

TRANSPLANT HEKİMLERİNİN KORKULU RÜYASI: KEMİK İLİĞİ VERİCİ ADAYLARININ DONASYONDAN VAZGEÇMESİ

A NIGHTMARE FOR TRANSPLANT PHYSICIANS: BONE MARROW DONOR CANDIDATES WITHDRAWING FROM THE DONATION PROCESS

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ÖZET

AMAÇ: Ülkemizde kök hücre nakli (HSCT) konusunda çok ilerlemeler kaydedilmesine rağmen, nakil vericisi gönüllülerinin sayısı hala istenilen düzeyde değildir. Bu çalışmada sağlık çalışanlarına, kök hücre nakli vericisi olma konusunda uzmanlar tarafından verilecek eğitimlerin, verici olma konusundaki düşüncelerine ve kararlarına etkilerinin değerlendirilmesi amaçlanmıştır.

GEREÇ VE YÖNTEM: Kök hücre nakli konusunda önceden herhangi bir eğitim almamış olan, sağlık çalışanları çalışmaya dahil edildi. 11-12 Ocak 2018 tarihlerinde Türkiye Kök Hücre Koordinasyon Merkezi (TÜRKÖK) tarafından, katılımcılara yarım saatlik bir toplu eğitim verildi. Bu çalışmaya TÜRKÖK tarafından verilen eğitimlere katılan 274 sağlık çalışanı dahil edilmiştir. Katılımcıların sosyo-demografik özellikleri, eğitim öncesi ve sonrası kök hücre nakli konusundaki bilgi ve tutumlarını, bağışçı olma konusunda kendilerini motive eden ve engelleyen faktörleri tespit etmeye yönelik ön test ve son test uygulandı.

BULGULAR: Eğitim almadan önce verici olmayı düşünmeyen 95 katılımcının, verici olmak istememelerine en çok neden olan faktörler sağlık sistemine güvenmemeleri idi (%16.5), ağrıya neden olma endişesi (%15.4), kemik iliği vericisi olmanın sağlığı olumsuz etkilediği düşüncesiydi (%13.4). Eğitim sonrasında kök hücre nakli vericisi olmayı düşünenlerin (p;.0001), kök hücre nakli ile ilgili yeterli bilgiye sahip olduğunu düşünenlerin (p;.0001), kök hücre vericisi olmak için nereye başvurulması gerektiğini bildiğini düşünenlerin (p;.000), ülkemizde kök hücre nakli ile ilgili toplumun yeterince bilgilendirildiğini düşünenlerin (p;.0001) oranlarında istatistiksel olarak anlamlı artış saptandı. Katılımcıların %67.3'ü (171 kişi) tüm süreç sonuna kadar verici olma kararlılığının devam edeceğini belirtirken, %32.7'si (83 kişi) verici olmaktan vazgeçebileceğini belirtti.

SONUÇ: Sonuçlarımız bu tür eğitimlerinin yaygınlaşarak, özellikle kurumlarda verilmeye devam edilmesinin, ülkemizde konu ile ilgili farkındalığı artırıp, yanlış inanışları azaltarak, kök hücre vericisi gönüllüsü sayısının yeterli düzeye ulaşmasına çok önemli katkı sağlayacağını göstermektedir.

ANAHTAR KELİMELEER: HSCT, Donör, Bilgi, Tutum, Eğitim.

ABSTRACT

OBJECTIVE: Although there have been remarkable developments regarding stem-cell transplantation (HSCT) in Turkey, but the number of people who would like to be stem cell donors is not yet at the desired level. The present study aimed to assess the effect of the training delivered by specialists on the thoughts and decisions of the health employees working in our center on being HSCT donors.

MATERIAL AND METHODS: Employees in the health sector who have not received any training in HSCT were included in the study. A half-hour of collective training for all participants was delivered by the General Directorate of Health Services Turkey Stem Cell Coordination Center (TÜRKÖK) on January 11-12, 2018. The present study included 274 health employees who attended the training delivered by TÜRKÖK. The pre-test and post-test were applied to determine the socio-demographic characteristics of the participants, their knowledge and attitudes about stem cell transplantation before and after the training, and the factors that motivate and prevent them from being a donor.

