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Knowledge, attitude, and practice of blood donation: A cross-sectional survey in Khulna city, Bangladesh

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ARTICLE INFO	A B S T R A C T								
<i>Keywords:</i> Adult Khulna city Blood donation Knowledge Perception	<i>Background:</i> There is evidence that the worldwide need for safe blood is not being met, particularly in poor nations like Bangladesh, where there is a scarcity of voluntary blood donors. This research intends to evaluate the public's knowledge, attitude, and practice of voluntary blood donation and the socio-demographic factors associated with blood donation in Khulna city, Bangladesh. <i>Materials and methods:</i> 720 interviews were taken using a structural questionnaire with Khulna city residents implementing the convenience sampling technique. After pre-processing and removing missing values, 697 records were left for further analysis. To investigate the association of sociodemographic factors such as age, gender, education, occupation, marital status, permanent address, and smoking status with knowledge, attitude, and practice of blood donation the binary logistic regression model was used. <i>Results:</i> According to this research, 478 (68.58%), 654 (93.83%), and 451 (64.71%) respondents were knowledgeable, had a favorable attitude, and practiced VBD, respectively. The study level higher secondary (AOR = 2.2; CI: 1.16–4.18), honors or degree (AOR = 2.37; CI: 1.3–4.3), and masters or above (AOR = 3.27; CI: 1.69–6.35) were associated with the knowledge. The favorable attitude was connected with being male (AOR = 2.24; CI: 1.23–4.06), learning about VBD through online social media (AOR = 2.61; CI: 1.13–6.05), and having knowledge of VBD (AOR = 3.05; CI: 1.82–5.12). Age between 26 and 35 years (AOR = 2.83; CI: 1.43–5.57) and older than 45 years (AOR = 3.74; CI: 1.34–10.4), being a man (AOR = 3.6; CI: 2.25–5.78), being a smoker (AOR = 3.78 ; CI: 2.11–6.77) were significant factors for practicing blood donation. <i>Conclusion</i> : This research demonstrates poor blood donation practices and limited knowledge of blood donation among Khulna city residents. The awareness of the residents should be prolonged for voluntary blood donation by the health bureau, the government, and non-governmental organizations.								

1. What this study adds

- With our research, we have gained insight into the knowledge, attitude, and practice (KAP) of voluntary blood donation (VBD) among people in Khulna city, and such an investigation has never been done before in this region of Bangladesh. This study examined how much people know about unpaid blood donation, as well as their perceptions and behaviors when blood is needed.
- In this research, participants' answers to several questions on their knowledge and attitudes toward VBD varied. We attempted to depict such variances so that individuals might understand what they knew less about and in which areas they had a more negative opinion.
- The association of people's demographic attributes with the KAP of VBD as well as the interconnection of the knowledge, attitude, and practice of VBD are shown in this study. How these findings differ from other studies conducted in different countries or regions is discussed in this study, which partially highlights the spatial variations in different aspects of VBD.

2. Implications for policy and practice

• The participants had remarkable perspective of voluntary blood donation, however we observed poor understanding and practice in this area. This paper discusses a compilation of correlated elements that may aid in determining the appropriate actions to be taken.

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- Before improving public opinion of VBD, concerned organizations should prioritize developing policies to raise blood donation awareness and practice.
- These results highlight the urgent need for prompt government intervention and effective dissemination of public health measures to address the potential scarcity of safe blood.

3. Background

The country depends on blood donors for survival; their kindness and altruism guarantee that the supply of blood will last for many more years. In systems that rely on them, friends and family donations seldom meet the therapeutic need for blood. However, there are issues with paid "donations" that impact the givers as well as the beneficiaries [1]. When a patient loses blood due to an accident, surgery, or any other medical condition that affects blood or its components, blood transfusions may save their lives. By working together, medical experts and blood banks ensure that transfusions are safe and risk-free [2]. Globally, every year, over 234 million major procedures that require transfusions are performed. Moreover, car accidents claim the lives of around 1.2 million people, leaving another 30 million injured or disabled every year. If blood is not transfused within the first 24 h of treatment, ninety percent of these patients will pass away. Every year, around 88 million units of blood are drawn from donors worldwide. However, just 20% of the world's safe blood demand-which is estimated to be 150 million units—comes from developing nations, where 80% of people live [3].

