

Construction of Incentive System for Automatic External Defibrillator in South Sichuan and Relevant Suggestions

Taishan Yang^{1*}, Chongyang Ma²

¹*School of Economics and Management, Southwest Petroleum University, Chengdu, 610500*

²*Law School of Southwest Medical University, Luzhou, 646000*

Abstract: Objective: To investigate the current incentive system of automatic external defibrillator (AED) in southern Sichuan and the public's attitude towards incentive measures, to understand the incentive situation, and to put forward suggestions and measures for the optimization and improvement of incentive mechanism. Methods: A self-designed questionnaire was used to investigate the people in Luzhou and Zigong, and the Red Cross Society and health committee in the investigated areas were interviewed. Results: A total of 768 people were surveyed, only 8.59% of them knew the incentive system of automatic defibrillator in their region, 77.99% of them thought that rescue workers who used automatic external defibrillator in public places should be rewarded. Conclusion: Strengthen the construction of legal system and implement the system guarantee; Expand the reward range and diversify the reward measures; Guide multi-party co-construction, increase AED delivery, and reasonably standardize AED; Expanding AED training and improving training quality; Step up publicity efforts to improve public awareness.

Keywords: Emergency Medical Treatment; Automatic External Defibrillator; incentive

1. INTRODUCTION

Out-of-hospital cardiac arrest is a worldwide public health problem, and the launch of public defibrillation program has a significant effect on improving the survival rate of out-of-hospital cardiac arrest patients [1]. However, for the public, the concept of automatic external defibrillator (AED) is not fully known to most people, and they do not know the operation method of AED and the incentive policy related to AED rescue. Relevant studies also show that the general public is reluctant to use AED mainly because they are not sure how to use AED or are afraid of using AED incorrectly, and they are worried that the object to be rescued may be hurt due to the lack of professional knowledge of AED, and they are worried about the legal consequences. As a result, the situation of people lacking first-aid training and unwilling to save or afraid to save has become a normal situation [2]. This paper puts forward specific optimization measures according to the problems existing in the construction of AED incentive system, in order to provide reference suggestions in the construction of AED incentive system.

2.1 SURVEY OBJECTS AND METHODS

2.1.1 Survey Respondents

A questionnaire survey was conducted among 800 residents of Luzhou City and Zigong City who were over 16 years old and had the capacity for civil conduct.

2.1.2 Survey Methods

Through self-designed questionnaire, a total of 800 questionnaires were sent out on site, and 768 valid questionnaires were recovered, with a recovery rate of 96%.

3. RESULTS

3.1 Basic Information

There were 341 people between 25 and 44, accounting for 44.4%, followed by 236 people between 45 and 59 years old, accounting for 30.73%. In terms of education level, there are 217 students with high school education, accounting for

28.26%, followed by bachelor's degree or above, accounting for 25.39%; In terms of occupation, mainly ordinary staff, a total of 206 people, accounting for 26.82%, followed by self-employed households 136 people, accounting for 17.71%.

3.2 AED Cognition

According to the survey, only 91 people (11.85%) understand the operation and use of AED; Among them, 46

people (50.55%) were aged between 25 and 44. The education level mainly concentrated in the undergraduate, a total of 57 people (62.64%); The occupation is mainly concentrated in civil servants/public institutions and students, 25 people (27.47%) and 21 people (23.08%) respectively.

In the survey, government/agency personnel are the occupational group with the most knowledge about the operation and use of AED, followed by students, as shown in Table 1.