RESULTS: Among the 95 participants, who did not think about being a donor before receiving education, the factors that caused them to not want to be a donor the most were their distrust of the health system (16.5%), the worry of causing pain (15.4%), and the thought that being a bone marrow donor had a negative impact on health (13.4%). A statistically significant increase was found in the rate of those who think about becoming a stem cell transplant donor after education (p;.0001), those who think they have enough information about stem cell transplant (p;.0001), those who think they know where to apply to be a stem cell donor (p;.000) those who thought that the society was sufficiently informed about stem cell transplantation (p;.0001). While 67.3% (171 people) of the participants stated that their determination to be a donor would continue until the end of the whole process, 32.7% (83 people) stated that they could stop being a donor.

CONCLUSIONS: Our results show that continuing giving such trainings, especially in institutions, will contribute to the increase of the number of stem cell donor volunteers to a sufficient level by raising awareness on the subject and reducing false beliefs in our country.

KEYWORDS: HSCT, Donor, Knowledge, Attitude, Training.

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INTRODUCTION

Hematopoietic stem cell transplantation (HSCT) is a life-saving treatment for several benign and malign hematologic diseases such as sickle cell anemia, severe thalassemia, Fanconi vanemia, aplastic anemia, severe combined immunodeficiency, lymphomas, and leukemias (1). Bone marrow transplantation (BMT), peripheral blood stem-cell transplantation (PBSCT), and umbilical cord blood are the three main procedures utilized in HSCT (2). A healthy hematopoietic stem cell source compatible with HLA (human-leukocyte-antigen) is the most important precondition for successful transplantation. In 70% of the cases that require HSCT, unrelated HLA-matched donors are required (3). For this reason, national donor screening banks have been established for the screening of unrelated HLA-matched donors around the world, especially in the developed countries. A stem cell donor pool and stem cell bank have been established in Turkey under the name of TÜRKÖK in collaboration with the Municipality of Health and Turkish Red Crescent. TÜRKÖK is a member of the Worldwide Network for Blood and Marrow Transplantation (WBMT) (4).

Although there have been significant developments in Turkey regarding bone marrow and stem-cell transplantation after the establishment of TÜRKÖK, the number of patients who require HSCT is much higher than the number of transplant donors, and it does not meet the need. In the literature, it has been reported that the training activities customized after the identification of the knowledge and attitude of people, as well as motivators and preventive factors affecting them, can be beneficial to increase the number of donors needed for bone marrow and stem cell transplantation (5). Health employees are viewed as guiding partners for the people in their environment regarding health decisions (6). Based on this fact, the present study aimed to contribute to increasing awareness in society, as well as to identify the motivation, opinions, knowledge levels, and attitudes of the health employees working at the Afyonkarahisar Health Sciences University

Medical Faculty Hospital and the factors motivating them to be bone marrow and stem-cell transplantation donors. Assessing the impact of the trainings events delivered by related specialists on health employees' thoughts and decisions about being donors was also one of the aims of the study.

MATERIAL AND METHODS

Subjects and Approval

Among the health employees working in Afyonkarahisar Health Sciences University Medical Faculty Hospital who have not received any training on the subject of bone marrow and stem-cell transplantation, the employees who attended a half-hour collective training on January 11 - 12, 2018, delivered by TÜRKÖK and employees who stated permission for their answers to be used in the study on the training surveys before and after the training were included in the study. Health employees who have received training on bone marrow and stem-cell transplantation before and employees who did not let their survey answers to be used in the studies were excluded from the study.

Lecture and Testing

Preliminary test forms were prepared in accordance with the literature by the training nurses and the researchers of the study working in Afyonkarahisar Health Sciences University Medical Faculty Hospital and the forms were finalized with the recommendation of three specialists. These forms and the final forms prepared in the same manner were filled by the participants before and after the training. They were collected by the training nurse. Related forms were utilized as data collection tool after having been evaluated retrospectively by the researchers (7 - 13). There were five questions to identify the sociodemographic features of the participants, thirteen questions to identify their knowledge and attitude regarding bone marrow and stem-cell transplantation, two questions regarding factors which motivated them to be donors and prevented them from being donors, one question to increase awareness of bone marrow transplantation and being a do-

nor in society, and one question to identify if the answers given could be used for research and publication purposes within the pre-training form, which includes 22 questions in total. The answer key for the 13 questions which were to identify the participants' knowledge and attitude regarding bone marrow and stem-cell transplantation was prepared in "yes/no" questions. The answer key for the other questions was prepared as open-ended questions placing the most frequent answers given to the similar questions in the literature to the answer choices and adding "another" option. Ten of the twelve questions and answers on the post-training test form were the same as those used before the training. This was to measure the effect of the training they received on their knowledge, attitudes, and the motivating and preventive factors. One question in the test form after the training was prepared to assess how the participants who would like to be donors would decide if a compatible patient was found after their donor registration. The answer key for this question was prepared as an open-ended question because no similar question could be found in the literature. The last question on the test form after the training was prepared to identify if the participants would let their answers be used for the study and publication purposes.