With 165 million people calling the country home, Bangladesh is the eighth-most populous nation in the world [4]. However, the country ranks 88th in terms of traffic accidents [5] and has a high maternal mortality rate (MMR) of 121 per 100,000 [6]. Bangladesh continues to have a daily need for all blood types, although the most in-demand ones are A(-ve), B(-ve), and O(-ve) [7]. Voluntary donors accounted for only 29% of the 362,000 units of blood received in Bangladesh in 2009 [3]. In 2016, only around 600,000 units of blood were collected from Bangladesh, even though the country was anticipated to need 800,000 units [8]. The 319 blood transfusion centers in Bangladesh, which cater to both the public and commercial sectors, also only received 31% of their blood supply from charitable donors. These ratios in Bangladesh fade in contrast to the staggering 95% in several Southeast Asian nations, such as Sri Lanka, India, and Thailand. Voluntary blood donations (VBD) are high in Japan (70/1000) and Switzerland (113/1000), whereas in Bangladesh and India, the corresponding rates were 4 and 5 per 1,000, respectively. A study conducted at Dhaka Shishu Hospital found that 19.4% of thalassemia patients who had several transfusions got Hepatitis-C virus infections as a result of unsafe blood. According to Bangladesh Red Crescent statistics, 22% of non-voluntary donors were contaminated with syphilis, 29% with hepatitis B, and 6% with hepatitis C, all of which could be avoided by utilizing the blood of voluntary donors [3,8].

To guarantee blood donation knowledge, attitudes, and practice, a representative sample of 17 rising nations-defined by the "International Monetary Fund"-was employed. The studies' primary findings were the need for more precise information on blood donation, the prevalence of the practice of selling blood and blood products, the absence of attitudes that encourage blood donation, and the anxiety that blood donors experience while giving blood [9]. Eighty-two percent of students at Dhaka University in Bangladesh who participated in a study had a favorable view of blood donation; yet, only sixteen percent had ever given blood voluntarily. Among the main obstacles to blood donation, according to the poll, are physical harm and the fear of providing blood [10]. Age, education level, sex, profession, monthly income, streaming media, and religion were the most commonly mentioned independent predictors of KAP for blood donation [11-14]. This research sought to evaluate important sociodemographic characteristics related to knowledge, attitudes, and practices about voluntary blood donation among the populace of Khulna, Bangladesh, to create the appropriate incentive programs to get enough safe blood.

4. Methods

4.1. Study design and sampling technique

Between January and February 2021, community-based research was undertaken to analyze individuals' knowledge, attitudes, and practices of voluntary blood donation (VBD) among Khulna City people. Khulna city comes after Dhaka and Chittagong, respectively, in terms of size, with a population of 950,000 in 2022, a 0.11 percent rise from 2021 [15,16]. The target population in this study were adults (18 years old or older) who were living in Khulna city permanently during the period of data collection. We used convenience sampling (non-probability sampling) to obtain our required data.

By applying Cochran's formula, the size of the necessary sample was estimated. The formula is:

$$n_0 = \frac{z^2 \times p \times (1-p)}{d^2}$$
(1)

where, n_0 = required size of the sample, p = 0.5 = proportion of the population who were considered knowledgeable about VBD, for a 5% critical region, z = 1.96, and the marginal acceptance error is d = 0.04. Substitution in the preceding formula in equation (1) yields $600.25 \approx 600$. The projected sample size was $n = 600 + (600 \times 0.2) = 720$ based on a 20% non-response rate. Finally, we had 697 respondents after removing missing values and cleaning the data.

4.2. Data collection

Table 1 presents the questions considered in a standardized questionnaire (closed-ended), which was used as a tool for in-person interviews. To guarantee uniformity, the contents of the questionnaire were written in English, then translated into Bangla, and then again translated into English. The questionnaire was validated by the committee of ethical clearance in the Khulna University Research Cell, and a pilot survey was conducted before the main research to check the reliability of the questionnaire. Data were collected on four sections, including sociodemographic information (such as age, gender, education, occupation, marital status, and permanent address), knowledge questions (six questions), attitude questions (seven questions), and practice questions (seven questions) regarding blood donation.

4.3. Variable declaration

4.3.1. Dependent variables

In this study, the three dependent variables were knowledge, attitude, and practice of VBD. Dependent variable-related questions were scored 1 for accurate answers and 0 for wrong answers. Two research groups were formed using the cut-point mean value. Individuals who scored at or above the mean on a composite of all knowledge-related items were classified as "Yes" for having knowledge or "No". On the attitude questions, a "Yes" was defined as a score above the cut point mean value for a favorable attitude, while a "No" was below for an unfavorable one. In this study, a participant's practice indicated whether he or she had previously donated blood voluntarily at least once or not.

4.3.2. Independent variables

The demographic attributes were age, gender, educational status, occupation, marital status, permanent address, and smoking status, considered independent variables for all three dependent variables in this study. Knowledge about VBD was used as the independent variable, while attitude towards VBD was the dependent variable. When blood donation as the dependent variable was taken into consideration, both

Table 1

Variables with questionnaire and coding were used in this study.

