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Original Research Article

The Effect of Viruses on Blood Transfusion, an Applied Study on the Hafr Al-Batin Blood Bank

Hadia Farhan Al-Dahmeshi Al-Enizi[1*], Aref Awad Al-Shammari[1], Mohammed Shabout Al-Shammari[1], Eidah Adehim Ageel Al-Dhafiry[1]

[1]Hafr Al Batin Health, KSA

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***Corresponding author:** Hadia Farhan Al-Dahmeshi Al-Enizi
Hafr Al Batin Health, KSA

Abstract

The fact that blood groups can act as receptors/coreceptors for bacteria, viruses, and parasites demonstrates the importance of blood groups in infection. Blood group antigens also aid in cell adsorption, signal transmission, and/or membrane micro-domain retention. Furthermore, blood type can influence the innate immune response to infection. This data was compiled using the risk perception of blood transfusion scale, which is part of a larger risk perception questionnaire. Blood transfusion risk perception is measured on a 7-point Likert scale based on a set of qualitative characteristics; 119 participants in Hafr Al-Batin blood bank had a significant difference in risk perception of blood transfusion due to receiving blood, whereas those who had never received blood had no risk perception. as much risk perception of blood transfusion, and because of viral hepatitis infection, those who did not have viral hepatitis had more risk perception of blood transfusion, but there is no significant difference in risk perception of blood transfusion due to gender, age, educational level, and blood donation. The implementation of strict donor pre-screening and preventative measures to control infections in the general population, as well as the introduction of new, more sensitive screening tests, could significantly reduce transfusion-transmitted viral infections across eastern Saudi Arabia.

Keywords: effect of viruses- blood transfusion- Hafr Al-Batin blood bank.

CHAPTER 1

INTRODUCTION

The significance of blood groups in infection is demonstrated by the fact that blood groups can function as receptors/coreceptors for bacteria, viruses, and parasites. Blood group antigens also facilitate cell adsorption, signal transmission, and/or the retention of membrane micro-domains. Furthermore, the innate immune response to infection can be influenced by blood type [1, 2].

In terms of frequency, the ABO Blood Group System is the most prevalent one. ABO blood types are passed down through families through the inheritance of A and B alleles [3].

Afterward, H antigen can serve as a substrate for ABO glycosyltransferase. H antigen is produced when FUT1 or H-glycosyltransferase adds 1-2 fucose. Group A members express 1-3 Nacetylgalactosamine (GalNAc), whereas Group B members express 1-3 galactose (Gal). But Group O members only express the H-antigen precursor due to their inactive ABO genes. Viruses, bacteria, and other A/Bantigen-like environmental material have been shown to trigger the production of antibodies in the ABO system against ABO blood group antigens. Antibody response to ABO antigens is an important aspect of the innate immune system [4].

However, blood types can trick the immune system by functioning as fake receptors. Certain blood groups serve as receptors and ligands for bacteria, viruses, and parasites. Malaria parasites, such as Plasmodium vivax, recognize the Duffy blood group antigen [5, 6].

Transfusion-transmitted infections (TTIs) such hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), and human T-

lymphotropic virus (HTLV) pose health risks due to their relationship with certain blood types [7, 8]. The distribution of blood groups is important in blood transfusion because of the diseases they can help treat [9, 10]. As an example, the (O) blood group has been associated with a higher risk of contracting HBV, while in the case of HCV, no significant association was found between the four different ABO blood groups [11].

There appears to be a dearth of research on the incidence and correlation of transfusion-transmitted illnesses associated with the ABO and Rh blood groups among blood donors in the western part of Saudi Arabia. As a result, the current retrospective analysis is the first attempt to determine the prevalence and correlation of transfusion-transmitted illnesses with ABO and Rh blood groups among blood donors at the KFSH and RC [12].

Blood Transfer Dangerous

Red blood cells (RBCs), white blood cells (WBCs), clotting factors, platelets, and plasma make up the bulk of blood, an essential bodily fluid. There are essential roles that each of these parts plays. Red blood cells (RBCs) are a prime example; they take oxygen from the lungs to the body's trillions of cells and subsequently return carbon dioxide to the lungs from which it can be exhaled. Platelets and clotting factors prevent excessive bleeding, whereas white blood cells (WBCs) are an integral part of the immune system and assist detect and protect against foreign substances and infections [13].

Plasma is the liquid part of the blood, and it aids in transporting the other parts of the blood (such as the nutrients, hormones, electrolytes, and proteins) to the organs and cells of the body that require them. Cell waste is another component that plasma carries to the liver, kidneys, and intestines for elimination. In several potentially life- threatening scenarios, humans may need immediate access to either whole blood or a specific blood component. Surgery, major accidents, wars (civil and military), terrorist attacks, and natural disasters (earthquakes) all fall into this category [14].

Blood transfusions are sometimes necessary for the treatment of cancer and other diseases or conditions when abnormal blood cells are present. Despite the efforts made over the past seven decades to develop blood substitutes, human blood donations remain the only supply of blood components. Because of this, the World Health Organization recommends that all countries make it a central part of their national health care policy to ensure that their national blood banks always have enough safe blood available (WHO**)** [15].

