



## Noninfectious Complications of Blood Transfusion in the South of Kerman Province: A 4-Year Retrospective Study

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### Abstract

**Background:** Although today, transfusion therapy has turned from a hazardous condition to a relatively safe method with the improvement of technology, the highest risk for the patient is a complication of blood transfusions. This study aimed to evaluate the prevalence and pattern of transfusion-related adverse events.

**Materials and Methods:** This study is a retrospective review which examined data of all those who received blood transfusions at Kashani and Imam Khomeini hospitals of the south of Kerman province from 2014 to 2018 years.

**Results:** Of the total 16081 blood transfusions, 148 (0.92%) cases of blood complications were observed. Most cases occurred in males aged 31-40 and over 50 years, O blood group, injection packed red blood cell (PRBC) product, and within 20-60 minutes. Most of the transfusion-related complications were related to the surgery ward and in patients without underlying disease, and most complications included fever and chills.

**Conclusion:** The results of our study showed that the highest transfusion-related complications were fever and chills. Therefore, fever and chills in the early hours of transfusion should be considered as the most common transfusion-related complications.

**Keywords:** Transfusion, Reactions, Complication, Blood

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### Introduction

Injection of blood products is an essential component of emergency medicine practice (1). Transfusion of blood is often needed to improve the patient's clinical condition. Blood transfusion is a therapy modality that has definite potential benefits and risks which alternate among patients (2, 3). An adverse reaction is an unwanted response or consequence in a patient, temporally correlated with the administration of blood or blood products (4). Today, transfusion therapy has turned from a hazardous condition to a relatively safe method with the improvement of technology (2, 5, 6). However, the highest risk for the patient is the complication of blood transfusions, which can be divided into acute (occurring within 24 hours) and delayed cases (occurring after 24 hours) (7-9). Cases of acute reactions resulting from blood transfusions include hemolytic transfusion reaction (immune and nonimmune), allergic reactions (e.g., anaphylaxis), transfusion-related severe lung injury, sepsis, transfusion-associated circulatory overload, complications of massive transfusion, febrile

non-hemolytic transfusion reaction, and air embolism (2, 10). Furthermore, cases of delayed reactions include transfusion-associated sepsis and infection transmission as well as transfusion-associated graft-versus-host disease with such symptoms as maculopapular rash, fever, elevated liver enzymes, hepatomegaly, jaundice, and gastrointestinal (2). This study aimed to evaluate the prevalence of acute complications of blood transfusion in patients admitted to Imam Khomeini and Kashani hospitals of Jiroft in the south of Kerman province in Iran. The study also strived to identify and reduce severe complications of blood transfusions in hospitalized patients and to inform health care personnel.

### Materials and Methods

This study is a retrospective review examining data of all those who received blood transfusions at Kashani and Imam Khomeini hospitals in Jiroft from 2014 to 2018 using the information in their case file.

A total of 16081 of blood transfusions were evaluated based on age, sex, blood group, inpatient ward,

underlying disease, type of blood product, history of blood transfusion, clinical signs and symptoms, and cause of the need for blood transfusion.

**Results**

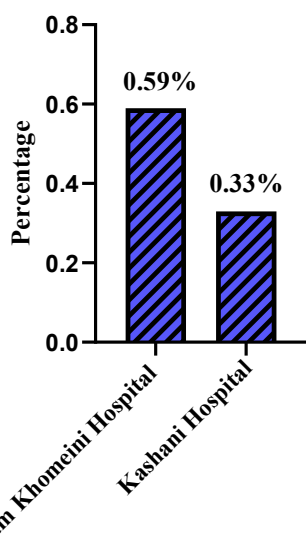
As depicted in Figure 1, of the total 16081 blood transfusions performed during 2014-2018, 148 (0.92) cases of blood complications were observed, of which 95 (0.59) cases belonged to Imam Khomeini Hospital and 53 (0.33) cases to Kashani hospital.

In terms of gender, blood transfusion complications appeared in 46 females and 49 males at Imam Khomeini hospital and in all females at Kashani hospital. Regarding age group, the majority of cases were in Kashani hospital between the ages 31-40, while in Imam Khomeini hospital, the majority were over 50 years. In terms of blood group, the majority of cases had O blood type in both hospitals. The history of blood transfusion in Kashani and Imam Khomeini hospitals were 26.4% and 40%, respectively. According to the type of transfused blood product, most cases were packed red blood cell (PRBC) in both Imam Khomeini and Kashani hospitals, and most cases happened within 20-60 minutes after transfusion (Table 1).

