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Non-physician health-care workers and voluntary blood donation: an ambiguous relationship

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SUMMARY

Objectives: This study aims to assess the knowledge, attitude and practice (KAP) of voluntary blood donation (BD) among the non-physician health-care workers of our institution, to investigate the relationship between these parameters and to determine the predictors of BD practice.

Background: KAP surveys provide a popular context-specific evidence base for the development of blood transfusion services' strategies and interventions to promote voluntary, non-remunerated BD. However, there are just few studies worldwide assessing KAP of BD among health-care workers.

Methods: This is a cross-sectional exploratory study, which took place at the 'Ippokrateio' General Hospital of Thessaloniki, Greece, a tertiary health-care institution. A specially designed, pre-tested questionnaire was distributed to all non-physician health-care workers of the hospital. A total of 1140 questionnaires were distributed. Participation in the study was optional and anonymous. Regarding data analysis, a binary logistic regression analysis was performed to describe the relationship between different elements of KAP of BD and to determine possible predictors of BD practice.

Results: The response rate was 25·5% (291 respondents). Logistic regression analysis revealed a positive attitude towards family replacement as an important predictor of both regular and voluntary BD, with male gender also a predictor of the latter. An inconsistency between knowledge, attitude and practice of BD was revealed.

Conclusions: The present study adds valuable data on KAP of BD among health-care workers. This will help blood transfusion services to improve management practices among this group as they have the potential to provide a reliable, stable and safe source of blood products.

Key words: donor recruitment, knowledge attitude and practice, voluntary blood donation.

Blood donation (BD) is a multifactorial process affected by numerous parameters, with people's knowledge and attitude being the key loops (Mousavi *et al.,* 2011). Demand for blood and blood products is constantly high and ever-increasing as a result of the development in medical sciences, surgical procedures and the consequent ageing of the population. As a result, one of the main challenges for blood transfusion services is the relative lack of BDs to fulfil the ever-increasing demand for blood products in modern medicine (Ringwald *et al.*, 2010; Mousavi *et al.*, 2011; Seifried *et al.*, 2011).

Both attitude and level of knowledge regarding BD may affect the disposition of potential donors to donate blood. Health-care workers are expected to be highly sensitised to BD. That is, they should be aware of the constantly high demand for blood products and have good knowledge and a positive attitude towards BD. They may therefore be expected to be active donors. Moreover, they should also be considered more likely to shift from first-time donors to long-term repeat donors. In addition, being well-informed, interested and involved in the blood transfusion process, health-care workers are likely to motivate others to become blood donors as well, promoting voluntary BD in a rather persuasive, effective and cost-effective way (Ringwald *et al.*, 2010). Therefore, even if they are not active donors, it is of critical importance that they are supportive of BD and accurately informed.

As different blood donor groups require specific approaches, a thorough study of health-care workers is crucial. The aim of the present study is to assess the knowledge, attitude and practice (KAP) of voluntary donation among the non-physician health-care workers of our institution and to determine the

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relationship between the practice of BD and socio-demographic characteristics as well as parameters defining knowledge and attitude about BD.

MATERIALS AND METHODS

The study was designated to be a cross-sectional and exploratory research. It took place at the 'Ippokrateio' General Hospital of Thessaloniki, Greece, a tertiary health-care institution, being the largest one in the broader Balkan area. Of note, among other departments, the hospital runs the Thalassemia and Hemoglobinopathies Unit, a quaternary care centre in an area of endemicity, as well as the Haemophilia Centre of Northern Greece, a unique quaternary care centre in the broader Northern Greece area. A specially designed, pre-tested questionnaire in reference to the KAP of voluntary BD was distributed to all non-physician health-care workers of the hospital. The questionnaire had been reviewed and approved by the hospital's research committee. It comprised of 21 questions (see Appendix, Tables 1–4) with the following structure:

1. Questions 1–5 were about socio-demographic characteristics, including age, gender, marital status, level of education and profession;
2. Questions 6–12 assessed knowledge about BD, including blood typing, eligibility of donors, BD process and safety issues;
3. Questions 13–16 assessed attitude towards BD, including attitudes towards different BD types, autologous blood transfusion and health effects;
4. Questions 17–21 assessed practice of BD, including history of BD, frequency and motivation factors as well as inhibiting factors.

A total of 1140 questionnaires were distributed. Participation in the study was optional and anonymous.

