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Giving blood donors something to drink before donation can prevent fainting symptoms: is there a physiological or psychological reason?



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ABSTRACT

The vasovagal reaction has been widely studied but its anatomic and physiological nature remains uncertain. The mechanisms underlying vasovagal reaction related to blood donation are not completely understood either. Does its occurrence depend on the blood donors' physical characteristics and health variables or psychological factors? On the basis that a psychological approach considerably prevents donor reactions, the effect of fruit juice ingestion was studied in a group of 1849 first-time high-school students as a simple strategy to avoid systemic reactions at blood donation. The reasons for the psychological effect of this hydration protocol are stressed also in light of previous physiological studies on the hemodynamic effects of water or carbohydrate drinks.

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1. Introduction

Vasovagal reaction related to blood donation has been studied worldwide. However, it can never be over-emphasized, especially considering that this kind of phenomenon can also cause serious accidents such as in the case of a Japanese blood donor who died after falling in the lavatory at the donation site. Nakajima [1] correctly wrote: "It is our mission and responsibility to secure the safety of the blood donation process and to prevent damage to the health of the donor as much as possible". Syncope is one of the most common conditions that afflict patients but its etiology remains unknown in 36–50% of cases [2–4]. The mechanism underlying syncope/pre-syncope associated with blood

donation is not fully understood either. Only a deeper comprehension of its pathophysiology will improve prevention. By considering the blood donors' physical characteristics and health variables (height, weight, race, systolic and diastolic blood pressure, hematocrit, hemoglobin), it has been impossible to exactly predict which donors will develop a vasovagal reaction [5–10]. A psychological support, in order to neutralize negative emotions linked to blood donation, greatly reduced the incidence and intensity of vasovagal reactions thus increasing return rates among first-time donors [11] and leading familiar donors to become regulars [12]. On the other hand, some researchers are trying to find the right physiological strategy to avoid blood donor systemic reactions [13–16]. Rehydrating blood donors with water before donation could be a simple and effective prophylaxis against fainting and pre-fainting symptoms but results are not unanimous [16–20]. The objective of this study is to verify the efficacy of fruit juice administration in

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Table 1
Students' reactions as regards gender.

	Non-hydrated students (1807)				Hydrated students (1849)				P value
	n	%	Reactions		n	(%)	Reactions		
			n	%			n	%	
Male	1174	65	43	3.66	1146	62	25	2.18	$P < 0.05$
Female	633	35	32	5.06	703	38	19	2.70	$P < 0.05$
P value			$P > 0.05$				$P > 0.05$		

preventing high-school first-time blood donors' reactions. How might fluid ingestion prevent these reactions? Does the administration of fluids improve orthostatic tolerance by counterbalancing either vasodilatation associated with the vasovagal mechanism [21] or relative hypovolemia following blood donation [22,23]? The hypothesis of this study is that giving donors something to drink has a placebo effect in preventing fainting and pre-fainting symptoms only when psychological discomfort linked to donation is not too intense.

2. Materials and methods

2.1. Participants

Research was conducted at the Blood Transfusion Institute of Serbia on an experimental group of 1849 first-time high-school blood donors who were given some fruit juice before donating, compared with a control group of 1807 first-time high-school blood donors who were not hydrated. The study protocol had approval from the Institutional Review Board. Students in the experimental group donated from October 2007 to December 2008 during 45 blood donation sessions. Control group students donated from October 2006 to October 2007 in 38 blood donation sessions. All students were aged between 18 and 19 years old and were recruited at school, in the presence of their teachers. Several days before the pre-scheduled blood-donation sessions, staff who are specially trained in motivating and recruiting new donors explained the procedure to the students and underlined how important blood donation was. Blood donation eligibility criteria were also discussed. A mobile team from the Blood Transfusion Institute was sent to the students' schools for the blood-donation sessions. In the hydrated experimental group, there were 1146 (62%) males and 703 (38%) females. In the non-hydrated control group, there were 1174 (65%) males and 633 (35%) females.

Table 2
Students' reactions as regards weight.

Weight (kg)	Non-hydrated students (1807)				Hydrated students (1849)				P value
	n	%	Reactions		n	%	Reactions		
			n	%			n	%	
50–55	162	9	10	6.17	166	9	5	3.01	$P > 0.05$
56–65	578	32	24	4.15	628	34	11	1.75	$P < 0.01$
66–80	868	48	32	3.69	850	46	21	2.47	$P > 0.05$
>80	199	11	9	4.52	205	11	7	3.44	$P > 0.05$
P value			$P > 0.05$				$P > 0.05$		

2.2. Methods

Students in the experimental group were given some fruit juice 30 minutes before donation. The quantity of juice was approximately the same as the quantity of blood to be donated. It was explained to the students that the quantity of juice they had been given would compensate in advance for the amount of blood they were about to donate and all of them gave informed consent. Students with the lowest acceptable values of weight and/or blood pressure (e.g. 50 kg and/or a blood pressure reading of 100/60 mmHg) donated 350 ml of blood and all the others donated 450 ml. Blood pressure was measured manually by nurses, following a standard procedure. Students' hemoglobin values were within the range for donor eligibility, as established by law. The relationship between the occurrence of fainting and pre-fainting symptoms was analyzed in both groups of students as a whole and, subsequently, according to the following four sub-groups: gender, weight, volume of donated blood, blood pressure value. Reactions at donation were not subdivided according to the degree of severity: in fact, even minor symptoms can discourage donors from returning [24].

2.3. Statistics

Statistical data analysis was performed using a proportion equality (two-tailed) test.

3. Results

There are statistically significant differences ($P < 0.01$) regarding unfavorable reactions between the groups. Forty-four (2.38%) of the hydrated students compared with 75 (4.15%) of the non-hydrated students reacted at donation. The relation between the occurrence of VVR in both groups of blood donors was also analyzed based on gender (Table 1), weight (Table 2), volume of blood donated (Table 3) and

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