As Table 2 illustrates, the most complications occurred in surgery wards in both hospitals.

In terms of underlying diseases in both hospitals, most cases were those with no underlying disease (Table 3).

According to Figures 2 and 3, the most common complications after blood transfusion in Imam Khomeini hospital were fever and chills (55.8%), itching and rash (20%), chest, abdominal, and back pain (18%), and other cases (55.8%). Likewise, the most common complications after blood transfusion in Kashani hospital were fever and chills (49.1%), shortness of breath (18.9%), hives (17%), and other cases (47.2%).



**Figure 1.** Frequency of Blood Transfusion Complications in Imam Khomeini and Kashani Hospitals.

**Table 1.** Details of Complications of Blood Transfusion in Imam Khomeini and Kashani Hospitals

		Imam Khomeini Hospital	Kashani Hospital
Genus	Male	49	0
	Female	46	53
Age	<20	12	1
	20-30	24	19
	31-40	10	21
	41-50	7	12
	>50	42	0
Blood group	O	56	28
	A	19	12
	B	19	9
	AB	1	4
History of blood transfusion	Positive	38	14
	Negative	57	39
Type of blood transfusion product	PRBC	80	48
	FFP	12	2
	Platelet	1	1
	PRBC and FFP	2	2
Time to the complication of blood transfusion	<20 Minutes	22	14
	20-60	26	20
	60-180	24	8
	>180 Minutes	23	11

Note. PRBC: Packed red blood cell; FFP: Fresh frozen plasma.

**Table 2.** Frequency of Complications After Transfusion Based on the Inpatient Ward

Hospital	Ward	Frequency	(%Total (
Imam Khomeini	Internal	21	95 (64.19%)
	Surgery	28	
	Orthopedic	8	
	ICU	8	
	Emergency	19	
	Other wards	11	
Kashani	Maternity	5	53 (35.81%)
	Surgery	34	
	Postpartum	3	
	Midwifery	11	

**Table 3.** Frequency of Complications After Transfusion Based on the Underlying Disease

Hospital	Imam Khomeini	Kashani
Underlying Disease		
Anemia	5	0
Heart-Pulmonary	8	0
Immuno-deficiency	4	0
Allergies	3	0
Hepatic-Kidney	2	0
Cancer	3	0
Other cases	7	0
More than one case	1	0
No underlying disease	62	53

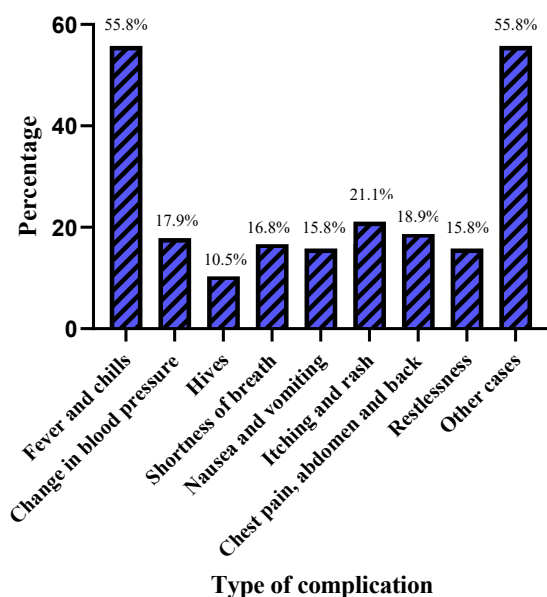


Figure 2. Frequency of Complications After Transfusion in Imam Khomeini Hospital.

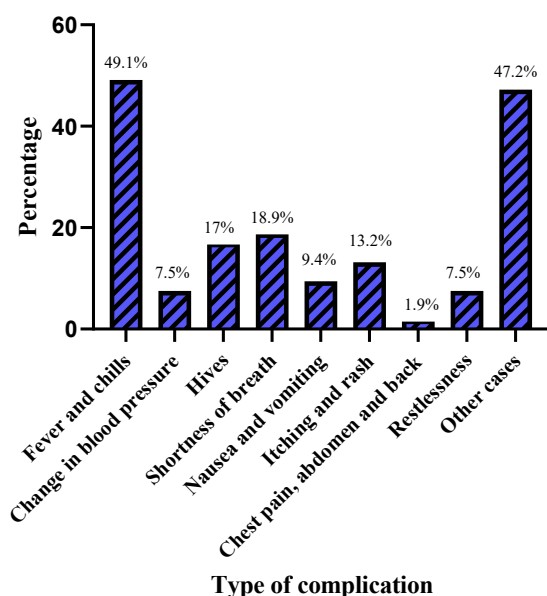


Figure 3. Frequency of Complications After Transfusion in Kashani Hospital.