Dependent variable: Knowledge, Attitude, and Practice toward VBD							
Variable names	Questions that were asked in the survey	Coding					
Knowledge about voluntary blood donation	How much of blood does a person donate at a time? What is the maximum number of times a healthy person can donate blood in a year? What is the appropriate age limit for blood donation? What is the minimum weight suitable for blood donation? What is more important before a blood transfusion? Having a physical problem (e.g., Hepatitis B, Hepatitis C), can anyone donate blood?	0 = Not- knowledgeable; 1 = Knowledgeable;					
Attitude toward voluntary blood donation	Does blood donation have some health benefits? Is free blood donation better than donating blood for money? Does blood donation have a bad effect on health? Are you afraid of blood donation? Do you willing to donate blood? Should blood only be donated to family members and friends? Should only adult males donate blood?	0 = Unfavorable attitude; 1 = Favorable attitude;					
Practice of blood donation	Have you ever donated blood?	0 = Never donated blood; 1 = Donated blood at					

The selected variables as predictors									
Variable names	Questions that were asked in the survey	Coding							
Age in years	How old are you?	0 = 18-25 years; 1 = 26-35 years; 2 = 36-45 years; 3 = above 45 years;							
Gender	Record gender from observation	0 = Female; 1 = Male;							
Educational status	What is your educational status?	0 = Secondary or below; 1 = Higher Secondary; 2 = Hon's/Degree; 3 = Masters or above;							
Occupational status	What is your occupational status?	0 = Student; 1 = Government employee; 2 = Private employee; 3 = Merchant; 4 = Searching for job; 5 = Housewife; 6 = Othere;							
Marital Status	What is your marital status?	0 = 0 Unmarried; 1 = Married:							
Permeant address	What is the type of your permanent residence?	0 = Rural; 1 = Sub-urban; 2 = Urban;							
Smoking status	Do you smoke?	0 = Non-smoker; 1 = Smoker;							
Heard about VBD through online social media	Have you heard about VBD using online social media?	0 = No; 1 = Yes;							

knowledge and attitude towards VBD were independent factors.

4.4. Data processing and analysis

Data analysis was done using STATA version 14.2. The variables'

frequencies were obtained for descriptive analysis in the univariate section. The chi-square test was used in the section on bivariate analysis. The binary logistic regression method was used in the multivariate analysis part to examine the association among the explanatory and response variables. In this research, the adjusted odds ratios (AORs) and crude odds ratios (CORs) with 95% confidence intervals (CI) were presented.

5. Results

5.1. Baseline characteristics

Of the 697 participants in this research, 333 (47.78%) were in the 18–25 year age range, 448 (64.28%) were men—more than half of the participants—and 314 (45.05%) had earned an honors or degree-level education. Among the respondents, 464 (66.57%) were from urban residential regions, and 270 (38.74%) were students. There were 375 (53.8%) unmarried individuals and 403 (57.82%) who did not smoke. Most of the participants, 660 (94.69%), had heard about VBD through online social media. According to the findings of this research, more than two-thirds of the respondents (68.58%) were knowledgeable about VBD, whereas 93.83% showed a positive attitude towards VBD. However, only 64.71% of the total respondents were donating blood voluntarily (Table 2).

Table 2

least once:

Baseline characteristics of the participants in Khulna, Bangladesh, 2021 (n = 697).

Variables	Frequency (n)	Percentage
Having knowledge of VBD		
No	219	31.42
Yes	478	68.58
Favorable attitude towards VBD		
No	43	6.17
Yes	654	93.83
Donated blood voluntarily		
No	246	35.29
Yes	451	64.71
Age in years		
18-25	333	47.78
26-35	191	27.40
36-45	131	18.79
>45	42	6.03
Gender		
Female	249	35.72
Male	448	64.28
Educational Status		
Secondary and below	80	11.48
Higher Secondary	121	17.36
Hon's/Degree	314	45.05
Masters or above	182	26.11
Occupational Status		
Student	270	38.74
Government employee	103	14.78
Private employee	120	17.22
Merchant	61	8.75
Searching for job	61	8.75
Housewife	68	9.76
Others	14	2.01
Marital Status		
Unmarried	375	53.80
Married	322	46.20
Permanent Address		
Rural	119	17.07
Sub-urban	114	16.36
Urban	464	66.57
Smoking Status		
Non-smoker	403	57.82
Smoker	294	42.18
Heard about VBD through online soc	ial media	
No	37	5.31
Yes	660	94.69

Almost half of the respondents (49.21%) knew that a blood transfusion may need 250–500 mL of blood. The respondents' understanding of the needed minimum weight for a blood donation was roughly equal (31.38%). Although 59.68% of respondents were conscious that a healthy individual may transfuse blood 3–4 times per year, only 22.38% knew that the appropriate age range for giving blood is 18–60 years (Fig. 1-a).

