Analysis of the effect of the application of the precision training model in the promotion of blood donation during public health emergencies

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Abstract. This study aimed to explore the impact of precision training on the promotion of blood donation during public health emergencies. The research focused on blood donation volunteers at the Wuwei Central Blood Station from 2018 to 2021. The data from 2018-2019 represented the period before precision training, while the data from 2020-2021 represented the period after precision training. The study observed the number of non-remunerated blood donations and group non-remunerated blood donations in the Wuwei Central Blood Station from 2013 to 2021. The success rate of blood donations, group blood donations, "turning back" of non-remunerated blood donations, and knowledge rate of non-remunerated blood donations were compared before and after precision training. The results showed that the actual values of blood donations were higher than the predicted values, indicating a positive influence of precision training. The success rate and group blood donation rate increased significantly after precision training. The rate of "returning" blood donation also increased significantly. Additionally, the knowledge rate of non-remunerated blood donation among different age groups increased significantly after precision training. In conclusion, precision training has a positive impact on blood donation during public health emergencies and can help alleviate blood shortage crises.

Keywords: Precision training, public health emergencies, awareness model, blood donation.

1. Introduction

Blood collection and supply during an emergency public health event is an important guarantee for patients' lives [1]. In order to improve the blood collection plan for emergency emergencies, the author's blood station implements target population precision training activities during public health emergencies, conducts precision training for potential blood donation volunteers, accurately screens blood donors with appointments, and promotes the knowledge of preventing and controlling public health emergencies and providing blood donation services for the local people [2]. This paper discusses the application effect of the precision training model in the publicity of non-remunerated blood donation during public health emergencies, and is reported as follows.

2. Data and Methods

Selected blood donation volunteers of Wuwei central blood station from 2013-2021

As the research object, the data of 2018-2019 was taken as the data group before precision training, and the data of 2020-2021 was taken as the data group after the application of precision training, and statistics were carried out with the Crossing Blood Station Management System Software[3-4].

METHODS: In response to public health emergencies, Wuwei Central Blood Station implemented the precise training propaganda model in 2020-2021. ①Precise propaganda team. To set up a relatively professional and stable precision training and propaganda team, based on the blood station experts, screen the backbone of blood transfusion related professionals and technicians, and form an excellent propaganda and training faculty team. Accurate training is carried out in the whole process of publicity, mobilization, recruitment and service. The content of the preaching is accurate. The newly-formed team of lecturers is trained by experts, and at the same time, the staff involved in

the whole process of recruiting, collecting, testing, processing, storing and supplying of non-remunerated blood donations are trained, with the focus on the World Health Organization's recommended textbook, "Safe Blood and Blood Products", and proficiency in blood transfusion industry regulations and standards, such as the Law of the People's Republic of China on Blood Donation, Law on the Prevention and Control of Infectious Diseases and the Technical Specifications for Clinical Blood Transfusion. Regulations and standards. Unify ideas, work objectives and propaganda contents through training. Different preaching materials and courseware are prepared for different groups of people. (iii) Accurate service targets. Changing the previous mode of random publicity in the streets and large-scale irrigation, accurately locating the target group, implementing the knowledge of proclaiming and training on non-remunerated blood donation into the institutions, schools, communities and rural areas, and giving full play to the advantageous role of the social public welfare of non-remunerated blood donation during the recruitment process, and using easy-to-understand forms of language to enhance the practicality. ④ The way of preaching is precise. Change the working habit of sitting and waiting for blood donors to the mode of leading door-to-door service, cultivate potential volunteers, set up publicity and consulting service points, and take the initiative to go door-to-door to preach, so as to bring the sense of distance between the service recipients closer; make use of the service recipients' free time to provide convenience for the masses; take the initiative to jointly carry out publicity and lecture-based voluntary service activities with medical institutions; and set up volunteer service for unreimbursed blood donation at the fixed and mobile blood collection points. Points. Continuously cultivate and train blood donation service personnel and volunteers, and test and improve the blood collection and supply mechanism[5-6].