Table 1. Cognition of AED operation use

item		AED operation Knowledge (Number /%)	
		understand	incomprehension
sex	male	51 (56.04%)	346 (51.11%)
	female	40 (43.96%)	331 (48.89%)
age	16~24	27 (29.67%)	78 (11.52%)
	25~44	46 (50.55%)	295 (43.57%)
	45~60	15 (16.48%)	221 (32.64%)
	>60	3 (3.30%)	83 (12.26%)
Educational level	Junior high school and below	5 (5.49%)	189 (27.92%)
	Senior high school	7 (7.69%)	210 (31.02%)
	Junior college	22 (24.18%)	140 (20.68%)
	Bachelor degree or above	57 (62.64%)	138 (20.38%)
Current occupation	School student	21 (23.08%)	45 (6.65%)
	Civil servant/public institution personnel	25 (27.47%)	58 (8.57%)
	Self-employed person	4 (4.40%)	132 (19.50%)
	clerk	17 (18.68%)	189 (27.92%)
	freelancer	8 (8.79%)	92 (13.59%)
	Workers in public places	7 (7.69%)	51 (7.53%)
	retiree	2 (2.20%)	61 (9.01%)
	other	7 (7.69%)	49 (7.24%)

3.3 Understanding of the AED Rescue Reward Method

The survey shows that 66 people (8.59%) know about

the AED reward mechanism in their region, and 702 people (91.41%) don't know about it, as shown in Table 2.

Table 2. AED incentive mechanism in the region

item	Number of people		Percentage (%)
	Understand the AED first aid reward system in your area	know	66
unknown		702	91.41

3.4 Public Attitude towards AED Reward Mechanism

According to the survey, 599 people (77.99%) think that the use of AED rescue personnel in public places should be rewarded, 169 people (22.01%) think that it should not be

rewarded; Specifically, the reasons for not giving rewards were mainly that the good social atmosphere should not be measured by rewards, a total of 114 people (67.46%), see Table 3 for details.

Table 3. Attitude of AED rescue incentive mechanism

item		Number of people	Percentage (%)
Should people who perform AED rescue be rewarded	Ought to	599	77.99
	Shouldn't	169	22.01
Reasons why rewards should not be given	Doing good is an obligation	17	10.06
	Doing good deeds is a good social atmosphere	114	67.46
	Doing good deeds is a reward to society	35	20.71
	other	3	1.78

3.5 People's Views on AED Rescue Rewards

According to the survey, 416 people (69.45%) believed that both material and spiritual rewards should be given to those who implement AED. Among the material rewards, 444 people (74.12%) preferred cash rewards; In terms of spiritual rewards,

496 people (82.8%) believe that rewards should be given (such as job promotion, free use of public services or priority use), as shown in Table 4.

Table 4. People's views on AED rescue reward

	content	Number of people	Percentage (%)
Reward type	Material reward + spiritual reward	416	69.45
	Material reward	121	20.20
	Mental reward	55	9.18
	other	7	1.71
Material reward	Cash reward	444	74.12
	Reward in kind	370	61.77
	Free access to government public services	368	61.44
What kind of spiritual reward	Cite or reward with commendation	496	82.80
	Verbal praise	259	43.24
	Honorary title	381	63.61
	other	27	4.51

3.6 Factors Considered By the Public to Be Most Likely to Hinder the Implementation of AED Assistance

The survey results show that among the factors most

likely to hinder AED rescue, 425 people (55.34%) and 615 people (80.08%) think that they are not able to master first aid knowledge and worry about delaying schedule, respectively, as shown in Table 5.

Table 5. Factors that people think are most likely to hinder AED assistance

	content	Number of people	Percentage (%)
What people think are the most likely obstacles to implementing an AED	Delay the schedule	425	55.34
	Fear of legal liability	372	48.43
	Failure to master first aid knowledge	615	80.08
	Afraid of taking on moral opinion	351	45.70
	other	124	16.15

4. DISCUSSION AND SUGGESTIONS

4.1 Discussion

4.1.1 The Absence of Special Exemption Laws and Inadequate Publicity are Important Influencing Factors for Citizens in the Implementation of Assistance

