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Original article

## Evaluating the effect of tariff on wastage and return of blood products in Kerman province

*Évaluation de l'effet des taxes sur le gaspillage et le retour de produits sanguins dans la province de Kerman*

H. Anani<sup>a</sup>, I. Baluchi<sup>a</sup>, M. Ghazizadeh<sup>b</sup>, H. Mardani Valandani<sup>c</sup>, R. Mirzaee Khalilabadi<sup>a,b,\*</sup>

<sup>a</sup> Faculty of Allied Medical Sciences, Kerman University of Medical Sciences, Kerman, Iran

<sup>b</sup> Blood Transfusion Research Center, High Institute for Research and Education in Transfusion Medicine, Tehran, Iran

<sup>c</sup> Department of Hematology and Blood Banking, Faculty of Allied Medicine, Iran University of Medical Sciences, Tehran, Iran

### Abstract

**Background.** – In Iran blood products had been available to health care centers on free order to reduce the wastage they were tariffed in 2016. Thus, health care centers must pay for the blood products and take back the payment from the insurance. The aim of this study was to examine the effects of the tariff on consumption, wastage and return rates of blood products in health care centers in Kerman province.

**Materials and methods.** – In this retrospective cross-sectional study, demand, delivery and return rates of blood products (fresh frozen plasma, red blood cell and platelet) were examined in 23 health care centers and hospitals before and after the tariff.

**Results.** – After the tariff in 2016, the return of unused units of fresh frozen plasma and platelet to the blood transfusion organization was increased and the increase was not statistically significant, but a significant increase was observed in red blood cell return rate and return/delivery ratio.

**Conclusion.** – Fresh frozen plasma and platelet return rates increased after the tariff resulting in less wastage of unused products but were not statistically meaningful. Tariff was highly effective on the wastage and return of red blood cell therefore it can be considered as a sparing action in the management of red blood cell.

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**Keywords:** Tariff; Blood product; Wastage; Return

### Résumé

En Iran, des produits sanguins avaient été mis gratuitement à la disposition des centres de santé. Afin de réduire le gaspillage, ils ont été taxés en 2016. Ainsi, les centres de santé doivent payer pour les produits sanguins et récupérer la prime versée par l'assurance. Le but de cette étude était d'examiner les effets des taxes appliquées sur la consommation, le gaspillage et le taux de retour des produits sanguins dans les centres de santé de la province de Kerman.

**Matériaux et méthodes.** – Dans cette étude transversale rétrospective, la demande, la livraison et le taux de retour de produits sanguins (plasma frais congelé, globules rouges et plaquettes) ont été examinés dans 23 centres de santé et hôpitaux avant et après la taxation.

**Résultats.** – Après l'application des taxes en 2016, le retour des unités non utilisées de plasma frais surgelé et de plaquettes servant à la transfusion sanguine ont augmenté. Cette augmentation n'était pas statistiquement significative, mais nous avons observé une augmentation du taux de retour des globules rouges et du ratio livraison/retour.

**Conclusion.** – Le nombre de retours de plasma frais congelé et de plaquettes a augmenté après la taxation ce qui a conduit à moins de gaspillage de produits inutilisés, mais cela n'a pas été statistiquement significatif. La taxation s'est avérée très efficace sur le gaspillage et le retour de globules rouges. Cette disposition a donc été bénéfique dans la gestion des globules rouges.

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**Mots clés :** Taxation ; Produit sanguin ; Gaspillage ; Retour

\* Corresponding author. Provincial General Department Blood Transfusion, 7616859979 Kerman, Iran.  
E-mail address: [khalilabadi60@gmail.com](mailto:khalilabadi60@gmail.com) (R. Mirzaee Khalilabadi).

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## 1. Introduction

Blood management has been described as an appropriate use of blood and blood components by the means of minimizing their use. World health organization has recently recognized patient blood management as a means for promoting the availability of transfusion alternatives [1]. Excessive blood reserve is one of the most common problems in hospitals [2].