Based on attitude questions, 90.82% of respondents thought VBD was much more useful than a paid donation, 88.95% believed blood donation had some health advantages, and 69.01% were not fearful of giving blood. Furthermore, 80.34% of respondents supported blood donation outside of family and friends, and 71.59% were willing to donate blood. Only 31.13% believed that women could not give blood in the same way as men could (Fig. 1-b).

5.2. Bivariate association

Prior to constructing logistic regression models, a chi-square test was conducted for each independent variable category in relation to each dependent variable. Age, gender, education, occupation, and hearing about VBD online were found to be linked to all the dependent variables. Marital status was associated with knowledge and attitude, while smoking status was associated with knowledge and practice of VBD. Furthermore, knowledge was significant for both attitude and practice of VBD, whereas attitude was associated with VBD practice. At a 5% significance level, each of these associations was noteworthy (Table 3).

5.3. Findings from binary logistic regression models

Table 4 displays the outcomes of binary logistic regression models.



a. Knowledge related questions

11.05%	9.18%	27.55%	30.99%	28.41%	19.66%	31.13%
88.95%	90.82%	72.45%	69.01%	71.59%	80.34%	68.87%
Think that, blood donation has some health benefits	Think that, VBD is better than paid donation	Believe that, safe transfusions do not cause ill health	Do not feel afraid to donate blood	Showed willingness to donate blood	Supported donating blood to random people	Believed that, both males and females can donate blood
			■Yes ■No			

b. Attitude related questions

Fig. 1. Response to knowledge and attitude related questions.

Table 3

Bivariate associations of the independent variables with knowledge, attitude and practice of VBD.

Variables	Having know	ledge of VBD	1	Favorable a	ttitude towards	VBD	Donated blood voluntarily		
	No, n (%)	Yes, n (%)	p-value	No, n (%)	Yes, n (%)	p-value	No, n (%)	Yes, n (%)	p-value
Age in years			0.008*			< 0.001*			0.031*
18_25 years	85 (25 53)	248	0.008	23	310	< 0.001	133	200	0.031
10 20 years	00 (20.00)	(74.47)		(6.910)	(93.09)		(39.94)	(60.06)	
26-35 vears	65 (34.03)	126		29	162		54 (28.27)	137	
		(65.97)		(15.18)	(84.82)			(71.73)	
36-45 years	52 (39.69)	79 (60.31)		19	112		48 (36.64)	83 (63.36)	
				(14.50)	(85.50)				
>45 years	17 (40.48)	25 (59.52)		10	32 (76.19)		11 (26.19)	31 (73.81)	
				(23.81)					
Gender			0.045*			< 0.001*			< 0.001*
Female	90 (36.14)	159		43	206		144	105	
		(63.86)		(17.27)	(82.73)		(57.83)	(42.17)	
Male	129	319		38 (8.48)	410		102	346	
	(28.79)	(71.21)			(91.52)		(22.77)	(77.23)	
Educational Status			< 0.001*			< 0.001*			0.002*
Secondary or below	47 (58.75)	33 (41.25)		22	58 (72.50)		36 (45.00)	44 (55.00)	
				(27.50)					
Higher Secondary	39 (32.23)	82 (67.77)		19	102		57 (47.11)	64 (52.89)	
				(15.70)	(84.30)				
Hon's/Degree	83 (26.43)	231		19 (6.05)	295		100	214	
		(73.57)			(93.95)		(31.85)	(68.15)	
Masters or above	50 (27.47)	132		21	161		53 (29.12)	129	
		(72.53)		(11.54)	(88.46)			(70.88)	
Occupational Status			0.004*			< 0.001*			0.001*
Student	70 (25.93)	200		15 (5.56)	255		106	164	
		(74.07)			(94.44)		(39.26)	(60.74)	
Government employee	33 (32.04)	70 (67.96)		11	92 (89.32)		26 (25.24)	77 (74.76)	
				(10.68)					
Private employee	34 (28.33)	86 (71.67)		15	105		36 (30.00)	84 (70.00)	
	06 (40 60)	05 (55 00)		(12.50)	(87.50)		10 (01 15)	40 ((0.05)	
Merchant Georgebing Consist	26 (42.62)	35 (57.38)		9 (14.75)	52 (85.25)		19 (31.15)	42 (68.85)	
Searching for Job	17 (27.87)	44 (72.13)		8 (13.11)	53 (86.89)		16 (26.23)	45 (/3.//)	
Housewife	34 (50.00)	34 (50.00)		17	51 (75.00)		37 (54.41)	31 (45.59)	
Others	E (0E 71)	0 ((1 00)		(25.00)	0 (57.1.4)		((49.0())	0 (57.14)	
Uners Marital Status	5 (35.71)	9 (64.29)	0.010*	0 (42.80)	8 (57.14)	0.010*	0 (42.80)	8 (57.14)	0.460
Marital Status	102	072	0.010"	22 (0 00)	240	0.012	197	220	0.460
Olinamed	(27.20)	(72.90)		33 (8.80)	01 20)		(26 E2)	230	
Morried	(27.20)	(72.80)		10	(91.20)		(30.33)	(03.47)	
Married	(36.34)	203		40	2/4		(33.85)	213	
Bermanent Address	(30.34)	(03.00)	0.840	(14.91)	(85.09)	0.740	(33.83)	(00.13)	0.340
Rural	35 (20 41)	84 (70 59)	0.040	12	107	0.740	46 (38 66)	73 (61 34)	0.340
Rutai	55 (25.41)	04 (70.35)		(10.08)	(80.02)		40 (30.00)	75 (01.54)	
Sub-urban	35 (30 70)	79 (69 30)		12	102		34 (29 82)	80 (70 18)	
	00 (001/0)	, , (05100)		(10.53)	(89.47)		01 (20102)	00 (, 0110)	
Urban	149	315		57	407		166	298	
	(32.11)	(67.89)		(12.28)	(87.72)		(35.78)	(64.22)	
Smoking Status	(0)	(0, 101)	0.018*	()	(0) (1) _)	0.140	(00000)	(*)	< 0.001*
Non-smoker	141	262		53	350		190	213	
	(34,99)	(65.01)		(13.15)	(86.85)		(47.15)	(52.85)	
Smoker	78 (26.53)	216		28 (9.52)	266		56 (19.05)	238	
		(73.47)			(90.48)			(80.95)	
Heard about VBD through online social			< 0.001*			< 0.001*			< 0.001*
media									
No	23 (62.16)	14 (37.84)		13	24 (64.86)		26 (70.27)	11 (29.73)	
				(35.14)					
Yes	196	464		68	592		220	440	
	(29.70)	(70.30)		(10.30)	(89.70)		(33.33)	(66.67)	
Knowledge about VBD						< 0.001*			< 0.001*
Not Knowledgeable	-	-	-	48	171		110	109	
				(21.92)	(78.08)		(50.23)	(49.77)	
Knowledgeable	-	-	-	33 (6.90)	445		136	342	
					(93.10)		(28.45)	(71.55)	
Attitude towards VBD									< 0.001*
Unfavorable attitude	-	-	-	-	-	-	54 (66.67)	27 (33.33)	
Favorable attitude	-	-	-	-	-	-	192	424	
							(31.17)	(68.83)	

