Factors Impacting Knowledge of Voluntary Blood Donation among Adult Residents of Mwanakwerekwe Ward in Zanzibar, Tanzania: Insights from a Community Survey

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Background and study aim: Insufficient blood donation in sub-Saharan Africa, including Tanzania, poses a significant public health challenge. Blood and its components provide vital life-saving support and treatment to patients. In Zanzibar, healthcare facilities face a blood shortage, with a collection of only about 10,000 units annually compared to the critical need of 18,000 units. This study intended to identify factors that affect the community's knowledge about voluntary blood donation in Mwanakwerekwe ward, Zanzibar, to increase motivation for donation.

Patients and Methods: A quantitative analytical cross-sectional study was conducted in Mwanakwerekwe Ward, Zanzibar, between March 20 and June 19, 2023, and included 100 adult male and female community members. The data collected was analyzed using the Statistical Package for Social Science (SPSS) version 26. Frequencies, percentages, and P-values for significant association were used.

Results: The study revealed that the average knowledge of the study participants regarding voluntary blood donation was 46%, which is inadequate. About 48% of all participants had adequate knowledge, and 52% had inadequate knowledge. Among the independent variables examined, only two factors (participants' level of education and occupation) showed a significant correlation with the level of knowledge, each exhibiting a P-value (P< 0.05). **Conclusion:** The results of this research indicated inadequate knowledge of voluntary blood donation within the community of Mwanakwerekwe ward, thus emphasizing the need to strengthen programs to increase awareness among its members.

INTRODUCTION

The rise in human life expectancy and the implementation of new and aggressive surgical and therapeutic methods have increased the demand for blood and blood products in most countries. Blood, being the most commonly donated tissue in medical settings, serves as a crucial resource in numerous life-saving scenarios when utilized appropriately. Blood donation involves the voluntary extraction of blood from individuals for transfusions or the production of biopharmaceutical medications through a procedure known as fractionation [1,2]. Blood is so important to the human body that existence is completely impossible without it. Health systems worldwide need an adequate blood supply for their proper functioning. In Sub-Saharan Africa, blood donation holds considerable importance due to factors such as anemia resulting from malaria, sickle cell disease, road traffic accidents, and other causes.[٣]

Nonetheless, insufficient blood donation in Sub-Saharan Africa, including Tanzania, represents a significant public health challenge. Blood and its derivatives offer patients essential life-saving and therapeutic advantages [4]. They are indicated in several medical conditions, such as bleeding due to trauma, surgery and blood disorders, malignancies, and pregnancy complications, among others [5,6]. Blood transfusion support is needed in many acute situations, but patients who require transfusions often face delays in accessing a safe blood source.[١،٦]

Globally, 118.5 million units of blood donations are collected each year.

However, 50% of these units come from developed countries, even though only 16% of the global population lives in developed countries [7]. This leaves 84% of the global population in non-developed countries facing chronic blood shortages for medical treatments. This shortage leads to unexpected deaths in African countries like Tanzania due to insufficient blood supplies in blood banks [7]. In India, approximately 15 million units of blood are required annually, but only around 11 million units are collected. Additionally, it is estimated that nearly 12,000 individuals perish daily due to the unavailability of high-quality blood [8].

In Africa, based on the 2009 national census of Kenya, blood donation in Nairobi has shown a decreasing trend over time. For instance, 38,808 units of blood were donated in 2006, whereas only 30,840 units were collected in 2009 [9,10]. According to the World Health Organization (WHO) Guidelines, a country needs at least 1% of the total population. However, with a Ugandan population of 34 million, it should ideally collect 340,000 units of blood, but only 220,000 were collected in 2014 because of many challenges [10-13].

In Tanzania, with a population of 54 million in 2020, the demand for blood stands at 540,000 units [5,14]. However, in 2016, less than 200,000 units were collected, resulting in a shortage of over 300,000 units [14]. Additionally, 15% of the collected units were deemed unfit for various reasons, reducing the available supply of usable blood [15]. Achieving health-related Millennium Development Goals, such as reducing child mortality, improving maternal health, and preventing HIV infection, hinges on ensuring equitable and universal access to safe blood [16,17]. According to the Ministry of Health of Zanzibar report published on World Blood Donor Day, June 14, 2022, Zanzibar is currently experiencing a significant shortage of blood within its healthcare facilities. The region collects an average of 10,000 units of blood annually, which falls short of the required demand of 18,000 units per year [18].

This study analyzed the factors impacting the community's knowledge of voluntary blood donation in Mwanakwerekwe Ward, Zanzibar. The insights, conclusions, and recommendations provided in this study are anticipated to enhance community members' willingness to engage in voluntary blood donation, thereby ensuring the community's safety in terms of blood supply.

