Original Article

Knowledge, attitude, and practice of pre-hospital emergency and their influencing factors among caregivers for older adults: a cross-sectional survey

Conhecimento, atitude e prática de emergência pré-hospitalar e seus fatores de influência entre cuidadores de idosos: pesquisa transversal

Conocimientos, actitudes y prácticas de emergencias prehospitalarias y sus factores de influencia en cuidadores de personas mayores: estudio transversal

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Abstract

Objective: To investigate the status quo and analyze the influencing factors of the knowledge, attitude, and practice of pre-hospital emergency among caregivers for older adults.

Methods: In this cross-sectional study, 133 caregivers for older adults in Guangdong province, China, nursing homes were selected as survey participants from December 2021 to June 2022 via convenience sampling. All participants were administered a general information questionnaire and a Pre-Hospital Emergency Knowledge, Attitude, and Practice Questionnaire. For data analysis, we used descriptive and inferential statistics.

Results: The scores on the knowledge, attitude, and practice dimensions were 24.65 ± 4.49, 24.52 ± 4.34, and 24.05 ± 4.67, respectively. Regression analysis showed that the age, professional skill level, and healthcare education experience of the caregivers were the main influencing factors of their pre-hospital emergency knowledge. Additionally, the presence/absence of direct participation in the pre-hospital emergency of the caregivers was the primary influencing factor of attitude, while education level and employment status were the factors mainly influencing pre-hospital emergency practice.

Conclusion: Caregivers for older adults currently have a low-to-medium level of knowledge, attitude, and practice of pre-hospital emergency. The main factors affecting the implementation of pre-hospital emergency for caregivers in China are their older age, low education levels, temporary employment and imperfect occupational security system.

Resumo

Objetivo: Investigar a situação atual e analisar os fatores influenciadores do conhecimento, atitude e prática de emergência pré-hospitalar entre cuidadores de idosos.

Métodos: Estudo transversal com amostragem por conveniência, conduzido entre dezembro de 2021 e junho de 2022, e seleção de 133 cuidadores de idosos em instituições de longa permanência na província de Guangdong, China, como participantes. Todos receberam um questionário de informações gerais e um questionário de conhecimento, atitude e prática de emergência pré-hospitalar. Na análise dos dados foi utilizada estatística descritiva e inferencial.

Resultados: As pontuações nas dimensões conhecimento, atitude e prática foram 24,65 ± 4,49, 24,52 ± 4,34 e 24,05 ± 4,67, respectivamente. A análise de regressão mostrou que a idade, o nível de habilidade profissional e a experiência em educação em saúde dos cuidadores foram os principais fatores que influenciaram seu conhecimento de emergência pré-hospitalar. A presença/ausência dos cuidadores na participação direta na emergência pré-hospitalar foi o principal fator de influência na atitude, enquanto o nível

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educacional e a situação profissional foram os fatores que influenciaram principalmente a prática na emergência pré-hospitalar.

Conclusão: O atual nível de conhecimento, atitude e prática em emergência pré-hospitalar dos cuidadores de idosos é de baixo a médio. Para os cuidadores chineses, os principais fatores que afetam a implementação da emergência pré-hospitalar são a idade avançada, os baixos níveis de escolaridade, o emprego temporário e as deficiências do sistema de segurança ocupacional.

Resumen

Objetivo: Investigar la situación actual y analizar factores influyentes de los conocimientos, actitudes y prácticas de emergencias prehospitalarias en cuidadores de personas mayores.

Métodos: Estudio transversal con muestreo por conveniencia, llevado a cabo entre diciembre de 2021 y junio de 2022. Se seleccionaron 133 participantes cuidadores de personas mayores de instituciones de larga estadía en la provincia de Guangdong, China. Todos recibieron un cuestionario de información general y un cuestionario de conocimientos, actitudes y prácticas de emergencias prehospitalarias. En el análisis de los datos se utilizó estadística descriptiva e inferencial.

Resultados: El puntaje en la dimensión conocimientos fue 24,65 ± 4,49, en actitudes fue 24,52 ± 4,34 y en prácticas 24,05 ± 4,67. El análisis de regresión demostró que los principales factores que influyeron en los conocimientos de los cuidadores sobre emergencias prehospitalarias fueron la edad, el nivel de habilidad profesional y la experiencia en educación para la salud. La presencia/ausencia de los cuidadores en la participación directa en emergencias prehospitalarias fue el factor principal de influencia en la actitud, mientras que el nivel educativo y la situación profesional fueron los que más influyeron en la práctica de emergencias prehospitalarias.