It must be stated that all procedures followed were in accordance with the ethical standards of the Helsinki Declaration of 1975, as revised in 2013 (World Medical Association Declaration of Helsinki, 2013). Moreover, the study design had been previously reviewed and approved by the institutional review board.

Statistical analysis

The responses were collated and analysed using SPSS® Version20.0 (IBM Corp., Armonk, NY, USA).

For each of the socio-demographic, knowledge and attitude parameters studied, both univariate and bivariate analysis were performed to determine each factor's effect on the practice of BD. The association between different variables was evaluated using the χ^2 test of independence. The statistically significant results at a robust significance level of 0·20 were included in two distinguished binary logistic regression models, one for regularity and one for volunteering. The dependent variable outcomes were 'regular donors'/'non-regular donors' and 'voluntary donors'/'non-voluntary donors'. 'Regular donors' included the respondents who answered either 'annually' or '1–3 times per year' for the question 'How often do you donate?' on the Practice of BD section of the questionnaire (Table 4), whereas 'Whenever it is needed' and 'Never' respondents were considered 'non-regular' donors. Similarly, 'voluntary donors' corresponds to the respondents who checked off 'Voluntary' as the 'Main reason for donating' on the same section of the questionnaire, whereas 'non-voluntary donors' included the rest of the respondents. The results include association statistics between both 'regular donors'/'non-regular donors' and 'voluntary donors'/'non-voluntary donors' and categorical variables (independent variables) regarding respondents' knowledge on BD (Table 2), their attitudes towards BD (Table 3) and their socio-demographic characteristics (Table 1), including age, gender, marital status, educational status and profession. The effect of age was examined with the use of the Mann–Whitney *U* test. The independent variables used in the two models were common as they were considered to be measurements that could possibly affect both of the outcomes of interest. It must be stated that although knowledge on both blood volume per donation and ABO blood group were associated with frequency of BD, these factors were excluded from the logistic regression model as they could not exert a causal relationship. All *P*-values reported are two-sided with the level of significance set at less than 0·05.

RESULTS

A total of 291 health workers responded to the questionnaire, providing a response rate of 25·5%. Not all respondents provided complete information on all required fields. In some cases, the total number of participants who responded to a question differs from the total number of respondents. These cases are appropriately indicated in the pertinent tables (Tables 1–4).

Demographic parameters

Most respondents were females (233, 80·1%), giving a male to female ratio of 1 : 4·1. (Table 1) The predominant age group was 40–50 years (170), whereas age groups 50–60 years and 30–40 years were represented by 63 and 49 participants, respectively. Most respondents (232, 79·7%) were married. Concerning educational status, most respondents (163, 56·0%) had completed a 3-year tertiary education programme, whereas 77 had completed a 2-year tertiary education programme; 23 had completed a 4-year tertiary Higher Educational Institute programme, and 25 had completed postgraduate studies. As for profession, most respondents were nursing staff (205, 70·4%), followed by administrative workers (36, 12·4%), laboratory staff (15, 5·2%) and technicians (10, 3·4%).

Knowledge on blood transfusion

Almost all respondents (280, 96·2%) reported knowledge of the ABO group system and awareness of their own specific ABO group (Table 2). Of the respondents, 101 (34·7%) said

Table 1. Socio-demographic parameters of respondents

	$N = 291$	Percentage (%)	*P*-value	Exp(B)	95% CI for Exp(B)
Age, years			0·60/*0·87*		
20 – 30	8	2·7			
31 – 40	49	16·8			
41 – 50	170	58·4			
51 – 60	63	21·6			
≥61	1	0·3			
Gender			0·08/*0·017*		
Male	57	19·6		*4·63*	*1·32 – 16·25*
Female	233	80·1			
Missing data	1				
Marital status			0·75/*0·83*		
Unmarried	57	19·6			
Married	232	79·7			
Missing data	2				
Educational status			0·40/*0·61*		
Secondary education or 2-year post-secondary education	77	26·5			
Technological Education Institute (3-year tertiary education)	163	56·0			
Higher Educational Institute (4-year tertiary education)	23	7·9			
Postgraduate	25	8·6			
Missing data	3				
Profession – Department			0·34/*0·50*		
Nursing	205	70·4			
Administrative	36	12·4			
Pharmaceutical	2	0·7			
Laboratory	15	5·2			
Technical	10	3·4			
Radiology	–	–			
Dental	–	–			
Other	22	7·6			
Missing data	1				

CI, confidence interval.