Ethical Committee

The study was conducted with the approval of the Afyonkarahisar Health Sciences University Medical Faculty Ethics Committee dated 05.01.2018 and numbered 2018/1-25.

Statistical Analysis

Data were registered in the computer by using a licensed SPSS program, SPSS for Windows 20.0 package program (SPSS Inc. Chicago, IL, USA) and analyzed accordingly. Number and percentage were used for the discrete variables, and median values (minimum-maximum) were used for the continuous variables in the definitive statistics. McNemar tests were used in dependent variables and Chi-square tests were used in independent variables to identify whether there was a difference between the percentages of the survey answers given by the participants. All statistical evaluations were

conducted two sided, and a P-value less than 0.05 was considered statistically significant.

RESULTS

The present study included 274 health employees who participated in the training delivered by TÜRKÖK and gave permission for their survey answers to be used in the studies. The study excluded 20 people who had received some kind of training on bone marrow and stem-cell transplantation, and 86 employees who did not let their survey answers be used in the studies. The participants' median age was 32.7 (minimum=22, maximum=55) with 32.8% (90) males and 67.2% (184) females. The thoughts of the participants regarding being bone marrow donors before the training was shown in Table 1 based on their sociodemographic features (**Table 1**).

Table 1: The evaluation of the thoughts of the participants on being bone marrow transplantation donor before the training based on their sociodemographic features

Demographic features	Yes	No	Total
Gender			
Female	110 (66%)	56 (34%)	166
Male	41 (52%)	39 (48%)	80
Marital Status			
Single	57 (64%)	31 (36%)	88
Married	94 (60%)	64 (40%)	158
Education Level			
Primary School	12 (66%)	6 (34%)	18
Middle School	10 (50%)	10 (50%)	20
High School	42 (56%)	32 (34%)	74
College	87 (64%)	47 (36%)	134
Profession			
Doctor	8 (72%)	3 (28%)	11
Nurse	72 (66%)	33 (34%)	110
Technician	17 (46%)	20 (54%)	37
Health Officer	14 (78%)	4 (28%)	18
Medical Secretary	14 (50%)	14 (50%)	28
Administrative Staff	18 (58%)	16 (42%)	37
Security	8 (62%)	5 (38%)	13

Accordingly, 14.6% (37) of the participants donated blood regularly, 5.1% (14) of them had a family member, relative or friend who was a bone marrow donor, 2.6% (7) of them had a family member, relative or friend who needed bone marrow transplantation. The opinions on being bone marrow donors for the specific groups have been shared below statistically:

The opinions of 37 people who donated blood regularly were shown in **Figure 1**, the opinions of 14 people who had a bone marrow donor family member, relative or friend and the opinions of 7 people who had a family member, relative or friend in need of bone marrow transplanti-

on, based on the test results before the training (Figure 1).

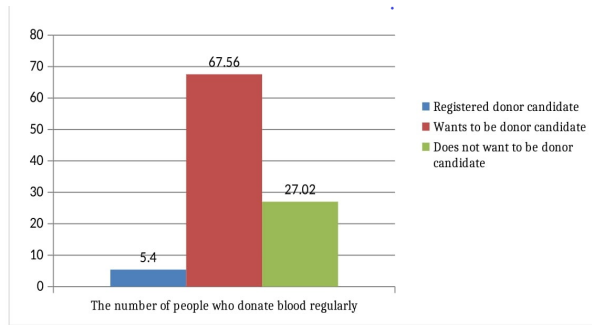


Figure 1: The thoughts of participants who donate blood regularly on being bone marrow donor before the training

While the distribution of the factors motivating participants who considered being bone marrow donors was shared in Figure 2 based on their answers in the test form before the training, the distribution of the factors preventing involuntary participants was shared in Figure 3 (Figure 2, 3).

