

## Prevalence of Blood Brotherhood among High School Students in Erzurum and the Effect of Peer-led Education on this Practice

### *Erzurum'daki Orta Öğretim Öğrencileri Arasında Kan Kardeşliği Yapma Yaygınlığı ve Buna Akran Eğitiminin Etkisi*

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#### Abstract

**Objective:** This study aimed to assess the prevalence of blood brotherhood (BB) in Erzurum, Turkey and to observe the effect of education interventions on this risky cultural behavior.

**Materials and Methods:** This study was designed as a cross-sectional intervention, based on minor interventions through a peer-led awareness campaign regarding the transfer of blood-borne diseases through BB rites. This study was conducted from February through May 2007 at 29 high schools in Erzurum.

**Results:** The study population was 53.8% (n=1,522) males and 46.2% (n=1,307) females. The proportion of the students who have participated in BB rituals was 24.1% (n=558). There was a statistically significant link between BB and a history of having Hepatitis B Virus (HBV) infection, family history of HBV and male gender (p<0.05). After the structured peer-led education the intention to participate in BB rituals decreased from 30.0% to 20.6% (p<0.001).

**Conclusion:** The prevention of BB rituals, which can result in the transfer of blood-borne diseases, requires urgent public awareness campaigns led by healthcare professionals.

**Key Words:** AIDS, blood brotherhood, Hepatitis B, Hepatitis C, risky cultural habits

#### Özet

**Amaç:** Bu çalışmada, Erzurum'da ortaöğretim öğrencileri arasında kan kardeşliğinin yaygınlığı ve akran eğitiminin bu riskli kültürel davranışı yapma üzerindeki etkisinin araştırılması amaçlanmıştır.

**Gereç ve Yöntem:** Çalışma Şubat 2007 ile Mayıs 2007 tarihleri arasında kan kardeşliğiyle bulaşabilen hastalıklar konusundaki bilincin artırılmasını amaçlayan ve akran eğitimine dayanan kesitsel, girişimsel bir çalışma olarak yapılmıştır.

**Bulgular:** Katılımcıların % 53.8'i (1522) erkek ve %46.2'si (1307) kadındı. Kan kardeşliği yapanların oranı %24.1 (558) idi. Daha önce hepatit B virüs enfeksiyonu geçirme, ailesinde hepatit B virüsü enfeksiyonu geçirme hikâyesi olma ve erkek cinsiyet arasında istatistiksel olarak anlamlı bir fark vardı (p<0.05). Yapılandırılmış akran eğitimi sonrasında kan kardeşliği yapma isteği % 30.0'dan %20.6'ya düştü (p<0.001).

**Sonuç:** Kan kardeşliği kan yoluyla bulaşan hastalıkların bulaşma yollarından biri olabilir. Bu konuda sağlık profesyonellerinin toplumu bilinçlendirmesi önemlidir.

**Anahtar Kelimeler:** AIDS, Hepatit B, Hepatit C, kan kardeşliği, riskli kültürel davranış

#### Introduction

It is an established fact that prevention is better than the cure when discussing the prevention of communicable diseases, and it is important to know all transmission routes for bacteria, parasites and viruses [1, 2]. There is a growing concern regarding dangerous blood-borne diseases including hepatitis B virus (HBV), human immunodeficiency virus (HIV), and hepatitis C virus (HCV). Although all three of these viruses are blood-borne and share common routes of transmission, the epidemiology of each virus differs based on the

virus and the circumstances of exposure. HBV is more efficiently transmitted than HCV or HIV, especially if the source is positive for the hepatitis B e antigen (HBeAg), a marker for increased infectivity [3]. In fact, when HBeAg is present, HBV is 100 times more likely than HIV to be transmitted after percutaneous exposure to infected blood. HCV, which is less infectious than HBV, is on average six times more likely than HIV to be transmitted after percutaneous exposure [4]. The literature shows that in Erzurum, the seroprevalence of HBV is 36.7%, and the carriage rate of HBsAg is 9.1% [5]. Studies have shown that carriage of HBsAg and seropositivity of HBV were

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higher in males and young age groups, and these values were even higher in children [6]. Thus, it is well-known that HBV is present in Eastern Anatolia (Erzurum) and is more dangerous and easily transferable than other blood-borne diseases.