In the survey, 372 people (48.43%) are worried about taking legal risks, which indicates that the exemption of liability for rescue damage is one of the important reasons affecting whether people participate in rescue. The legal system is to provide the most basic protection for the public, and the formulation and implementation of the legal system is to solve the worries of the public when using AED emergency assistance. China's AED-related legal system has always existed at a broader level. In terms of the protection system, although China promulgated the Civil Code in January 2021, Article 184 of which stipulates that "the rescuer shall not bear civil liability if the recipient is harmed due to the voluntary implementation of emergency assistance". Some provinces and cities, such as Sichuan Province, have issued the "Regulations on the Protection and Reward of Heroism in Sichuan Province" since 2000, and Jiangsu Province issued the "Protection and Reward of Heroism in Jiangsu Province" in 2019, but China currently has no relevant laws on first aid exemption at the national level. Only some cities such as Hangzhou have formulated and implemented the "Hangzhou Automatic External Defibrillator Management Measures in Public Places" on January 1, 2021, but due to the lack of special legal provisions and the inadequate publicity of relevant legal provisions, the implementation of the current use of AED is still worrying.

4.1.2 The Disadjustment of Reward Type Seriously Affects the Aid Use Behavior of AED

According to egoism, people make a reasonable judgment about whether to do something or not through their own thinking results; In addition, Harold Koontz defined motivation as a series of forces such as demand, motivation and willingness, so a certain reward can play a positive role in promoting rescue behavior. According to the data, 69.45% of the people are in favor of rewarding AED rescuers, 69.45% of the respondents hope that material rewards and spiritual rewards are combined, and 20.2% hope that there are pure material rewards. According to Maslow's hierarchy of needs theory, people's lowest needs are material needs, and their highest needs are self-actualization needs. Therefore, in the incentive system, material needs can generate the motivation to attract people, and spiritual rewards can enable people to realize their self-value. Most people start to realize their self-value only when their basic needs are satisfied and their motivation can be

basically realized. However, through interviews with the health administration departments, we learned that due to the lack of funding sources, local governments have not set up special funds to reward, and the incentive measures lack material incentives for rescuers, mainly focusing on spiritual rewards, such as the promotion of "good people and good deeds" for non-professionals, and the push of public accounts. For ambulance and other professional personnel, there are excellent selection, China excellent Red Cross Society evaluation and other ways; Among the types of government rewards, the proportion of spiritual rewards is relatively small, which is similar to providing free social public service convenience and obtaining priority right to use social public service. It involves internal communication and cooperation among government functional departments, which may lead to overlapping of functional scopes among government departments, and requires collaboration with other organizations, resulting in heavy workload. Practical implementation is difficult. Although the implementation effect of the reward based on spiritual reward is relatively good, it lacks the incentive effect for the vast majority of ordinary people.

4.1.3 Lack of AED Configuration and Use Training Seriously Restricts the Incentive Effect

In reality, the configuration of AED and the training of AED is a disguised incentive. The objective existence of AED is the basis of the use of AED for first aid. In short, the purpose of incentive is to use AED, and incentive is an indirect promotion factor derived from the existence and use of AED. Increasing the allocation of AED and expanding AED training is a two-way situation in which the result acts on the process in reverse, resulting in a two-way promotion situation. Fan, a scholar in Hong Kong, China, and other surveys found that only 18% of respondents would use AED, and 78% did not know the location of AED near their homes or workplaces, and the awareness and usage rate of AED have been low [3]. In the survey, the proportion of people who can use AED is very low, which leads to the lack of AED training, which seriously hinders people's use of AED for rescue. The survey shows that 88.15% of the respondents do not understand the operation and use of AED. 80.08% of the people believe that their failure to fully master AED rescue skills is the reason for hindering the implementation of AED rescue, so the lack of AED training seriously restricts the incentive effect. At the same time, the lack and unreasonable configuration of AED restricts the use of AED by the public. In China, because there is no mandatory registration of AED, the location of AED is not known to the public [4]. The number of AED in Shanghai is only more than 3000, and about 1000 in Zhejiang Province [5]. The survey results show that only a few places in large and medium-sized cities in China are equipped with AED, and the small number of AED and the low per capita ownership have become the

constraints for people to understand and use AED.