Thus, much research has investigated people's familiarity with and views on blood donation in the literature, and these studies have been undertaken in both developed and developing countries, including Saudi Arabia. Most of these studies have found that a lack of awareness, misunderstandings, lack of time, unfavorable attitudes, and anxieties about the blood donation procedure are to blame for the drop in the number of blood donations. However, there has only been a handful of research looking at how people risk perceptions of blood transfusions, especially in Saudi Arabia. A young Saudi girl in the country's southern region contracted HIV from blood that had been transfused to multiple patients, heightening the urgency of this problem after a string of incidents involving the transfusion of contaminated blood to Saudi Arabian patients. Due to rigorous national and international screening procedures advocated by the WHO, blood transfusions are widely regarded as a safe practice. It's possible that this and similar incidents have decreased public faith in blood banks and increased worry among Saudi citizens about the dangers of receiving transfusions. Current and potential blood recipients, as well as their families, may face psychological difficulties as a result of this tragedy. As such, the purpose of this research was to assess how people in Saudi Arabia view the potential dangers of receiving a blood transfusion [16].

People in Saudi Arabia are Participant were chosen using a convenience sampling method. Participants required to be Saudi nationals living in Riyadh City and at least 18 years old, without any known mental disabilities. During a two-week annual festival celebrating Saudi Arabia's rich cultural history, the study team sought potential participants in the city of Riyadh. Many people from all walks of life in the Kingdom of Saudi Arabia and abroad go to participate in this annual national celebration [17].

The formula for determining sample size was used. A total of 46.6% of study participants rated the danger of blood transfusion to themselves and their families as "moderate" or "high,"14 while another study found that 57% of individuals viewed blood transfusion as a concern for the transmission of blood-borne infections. The predicted sample size for this study is 311 participants, based on the following hypotheses about the self-reported perceived risk of blood transfusion among visitors to this national festival: 95% confidence limit (z=1.96), margin of error 5.5%. All participants were made aware that their participation is completely confidential and optional [18].

Methods for Collecting Information

The risk perception of blood transfusion scale was used to compile this data; this scale is a component of a more comprehensive risk perception questionnaire. Blood transfusion risk perception is measured on a 7-

point Likert scale with respect to a set of qualitative characteristics, including the following: overall riskiness, the extent of worry, dread, the benefits provided, the degree to which those exposed are aware of the risks, the degree to which scientists understand the risks, the likelihood of fatal consequences, the degree to which exposure to the hazard is voluntary, the amount of control an average person has, and the likelihood of the hazard occurring. Statements were divided into three categories: the fear and severity of this risk, the understanding and control of this risk, and the benefit of blood transfusion, in order to more accurately assess the degree of this risk. Percentage mean scores (PMS) were calculated for each domain based on the replies to the statements [19].

The hepatitis E virus (HEV) is an icosahedral, non-enveloped, positive-sense RNA virus that is classified as an orthohepevirus. Members of this genus cause liver damage just like other hepatitis viruses. An acute form of hepatitis in mammals including humans. Chronic hepatitis can also affect immunocompromised patients and pregnant women. The ability of HEV to infect animals, in contrast to other hepatitis viruses, is a defining characteristic of this pathogen [20].

Orthohepevirus A is a phylogenetically diverse group of viruses that includes eight different genotypes (HEV 1- 8) that each infect a little different host range and are found in somewhat different parts of the world. While HEV-1 and HEV-2 are typically only seen in people, HEV-3 and HEV-4 can infect both humans and animals like pigs, deer, goats, dolphins, and boars. Wild pigs in Japan were found to be infected with HEV-5 and HEV-6, while in China, camels have been the sole source of HEV-7 and HEV-8 isolation. Genotype 1 is more prevalent in Asia and Africa, while genotype 2 is more prevalent in Mexico, Nigeria, and Chad. Type 3 is only found in East Asia (Japan, Korea, and Taiwan), while types 4–8 are confined to Asia [21].

In 1955, a HEV infection outbreak was identified in India as icteric hepatitis. In 1990, the oral route of infection was documented in a Russian military Camp. Infection of immunocompromised, thalassemic, HIV patients and pregnant women can produce mild forms of hepatitis, extra- hepatic symptoms, and death, despite the fact that HEV infection is typically self-limiting and can cause silent disease. Transmission of HEV is mostly through water-borne and fecal-oral pathways, making it ecologically reliant and linked to past travel to endemic locations or poor sanitation. Blood and plasma transmission of HEV has been recorded worldwide, however.

The World Health Organization (WHO) estimates that 118.2 million units of blood were donated in 118 countries in 2013, with almost 21 million blood components transfused each year in the United States. The testing for pathogens prior to a blood transfusion, however, does not include HEV. Multiple surveillance studies have been conducted to determine the prevalence of HEV in blood donors, and the results show that the sero-positivity of HEV among blood donors varies from 2% to 49% over the world. 4,9,11–55 Some research has found evidence of active viremia in blood donors, which poses a direct threat to those who receive transfused blood or blood components [22].

Multiple studies have demonstrated HEV transmission through blood transfusions, which calls into question whether or not blood donations should be screened for HEV. Too far, there has been no research conducted in Saudi Arabia to quantify the risk of HEV transmission through blood transfusion by examining the prevalence of HEV RNA in blood donors. Our goal in this study was to use both genetic and serological assays to establish the incidence of HEV among blood donors in Saudi Arabia's Eastern Province [23].