Blood brotherhood (BB) rituals are one of several types of alliances or ties that bind people together in a way analogous to, but distinct from, kinship bonds [7]. BB derives its name from the ritual of two friends cutting their own fingers or arms in agreement and commingling their blood, by scraping the wounded body parts against one another or by sucking a small amount of one another's blood. The participants swear an oath to treat one another as his/her brother/sister [8]. The alliance that is formed after BB rites enjoins the members to mutual support, loyalty and affection.

The blood brotherhood (BB) rite has been practiced by mankind for thousands of years. Many classical writers, beginning with Herodotus, reference BB in their works. There are many accounts of BB in myths and sagas from central Europe, Scandinavia, Anatolia and Asia. The custom has also been documented in Africa and among North American Indians [9]. Although the literature does not show that BB is widely practiced, BB occurs among Turkish children and teenagers. This ritual is extensively practiced for solidarity to defend one another in the case of hostility or an assault. Sometimes, BB are formed between groups to establish similar bonds especially in areas such as Erzurum, in which people still have old cultural beliefs. Thus, different methods have been applied to prevent these practices; however, peer-to-peer education has been found to be very effective at modifying adolescent behavior [10-12].

The first objective of this study was to assess the prevalence of BB practices in Erzurum, Turkey. These practices are a behavioral risk for the transmission of blood-borne infectious diseases, such as HBV, which is very prevalent. However, prevention of these behaviors has been neglected because these rituals are non-sexual. The secondary aim of this study is to assess the effect of peer-to-peer education in altering the attitudes of high school students towards this cultural behavioral risk.

## Materials and Methods

### Study setting

This study was conducted in high schools in the city center of Erzurum in East Anatolia, Turkey. At the time of the study, there were 17,598 students enrolled in the 9<sup>th</sup> to 11<sup>th</sup> grades at 29 high schools.

### Study design and sample size

The study was designed as cross-sectional with interventions; these interventions were peer-led education concerning the transfer of blood-borne diseases during BB rites.

The sample size calculation was based on the main outcome variable "intention to participate in BB" before and after the interventions. The probability of BB before intervention ( $p_1$ ) was 30%, the probability of BB after intervention ( $p_2$ ) was 25%, the alpha error was 5%, and the sample size was 1,615 cases, which yields a power of 88.2%.

The data were collected between February and May of 2007. Students from 16-18 years of age were included in this study. Using school registries, 3,055 students were selected out of 17,598 pupils in the 9<sup>th</sup> to 11<sup>th</sup> grades who were studying in 29 high schools in the city center of Erzurum. Randomization was based on classroom clusters. The researchers informed the class verbally regarding the aims of the study and asked for voluntary participation. Before and after the peer-led education, a study questionnaire was administered to each group. The study was approved by the local ethics committee.

### Study Questionnaire

We developed a structured questionnaire. The definition of "kan kardeşi/blood brotherhood" as defined in the online electronic Grand Turkish Dictionary, which is published by The National Turkish Language Association, was provided in the questionnaire. There were questions relating to BB application in the questionnaire. The questions concerned demographic features and whether they had made a BB as explained in the questionnaire, whether they would like to participate in new BBs, and whether they or their family members have a history of HBV.

### Inclusion criteria of peer-led educators

The volunteers were high-achieving high school students with leadership potential that were selected by their school teachers. During the training program, group discussions and presentations were held. The highlights of the training program were as follows: types of Viral Hepatitis (VH), their epidemiology and how to prevent VH. A survey questionnaire consisting of 25 questions was prepared for data collection. The questionnaire for the study collected demographic information, and attitudes, knowledge, and behavior regarding VH. The questionnaire was pre-applied and tested on a group of 50 students who were not included in the study sample. A one-day training program was revised and improved with the contribution from 3 departments: Public Health, Infectious Diseases, and Psychology. This program was advised 10 volunteer doctors from the Faculty of Medicine.

Peer educators consisted of volunteer students 16-18 years old who were trained by a professional peer education trainer to convey their message. Peer educators were trained to impart factual information on VH prevention and transmission through a single discussion-oriented session lasting one hour.

The peer educators made a one-hour interactive presentation in their own classrooms. The presentation included information on the signs and symptoms of VH, routes of exposure, and preventive measures.