PATIENTS AND METHODS

Area of study

This research was conducted at Mwanakwerekwe ward, located within Mwanakwerekwe Constituency in the West urban region in Zanzibar, approximately 7 kilometers from Zanzibar town. Mwanakwerekwe Constituency has two wards, Jitimai ward and Mwanakwerekwe ward.

Study design

A quantitative analytical cross-sectional study was conducted at Mwanakwerekwe ward in Zanzibar from March 20 to June 19, 2023.

Study population

The study included male and female adult community members at Mwanakwerekwe ward in Zanzibar.

Sampling procedures and sample size

Simple random sampling was used in the formed clusters of eight streets in which the respondents were allowed to take part in the study by picking a paper from an enclosed box, and any respondent who picked a paper written YES was invited to participate. This technique was used to ensure that each member of the targeted population had an equal and independent chance of being included in the study sample and to reduce bias. The sample size of 100 participants was calculated using Krejcie and Morgan formula with a confidence level of 95% = 1.96, a population size of 20,215 people, a population proportion of 85% = 0.85, and a margin error of 7% = 0.07.

Data collection and analysis

The researcher used a self-administered questionnaire. Data collected was analyzed using Statistical Package for Social Science (SPSS) version 26. Frequencies, percentages, and P-value for significant association.

Operational definitions of knowledge assessment

The level of knowledge is the understanding level of participants on the benefits, risks, and eligibility criteria of blood donation. Knowledge was assessed by 10 questions, each with 10

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points to make 100%. Based on the total score, knowledge level on blood donation was categorized into adequate (≥50%) and inadequate (<50%).

RESULTS

The distribution of respondents by socio-demographic characteristics

The findings indicated that most of the participants, 33 (33.0%), were in the age range of 30-35 years, but only 14 (14.0%) of them were in the age range of 40-45. The majority of respondents, 56 (56%), were males. About 33 (33.0%) of all respondents had secondary education, and only 2 (2.0%) respondents had postgraduate degrees. Also, the results showed that the majority of respondents, 28(28%), were government employees, most of the respondents, 47(47.0%), were single in marital status, and the majority of respondents, 83(83%), were Muslim, as described in Table 1.

Distribution of respondents by knowledge of voluntary blood donation

The results in Table 2 showed that the mean knowledge of the response was 46%, a maximum score of 90%, and a minimum score of 0% in descriptive statistics. Most of the respondents, 84 (84%), were aware that diabetic people could not donate blood, 68 (68%) were aware that people under medication could not donate blood, 64 (64%) were aware that people living with HIV/AIDS could not donate blood and 62 (62%) were aware that people with hepatitis could not donate blood. Most respondents showed poor knowledge on questions asked about the maximum age for voluntary blood donation, criteria for someone to donate blood, and the best source for blood donation by 16 (16%), 25 (25%), and 26 (26%), respectively. This study revealed that 48% and 52% of participants holding adequate and inadequate knowledge respectively, as shown in Figure.

Association of predictor variables and level of knowledge among participants

In this research, a significant correlation between predictor variables and the level of knowledge among adult residents in the Mwanakwerekwe ward was analyzed through bivariate analysis. Among the independent variables examined, only two (participants' level of education and occupation) displayed a significant association with the level of knowledge, all with a P-value ($P< 0.05$). In contrast, the rest of the independent variables showed no significant correlation with the level of knowledge, all with a P-value ($P> 0.05$), as illustrated in Table 3.

Factors impacting the level of knowledge on blood donation among adult residents

The participants' knowledge level was computed by binary logistic regression with predictor variables. Adequate knowledge as a reference category was contrasted against inadequate knowledge. Binary logistic regression results shown in Table 4 indicate that only one predictor (occupation of participants) significantly predicted a relationship with a P-value < 0.05. Private employee participants significantly increased the odds of inadequate knowledge by a factor of 6.2 (AOR =6.239, 95% CI: 1.378-28.254, P =0.018).