## Discussion

Adverse transfusion reactions are inevitable risks of blood transfusion. Any undesirable transfusion-dependent event happening in the patient within or after the transfusion of blood and blood components is known as adverse transfusion reaction (11, 12). A blood transfusion reaction can be classified based on the time interval between the injection of blood products and the occurrence of adverse reactions as acute (i.e., those that appear during or within 24 hours) and as delayed (i.e., those that occur at any time after 24 hours) (13). Furthermore, transfusion reactions can be based on the pathophysiology further categorized as immune and non-immune or infectious and non-infectious (14). Knowledge of different types of blood transfusion reactions will aid not only in the early

recognition and management but also in taking enough measures to prevent similar cases (15, 16). This study was conducted to evaluate the transfusion reaction reported in Imam Khomeini and Kashani hospitals during 2014-2018 years.

In this study, out of a total of 16081 blood transfusions, 148 (0.92%) cases had post-transfusion complications, which is similar to studies by Bodaghkhan et al (17), Moore et al (18), Lichtiger and Perry-Thornton (19), Robillard et al (20), Sharma et al (21), and other studies reported by Bhattacharya et al (22) and Chavan et al (23).

Totally, risks for acute hemolytic reactions were reported in various studies from 0.02 to 0.07 per 1000 red cell units transfused (18-20). In the present study, this frequency was 0.31%, which is similar to other studies.

The present study indicated that most complications of blood transfusion occurred in people over the age of 50, which is similar to the study by Waqar et al (24), females which is similar to studies by Gotekar and Khade (25) and Amiri et al (26), and the O blood group which is similar to study Asgharniya et al (27). In their study, Asgharniya et al (27) and Gotekar and Khade (25) reported the most complications of blood transfusion in people under 50, which is different from the present study.

Moreover, 82.19% of transfusion reactions occurred with PRBC transfusion, which is similar to the study conducted by Sharma et al (21), Gotekar and Khade (25), Ramanathan et al (30), and Bhattacharya et al (22) in India, Kaleemi et al (28) in Pakistan, and Khalid et al (29) in Saudi Arabia. The results of the present study are also consistent with different studies reported by Agnihotri et al with 42.62% transfusion reactions (31), Chavan et al with 42.22% transfusion reactions (23), and Akhter et al with 26.09% transfusion reactions (9).

In this study, the highest rates of post-transfusion reactions were related to fever and chills (55.8%), which is close to studies by Kumar et al (8), Philip et al (13), Ramanathan et al (30), Asgharniya et al (27), and different studies by Bassi et al (32), Kumar et al (16), and Lubart et al (33) in terms of the frequency percentage. However, the results of studies by Chavan et al (23), Borhany et al (34), Khoyumthem et al (1), Sidhu et al (35), Amiri et al (26), Sharma et al (21), and Hasan et al (36) were different from results obtained in the present study, and the highest post-transfusion complications were related to allergic reactions.

The limitation of this study is the lack of correct registration or ambiguity of the complications reported in some cases, which led to the exclusion of these cases from the study.

## Conclusion

The results of this study demonstrated that the highest complications after blood transfusion are related to males, aged 31-40 or over 50 years old, O blood group,

and transfusion of the PRBC product. Time for the complication of blood transfusion was between 20 and 60 minutes, and fever and chills were the most common complication. Therefore, it is important that medical staff pay attention to fever and chills in the early hours as the most common complication after blood transfusion.

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#### Authors' Contribution

NS designed the study, and JA wrote the manuscript. RMK analyzed and interpreted the data. ASD and AB performed the technical revision of the manuscript. All authors read and approved the final manuscript.

#### Conflict of Interests Disclosure

There is no conflict of interests.

#### Ethical Statement

The current study was approved by the Ethics Committee of Jiroft University of Medical Sciences, Jiroft, Iran (IR.JMU.REC.1397.047).

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#### Informed Consent

Not applicable.

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