n = Number of participants; *p-value <0.05.

Table 4

Factors attributed to knowledge, attitude, and practice of VBD among adults in Khulna city, Bangladesh (n = 697).

Variables	Having knowledge of VBD				Favorable attitude towards VBD				Donated blood voluntarily			
	COR (95% CI)	p-value	AOR (95% CI)	p-value	COR (95% CI)	p-value	AOR (95% CI)	p-value	COR (95% CI)	p-value	AOR (95% CI)	p-value
Age in years												
18–25	ref.	-	ref.	-	ref.	-	ref.	-	ref.	-	ref.	-
26–35	0.66	0.039*	0.54	0.067	0.41	0.003*	0.50	0.154	1.69	0.008*	2.83	0.003*
	(0.45,		(0.28,		(0.23,		(0.19,		(1.15,		(1.43,	
	0.98)		1.04)		0.74)		1.30)		2.48)		5.57)	
36–45	0.52	0.003*	0.42	0.032*	0.44	0.012*	0.54	0.297	1.15	0.512	2.10	0.057
	(0.34,		(0.19,		(0.23,		(0.17,		(0.76,		(0.98,	
> 4E	0.80)	0.042*	0.93)	0.002	0.83)	0.001*	1./3)	0.000	1./5)	0.000	4.51)	0.011*
>40	0.30	0.043	0.43	0.085	0.24	0.001	0.32	0.088	1.67	0.000	3.74 (1.34	0.011
	(0.20,		(0.10,		(0.10,		(0.09,		3.86)		(1.34,	
Gender	0.90)		1.12)		0.54)		1.17)		5.00)		10.4)	
Female	ref.	_	ref.	_	ref.	_	ref.	_	ref.	_	ref.	_
Male	1.4 (1.01.	0.046*	1.01	0.959	2.25	0.001*	2.24	0.008*	4.65	< 0.001*	3.60	< 0.001*
	1.95)		(0.64,		(1.41,		(1.23,		(3.33,		(2.25,	
			1.60)		3.59)		4.06)		6.50)		5.78)	
Educational Status												
Secondary or	ref.	-	ref.	-	ref.	-	ref.	-	ref.	-	ref.	-
below												
Higher Secondary	2.99	< 0.001*	2.20	0.016*	2.04	0.044*	0.95	0.900	0.92	0.769	0.71	0.359
	(1.67,		(1.16,		(1.02,		(0.42,		(0.52,		(0.35,	
	5.38)	0.001+	4.18)	0.005+	4.07)	0.001+	2.16)	0.000	1.62)	0.000+	1.47)	0.000
Hon's/Degree	3.96	<0.001*	2.37	0.005*	5.89 (3.0,	<0.001*	2.16	0.068	1.75	0.028*	1.01	0.969
	(2.38,		(1.30,		11.57)		(0.94,		(1.06,		(0.52,	
Maatana an ahawa	0.01)	<0.001 *	4.30)	<0.001*	2.01	0.000*	4.94)	0.260	2.89)	0.019*	1.99)	0.409
Masters of above	3./0 (2.17	<0.001	3.2/	<0.001	2.91	0.002	1.05	0.269	1.99	0.015"	0.73	0.408
	(2.17,		(1.09,		(1.49,		(0.08,		(1.10,		(0.34,	
Occupational Statu	s		0.55)		5.00)		4.00)		5.45)		1.55)	
Student	ref.	_	ref.	_	ref.	_	ref.	_	ref.	_	ref.	_
Government	0.74	0.239	0.83	0.649	0.49	0.088	0.44	0.177	1.91	0.012*	1.08	0.863
employee	(0.45,		(0.38,		(0.22,		(0.13,		(1.15,		(0.47,	
	1.22)		1.84)		1.11)		1.45)		3.18)		2.47)	
Private employee	0.89	0.62	1.15	0.694	0.41	0.021*	0.42	0.115	1.51	0.08	0.96	0.907