In reference with the results of the binary logistic regression analysis, the data in roman font represent the analysis on the outcomes 'regular donors'/'non-regular donors', whereas the data in italics represent the analysis on the outcomes 'voluntary donors'/'non-voluntary donors'. This is not a validated translation of the study's questionnaire. The original questionnaire (in Greek) is available in the appendix.

BD could possibly harm the blood donor. Concerning the blood recipient, although a high percentage of the respondents (225, 77·3%) expressed knowledge of the risk of transmission of infection by transfusion, only a small percentage (9·6%, $n = 28$) were able to mark the specific pathogens involved. The majority of the respondents (238, 81·8%) had a good knowledge of the volume of blood collected in each donation. However, only 78 (26·8%) knew the correct minimum interval between BDs.

Attitude towards blood donation

Concerning source of blood, voluntary donation was accepted as the best source among other alternates by the vast majority of the respondents (260, 89·3%) (Table 3). Furthermore, respondents supported family replacement strategy, suggesting that the patient's relatives should be asked to donate (212, 72·9%). More than two-thirds felt that the BD process was beneficial for both the blood recipient and donor.

Practice of blood donation

Among respondents, 126 (43·3%) had donated in the past (Table 4). Among them, 58 donated to a friend or relative in need of blood and 70 donated voluntarily. Among participants who had not donated, the predominant reason for non-donation was health issues (133, 45·7%), followed by lack of interest (45) and/or time (33). Of the respondents, 141 stated that their attitude and practice would not be affected by receiving an invitation from the blood centre.

Logistic regression analysis

In order to assess the effect of the measured variables on what may affect the regularity of BD and the volunteering perspective

Table 2. Knowledge of blood donation

	N = 291	Percentage (%)	*P*-value	Exp(B)	95% CI
Do you know the different types of blood groups?					
Yes	280	96·2			
No	11	3·8			
Do you know your blood group?					
Yes	278	95·5			
No	12	4·1			
Missing data	1				
Could blood donation be harmful to the donor?			0·12/*0·10*		
Yes	101	34·7			
No	185	63·6			
Missing data	5				
Do you know which infections can be transmitted by blood transfusion?			0·27/*0·33*		
Yes	225	77·3			
No	66	22·7			
If yes … which of the following infections can be transmitted? (HIV, HBV, HCV, syphilis, malaria, none)			0·77/*0·91*		
Correct	28	9·6			
False	217	74·6			
How often can an individual donate?			0·07/*0·07*		
Every 3 months	76	26·1			
Every 6 months	110	37·8			
Annually	6	2·1			
Depending on age and gender	92	31·6			
Missing data	7				
What is the blood volume that is collected during a donation?					
≤500 mL	238	81·8			
500 – 800 mL	8	2·7			
I do not know	45	15·5			

CI, confidence interval; HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus.
In reference with the results of the binary logistic regression analysis, the data in roman font represent the analysis on the outcomes 'regular donors'/'non-regular donors', whereas the data in italics represent the analysis on the outcomes 'voluntary donors'/'non-voluntary donors'. This is not a validated translation of the study's questionnaire. The original questionnaire (in Greek) is available in the appendix.

of the donors, two distinguished binary logistic regression models were applied for each variable's outcomes. Logistic regression models can estimate the pooled effect of all independent variables and subsequently determine the independent prognostic factors for each of the outcomes, taking into consideration possible interaction effects.

Binary logistic regression analysis on the outcome of categorisation as 'regular donors' or 'non-regular donors' revealed that positive attitude towards family replacement was the single significant predictor of regular BD ($P = 0{\cdot}048$, odds ratio (OR): 3·597, 95% confidence interval (CI): 1·012 – 12·82) (Fig. 1). Similarly, logistic regression analysis on the outcome of categorisation as 'voluntary donors' or 'non-voluntary donors' revealed a positive attitude towards family replacement as well as male gender as significant predictors of voluntary BD ($P = 0{\cdot}046$, OR = 4·78, 95% CI: 1·026 – 22·22 and $P = 0{\cdot}017$, OR = 4·63, 95% CI: 1·32 – 16·25, respectively) (Fig. 2).

The models were both statistically significant, with a *P*-value equal to 0·046 for regularity and 0·006 for volunteering. Nagelkerke's R^2 was 0·067 and 0·121, respectively.