### Sampling and Application

Before the presentations, the study questionnaire was applied to a sample of 87 classes. These classes were selected randomly and weighted according to the total number of students in each school. Participants were informed about the study verbally and by written information in the questionnaire. Participation was voluntary, and data collection was conducted anonymously. Of the selected students ( $n=3,055$ ), 2,982 agreed to participate, and 2,829 questionnaires with valid and complete data were analyzed after the first application. The questionnaire was applied to a similar sample of students after one month using the identical methodology. In the second application, 2,912 students participated, and 2,814 questionnaires were analyzed. A total of 1,615 students participated in both surveys and provided valid answers to the questions related to their intentions to participate in BB and peer-led education.

### Statistical Analysis

All analyses were performed with the Statistical Package for Social Sciences version 17 (SPSS Inc., Chicago, IL, USA). Categorical variables were expressed as frequencies and percentages. Chi square test and McNemar's test were performed for bivariate comparisons. P-values lower than 0.05 was considered statistically significant.

### Results

The total number of analyzed questionnaires was 2,829, and the population was 53.8% ( $n=1,522$ ) males and 46.2% ( $n=1,307$ ) females. The demographic features of the participants are shown in Table 1. The proportion of the students who had participated in BB was 24.1% ( $n=558$ ), and the proportion of those who wanted to participate in BB was 30.0% ( $n=485$ ) (Table 1).

There was a statistically significant history of BB ritual compared to HBV status, history of family members with HBV and male gender ( $p<0.05$ , Table 2).

Of the subject who intended to form new BB, 61.7% had previous BB and 19.5% had no previous BB; this difference was statistically significant ( $p<0.001$ , Table 3). There was no statistically significant difference with respect to gender and the intention to form a new BB ( $p=0.276$ , Table 3).

We analyzed the effect of peer-led education on the intention to form BB. After the peer-led education, the number of participants who intended to form BB decreased from

**Table 1. Demographic features of the participants**

		n	%
Gender	Male	1522	53.8
	Female	1307	46.2
Class	9	1066	37.7
	10	1147	40.5
	11	616	21.8
BB Participation	Yes	558	24.1
	No	1753	75.9
Intention to participate in BB	Yes	485	30.0
	No	1130	70.0

BB: Blood brotherhood

30.0% to 20.6%, which was a statistically significant difference ( $p<0.001$ , Table 3).

### Discussion

Unfortunately, health professionals have ignored this risky behavior until recently and have not performed research to determine the prevalence of this behavior. Therefore, there is a lack of literature available concerning the role of these types of cultural rituals in the transmission of blood-borne diseases. This study was the first study conducted on BB rituals in Turkey with a large sample size. This study showed that one quarter of the high school students have participated in the BB ritual, which is very high.

Although males had 6% higher proportion of BB than females, participation in BB was very high in both teenage boys and girls. This practice is typically prevalent among males, although some females have reportedly become "blood brothers" in the past [13].

This may be because of the higher involvement of boys in hostilities, assaults and fights compared with girls and also their need for confirming solidarity to defend themselves.

There were some interesting findings illustrated by this study; for instance, one third of those who have participated in BB rites almost also have a history of hepatitis. In addition, one third of those who have participated in BB rites have a history of HBV infection in their family. This finding supports the idea that BB rites may play a role in the transmission of blood-borne diseases.

Another dreadful result is that almost a quarter of the sample population has the intention to participate in BB rites, which worsens the problem. Of those who have the intention to form BB, they are three times more likely to have previously participated in BB. These results are alarming because it will exacerbate the problem further and also shows that youth are not aware of the risks of forming BB.

**Table 2. Relationship of blood brotherhood ritual participation with history of HBV, family history of HBV and gender**

		Have you participated in blood brotherhood before?		$\chi^2$ ; p
		Yes n/(%)	No n/(%)	
Did you have HBVI before?	Yes	133/(28.8)	329/(71.2)	7.884; 0.005
	No	411/(22.6)	1411/(74.4)	
Do you have a family member with HBVI?	Yes	248/(30.1)	575/(69.9)	29.354; <0.001
	No	290/(20.1)	1155/(79.9)	
Gender	Male	326/(27.0)	881/(73.0)	11.313; 0.001
	Female	232/(21.0)	872/(79.0)	

HBVI: Hepatitis B virus infection

**Table 3. Relationship among previous participation in BB, intention to participate in new BB, effect of peer-led education and gender distribution**