Understanding the costs associated with blood products is increasingly attracting the attention of administrative health care sectors globally. To boost the outcomes, blood usage must be optimized and consequently expenditures must be controlled. Costs of blood products continue to drive upward because of the application of a precautionary principle to reduce the transfusion related risks and shrinking donor availability [3]. Over the past 20 years, efforts in blood transfusion have focused on safety and clear patient benefits. Although these efforts must be continued, now there is also a need to develop a plan to ensure whether the blood supply is adequate for the aging population [4].

Transfusion of blood products is undertaken for varying purposes, including preservation of intravascular volume, improvement of oxygen delivery, correction of coagulopathies and improvement of overall homeostasis.

One of much discussed public health issues is the appropriate use of blood products because of aging of the population, increase in demand for blood products and costs of transfusion therapy. Blood products are finite and careful clinical discrimination must be undertaken to ensure optimum allocation and limit the wastage [5].

Healthcare providers are vigilant that every effort must be made to reduce the wastage of this precious resource [6]. High blood consumption in surgical ward can be due to excessive reserve of blood, not having an efficient national strategy for blood reserving, failure in cool chain management outside the hospital blood bank (During transportation of blood units between the blood bank and hospitals or in operating rooms) and impossibility to return the unused blood to the blood bank [7]. Non transfused ordered blood components are very high in Zahedan teaching hospitals, Therefore regional strategies must be implemented to cut down on the request of blood and its components [8].

In Iran blood products had been available to healthcare centers and hospitals free of charge, in the name of health care reform; they were tarified in 2016 in order for efficient consumption and reducing the wastage. Although health care centers and hospitals must pay for the blood products, but the insurance goes under the expenditures and give them back to health care centers. The aim of the present study was to evaluate the effects of tariff on the request, delivery and return rates of blood products in health care centers and hospitals in Kerman province.

## 2. Materials and methods

In this retrospective cross-sectional study, 23 health care centers and hospitals in Kerman province were included.

By visiting the Blood Transfusion Organization of Kerman province, the request, delivery, and return of the blood products in the first half of 2015 and the first half of 2016 were compared.

Return rate refers to the number of blood units that are not used in hospitals and/or healthcare centers and return to the National Iranian blood service before being expired, so that the National Iranian blood service may send them to other hospitals and/or healthcare centers based on their demands.

All participating centers were governmental hospital based healthcare centers. Blood transfusion services are included in these centers, and patients are undergoing transfusion free of charge. The National Iranian blood service provides each center with blood product as their demands.

Statistical analysis was performed using SPSS 16 software. Paired sample *t*-test was used to compare the groups.  $P < 0.05$  was considered statistically significant.

## 3. Results

### 3.1. Fresh frozen plasma

FFP (Fresh Frozen Plasma) request, delivery and return rates of health care centers in Kerman province are presented in Table 1. As shown in Fig. 1a, FFP return rate was increased after the tariff in 2016 ( $P = 0.28$ ) but was not statistically significant; furthermore, according to Fig. 1b, FFP return/delivery ratio was also increased after the tariff ( $P = 0.37$ ), which shows that more unused FFP units were returned to the Iranian Blood Transfusion Organization. It was not also statistically meaningful. FFP request (Fig. 1c) has been slightly increased in 2016 but was not statistically meaningful ( $P = 0.89$ ). FFP delivery rates are demonstrated in Fig. 1d. An unexpected decrease was observed in the FFP delivery rate in 2016 ( $P = 0.056$ ).

### 3.2. Red blood cell

RBC (red blood cell) request, delivery and return rates of health care centers in Kerman province are presented in Table 1. RBC return rate ( $P = 0.013$ ) as well as return/delivery ratio ( $P = 0.0057$ ) was increased after the tariff and their increase was highly significant (Fig. 2a and b respectively). As shown in Fig. 2c and Fig. 2d, RBC request ( $P = 0.061$ ) and delivery rates ( $P = 0.47$ ) were increased after the tariff, but they were not statistically meaningful ( $P > 0.05$ ).

### 3.3. Platelet

Platelet request, delivery and return rates of health care centers in Kerman province are presented in Table 1. As shown in Fig. 3a, platelet return rate ( $P = 0.07$ ) was increased after the tariff; additionally platelet return/delivery ratio ( $P = 0.37$ ) was also increased after the tariff, but none of them was statistically meaningful. Platelet request ( $P = 0.21$ ) and delivery ( $P = 0.24$ )

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