DISCUSSION

KAP surveys provide a context-specific evidence base for the development of blood transfusion services' education and communication strategies and interventions to promote voluntary, non-remunerated blood donors, with these being essential components of a safe blood supply (Lownik *et al.,* 2012). There are numerous studies assessing the KAP of voluntary BD. However, there are just few studies worldwide assessing the KAP among health-care workers (Reza *et al.*, 2009; Benedict *et al.*, 2012; Mullah *et al.*, 2013; Nwogoh *et al.*, 2013). The present study aimed to assess the KAP of voluntary donation among the non-physician health-care workers of our institution, to investigate the relationship between these parameters and to determine the predictors of BD practice.

Overall, general knowledge of the typing as well as knowledge of the specific blood type of each individual was high across respondents. However, there were some knowledge gaps regarding the BD process. First, one-third of the respondents indicated that BD can be harmful to the donor. Of note, half of them had donated in the past. Second, although respondents answered

Table 3. Attitude towards blood donation

	N = 291	Percentage (%)	*P*-value	Exp(B)	95% CI
In your opinion, which is the best source of blood?			0·17/*0·25*		
Voluntary donors	260	89·3			
Paid donors	6	2·1			
Family replacement	23	7·9			
Missing data	2				
Do you know autologous blood transfusion?					
Yes	116	39·9			
No	168	57·7			
Missing data	7				
What do you think about blood donation?			0·95/*0·51*		
It is beneficial only to the recipient	49	16·8			
It is beneficial to both the recipient and the donor	205	70·4			
I do not know	37	12·7			
Should patients' relatives be asked to donate?			0·048	0·28	0·08 – 0·99
			0·046	*0·21*	*0·05 – 0·97*
Yes	212	72·9			
No	24	8·2			
I do not know	50	17·2			
Missing data	5				

CI, confidence interval.

In reference with the results of the binary logistic regression analysis, the data in roman font represent the analysis on the outcomes 'regular donors'/'non-regular donors', whereas the data in italics represent the analysis on the outcomes 'voluntary donors'/'non-voluntary donors'. This is not a validated translation of the study's questionnaire. The original questionnaire (in Greek) is available in the appendix.

Table 4. Practice of blood donation

	N = 291	Percentage (%)
Have you donated before?		
Yes	126	43·3
No	165	56·7
How often do you donate?		
Annually	28	9·6
1 – 3 times per year	25	8·6
Whenever it is needed	57	19·6
Never	166	57·0
Missing data	15	
Which is the main reason for donating?		
A friend or relative in need for blood	58	19·9
Voluntary	70	24·1
Religious reasons	2	0·7
Check-up/screening status	3	1·0
Missing data	158	
Would you donate more often if you were invited to do so by the blood bank centre?		
Yes	125	43·0
No	141	48·5
Missing data	25	
Reasons for non-donation?		
Indifference	19	6·5
Fear of the needle	17	5·8
Fear of a positive result on the screening tests.	–	–
Lack of time	33	11·3
Unconcern	26	8·9
Health issues	133	45·7
Missing data	63	

This is not a validated translation of the study's questionnaire. The original questionnaire (in Greek) is available in the appendix.

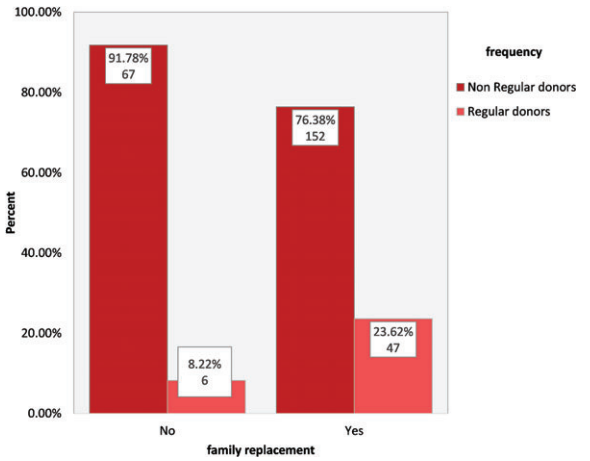

Fig. 1. Binary logistic regression analysis on the outcomes 'regular donors'/'non-regular donors'. The analysis revealed positive attitude towards family replacement as the single important predictor of regular blood donation (either annually or 1 – 3 times per year) ($P = 0{\cdot}048$, odds ratio (OR): 3·597, 95% confidence interval (CI): 1·012 – 12·82).