The risk perception of blood transfusion scale was used to compile this data; this scale is a component of a more comprehensive risk perception questionnaire. Blood transfusion risk perception is measured on a 7-point Likert scale with respect to a set of qualitative characteristics, including the following: overall riskiness, the extent of worry, dread, the benefits provided, the degree to which those exposed are aware of the risks, the degree to which scientists understand the risks, the likelihood of fatal consequences, the degree to which exposure to the hazard is voluntary, the amount of control an average person has, and the likelihood of the hazard occurring. Statements were divided into three categories: the fear and severity of this risk, the understanding and control of this risk, and the benefit of blood transfusion, in order to more accurately assess the degree of this risk. Percentage mean scores (PMS) were calculated for each domain based on the replies to the statements. Therefore, a healthy donor population is important not only for maintaining a reliable blood supply but also for learning more about the local incidence of TTIs. The need of TTI screening for blood donors is highlighted by several studies showing that the prevalence of TTIs among blood donors is similar to that of the general population [24]. In this way, rising infection rates among blood donors may reflect shifts in population risk, calling for new and better blood-screening practices [25]. Although these facts are generally true, there are still certain risks involved because blood donors are a specially selected population with a low risk of infectious diseases, a low percentage of female ganders, and an age range of 18-60 [26].

Millions of individuals throughout the world receive blood transfusions or items made from blood each year. Blood-derived products are made from the pooled plasma of hundreds of donors, while one unit of whole blood can be used to transfuse up to three

patients. Testing for transfusion transmitted illnesses (TTIs) with the help of the available serological and molecular technologies is standard procedure around the world to ensure the quality and safety of the blood and blood products that are distributed. The three most prevalent agents responsible for TTIs are the hepatitis B virus (HBV), the hepatitis C virus (HCV), and HIV types 1 and 2. Blood banks have implemented measures like strict donor selection criteria, the exclusion of those with clinical and theoretical risks of carrying infectious agents via questionnaire, and the encouragement and maintenance of a voluntary pool of blood donors in order to increase the safety of the blood being donated [27].

The ability of traditional serology tests to detect blood-borne viruses is dependent on the generation of viral- specific antibodies, the concentration of virus antigens in blood, and the method's sensitivity and specificity. Although a serological test may come back negative for the infected person, the virus may still be present in their blood and be transmitted to a healthy person during this time period, which is known as the serological window. Application of Nucleic Acid Testing (NAT), a very sensitive approach for simultaneous detection of HBV, HCV, and HIV, can reduce the danger of the serological window period associated with TTI. The serological window duration for HBV is shortened by NAT to 10.34 days, HCV to 1.34 days, and HIV to 2.93 days. Donor notification and counselling rely heavily on NAT's ability to resolve erroneous seroreactive contributions. Testing for NAT is necessary if there is a high prevalence of infections among blood donors, and the proof that additional diagnostic tools like serology testing improve the situation. Many nations use NAT testing with conventional serology procedures to ensure their blood supplies are as safe as possible. This is because of the significant impact NAT can have in reducing the risk of TTIs [28].

Individual donor testing (IDT) and pooled testing are two methods of NAT screening that use assays in conjunction with common NAT platforms, which can be fully integrated and automated, semiautomated, or modular automated. Each mini-pool may employ a different number of samples, depending on the overall sensitivity of the tests and the costs involved, to best suit the needs of individual blood donation locations. With IDT, the most sensitive technology, there is no need to dilute the viral genetic elements before evaluating a sample from each unit of donated blood. Since virus titers are often low during windows, IDT can keep its sensitivity high. However, many blood centers that need to process a high volume of given blood units favor pooled testing, in which samples from numerous donors are blended before testing [29].

Medical communities and government agencies can benefit from knowing the frequency of TTIs in blood donors so that they can better manage the disease burden, create strategies for assessing the safety of the blood supply, and provide preventative measures for the growth of vaccination programmers. This study for the Makkah region by King Abdullah Medical City, a tertiary care center, is one of the few known epidemiologic studies on the prevalence of transfusion-transmitted diseases using both serological and/or NAT approaches for blood donors in Saudi Arabia (SA) [30].

In this retrospective study, we analyzed the trends in the NAT prevalence and seroprevalence of HBV, HCV, and HIV among blood donors in Makkah between 2011 and 2014. Extracted from donor serological and molecular profiles were temporal trends related with the prevalence and stage of TTIs. The use of IDT or mini-pool testing to lessen the sensitivity of NAT findings was not an option, so we made it a secondary goal to implement the most appropriate NAT format [31].

On January 30, 2020, the WHO announced that an epidemic of a novel coronavirus (COVID-19) was a public health emergency of international concern, and by March 11, 2020, the WHO had proclaimed a global pandemic. This prompted the Indian federal and state governments to implement a nationwide lockdown as a preventative step against the introduction of the novel coronavirus known as COVID-19. This unexpected event has had a significant impact on healthcare all throughout the world. Managing blood supplies to meet demand, finding donors who are healthy and not at risk for contracting COVID-19, and protecting blood donors and blood center employees all become enormously difficult because of this. Even in the absence of a pandemic, the general population of India lacks the desire and willingness to donate blood due to widespread doubts about the safety of blood donation and the possibility of transmitting an infection through transfusions [32].