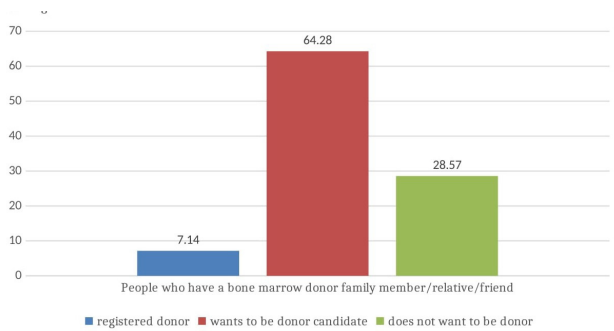


Figure 2: The Factors Affecting the Consideration of Being Bone Marrow Donor in a Positive Way

- Helping a Person 79.2
- The Thought of Saving Life 81.1
- Family's/Friends'/Relatives' Need for Help 22
- Recommendation of a Friend 4.4
- Media 7.5
- Bone Marrow Transplantation Saves Life 70.4
- Other Reasons 5.7

From the people who are bone marrow donor candidates and whom would like to be donor candidates

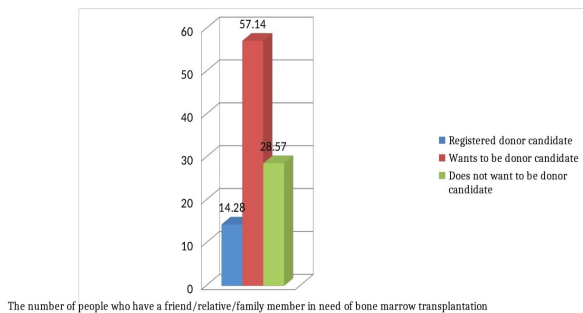


Figure 3: The Factors affecting the Consideration of Being Bone Marrow Donor in a Negative Way

- Being bone marrow donor affecting health in a negative way 34.3
- Concern it can cause pain 39.4
- Not acceptable for religion 13.1
- The family's disapproval of it 11.1
- The cost of being bone marrow donor 5.1
- The thought it can be a financial burden 7.1
- Not believing in the health system 42.4
- Other reasons 24.2

According to this data, the most encouraging factor for the 151 participants who considered being donors before the training was the thought of saving lives (50.8%; 129 people). The second most frequent (49.6%; 126 people) factor was the thought of helping people, and the third most frequent factor was considering it as a life-saving intervention (44.1%; 112 people). The reason why 95 participants who did not consider being donors before the training was distrust in the health system (16.5 %; 42 people). The second most frequent opinion (15.4%; 39 people) was the concern that it could cause pain, and the third most frequent opinion (13.4%; 34 people) was that being a bone marrow donor affecting health in a negative way. The evaluation of the answers given to the same questions before and after the training has been shown in Table 2 .

Table 2: The evaluation of the participants' answers to the same questions before and after the training

Questions	Before Lecture	After Lecture	P value
1) Do you think that you have sufficient information about the bone marrow transplantation?			
Yes	11 (4.3%)	215 (84.6%)	0,0001
No	243 (95.7%)	39 (15.4%)	
2) Do you know how bone marrow transplantation is conducted?			
Yes	59 (23.2%)	223 (87.8%)	0,0001
No	195 (76.8%)	31 (12.2%)	
3) Do you know where to apply to be bone marrow donor?			
Yes	57 (22.4%)	232 (91.3%)	0,0001
No	197 (77.6%)	22 (8.7%)	
4) Do you think that the bone marrow transplantation is acceptable for religion?			
Yes	216 (85%)	229 (90.2%)	0,085
No	38 (15%)	25 (9.8%)	
5) Do you think that your health will be affected in a negative way after you donate bone marrow when you become bone marrow donor and a compatible patient is found?			
Yes	35 (13.8%)	44 (17.3%)	0,289
No	219 (86.2%)	210 (82.2%)	
6) If you become a bone marrow donor and a compatible patient is found, do you think that the bone marrow transplantation process will be financial burden for you?			
Yes	29 (11.4%)	25 (9.8%)	0,618
No	225 (88.6%)	229 (90.2%)	
7) Will your family's, friends' and relatives' attitude be effective in your decision about being a bone marrow donor?			
Yes	107 (42.1%)	104 (40.9%)	0,801
No	147 (57.9%)	150 (59.1%)	
8) Do you think that, society in Turkey is being informed enough about bone marrow transplantation?			
Yes	14 (5.5%)	52 (20.5%)	0,0001
No	240 (94.5%)	202 (79.5%)	
9) Do you think that giving training for institutions will lead to raising awareness of our society on bone marrow transplantation and being bone marrow donor?			
Yes	145 (57.1%)	182 (71.7%)	0,0001
No	109 (42.9%)	72 (28.3%)	