4.1.4 The Lack of Publicity and Popularization of AED Knowledge Seriously Affects the Incentive Effect of AED

From knowing to using, and then to using many times, it is a gradual process from knowing to using AED, and it is also a process of deepening cognition. In this process, cognition plays an important role. Through cognition, people can have a familiar impression of things and thus generate the motivation to use them. In other words, motivation is born from cognition. In addition, publicity and popularization by government departments can greatly stimulate people's interest in understanding AED and stimulate people's sense of social responsibility. However, the survey results show that 88.15% of the respondents do not understand the operation and use of AED, and 91.41% do not understand the incentive mechanism in their own region. The lack of publicity and popularization of AED knowledge is a great obstacle to the implementation of AED assistance, which seriously affects the incentive effect of AED.

4.2 Suggestions

4.2.1 Strengthen the Construction of the Legal System and Implement Institutional Guarantees

Legal system protection is an important reason for people to use AED rescue. On the basis of the exemption of liability for acts of heroism in the existing Civil Code, the local government should issue special local administrative regulations and administrative rules for the use of AED emergency assistance protection according to the actual situation of the place. In addition, conditional units can also incorporate the AED emergency assistance guarantee system into the compilation of the system of enterprises, schools, and other social organizations to become part of their system, that is, it can broaden the public's understanding of the AED exemption situation, increase the depth of the public's subconscious impression of AED, and at the same time, the units to be done are exempt from liability. It will also greatly reduce the own losses caused by the implementation of AED assistance, so that people can reduce the mental burden during AED assistance and promote the development of AED assistance.

4.2.2 Expand the Reward Range and Diversify the Reward Measures

In terms of rewards, the development of diversified material and spiritual incentives should be encouraged. In addition to the spiritual rewards for rescuers, such as character

interviews, deeds publicity, and the evaluation of the spirit of the advanced people, the government should set up special funds for AED incentives, and should not be classified as first-aid funds in general, and should carry out detailed planning of the input and output of funds, and make adaptive rewards according to the needs of the implementer. In addition, rescuers can be provided with free or preferential social public services or preferential access to public services, and additional points can be provided for entering government departments or other institutional units, or certain tax deductions can be given. Meanwhile, each organizational unit can also provide internal rewards in terms of job promotion, title evaluation, and evaluation of excellence. It can be popularized from state-owned enterprises and gradually expand to other social organizations.

4.2.3 Guide Multi-Party Co-Construction, Increase AED Delivery, and Reasonably Standardize AED

Increasing the number of AEDs can create a first-aid atmosphere of mutual aid, which is another extension of the incentive method. AED first aid is of the nature of public welfare. Government departments play a leading and coordinating role in encouraging the early development of AED, and other organizations play a supporting and building role. The government should directly or indirectly increase the input of human, material, financial, information and other resources through various means, and introduce preferential policies to encourage social capital and the public to donate and subsidize AED [6]. At the same time, it is also necessary to strengthen the location and configuration management of AED, do a good job of prominent identification of AED, publish the identification map about the location of AED, and upload the location of AED to the cloud, so that the AED can be realized quickly and conveniently. After that, a sound AED operation system should be built, the use of AED should be reasonably standardized, the whole process of AED from use to return and then to maintenance should be done well, the main body of responsibility in the operation and maintenance stage should be clearly defined, the system operation responsibility should be reasonably assigned to each organizational unit, the responsibility should be strictly assigned to individuals, and a good supervision system should be built. Form a supervision environment with the government health administration department as the main supervision and other organizational departments as the auxiliary supervision, create a first-aid atmosphere to encourage the use of AED, and create a sense of first-aid responsibility.