	(0.55,		(0.57,		(0.19,		(0.14,		(0.95,		(0.46,	
	1.43)		2.35)		0.87)		1.23)		2.39)		1.99)	
Merchant	0.47	0.01*	0.77	0.546	0.34	0.016*	0.36	0.119	1.43	0.239	0.66	0.346
	(0.26,		(0.33,		(0.14,		(0.10,		(0.79,		(0.27,	
	0.84)		1.80)		0.82)		1.30)		2.59)		1.57)	
Searching for job	0.91	0.756	1.03	0.928	0.39	0.042*	0.45	0.147	1.82	0.059	1.36	0.449
	(0.49,		(0.50,		(0.16,		(0.15,		(0.98,		(0.61,	
Homowife	1.69)	<0.001*	2.13)	0 564	0.97)	<0.001*	1.33)	0.206	3.38)	0.025	3.05)	0 701
nousewile	0.33	<0.001	0.78	0.304	0.18	<0.001	0.45	0.200	0.34	0.025	1.10	0.701
	(0.20,		(0.33,		0.38)		(0.13,		(0.32,		(0.31, 2.71)	
Others	0.63	0.422	1.20	0.778	0.08	< 0.001*	0.09	0.001*	0.86	0.788	0.78	0.711
ouloib	(0.20.	01122	(0.33.	01770	(0.02.	0.001	(0.02.	01001	(0.29.	01/00	(0.22.	00/11
	1.94)		4.38)		0.26)		0.38)		2.55)		2.84)	
Marital Status												
Unmarried	ref.	-	ref.	-	ref.	-	ref.	_	-	-	-	-
Married	0.65	0.01*	1.37	0.304	0.55	0.013*	2.09	0.118	-	-	-	-
	(0.47,		(0.75,		(0.34,		(0.83,					
	0.9)		2.51)		0.88)		5.28)					
Smoking Status												
Non-smoker	ref.	-	ref.	-	-	-	-	-	ref.	-	ref.	-
Smoker	1.49	0.018*	1.45	0.094	-	-	-	-	3.79	< 0.001*	1.87	0.009*
	(1.07,		(0.94,						(2.67,		(1.17,	
Heard about VBD +	2.07)	e social ma	ر222 dia						5.30)		2.90)	
No	ref		ref	_	ref	_	ref	_	ref	_	ref	_
Yes	3.89	<0.001*	2.69	0.009*	4.72 (2 3	<0.001*	2.61	0.025*	4.73	<0.001*	3.70	0.003*
	(1.96.		(1.29.		9.69)	. 510 51	(1.13.		(2.29.		(1.57.	
	7.72)		5.63))		6.05)		9.74)		8.72)	
Knowledge about V	/BD						,		-			
Not	-	-	-	-	ref.		ref.	-	ref.	-	ref.	-
Knowledgeable												
Knowledgeable	-	-	-	-	3.79	< 0.001*	3.05	< 0.001*	2.54	< 0.001*	2.31	< 0.001*
					(2.35,		(1.82,		(1.82,		(1.55,	
					6.1)		5.12)		3.53)		3.42)	
Attitude towards V	RD											
Uniavorable	-	-	-	-	-	-	-	-	reı.	-	reı.	-
aunuud												

(continued on next page)

Table 4 (continued)

Variables	Having knowledge of VBD				Favorable attitude towards VBD				Donated blood voluntarily			
	COR (95% CI)	p-value	AOR (95% CI)	p-value	COR (95% CI)	p-value	AOR (95% CI)	p-value	COR (95% CI)	p-value	AOR (95% CI)	p-value
Favorable attitude	-	-	-	-	-	-	-	-	4.42 (2.7, 7.23)	<0.001*	3.78 (2.11, 6.77)	<0.001*

AOR = adjusted odds ratio, COR = crude odds ratio, and CI = confidence interval; *p-value <0.05.