In addition, frequent voluntary blood donors were hindered because of the movement restrictions set out to contain the illness spread. Transfusion centers in India are adapting their donor recruiting, selection, and inventory management policies in accordance with the National Blood Transfusion Council's (NBTC) directives as the pandemic develops. We designed this study to evaluate our blood center's transfusion services throughout the COVID-19 pandemic, from donor recruiting to blood supply management, and to report on the preventative steps used to ensure a steady blood supply throughout the outbreak [33].

In hospitals, transfusions of blood and blood components are commonplace. Supply and demand, economics, and evidence-based medical practice with

more restricted transfusion guidelines have all contributed to a rise in the need for blood utilization control in transfusion medicine. Healthcare providers in Saudi Arabia must justify the use of blood products acquired from healthy, unpaid volunteers. When blood is ordered in excess, time and reagents are wasted, and the blood bank has more work to do at a higher cost. Identifying main areas of concern in blood component utilization necessitates continuous monitoring of blood consumption and auditing of transfusion operations [34].

Due to the time required for the crossmatching of blood products, the unit of blood that has been designated for a certain patient is unavailable for transfusion for the subsequent 48 to 72 hours. A decrease in the likelihood of its being used because of its delayed availability increases the likelihood that it will expire prematurely. Blood and blood components utilisation is measured in a variety of ways. The crossmatch-to-transfusion (C/T) ratio is currently a generally recognised metric of blood bank use. It was first introduced in 1975 by Boral and Henry. Transfusion probability percent (T%) and transfusion index are two other indices (TI). A high TI suggests that crossmatching the corresponding number of units is appropriate for the average number of units utilized per patient. The Maximum Surgical Blood Order Schedule (MSBOS) was developed by Friedman *et al.,* in 1975 to limit the preoperative cross matching of blood product units for patients undergoing elective surgery. The goal of the MSBOS is to improve the accuracy of comparing the number of cross matched units of blood for a given procedure with the actual number of units transfused to the patient. Each hospital will adjust it based on its own procedures and knowledge [35].

Few studies have been conducted in Saudi Arabia on the topic of blood bank utilization, and those that have are limited in both sample size and duration of follow-up. Over-ordering of blood products and cancellation of more than 60% of transfusions were found in a study of blood bank utilization at our facility between 1996 and 2000. This resulted in a C/T ratio that was higher than the worldwide standard of less than 2. Before 1999, it was common practice to transfuse blood for "liberal" reasons, such as when the patient's hemoglobin level was below 10 gm/dL but the doctor thought it should be higher. The randomized controlled trial by Hébert *et al.,* published in 1999 changed this view by showing that a "restrictive" strategy is just as effective if it is correlated to the clinical presentation. Standard of care has since shifted, but the first study was conducted at our institution before the shift. In this time period, our transfusion committees developed and updated policies and procedures in accordance with the recommendations of the Association for the Advancement of Blood and Biotherapies (AABB). The clinical departments were educated on a regular basis to ensure the new standards were being followed. In 2012, it was accredited by the College of American Pathologists, and in 2015, it was accredited by Joint Commission International. The hospital's adherence to the highest standards of care was validated by its international accreditations. In light of this, we conducted an in-depth audit and review of the blood bank's policies and procedures, and then analyzed their effect on the utilization of blood products. Our hospital's current transfusion policy is based on the most recent (2016) AABB guidelines revisions [36].

Twenty years after the original study, we wanted to see how well our blood bank auditing had held up and how often patients were receiving transfusions. We looked at the C/T ratio, the T%, and the TI across the hospital, as well as in each individual specialty. The impact of the 2019 coronavirus disease (COVID-19) pandemic on our blood bank was also assessed. We hoped our research would pave the way for positive change at our hospital [37].

In the field of medicine, and especially in the case of an emergency, blood donation has been established as a reliable and successful method of saving lives. Infectious diseases spread by blood transfusions pose a threat to public health on a yearly basis (TTI). This has increased; especially among high-risk groups such pregnant women and children with Malaria, hemorrhage, or pregnancy anemia. At least 92 million units of blood are collected from at least 164 countries per year, according to the World Health Organization's Global database. There was no way to detect HIV, HBV, HCV, or syphilis in blood donors in 41 low-income countries. Only 47% of blood donors were tested in developed nations. At least 13 million potential blood donors were turned away because they had a transfusion-transmitted infection (TTI) such as HIV, HBV, HCV, or syphilis, or because they had a preexisting medical condition or anemia [38].