4.2.4 Expand AED Training and Improve Training Quality

During the training process, it is clear that the main body of the training is social public welfare organizations such as the Red Cross Society, and perfect training procedures are established. The training is conducted through organizations such as the Red Cross Society, and the government health administrative department will organize the assessment and issue a certificate after confirming the qualification. On this basis, the selection of appropriate training places, training time, training methods, training groups, and acceptable assessment methods can greatly improve the quality of AED training. Training can increase people's recognition of AED. At the same time, the training process can make the trained people clear their responsibilities and take the lead when they master the AED rescue skills, radiate from the point and surface to the surrounding area, encourage the surrounding people to participate, and increase the effective power of AED rescue in public places.

4.2.5 Increase Publicity Efforts to Improve Public Awareness

The Opinions of The State Council on the implementation of the Healthy China Action point out that attention is paid to publicity and guidance. Adopt various forms

to strengthen public opinion publicity, timely release policy interpretations, and respond to social concerns. It seems that the author can link with well-known platform figures to expand the publicity of AED knowledge and let more people know about AED; Strengthen the introduction of AED into the society and into the classroom, and carry out the popularization of AED knowledge in schools [7]. Schools can set up AED learning classes, carry out the teaching method combining theory and practice, and give credit rewards according to the assessment, or set up AED popularization activities, and use prizes and practice credits to achieve the purpose of publicity. In communities and villages, AED knowledge lectures are carried out, and different methods are adopted for different groups: the elderly group adopts the means of pushing TV propaganda, site selection and field explanation; Young people mainly rely on wechat and information promotion to establish an "Internet + first-aid platform" to popularize and disseminate first-aid knowledge [8], which enables the government to gain the popularity of AED among the masses in the publicity of AED and provide official incentives. Meanwhile, the government should control the development direction of public opinion and correctly guide the public's attention to the good social atmosphere of mutual aid and treatment. Consider the mental pressure borne by the rescuer, voice the legitimacy of the rescue behavior, and encourage the affirmation of this behavior.

REFERENCES

- [1] Li Menghan, Li Heng et al. Comparison and reference of pre-hospital public emergency mode in foreign countries [J]. Chongqing Medical Journal, 2019,50(04):704-707.
- [2] Qian L N, Chen Y J, Wang J G, et al. Current situation and consideration of automatic external defibrillator configuration in public places in Hangzhou [J]. Clinical and Education in General Practice, 2019,17 (3) : 250-251.
- [3] Luo Ding, Zhang Na, Zheng Yuan, Cheng Pengfei, Chen Lihua, Zhang Hua. Research progress on configuration and implementation of automatic external defibrillator [J]. Chinese Journal of Emergency Medicine, 201,41(02):182-185.
- [4] Fan KL, Leung LP, Poon HT, et al. Public knowledge of how to use an au-tomatic external defibrillator in out - of - hospital cardiac arrest in Hong Kong [J]. Hong Kong Med J, 2016,22 (6) : 582-588.
- [5] Lou Han-song, CAO Gong-hua, Jiang Qingqing, Chen Hua-Sheng, TANG Hai-Ru, Zhang Linghong, Jin Lishan, Lin Jun, Han Yidan, Zhang Yong, Wang Xingfang, Yang Peipei, Jin Sheng-xiang, Ren Riyang, He Lele, Qiu Tian, Cao Wei, Lin Lu, Zhou Yi, Zhan Jiani, Wang Yabing, Zeng Beilei, Zhang Li-dan, Guo Wei. Hangzhou became the first city in China to standardize the allocation and use of AED in public places by local legislation [J]. Hangzhou,2021,(15):28.
- [6] You Shaochun. Research on Social first aid policies and regulations in China [D]. PLA Air Force Military Medical University,2018.
- [7] Pan Chaojun. Development status and future prospect of AED in China [J]. Science Advisory (Education and Research),2020,(12):57.
- [8] JIA Haonan, LI Jingqun, Fang Huiying, Li Yuze, Li Yuanheng, Sun He, Jiao Mingli. Analysis of problems related to the allocation of automatic external defibrillator in public places in China [J]. Medicine and Society,2020,33(01):53-56.