According to the evaluation, a statistically significant change was identified in the rates of people in the stated groups at the end of the training: The rate of people considering being bone marrow donors went from 37.4% to 75.8% (p=000), people who thought they had sufficient information regarding bone marrow transplantation went from 4.3 % to 84.6% (p=0,000), people who thought they knew how bone mar-

row transplantation was conducted went from 23.2% to 87.8% ($p=0,000$), people who thought they knew where to apply if they wanted to be bone marrow donors went from 22.4% to 91.3% ($p=0,000$), people who thought the community was being sufficiently informed in Turkey went from 5.5% to 20.5% ($p=0,000$), and people who thought the best method to increase awareness regarding being a bone marrow donor in the community is delivering training for the organizations went from 57.1% to 71.7% ($p=0,000$). No statistically significant change in the number of people who considered bone marrow transplantation not acceptable because of religious reasons, thought being a bone marrow donor might affect health in a negative way, thought that the process of bone marrow collection could bring financial burden and believed the attitude of families, friends or relatives had an impact on their decision of being bone marrow donor was identified. After the participants' donation registrations were completed, the distribution of their answers on how their decisions might be affected when a patient who was matching them and in need of a transplant was found was analyzed based on their sociodemographic features (**Table 3**).

Table 3: The decisiveness of the participants on being donors when their donor registrations are completed, a compatible patient in need of transplantation is found

Demographic feature	Yes	No	Total
Will you be donor if a compatible patient is found whom you can be donor for after your donor registration is completed?	171 (67.3%)	83 (32.7%)	254 (100)
Features of the people who stated they could quit being donors after their donor registrations are completed, and a compatible patient is identified for them			
Gender			
Female		47 (56.6%)	
Male		36 (43.4%)	
Marital Status			
Single		27 (32.5%)	
Married		56 (67.5%)	
Education Level			
Primary School		7 (8.4%)	
Middle School		7 (8.4%)	
High School		26 (31.3%)	
College		43 (51.8%)	
Profession			
Doctor		2 (2.4%)	
Nurse		36 (43.4%)	
Technician		17 (20.5%)	
Medical Secretary		5 (6%)	
Health Officer		5 (6%)	
Administrative Staff		2 (2.4%)	
Other Health Staff		16 (19.3%)	
The reasons of people who stated they could withdraw from the donation process			
Religious reasons		9.6% of them (8 people)	
People who think that it can affect the donor's health in a negative way		20.5% of them (17 people)	
People who think that it can create financial burden for the donor		12% of them (10 people)	
People who think that their family/friends will have a negative effect in their decisions		48.2% of them (40 people)	

Of the participants, 67.3% (171 people) stated that their decisiveness regarding being a donor would continue until the end of the whole process, 32.7% (83 people) stated they could possibly quit being a donor. People who stated they could quit did not write their reasons even though an open-ended answer was requested. Of the respondents who stated they could quit the process, 43.4% (36 people) were males and 56.6% (47 people) were females. Of the participants, 67.5% (56 people) were married, and 32.5% (27 people) were single. About the educational background, 8.4% (7 people) were primary school graduates, 8.4% (7 people) were middle school graduates, 31.3% (26 people) were high school graduates and 51.8% (43 people) were university graduates. Of the participants, 43.4% (36 people) were nurses, 6% (5 people) were medical secretaries, 19.3% (16 people) were from the other professions (9 cleaning personnel, 1 chef, 3 kitchen staff, 3 security staff), 2.4% (2 people) were doctors, 20.5% (17 people) were technicians, 6% (5 people) were health officers, 2.4% (2 people) were administrative staff. Of the participants, 9.6% (8 people) stated that bone marrow transplantation would not be proper for religious reasons, 20.5% (17 people) stated it could affect health in a negative way, 12% (10) stated that the recovery process of bone marrow transplantation could be a burden financially, and 48.2% (40) stated that their, families', friends', or relatives' attitude could be effective in their decisions.

