The EOM should also build an image around donation as a humanitarian act which offers great moral satisfaction to the donor while they are harmless and not painful. Additionally, EOM could develop a more "personal" communication with employees during training sessions, workshops or conferences organized by creating a forum that will initially present and then discuss and clarify the issues and questions that arise. Exploitation of the Internet and local media is also a good way of informing the public. Supporting printed material should be available in hospitals and posters bearing the websites of public UCB banks and contact numbers should be on sight.

The cooperation of EOM with other international organizations, the integration and implementation of EU directives into Greek legislation, the creation and implementation of international guidelines, the direct contact of medical staff with their counterparts in other countries through special interest websites or European and international conferences are a few more suggestions that would contribute to the dissemination of knowledge and information about UCB among health professionals.

Limitations

For the findings presented in this paper some limitations should be taken into account. The small sample size represents a limitation and therefore the results may not be generalized. Additionally, one of the participating hospitals has developed a UCB department. As a result the findings may be biased and real awareness maybe lower (the personnel of the specific hospital possibly has increased knowledge of the subject. However, the limited sample didn't permit any statistically significant comparisons between the hospitals.

Conflict of interest
Authors declare no conflict of interest.

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