Table 1: Socio-demographic characteristics of participants (N=100)

Socio-demographic characteristics	Frequencies (n)	Percentages (%)
Gender		
Male	56	56
Female	44	44
Age (years)		
18-23	15	15
24-29	23	23
30-35	33	33
36-41	15	15
42-Above	14	14
Marital status		
Married	37	37
Widow	10	10
Single	47	47
Divorced	6	6
Educational level		
Primary education	11	11
Secondary education	33	33
Certificate	24	24
Diploma	20	20
Bachelor Degree	10	10
Postgraduate degree	2	2
Occupation		
Government employee	28	28
Private employee	23	23
Self-employed	25	25
Not employed	24	24
Religious beliefs		
Muslim	83	83
Christian	17	17

Table 2: Descriptive analysis of participants' knowledge of voluntary blood donation

Asked questions	Correct n (%)	Incorrect n (%)
What do you think is the best source of blood donation?	26 (26)	74 (74)
Who should donate blood?	25 (25)	75 (75)
What is the minimum age for voluntary blood donation in your country?	52 (52)	48 (48)
What is the maximum age for voluntary blood donation in your country?	16 (16)	84 (84)
Which blood type is known as the "universal donor"?	30 (30)	70 (70)
Which blood type is known as the "universal recipient"?	33 (33)	67 (67)

Can you donate blood if you have diabetes?	84 (84)	16 (16)
Can you donate blood if you have hepatitis?	62 (62)	38 (38)
Can you donate blood if you have HIV/AIDS?	64 (64)	36 (36)
Can you donate blood if you are under medication?	68 (68)	32 (32)
Descriptive statistics: Mean = 46, Std. Deviation = 21.56, Range = 90, Minimum = 0, Maximum = 90		

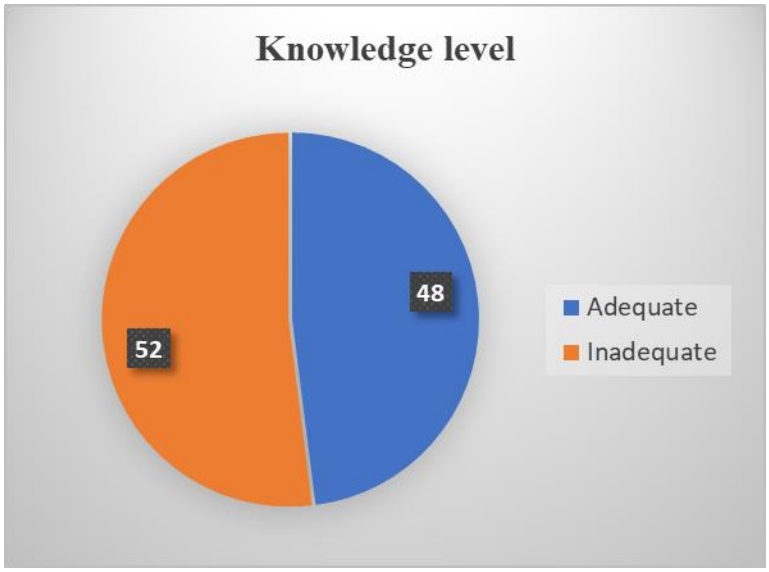

Figure 1. Level of knowledge among participants

Table 3. Bivariate analysis of the predictor variables and level of knowledge among participants (N=100)

	Knowledge level			
Predictor variables	**Adequate**	**Inadequate**	**Chi-square**	**P-value**
Gender				
Male	28	28	0.204	0.652
Female	20	24		
Age (years)				
18-23	9	6		
24-29	8	15		
30-35	20	13	6.704	0.152
36-41	7	8		
42-Above	4	10		
Marital status				
Married	21	16		
Widow	2	8	4.314	0.229
Single	22	25		
Divorced	3	3		
Educational level				
Primary education	3	8		
Secondary education	18	15		
Certificate	7	17	12.172	**0.033***

Diploma	10	10		
Bachelor Degree	8	2		
Postgraduate degree	2	0		
Occupation				
Government employee	15	13		
Private employee	5	18	8.885	**0.031***
Self-employed	13	12		
Not employed	15	9		
Religious beliefs				
Muslim	40	43	.007	0.932
Christian	8	9		

* P<0.05 is statistically significant

Table 4: Binary logistic regression of predictor variables and level of knowledge among participants.

	Adequate knowledge (Reference) vs. Inadequate knowledge				
Predictor variables	**B**	**AOR**	**95% C.I for AOR**		**P-value**
			Lower	**Upper**	
Gender					
Male	-0.247	0.781	0.243	2.515	0.679
Female	Reference				
Age (years)					
18-23	-0.541	0.582	0.088	3.843	0.574
24-29	-0.899	0.407	0.066	2.516	0.333
30-35	-1.153	0.316	0.061	1.622	0.167
36-41	-0.591	0.554	0.088	3.467	0.528
42-Above	Reference				
Marital status					
Married	-0.515	0.597	0.049	7.316	0.687
Widow	1.307	3.695	0.215	63.581	0.368
Single	0.02	1.02	0.086	12.115	0.987
Divorced	Reference				
Educational level					
Primary	22.918	-	-	-	0.999
Secondary	21.325	-	-	-	0.999
Certificate	22.246	-	-	-	0.999
Diploma	21.806	-	-	-	0.999
Bachelor Degree	20.088	-	-	-	0.999
Postgraduate degree	Reference				
Occupation					
Government employee	1.333	3.794	0.792	18.166	0.095
Private employee	1.831	6.239	1.378	28.254	**0.018***
Self-employed	0.449	1.566	0.394	6.219	0.524
Not employed	Reference				
Religious beliefs					
Muslim	0.312	1.366	0.353	5.292	0.652
Christian	Reference				