that were aware of BD-related infection issues, when they were asked to specify, their responses revealed that they had no clear insight into the nature of the infection that they perceived could occur. Lastly, regarding knowledge of specific eligibility requirements for donors (e.g. interval requirement), the knowledge of the respondents was low. It should be stated that the level of knowledge of respondents may have been overestimated as it is possible that people who answered the questionnaire were more sensitised to BD and thus better informed. Similarly, existing donors may be more prone to answer the questionnaire

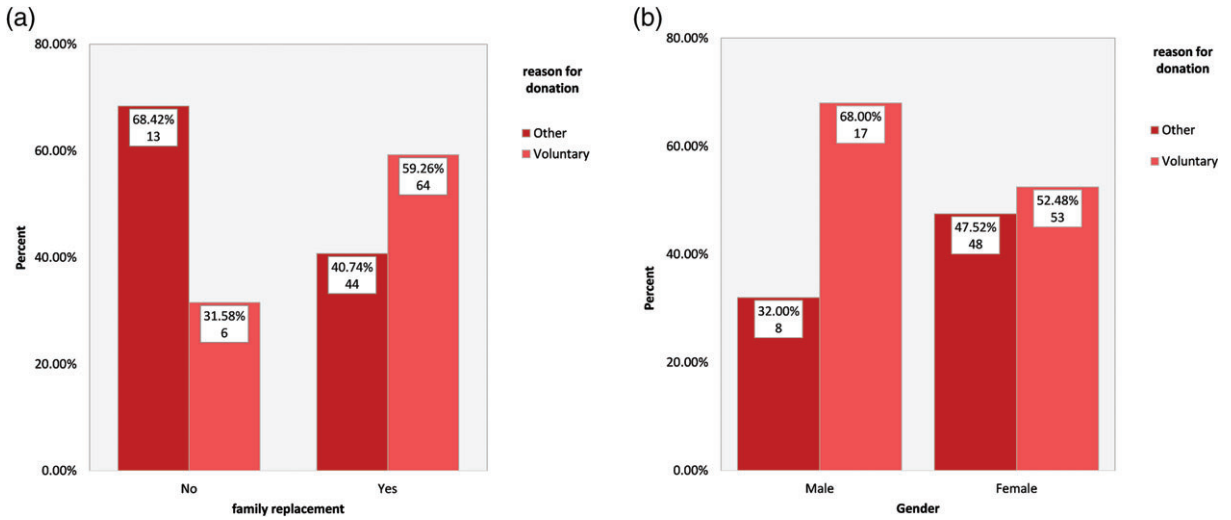

Fig. 2. Binary logistic regression analysis on the outcomes 'voluntary donors'/'non-voluntary donors'. The analysis revealed positive attitude towards family replacement (a) as well as male gender (b) as the important predictors of voluntary blood donation ($P = 0{\cdot}046$, odds ratio (OR): 4·78, 95% confidence interval (CI): 1·026 – 22·22 and $P = 0{\cdot}017$, OR = 4·63, 95% CI: 1·32 – 16·25, respectively)

than non-donors. If this were the case, then it is established that donors tend to be more knowledgeable than non-donors (Lownik *et al.*, 2012). Inadequate knowledge could further affect respondents' attitudes and practice of BD. In addition to this direct effect, Mullah *et al.* (2013) stated that inadequate knowledge by non-medical health-care workers may contribute to misleading or undermining the motivation of communities with regards to BD.

Concerning attitude towards BD, respondents recognised that voluntary donors are the best source of blood, resulting in benefits for both the donor and blood recipient. With respect to the increased need for blood and blood products, the majority of the respondents supported family replacement. The percentage of the overall positive attitude towards voluntary BD is in accordance with the pertinent literature (Lownik *et al.*, 2012).