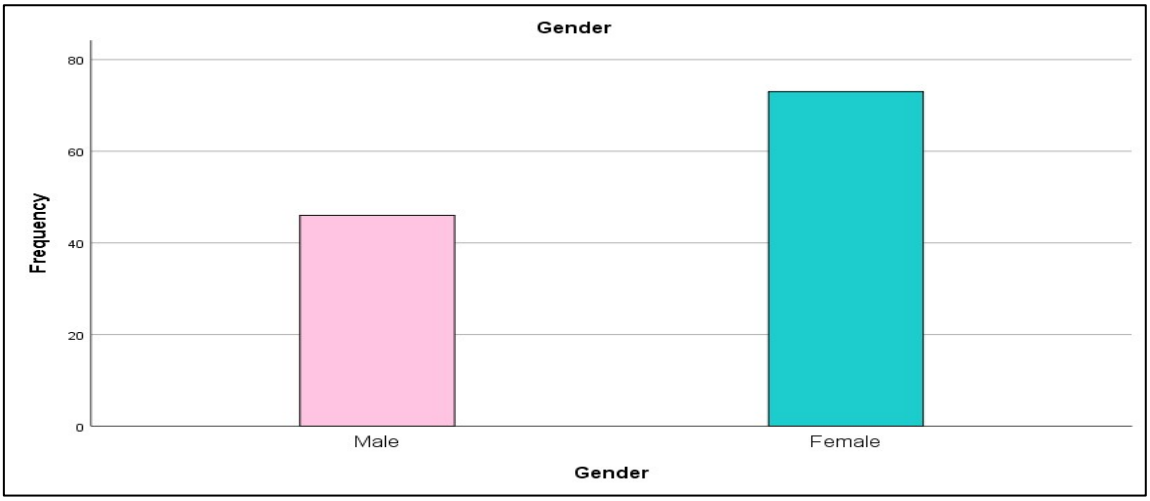
Historically, the Middle East has included regions of North Africa and Southwest Asia, but this is no longer clear-cut. The Eastern Mediterranean Regional Office is one of WHO's six regional offices and serves 22 Member States with a total population of 605 million. A World Health Organization report found that many countries lacked enough availability to safe blood for transfusions. Only in Iran and Turkey do hospitals receive all of their blood supply from unpaid donors. There was no unified, consistently available, or well managed blood transfusion service in Iran in the 1940s. In the nearly four decades prior to the 1970s, commercial organizations and professional blood donors were the primary sources of blood supply. The Iranian Blood Transfusion Organization was founded in 1947 to standardize blood donation and transfusion procedures across the country. There was a lag in the growth of equivalent services in other Middle Eastern nations [39].