According to this research, people aged 36 to 45 were 58% (AOR = 0.42; CI: 0.19-0.93) less knowledgeable about blood donation than those aged 18 to 25. People aged 26 to 35 were 2.83 (AOR = 2.83; CI: 1.43–5.57) times more likely to donate blood, and those aged 45 and higher were 3.74 (3.74; CI: 1.34-10.4) times more likely to do so than those in the reference age group. Male respondents were found to show a more positive attitude towards VBD as well as practice VBD compared to their counterparts. Knowledge of VBD was found to increase with higher educational levels than with secondary or lower educational levels. Surprisingly, those in other occupations (excluding government employees, private employees, merchants, searching for a job, and housewives) had 99.01% (AOR = 0.09; CI: 0.02-0.38) fewer positive attitudes towards VBD than the students. To our astonishment, smokers donated blood 87% (AOR = 1.87; CI: 1.17-2.98) more times than non-smokers. Those who had heard about VBD online were more likely to have knowledge, a favorable attitude, and the practice of VBD. People who had knowledge about VBD had a more positive attitude towards VBD. Furthermore, knowledgeable persons about VBD donated blood 2.31 (AOR = 2.31; CI: 1.55-3.42) times more than those who were not knowledgeable, and the likelihood of VBD practice was 3.78 (AOR = 3.78; CI: 2.11-6.77) times higher among those with a good attitude toward VBD than those with a negative one.

6. Discussion

The purpose of this study was to examine the public's knowledge, attitude, and practice of VBD in Khulna, Bangladesh, as well as the factors associated with these aspects, using information from 697 interviews. We found that a significant proportion of respondents had a positive attitude toward VBD; nevertheless, the respondents lacked knowledge and practice of VBD. Additionally, people's knowledge of VBD was correlated with their age, educational position, and hearing about VBD using online social media, while the most important elements influencing individuals' attitudes about VBD were their gender, occupation, hearing about VBD using online social media, and knowledge about VBD. Moreover, age, gender, smoking status, knowledge about VBD, and attitude towards VBD were all significant factors in a person's likelihood to donate blood.

All our participants had heard about VBD before conducting this research, while this percentage was low in studies done in Harar town (93.7%) and Mekelle city (85.5%) [12,17]. When compared to studies done in Markos town (56.5%) and the city of Mekelle (49%), this research found a higher knowledge of VBD among a higher portion (68.58%) of the respondents [11,17] but lower than another study conducted in Addis Ababa (83%) [18]. The majority of respondents (59.68%) agreed that once every three to four months is the optimal frequency for blood donation, which is higher than the percentages found in studies conducted in Markos town (53.8%), Benin (21.5%), Chennai (51.2%), and Mekelle (43.6%) [11,17,19,20]. However, a higher portion of the participants (90.82%) in this study believed that unpaid blood transfusions could be the safest blood supply which is consistent with the study conducted in Chennai [20]. Also, a larger proportion of respondents (73.89%) in this study than in the Markos town research (47%), but a smaller proportion than in the Benin study (95.7%), had awareness of the risk of disease transmission through an unsafe blood transfusion [11,19].

Respondents aged between 36 and 45 years were less knowledgeable of VBD than respondents aged between 18 and 25 years. It goes against the findings of the research done in Markos [11]. It may be because people at this age get so busy in their daily lives that they cannot get the proper time to become aware of blood donation. An increasing level of educational status was an indicator of higher knowledge about VBD, which supports the studies conducted in Sikkim, India [21]. People may become more knowledgeable about social responsibilities after completing their higher education. The people of Khulna city with higher education than a secondary or below secondary educational level were found to have higher VBD knowledge. Nevertheless, respondents who had heard about VBD through any online social media were more knowledgeable than those who had heard through any other media. Usually, online social media users can easily search on the internet instantly for what they have seen on social media; perhaps they have succeeded in gaining more knowledge on VBD.

In contrast to previous research performed in Bangladesh with university students (74%), Markos town (52.2%), Mekkele (61%), and Addis Ababa (68%), the vast majority of participants in this study (93.83%) had a positive view of VBD [11,17,18,22]. Additionally, fewer respondents (71.59%) in this study than in the previous studies carried out in India (90%) and Addis Ababa (100%) expressed a favorable desire to donate blood in the future [18,23].