Concerning the practice of BD, only 43·3% of the respondents indicated that they had donated in the past. Among blood donors, just 55·6% donated mostly voluntarily, whereas the remainder donated mostly on the request of a friend or relative who was in need. The predominant reason for non-donation was health issues, followed by lack of time, indifference or unconcern and fear of the needle. Moreover, 48·5% would not donate more often even if they were asked to do so by the blood bank centre. The present study replicates the commonly observed failure to convert a positive attitude towards BD into the practice of volunteering to donate (Lownik *et al.*, 2012; Bednall *et al.*, 2013). It is estimated that only 3 – 8% of the age-eligible population in developed countries donate blood per year, and furthermore, only half of the available blood supply comes from the 1% who are frequent donors (Ringwald *et al.*, 2010). It is blood transfusion services' responsibility to augment their effort to further sensitise, encourage and educate society about BD practice. In that direction, health-care workers should be an example for the rest of the donation-eligible population to shift BD from 'gift of life' to 'way of life' (Viswanath, 2010). It is possible that the inconsistency between attitude and practice of BD may reflect opposing explicit and implicit attitudes towards the act of donating blood (Ferguson *et al.*, 2008). The percentage of blood donors observed in the present study is far more disappointing when compared with previous studies regarding the general population in both Greece (Marantidou *et al.*, 2007) and other developed counties (Mousavi *et al.*, 2011). As for Greece, in 2007, Marantidou *et al.* (2007) reported that rate of BD in Greece is as high as 71·5%, although study design did not aim to estimate that rate. It is also worth mentioning that the present study reveals a trend towards predominance of the benevolence hypothesis over altruism (Farrugia *et al.*, 2010). Although voluntary BD was widely supported by the respondents as the best source of blood supply, only half of the respondents who were donors were voluntary blood donors. The majority of respondents supported family replacement, and moreover, half of them would not donate more frequently even if they were asked to do so by the blood transfusion service. Lastly, regarding non-donation aetiology, surprisingly, the main reason for non-donation were health issues. In prior KAP studies, fear is typically cited as the predominant reason for non-donation (Lownik *et al.*, 2012; Bednall *et al.*, 2013). It is possible that knowledge and experience of the health-care workers sampled lead to diminished levels of fear. In addition, the other most significant inhibitory factor to BD is inconvenience (Mousavi *et al.*, 2011; Bednall *et al.*, 2013; James *et al.*, 2013). Working in the hospital, health-care workers have absolutely no difficulty accessing BD. Moreover, in the pertinent literature, a convenient location is the most frequently cited motivator (Bednall *et al.*, 2013; James *et al.*, 2013).

Overall, non-physician health-care workers of our hospital are reasonably informed, and have a positive attitude towards BD. Nevertheless, only a few have ever donated blood, fewer have ever donated voluntarily and even fewer are repeated donors. It is clear that there is a serious inconsistency between individuals' knowledge and attitude and their practice of BD. The analysis of the data – via the logistic regression analysis model – revealed that family replacement seems to remain an important motivator of regular BD. Notably, supporting family replacement is positively associated with voluntary blood donation. This is hard to explain, and it could be possibly attributed to a common misunderstanding among donors as to the definition of voluntary BD. Lastly, being male was a positive predictor of voluntary BD. This suggests that blood transfusion services may more efficiently target their recruitment strategies to men rather than women. However, the abovementioned results lack validation and generalisability, and thus, careful interpretation is needed. In addition, it must be stated that a major limitation of the study is the low response rate (25·5%).

To date, there are just few studies published in reference to the KAP among non-physician health-care workers (Reza *et al.,* 2009; Mullah *et al.,* 2013; Nwogoh *et al.,* 2013), with the present study being the biggest. All previous studies confirm the serious disparity in KAP among this group. First, in 2009, Reza *et al.* (2009) assessed the knowledge of 122 health-care workers in various hospitals of Zabol, Iran and demonstrated that almost half of the participants had weak and moderate knowledge of proper methods of blood and blood products transfusion. In 2013, Mullah *et al.* (2013) published a KAP study of 100 health-care support staff workers of a tertiary hospital in Gurajat, India. The participants indicated poor knowledge and serious misconceptions regarding BD, although 39% had donated in the past. Later that year, Nwogoh *et al.* (2013) studied the KAP of voluntary BD among 163 health-care workers at an institution in Benin City, Nigeria. The respondents demonstrated moderate knowledge and positive attitude towards BD. However, there was a serious contradiction in the practice of BD; only 22·1% had donated in the past, and only 41·7% of them had donated voluntarily.

The present study adds valuable data on the KAP of BD among health-care workers. This information could be used to help blood transfusion services improve their management practices with this group as they have the potential to provide a reliable, safe and stable supply of blood products. Moreover, the results of the study are of significant interest and importance to blood transfusion services that either use or wish to use health-care workers as active promoters of blood donation. It is hoped that this study will stimulate further research on this topic, which could provide robust, high-quality data leading to specific strategies and interventions.