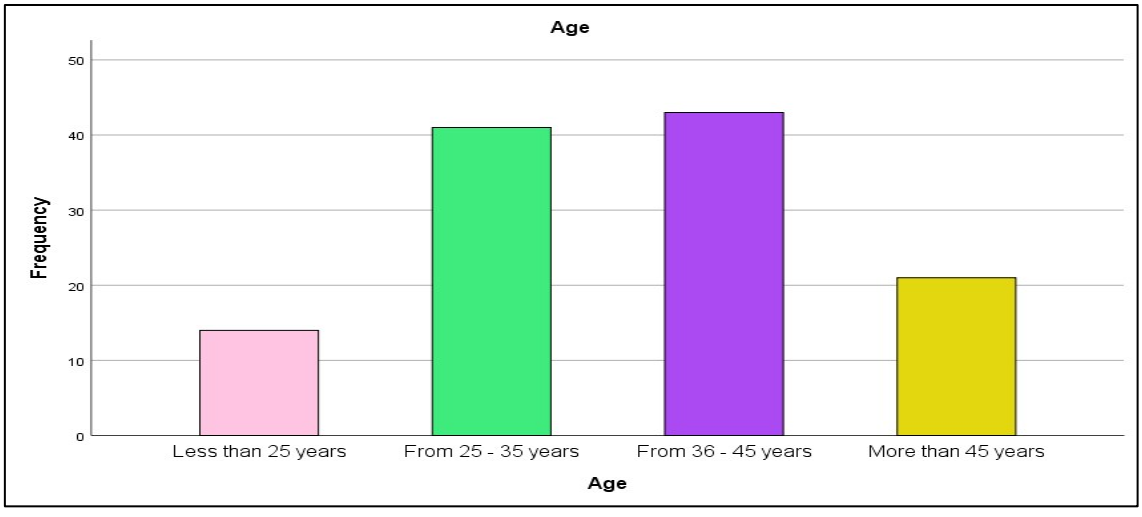
RESULTS

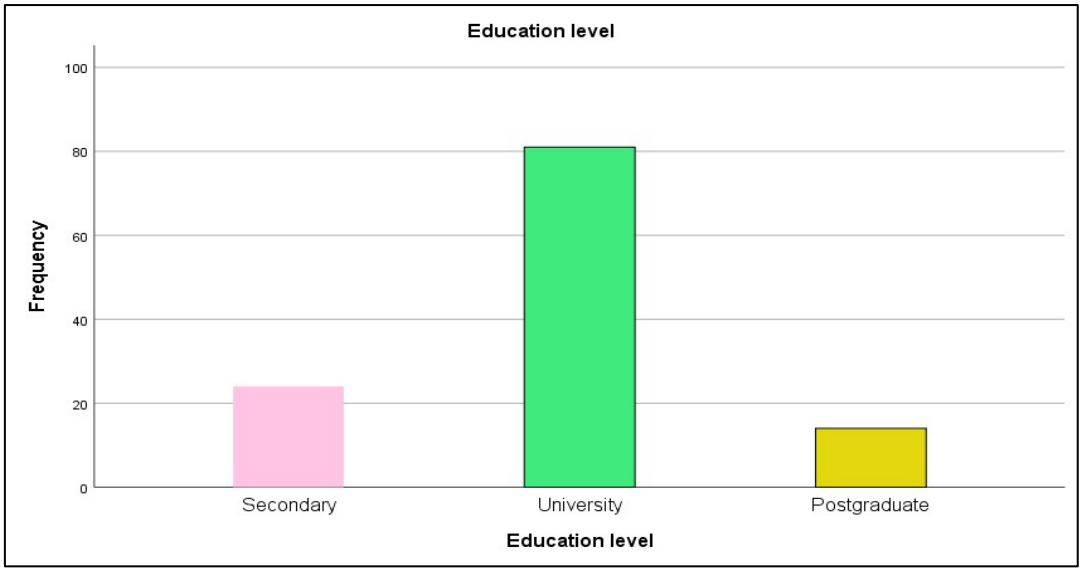
Table 1: Basic data

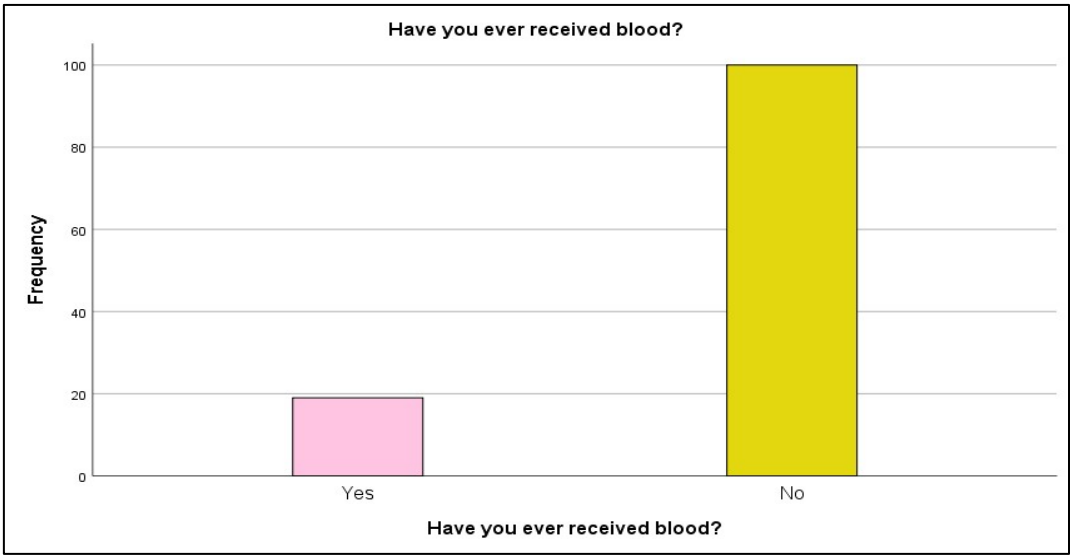
Variables	Categories	N	%
Gender	Male	46	38.7
	Female	73	61.3
Age	Less than 25 years	14	11.8
	From 25 - 35 years	41	34.5
	From 36 - 45 years	43	36.1
	More than 45 years	21	17.6
Education level	Secondary	24	20.2
	University	81	68.1
	Postgraduate	14	11.8
Have you ever received blood?	Yes	19	16
	No	100	84
Have you ever donated blood?	Yes	46	38.7
	No	73	61.3
Do you have viral hepatitis	Yes	1	0.8
	No	118	99.2

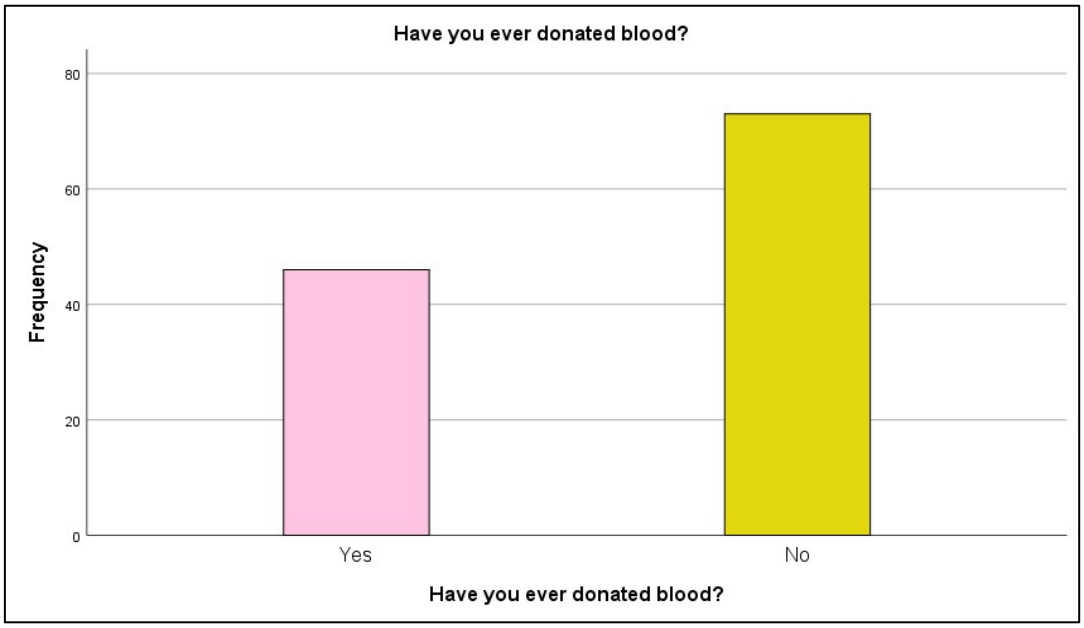
The result showed the participants were 119, most of them 61.3% were female, 38.7% male, 36.1% aged from 36 – 45 years, 34.5% from 25 – 35 years, 17.6% more than 45 years, 11.8% less than 25 years, 68.1% have university education, 20.2% secondary education, 11.8% postgraduate, the majority 84% haven't received blood, only 16% have received, the most of them 61.3% haven't donated blood, and 38.7% have donated, the majority 99.2% don't had viral hepatitis, and 0.8% have.