DISCUSSION

Health employees, especially doctors, are regarded as behavioral role models in society, especially in the issues of health. However, not only doctors but also other health employees can lead the community primarily in matters of health. According to the data of European Group for Blood and Marrow Transplant (EBMT) which many transplant centers are members in Turkey, the number of donors who are not relatives is not at the desired level yet and it does not meet the need. It is believed that the main

reason for this is because there is not enough awareness and knowledge of the topic in Turkey yet (14). Our study's target audience included not only doctors, but all health employees, based on our hypothesis that it would raise awareness about the topic in our society more quickly and to the desired level. The knowledge level of our target audience regarding being bone marrow donors was evaluated with a survey form. Then it was ensured they got a half hour visual training in a lecture hall. Then, the effects of the training on their knowledge, attitude, and decision to be donors were assessed. There have been studies in Turkey assessing the knowledge of medical faculty students (15) and the knowledge of cancer patients or people having cancer patients in their families (16) regarding being bone marrow transplantation donors. However, we have not come across any study in the literature assessing the knowledge level of people regarding being bone marrow donors involving all hospital employees. In the TÜRKÖK project, the aim was to inform, especially blood donors as the target audience, and raise awareness so that the bone marrow candidate pool expands. While 2 (5.4%) of the 37 participants who donated blood regularly were registered as donor candidates, 25 (67.56%) of them were considering being donors according to the test results before the training. In the study in which Narayanan et al. (17) evaluated the knowledge, attitude and behaviors of the medical faculty students about being bone marrow donors, it was reported that 56% of students who were previously blood product donors were registered as candidate donors. Hazzazi et al. (1) reported that 36% of the students who were previously blood product donors were registered as donor candidates. Suluhan et al. (18) reported that no donor from the 100 donors who donated regularly was registered as donor candidate, and 47% of them were considering being donor candidates. It was reported that the people who donated regularly were more motivated to be donors in the study conducted by Galenos et al. (10). This finding is in line with the results of our study. Our study demonstrates that the selection of primarily blood donors as the target audience for the TÜRKÖK project was the correct approach.

The present study found that those who had a family member, friend, or relative who was a bone marrow donor or who needed a bone

marrow transplant were more motivated to be donors and were more sensitive to the issue. In the study Bagcivan et al. conducted, it was reported that the stem-cell transplantation awareness of cancer patients and their families were higher than the awareness of patients, and their families, who had a disease other than cancer. When health employees were evaluated, the groups with the highest involuntary rate were as follows: the middle school graduates (based on their educational background), technicians (based on their profession), married couples (based on their marital status), and males (based on their gender). These groups did not consider being donors with the highest involuntary rate. Factors leading to this condition can be analyzed with the studies focused on these groups and the training events can be customized accordingly. It may also contribute increasing the number of people who would consider being bone marrow donor candidates. Our study, in parallel with the previous studies, showed that people who had a higher education level were more motivated to be bone marrow donors (11, 18 - 20). While men were more motivated to be bone marrow donors in the study conducted by Suluhan et al. (18), in the study conducted by Onitilo et al. (11) women were more motivated to be bone marrow donors. The results of the study of Onitilo et al. were similar to the results of our study. In the study conducted by Narayanan et al. (17) majority of the bone marrow donor registrations were reported to be females.

The following were the reasons given by research participants who stated that they did not consider becoming bone marrow donors in a pre-TÜRKÖK survey: The health system is not trusted, the concern that it can be painful, and the thought of being a bone marrow donor affect health in a negative way. In a study conducted with medical students in Minnesota, USA, the most reported concerns regarding being a bone marrow donor were the thought that the process could be painful, considering it as a time consuming process (time commitment), long-term adverse effects and concerns regarding financial cost (17). In a study with medical students in Saudi Arabia, refraining from long-term costs, considering it a time consuming process (time commitment) and the concern that the process would be painful were the most frequent concerns stated (1). In a study conducted in South Carolina, USA, fe-

aring pain, having health problems, considering it not convenient and distrust in the health system were the most frequent concerns (11). In another study, conducted in South Carolina, the most frequent reasons were reported as worrying about costs, not having the opportunity, other reasons and fear of the pain (19). In a study in Hong Kong involving people from the public between the ages of 18-60, the most frequent reasons were reported as health problems, fearing of the pain, insufficient level of knowledge, families not giving permission and distrust in the health system (20).