Observation indicators: ① Observe the number of unpaid blood donations and the number of group unpaid blood donations in Wuwei Central Blood Station from 2013 to 2021. ② Observe the success rate of blood donation before and after precise training. ③ Observe the group blood donation before and after precision training. ④ Observe the situation of "turning back" of unpaid blood donation before and after the precise training.⑤ Observe the knowledge rate of non-remunerated blood donation before and after the precise training, which was collected and calculated by distributing questionnaires[7-10].

Statistical methods: The data were analyzed by Rx64 4.1.2 statistical software; the count data were expressed as n(%), and the $\chi 2$ test was used; $P < 0.05$ means the difference is statistically significant.

3. Results

The number of unpaid blood donations and the number of group unpaid blood donations at the central blood station of Wuwei City from 2013 to 2021: Table 1 Using the 3-period moving average and damping coefficient 0.3 exponential smoothing as exponential smoothing and moving average analysis, visually reflecting the comparison of the actual value with the predicted value and the trend of change. the trend of the actual value after 2020 has an inflection point and tends to flatten out, which proves that the trend of actual value After 2020, the trend of actual values showed a turning point and leveled off, proving that the trend of actual values was obviously affected by the public health emergencies in early 2020, but the actual values were still higher than the predicted values, indicating that the precision training events had a positive influence. Comparison of the success rate of blood donation before and after precision training: the success rate of blood donation after precision training is higher than that before precision training. success rate is higher than that before precision training, and the difference is statistically significant ($P < 0.05$). See Table 2.

Comparison of group blood donation before and after precision training: the group blood donation rate after precision training was higher than that before precision training, and the difference was statistically significant ($P < 0.05$). The difference is statistically significant ($P < 0.05$). See Table 3.

Comparison of "return" of blood donation before and after precision training: the rate of "return" of blood donation after precision training is higher than that before precision training, and the difference is statistically significant (P＜0.05). See Table 4.

Comparison of the knowledge rate of unpaid blood donation before and after precision training: the knowledge rate of unpaid blood donation among 7-17-year-olds and 18-60-year-olds after precision training was higher than that before precision training, and the difference was statistically significant (P＜0.05). See Table 5.

Table 1. Non-remunerated Blood Donations and Group Non-remunerated Blood Donations at Wuwei Central Blood Station, 2013-2021

Year (years)	Number of blood donations (times)	Number of group blood donations (times)	3-period moving average (times)	Damping factor 0.3 Exponential smoothing (times)
2013	11 902	602	-	-
2014	12 390	670	-	602
2015	11 002	2 577	-	622
2016	12 674	3 748	1 283	1 208
2017	12 252	4 206	2 331	1 970
2018	12 160	5 810	2 510	2 641
2019	11 843	5 824	4 588	3 591
2020	10 948	6 462	5 280	5 824
2021	10 631	6 332	6 032	6 015

Note: 3-period moving average and damping factor 0.3 Exponential smoothing is exponential smoothing and moving average analysis data

Table 2. Comparison of blood donation success rates before and after precision training (n, %)

groups	Number of registrations	Number of blood donations	Number of non-donors	Blood donation success rate
Before Precision Training	73 080	24 003	49 077	32.84
After Precision Training	44 216	21 579	22 637	48.8
$\chi 2$	2 953			
p	<0.05			

Table 3. Comparison of group blood donation before and after precision training

groups	Number of group blood donations (volume of blood donated U)	Number of non-group blood donations (volume of blood donated U)
Before Precision Training	11 634(17 660)	12 369(22 746)
After Precision Training	12 794(18 142)	8 785(15 360)
$\chi 2$	534.61	534.61
p	＜0.05	＜0.05

Table 4. Comparison of blood donation "turnaround" before and after precision training (n, %)

groups	Number of blood donations	Number of "turnarounds"	Number of "no turnarounds"	"Return" rate (%)
Before Precision Training	24 003	6 262	17 741	26.09
After Precision Training	21 579	8 205	20 297	38.02
$\chi 2$	47.55			
p	<0.05			

Table 5. Comparison of knowledge of blood donation before and after precision training (n, %)