Education level
Frequency
100
80
60
40
20
0
Secondary
University
Postgraduate
Education level


Have you ever received blood?
Frequency
100
80
60
40
20
0
Yes
No
Have you ever received blood?


Have you ever donated blood?
Frequency
80
60
40
20
0
Yes
No
Have you ever donated blood?

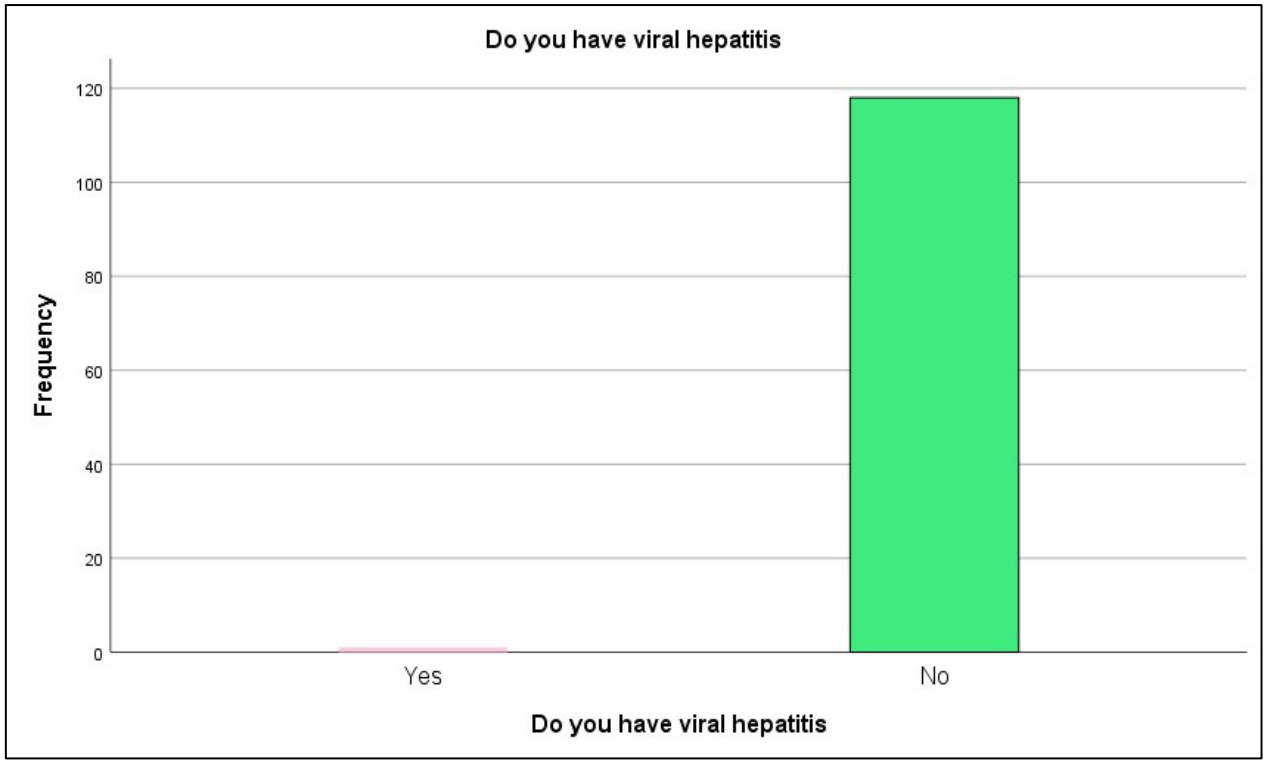


Table 2: reliability

No	Domains	No. items	Cronbach's Alpha
	The risk perception of blood transfusion scale	10	0.895

The results showed the Cronbach's Alpha was 0.895 for the questionnaire, which mean that the tool of the study (questionnaire) have high reliability.