* P<0.05 is statistically significant, B = Logistic regression coefficient, AOR = Adjusted Odds Ratio, C.I = Confidence Interval

DISCUSSION

The study revealed that the average knowledge of the study participants regarding voluntary blood donation was 46%, which is inadequate. About 48% and 52% of participants had adequate and inadequate knowledge respectively. This was comparable with the study conducted in Harar town, Ethiopia, which reported 43.5% of overall good knowledge [19], and another Ethiopian study in Mekelle town, where 51% of respondents had low overall knowledge about voluntary blood donation [20]. Another study in Nigeria reported low knowledge, which revealed that 46.2% of participants knew some indications for blood transfusion [21]. The overall knowledge concerning voluntary blood donation in this study was higher than that of Abderrahman & Saleh [22] in Jordan, which revealed that, among the study participants, 28.6% exhibited a satisfactory level of understanding regarding blood donation. However, it was lower than that reported by studies conducted in Gondar by Melku et al [23] which reported 56.8% of adequate knowledge, in different districts of Nigeria by Salaudeen et al [21], which reported 61%, and by Olubiyi et al [24] reported 96.9% where the community had adequate knowledge on blood donation. This difference may have been caused by the different times the studies were conducted, different methods of measuring knowledge among participants, different levels of community awareness concerning blood donation, and the sample size.

In this study, most of the participants showed adequate awareness of some unfavorable conditions for blood donation, such as 84% were aware that diabetic people could not donate blood, 68% were aware that people under medication could not donate blood, 64% were aware that people living with HIV/AIDS could not donate blood, and 62% were aware that people with hepatitis could not donate blood. However, the study of Mohammed & Essel [25] in Ghana reported a higher level of awareness that about 91.4% of the participants answered correctly that a person positive for HIV/AIDS is ineligible to donate blood. The study of Rizwan et al. [26] in Saudi Arabia showed different results, such as the level of knowledge regarding blood donation being insufficient among the study population, with only 33% of participants demonstrating proficiency.

Most participants showed inadequate knowledge on questions asked about the maximum age for voluntary blood donation, criteria for someone to donate blood, and the best source for blood donation by 16%, 25%, and 26% respectively. These results are nearly similar to other studies [25, 27], which found that more than half of the donors did not know the minimum age for blood donation, the maximum number of donations in a year, and the recommended interval between two donations. These findings contradict an earlier study by Jemberu et al [28] in Ethiopia which reported that about 53.8 % of participants knew that people could donate every 3 months, which was also higher than other earlier studies conducted in Benin, (21.5 %), Chennai (51.2 %) and Mekelle (43.6 %) [29-31].

Consistent low awareness of blood donation can significantly impact education campaigns aimed at promoting it in communities, on radio, and on television [25]. When people are unaware of the importance and need for blood donation, they are less likely to participate in donation drives. This can lead to shortages in blood supply, especially during emergencies or natural disasters. A lack of awareness may foster misconceptions or fears about blood donation, such as concerns about safety or discomfort during the process. This can lead to reluctance or refusal to donate among those who might otherwise be willing.

CONCLUSION

The study's results indicated that the community's understanding of voluntary blood donation at Mwanakwerekwe ward was inadequate, highlighting the need for increased awareness among community members. It is crucial to emphasize the positive impact of voluntary blood donation on the country's healthcare sector.

Recommendations

It is crucial to design comprehensive education campaigns that raise awareness about the importance of blood donation, address misconceptions, provide clear information on donation procedures, and actively engage communities. Utilizing multiple channels such as radio, television, social media, and community outreach programs can help reach diverse audiences and maximize the impact of education efforts. Additionally, partnerships with healthcare institutions, local organizations, and

government agencies can strengthen the reach and effectiveness of blood donation campaigns.

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Ethical approval:

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HIGHLIGHTS

- The level of knowledge is the level of understanding participants have of blood donation's benefits, risks, and eligibility criteria.
- The study revealed that the average knowledge of the study participants regarding voluntary blood donation was 46%, which is inadequate. About 48% of all participants had adequate knowledge, and 52% had insufficient knowledge.
- Developing comprehensive educational initiatives across various platforms is essential to emphasize the importance of blood donation, clarify misconceptions, and clearly outline donation procedures.

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