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It must be stated that all procedures followed were in accordance with the ethical standards of the Helsinki Declaration of 1975, as revised in 2013 (World Medical Association Declaration of Helsinki, 2013). Moreover, the study design was approved by the hospital's research committee. The author list is in accordance with the International Committee of Medical Journal Editors (ICMJE) authorship criteria (ICMJE, 2015). All authors made significant contributions to the work that is reported, and they accept responsibility for the aspects of the work with which they were involved. N. S. performed the analysis and interpretation of the data and wrote the paper. S. T., S. S., D. A. and T.-A. V. designed the study, and S. S., M. K., A. F., T. K. and M. C. performed the questionnaire distribution and acquisition of the data. All authors agree with the content of the manuscript as a whole. The authors have no competing interests.

CONFLICT OF INTEREST

The authors have no competing interests.

REFERENCES

Bednall, T.C., Bove, L.L., Cheetham, A. & Murray, A.L. (2013) A systematic review and meta-analysis of antecedents of blood donation behavior and intentions. *Social Science & Medicine*, **96**, 86–94.

Benedict, N., Usimenahon, A., Alexander, N.I. & Isi, A. (2012) Knowledge, attitude and practice of voluntary blood donation among physicians in a tertiary health facility of a developing country. *International Journal of Blood Transfusion and Immunohematology*, **2**, 4.

Farrugia, A., Penrod, J. & Bult, J.M. (2010) Payment, compensation and replacement--the ethics and motivation of blood and plasma donation. *Vox Sanguinis*, **99**, 202–211.

Ferguson, E., Prowse, C., Townsend, E., Spence, A., Hilten, J.A.v. & Lowe, K. (2008) Acceptability of blood and blood substitutes. *Journal of Internal Medicine*, **263**, 244–255.

International Committee of Medical Journal Editors 2015 Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals [homepage on the Internet]. URL: http://www.ICMJE.org (Accessed 11/5/16).

James, A.B., Schreiber, G.B., Hillyer, C.D. & Shaz, B.H. (2013) Blood donations motivators and barriers: a descriptive study of African American and white voters. *Transfusion and Apheresis Science*, **48**, 87–93.

Lownik, E., Riley, E., Konstenius, T., Riley, W. & McCullough, J. (2012) Knowledge, attitudes and practices surveys of blood donation in developing countries. *Vox Sanguinis*, **103**, 64–74.

Marantidou, O., Loukopoulou, L., Zervou, E. *et al.* (2007) Factors that motivate and hinder blood donation in Greece. *Transfusion Medicine*, **17**, 443–450.

Mousavi, F., Tavabi, A.A., Golestan, B., Ammar-Saeedi, E., Kashani, H., Tabatabaei, R. & Iran-Pour, E. (2011) Knowledge, attitude and practice towards blood donation in Iranian population. *Transfusion Medicine*, **21**, 308–317.

Mullah, F., Kumar, D., Antani, D. & Gupta, M. (2013) Study of knowledge, perceptions and practices related to blood donation among

the healthcare support staff of a tertiary care hospital in Gujarat, India. *Online Journal of Health and Allied Sciences*, **1**, 2.

Nwogoh, B., Aigberadion, U. & Nwannadi, A.I. (2013) Knowledge, attitude, and practice of voluntary blood donation among healthcare workers at the University of Benin teaching hospital, Benin City, Nigeria. *Journal of blood transfusion*, **2013**, 797830.

Reza, P.A., Aziz, S.V., Ali, M.A., Marjan, M.H. & Reza, T.M. (2009) Evaluation of knowledge of healthcare workers in hospitals of Zabol city on proper methods of blood and components transfusion. *Asian Journal of Transfusion Science*, **3**, 78–81.

Ringwald, J., Zimmermann, R. & Eckstein, R. (2010) Keys to open the door for blood donors to return. *Transfusion Medicine Reviews*, **24**, 295–304.

Seifried, E., Klueter, H., Weidmann, C., Staudenmaier, T., Schrezenmeier, H., Henschler, R., Greinacher, A. & Mueller, M.M. (2011) How much blood is needed? *Vox Sanguinis*, **100**, 10–21.

Viswanath, V. (2010) Strengthening blood ties. *Indian Journal of Medical Ethics*, **7**, 177.

World Medical Association (2013) World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA*, **310**, 2191–2194.

APPENDIX

Sample of the questionnaire of the present study in its original form in Greek.