Similar to the conclusion of the research on the Iranian population, male respondents showed a substantially more favorable attitude towards VBD than female respondents [13]. Males are more independent and have less fear of the blood transfusion process, and this may be an adequate reason why males show a higher positive attitude towards VBD. Respondents associated with other jobs (excluding government employees, private employees, merchants, searching for a job, and housewives) were found to have a less favorable attitude than the students, which may be because of a lack of time in other professions. Furthermore, hearing about VBD through online social media was associated with a positive attitude towards VBD. Those respondents who had heard about VBD through online social media had a more favorable attitude, which might be because they found the importance of VBD using the internet and online social media. Lastly, respondents who had more knowledge of VBD were more likely to have a positive attitude towards it, which is in line with the research conducted in Markos town [11]. Through the discovery of a relationship between knowledge and a positive attitude in this research, it can be concluded that knowledge creates the ideal attitude.

Compared to studies done in Jamalpur district (8%), Bangladesh with university students (54%), South India (38.05%), Northern Nigeria (22.6%), and Markos town (16.1%), respondents in this research had a higher record (64.71%) of blood donation [11,22,24–26]. When compared to previous studies done in Markos town (4.8%) and Benin (13.9%), the percentage of frequent blood donors among the respondents was very high at 35.92% [11,19]. It is, however, lower than the 42.2% found in an Addis Ababa facility study [18]. Compared to research done in South India, where 64.1% of donors gave blood willingly, over 76.0% of these donors did so on their own accord [25]. Inadequate blood supply and fear of the blood donation process were cited as the top two reasons for never donating blood. Evidence suggests that some individuals were not donating blood because they had limited knowledge, did not want to be approached, were unable to donate,

needed to donate only to a friend or relative, were afraid of needles and unaware of their viral status, believed the blood might be sold, were ignorant, or were religious [9–13,22,24].

Blood donation was more common in older age groups, which is consistent with research undertaken in Markos town, Karachi, and Iran [11,13,27]. One possible explanation could be the change in perception of VBD among people of growing age. Moreover, male participants had a higher likelihood of donating blood, which is in line with a study conducted with university students in Bangladesh [22]. Surprisingly, the act of donating blood was shown to be more prevalent among those who smoke compared to those who do not smoke. Nonsmokers could have been reluctant to give blood because they may be too concerned about their health. Blood donation practice was found to be much higher in respondents who had heard about VBD through online social media, which supports a previous study conducted in Bangladesh with university students [22]. In this modern era, online social media is playing a vital role in creating awareness about important social activities like VBD, which may distinguish the practice of VBD between users and non-users of social media. Donation rates were shown to be significantly correlated with donors knowledge and attitudes towards VBD, which supports the study conducted in Jamalpur district [24]. Understanding blood donation is crucial for providing and receiving volunteer blood donations in a timely manner. It helps people get over their fears and develop a healthy respect for those who give blood. The academic initiatives in Mekelle and Markos Town get advantages from VBD [11,17].

7. Strength and limitation

Every research has advantages and disadvantages, and to understand the limits of this study, it must be acknowledged that it does not provide a long-term picture of VBD knowledge, attitudes, and behaviors since it was cross-sectional. Furthermore, convenience sampling, also known as non-probability sampling, has its own set of limitations, which meant that many individuals who could have been a suitable match for this study were unable to participate. People's response rates also differed based on where they were in the city. One or more of these circumstances may cause prejudice. Although this research attempted to explain the knowledge and behavior of individuals in a specific location, these explanations may not apply to Bangladesh as a whole. A contribution to the literature and the results about VBD for Khulna city residents are two important strengths that may aid health policy choices and guide the development of more thorough research methods.

8. Conclusion

This research aimed to identify the characteristics related to knowledge, attitude, and practice of VBD since it is safe for both the donor and the receiver when a blood transfusion is necessary. According to this study, it has been verified that while the majority of residents in Khulna have a good attitude toward voluntary blood donation, their practice and knowledge of VBD are not at adequate levels. This research indicates that attitudes and knowledge of VBD have an effect on its practice, in addition to certain demographic characteristics. Public awareness and compliance with VBD should be increased in every way possible by addressing the important issues raised in this study using a variety of strategies, including online social media, health extension workers, educational institutions, and youth centers.

Data availability

The data used to substantiate the findings of this research is accessible and may be given upon inquiry.

Ethical approval

Khulna University's Ethical Committee in Khulna, Bangladesh

(Reference Number: KUECC-2022/09/39) provided oversight for this research.

Authors' contributions

Each author made important contributions to the study's overall conception, design, data collecting, analysis, and interpretation, as well as to the writing of the study's paper. The final draught was approved by all contributors.

Declaration of competing interest

The authors of this work declare that they have no competing interests with the publication of this work.

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