		Do you want to participate in new BB?		$\chi^2$ ; p
		Yes n/(%)	No n/(%)	
Gender	Male	291/(31.1)	645/(68.9)	1.188; 0.276
	Female	194/(28.6)	485/(71.4)	
Have you participated in BB before?	Yes	201/(61.7)	125/(38.3)	198.104; <0.001
	No	171/(19.5)	707/(80.5)	
Peer-led education*	Before	485/(30.0)	1130/(70.0)	77.88; <0.001
	After	333/(20.6)	1282/(79.4)	

BB: Blood brotherhood.  
\*Only considered (n=1615) those who participated in peer-led education program and both surveys because of application of McNemar's test.

This behavior cannot be neglected by simply arguing that children play this rite as a game and that it will disappear as they mature. In fact, this ritual practice makes this population more likely to transmit blood-borne diseases. Another interesting and important finding is that when an education intervention through peers is provided, there is a chance to decrease their intention to participate in BB ( $p < 0.001$ ). This finding certainly emphasizes the importance of health education regarding this hidden mechanism for transfer of blood-borne diseases.

Peer-led educational activities are an effective method to improve the behavior of adolescents and change their beliefs regarding risky behavior [10-12] and has been used as a model for these specific needs. The results of our study show a reasonable change in the opinion of participants.

Although, all blood-borne diseases can be transmitted through BB practices HBV is more efficiently transmitted than HCV or HIV, especially when the source is positive for the

hepatitis B e antigen (HBeAg), a marker for increased infectivity [3]. In fact, when HBeAg is present, HBV is 100 times more likely than HIV to be transmitted after percutaneous exposure to infected blood, and prior literature has shown that Erzurum has a high carriage rate of HBsAg [5]. HBsAg is more prevalent in males and young age groups, and HBsAg carriage is even higher in children [6]. Therefore, it is more challenging to control the transmission of blood-borne diseases because a population with a high transmission risk for HBV engages in BB rites.

Transferring one person's blood increases the risk of transmission for human immunodeficiency virus (HIV), hepatitis B virus, hepatitis C virus and other blood-borne infectious diseases [14, 15]. In BB rituals, two friends exchange their blood by scraping the wounded body parts of one another [8]; therefore, these non-sexual cultural practices are possibly connected with increased virus transmission. Unfortunately, we could retrieve only 2 case reports [14, 15] and 1 review

article [16] from the literature to support our argument. The first report concerns a case of acquired immune deficiency syndrome (AIDS) and reported that the patient potentially acquired HIV through the exchange of blood during a BB ritual. The second report included two cases [14] which illustrated data from Turkey in which BB remains widely practiced among children and teenagers. The first case discusses the identification of a HIV positive patient who participated in a BB ritual 4 years ago and discovered a few days after the ritual that his blood brother was HIV positive. The patient subsequently became HIV positive. The other case concerns the transmission of hepatitis B virus from a teenage HBV carrier to his two blood brothers, who had participated in BB rites sixty-four days prior.

These case reports are alarming and show that cultural practices contribute to the transmission of blood-borne diseases. These findings are further reinforced by a review that showed that non-sexual cultural practices, including reactions resulting in exposure to blood, that do not fit the age distribution pattern of AIDS may expose individuals to infectious diseases such as HIV and Hepatitis B and C [15].

This study is a part of an interventional peer-led health education study for viral hepatitis among high school students [17]. This study was limited because we could not ask more detailed questions pertaining to the reasons for participation in BB, their ages when they participated in BB, the education level of the families, whether their family knows about their BB, whether they acquired blood-borne infectious disease after participating in BB, and when they received vaccines against HBV.

In conclusion this data demonstrated that a high proportion of high school students participate in BB and that these students have a high chance of transferring HBV. Therefore, health educational programs concerning the danger of blood-borne diseases should be developed and applied to teenagers, and peer-led education could be a good way of educating the young population. Family physicians can play a vital role by updating and informing their families and increasing awareness about the danger of these types of risky behaviors. Educational intervention at primary schools may be one of the most effective ways to decrease this risky ritual. The role of this ritual in the transmission of blood-borne diseases requires further research.

**Conflict of interest statement:** The authors declare that they have no conflict of interest to the publication of this article.

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