0	7-17 year olds			18～60year olds		
	know	unknown	awareness rate	know	unknown	awareness rate
Before Precision Training	2 638	1 362	65.95	3 358	638	83.95
After Precision Training	3 846	154	83.65	3 762	238	94.05
$\chi 2$	1 187.6			205.57		
p	<0.05			<0.05		

4. Discussion

In recent years, public health emergencies have shown a trend of normalization, which has caused a certain degree of impact on the work of gratuitous blood donation [3]. Non-remunerated blood donation is an effective way to cut off infectious diseases transmitted through blood, and through precise training, non-remunerated blood donors are guided to carry out "universal vaccination + effective physical protection" based on the basic principles of infectious disease prevention and control, which plays a positive role in guaranteeing clinical blood supply [4].

The results of this study show that the implementation of an accurate training and publicity model for unpaid blood donation can achieve the goal of increasing the public's expectation of participating in unpaid blood donation, effectively promoting the prevention and control of public health emergencies in local communities, improving the rate of knowledge about unpaid blood donation, deepening the level of awareness of volunteers, effectively increasing the success rate of unpaid blood donation, and solidly expanding the team of unpaid blood donors. By targeting the knowledge that unpaid blood donors expect to acquire or lack, the implementation of health education can be more effective, increase the "return" rate of the unpaid blood donation team, and hopefully make more first-time donors become regular donors [5]. The impact of public health emergencies has challenged the supply of blood for clinical use around the world, resulting in a decline in blood collection and a shortage of blood for clinical use, which has affected the expected effectiveness of the blood donation campaign, and the trend is consistent with the local predictions. The success rate of blood donation has been significantly improved through precise training to equip volunteers with certain knowledge of blood donation and to make appropriate preparations before donating blood. Although the overall number of blood donations did not increase compared with previous years, the number of donations and the volume of blood collected by organized groups increased relatively after receiving precise training, and the proactive door-to-door service was different from the waiting window service. Through the precision training, the "return" rate of blood donation was higher than that before the precision training, and the enthusiasm of volunteers who participated in >2 blood donations was mobilized. Volunteers who have participated in >2 blood donations have been mobilized, and their presentations are more inspiring. Comparison of the knowledge rates of different age groups about blood donation shows that the knowledge rates of the school-age group aged 7-17 years old and the group aged 18-60 years old who are suitable to donate blood have both increased, indicating that the

degree of cognition determines the acceptance and efficiency of action in blood donation, which is of great significance for the in-depth popularization of the knowledge of blood donation in the future.

In summary, public health emergencies have an impact on the work of non-remunerated blood donation, but the implementation of precise training can effectively recruit and retain group non-remunerated blood donors, which is a proven method of non-remunerated blood donation publicity and recruitment, and has far-reaching significance for coping with and alleviating the pressure of supply and demand caused by blood as a scarce medical resource.

5. Conclusion

Based on the information provided, it can be concluded that public health emergencies have had an impact on the work of non-remunerated blood donation. However, the implementation of accurate training and publicity models for unpaid blood donation has proven to be effective in increasing public participation in unpaid blood donation. This has resulted in several positive outcomes, including the promotion of prevention and control of public health emergencies, improvement in knowledge and awareness of unpaid blood donation, increased success rate of unpaid blood donation, and expansion of the team of unpaid blood donors.

The study also revealed that the impact of public health emergencies on blood supply has led to a decline in blood collection and a shortage of blood for clinical use. However, precise training and preparation of volunteers have significantly improved the success rate of blood donation. While the overall number of blood donations did not increase compared to previous years, the number of donations and the volume of blood collected by organized groups increased after receiving precise training.

Furthermore, the precision training has resulted in a higher "return" rate of blood donation and increased enthusiasm among volunteers who have participated in multiple blood donations. The knowledge rates about blood donation have also increased among different age groups, indicating that the level of knowledge plays a crucial role in the acceptance and efficiency of blood donation actions.

In conclusion, public health emergencies have impacted non-remunerated blood donation, but the implementation of precise training has proven to be an effective method in recruiting and retaining unpaid blood donors. This approach is significant in coping with and alleviating the pressure on the supply and demand of blood, which is a scarce medical resource.

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