Focusing on the concerns of public regarding being a donor in the training events can be effective to change the thoughts of people from negative to positive. Donors may need to rest for 7-10 days after the process and this can cause financial loss for both donors and employers (21). It has been reported that there has been a significant increase in the number of donors thanks to the leave and/or tax reduction practices for the donors and employers (22) in many states in the USA. We think that in addition to training events informing public on the HSCT, preparing certificates of appreciation/honor which will increase respectability in the society and supporting both the donor and employer financially (tax reduction) can contribute to increasing the number of donors in Turkey. In the present study, the number of people who considered being a bone marrow donor after the training, the number of people who thought they had enough information regarding bone marrow transplantation, the number of people who thought they knew how bone marrow transplantation was conducted, the number of people who thought they knew where to apply to be a bone marrow donor and the number of people who thought society was being informed sufficiently in Turkey and the number of people who thought the best method to increase awareness in the public regarding being a bone marrow donor would be through training programs for institutions, significantly increased after the training statistically. These data show that the training delivered by TÜRKÖK achieved its objective and the awareness of the participants increased. In a study (15) conducted in Turkey, it has been reported that the knowledge and awareness level of students regarding stem cell donation, stem cell banking, and/or

the number of stem cell donors in Turkey, and the number of people who would like to donate blood and stem cells have significantly increased statistically compared with the pre-training period according to the tests filled in by the medical and law faculty students after the training. In a study (23) conducted in Korea with nursing students in which nursing students' knowledge, attitude regarding HSCT and motivation for being donors were assessed before and after the training, it has been reported that the students' knowledge, attitude ($p < 0.001$) regarding HSCT and motivation ($p = 0,06$) for being donors significantly increased statistically according to the tests performed in the second week after the training. It has also been reported that the registration rate ($p = 0.039$) for the HSCT statistically, significantly increased 14 weeks after the training. The identification of statistical, significant increase in the number of people who believe that the best method to increase awareness in the society is delivering training for the institutions shows that continuation of the training events will contribute to increasing the number of bone marrow donors in society and awareness on the subject significantly.

A high percentage of the participants (32.7%, 83 people) stated that they might quit being donors when a proper patient was found after considering being donors and having been registered as donors. People who stated they could quit the process did not write their reasons even though an open-ended answer was requested from them. Since this condition can lead to significant problems after a donor is found and the transplantation process is started, studies researching the cause of the condition and solutions are needed urgently. It has been identified that the 48.2% of the participants (40 people) who stated they could quit the process (even if they were registered) upon a donor was found were the ones who thought that the attitude of families, friends, or relatives was instrumental in their decision to be donors. When there is a compatible patient for a donor candidate, the involvement of the families, friends, or relatives of the patients in the training by the will of the donor shall reduce the risk of donors leaving the process and it can reduce negativities during the transplant process. According to the data the Head of the Municipality of Health, the General

Directorate of the Health Services Blood, Organ, Tissue Transplant Services Office, shared in his presentation in the health authority session in the 11th National Bone Marrow Transplantation and Stem Cell Treatments Congress, 12.87% percent of compatible donors withdrew from the process in the period from the date TÜRKÖK was established to March 2nd, 2019 (472/3666). It has been reported that 66.7% of the people left the process because of individual reasons. It has been reported that the major reason for this situation is involvement of inappropriate people in the system such as people who cannot accept donorship, who do not have a developed sense of donorship culture. Of the people who quit the process, 27.5% did this because of the family pressure. This supported the findings in our study. This group consisted of mainly females. Other less prevalent reasons for quitting included a willingness to get to know the patient, financial expectations, skepticism in the system, refusal to accept the method of transplantation, and general discontent.

There has been only one study in Turkey assessing the motivation to be a donor and the knowledge and attitude change regarding HSCT after the delivery of training on HSCT, conducted by Kaya et al. (15). We believe that the awareness regarding the subject will increase and false beliefs will decrease in Turkey thanks to these studies and the TÜRKÖK training events will become widespread and continue to be delivered, especially in the institutions. We believe that all these developments will contribute to the number of bone marrow donors reaching a sufficient level. When there is a compatible patient found for a donor candidate, the involvement of the families, friends, or relatives of the patients in the training by the will of the donor will reduce the risk of donor's leaving the process and it can reduce the negativities during the transplant process for this reason. Involvement of people who regularly donate blood in the system and conducting a face-to-face and questions&answers meeting with visual aids with the participation of educated and experienced transplant doctors and people whom the donor would be requested when there is a match can lead to significant decreases in the rate of withdrawal.

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