Table 3: response to the risk perception of blood transfusion scale

No	Item	1	2	3	4	5	6	7	Mean%	SD
1	How risky is receiving a blood transfusion	28	6	13	25	16	8	23	56.1	2.1
		23.5%	5.0%	10.9%	21.0%	13.4%	6.7%	19.3%		
2	If you were to receive a blood transfusion, how worried would you be about the risk	27	4	9	22	22	10	25	59.4	2.2
		22.7%	3.4%	7.6%	18.5%	18.5%	8.4%	21.0%		
3	Is this a risk that you dread, on a gut level	36	8	9	21	19	7	19	52	2.2
		30.3%	6.7%	7.6%	17.6%	16.0%	5.9%	16.0%		
4	To what degree does blood transfusion provide important benefits	24	6	8	14	12	9	46	66.3	2.4
		20.2%	5.0%	6.7%	11.8%	10.1%	7.6%	38.7%		
5	To what extent are the risks of blood transfusion known to people who received blood transfusion	22	9	14	28	15	9	22	57.3	2.1
		18.5%	7.6%	11.8%	23.5%	12.6%	7.6%	18.5%		
6	To what extent are the risks of blood transfusion understood by scientists	20	8	7	11	9	16	48	69.4	2.3
		16.8%	6.7%	5.9%	9.2%	7.6%	13.4%	40.3%		
7	If a blood transfusion leads to illness or disease, how likely are the consequences to fatal	18	4	10	26	19	20	22	63.6	2.0
		15.1%	3.4%	8.4%	21.8%	16.0%	16.8%	18.5%		
8	To what extent is receiving a blood transfusion voluntary	23	6	9	32	23	9	17	57.4	2.0
		19.3%	5.0%	7.6%	26.9%	19.3%	7.6%	14.3%		
9	How much control does an average person have over the risk	28	9	19	31	15	8	9	49.6	1.8
		23.5%	7.6%	16.0%	26.1%	12.6%	6.7%	7.6%		
10	To what extent are future generations threatened by this risk	19	7	15	31	20	10	17	57.7	1.9
		16.0%	5.9%	12.6%	26.1%	16.8%	8.4%	14.3%		
	Mean score								**58.9**	**15.1**

The results showed the mean score percentage of the risk perception of blood transfusion was 58.9%, the more extreme item was (To what extent are the risks of blood transfusion understood by scientists) with mean 69.4%, followed by (To what degree does blood transfusion provide important benefits) with mean 66.3%, followed by (If a blood transfusion leads to illness or disease, how likely are the consequences to fatal) with mean 63.6%, followed by (If you were to receive a blood transfusion, how worried would you be about the risk) with mean 59.4%, followed by (To what extent are future generations threatened by this risk) with mean 57.7%, followed by (To what extent is receiving a blood transfusion voluntary) with mean 57.4%, followed by (To what extent are the risks of blood transfusion known to people who received blood transfusion) with mean 57.3%, followed by (How risky is receiving a blood transfusion) with mean 56.1%, followed by (Is this a risk that you dread, on a gut level) with mean 52%, followed by (How much control does an average person have over the risk) with mean 49.6%.

Table 4: the factor associated with the risk perception of blood transfusion

Variables	Categories	Mean	Test	Statisti cs	Pvalue
Gender	Male	41.28	Independent Samples Test	0.042	0.967
	Female	41.16			
Age	Less than 25 years	43.07	ANOVA	0.335	0.8
	From 25 - 35 years	39.34			
	From 36 - 55 years	42			
	More than 45 years	42			
Education level	Secondary	37.08	ANOVA	3.063	0.051
	University	41.02			
	Postgraduate	49.36			
Have you ever received blood?	Yes	33.16	Independent Samples Test	-2.605	0.01
	No	42.74			
Have you ever donated blood?	Yes	40.15	Independent Samples Test	-0.601	0.549
	No	41.88			
Do you have viral hepatitis	Yes	10	Independent Samples Test	-2.113	0.037
	No	41.47			

The results showed there is a significant difference in the risk perception of the blood transfusion due to receiving blood (t = -2.605, p-value =0.01) where who haven't ever received blood had more risk perception of blood transfusion, and due to viral hepatitis infection (t = -2.113, p-value =0.037), where who didn't have viral hepatitis had more risk perception of blood transfusion, but there is no a significant difference in the risk perception of the blood transfusion due to gender, age, educational level, and blood donation.

The results showed there was only 16% have ever received blood, and 38.7% have ever donated, the majority don't have viral hepatitis, the mean score percentage of the risk perception of blood transfusion was 58.9%, and there is a significant difference in the risk perception of the blood transfusion due to receiving blood where who haven't ever received blood had more risk perception of blood transfusion, and due to viral hepatitis infection, where who didn't have viral hepatitis had more risk perception of blood transfusion, but there is no a significant difference in the risk perception of the blood transfusion due to gender, age, educational level, and blood donation.

CONCLUSION

Transfusion-transmitted viral infections across eastern Saudi Arabia could be greatly reduced with the implementation of strict donor pre-screening and preventative measures to control infections in the general population, as well as the introduction of new, more sensitive screening tests.

The public at large may be overly optimistic if they think that completely safe blood products can be produced today. As new pathogens emerge or as the epidemiological pattern of existing pathogens shifts, so too may the threat have posed by infectious agents entering the blood supply. However, the goal of a safe and affordable blood supply that can meet the growing global demands may be reached through the coordinated optimization of each step in the transfusion chain, such as the careful consideration of donor eligibility criteria, the observance of rigorous rules during donation, processing, and storage, the optimal implementation of available screening tests, the use of suitable pathogen inactivation methods, and finally the vigilance of prudent physicians. While hospitals and clinics work hard to provide safe blood products, doctors who give transfusions also have a responsibility to report any negative effects their patients may have experienced as a result. Thus, national haemovigilance systems that are part of an international network are

becoming crucial to ensuring the quality and safety of blood products. To that end, we must simultaneously advance and put into practice highly sensitive yet cost-effective detection and inactivation strategies.

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