Conclusión: El nivel actual de conocimientos, actitudes y prácticas en emergencias prehospitalarias de los cuidadores de personas mayores es de bajo a mediano. En los cuidadores chinos, los principales factores que afectan la implementación de emergencias prehospitalarias son la edad avanzada, los bajos niveles de escolaridad, el empleo temporario y las deficiencias del sistema de seguridad laboral.

Introduction

According to its seventh national census data, China is projected to face the challenge of population aging in the next 10 years. Moreover, the census data of the past 10 years showed a 5.44% increase in the population over 60 years, while a 4.6% incline was demonstrated in individuals over 65 years.[1] Population aging is a particularly prominent phenomenon in developing countries and is the most critical medical issue globally.[2] The World Health Organization (WHO) promotes healthy aging via action areas such as providing primary health care and ensuring empowerment of older people through communities.[3] However, the health status of the older population is currently not satisfactory. The prevalence of various chronic diseases increases with increasing age, with 33% of the worldwide aging population having multiple diseases. Furthermore, multiple chronic diseases are present in >50% of older adults over 65 years.[4] Studies have also reported that older adults with multiple chronic diseases have the highest emergency rates.[5]

The growing aging population has intensified the demand for high-quality services in nursing homes. The occupancy rate of nursing homes is 61.5%, indicating the crucial role of nursing homes in care services for the older adults.[6] The incidence of emergencies is also increasing in nursing homes, with only 42% of the nursing homes reporting no emergencies.[7] However, 30%-40% of the caregivers for older adults have no emergency preparation for common emergency event. The high incidence of emergency events in nursing homes also poses occupational safety challenges to caregivers. Therefore, nursing homes should improve the pre-hospital emergency warning and management abilities of the caregivers to ensure the safety of the older adults.[8]

Pre-hospital emergency refers to the rescue process from the injury onset of the patients to their arrival at the hospital for medical treatment. Rapid and effective pre-hospital emergency care can reduce the disability and mortality rates and improve the quality of life of patients.[9,10] The demand for pre-hospital emergency is further amplified by the aging population and the escalation of chronic diseases. The pre-hospital emergency of medical auxiliary staff should satisfy the needs of the currently changing social population to free more medical resources for patients with life-threatening conditions.[11] Appropriate pre-hospital emergency administered by the caregivers may fulfill the requirements of the older adults, improve their dignity of life, and reduce their hospital admission rate.[12]

In 2019, the National Occupational Skills Standards for Caregivers (2019 edition) was pro-

mulgated and implemented.[13] This standard clarified the emergency general knowledge and skills that caregivers should possess. However, the current pre-hospital emergency ability of caregivers for older adults is lacking. Most caregivers are focused on basic life nursing. This gap in their skills increases the safety risk of the older adults.[14] The knowledge, attitude, and practice (KAP) model interprets human behavior change as three continuous processes: acquiring knowledge, generating appropriate or positive attitudes, and forming practice. Moreover, knowledge is the foundation, followed by attitude as the motivation and practice as the goal. Among them, attitude is the critical component, an individual's attitude in a particular field will be altered as they accumulate related knowledge.[15] Therefore, this study aimed to investigate the status of pre-hospital emergency among caregivers for older adults. Furthermore, we hoped to explore the mechanism underlying the pre-hospital emergency behavior of caregivers based on the KAP model and provide theoretical and data support for the future development of training courses.

Methods

From December 2021 to June 2022, this cross-sectional, used convenience sampling to select 133 caregivers for older adults in nursing homes in Guangdong Province. The subjects inclusion criteria were as follows: (1) on-the-job caregivers for older individuals, (2) informed consent and voluntary participation, (3) ability to cooperate to complete the questionnaire, and (4) good cognitive, communication, and expression skills. The subjects were excluded if they met any of the following exclusion criteria: (1) nursing home volunteers or (2) managers of pension institutions.

According to the sample size estimation method proposed by Kendall,[16] the sample size should be at least 5 -10 times the number of variables. Considering that the questionnaire employed in this study had 10 predictive influence variables, 50–100 caregivers for older adults were required to be investigated. Additionally, the sample size was increased by 10%, i.e., 55-110 participants, to address invalid questionnaires. Ultimately, 133 caregivers for older adults were analyzed.

The researchers designed a general information questionnaire comprising 10 items, including age, gender, education level, professional skill level, etc. Based on the framework of KAP theory, with referenced to the "the National Occupational Skills Standards for Caregivers (2019 edition)" and related literatures to construct item pool. A total of 5 experts participated in the expert consultation, the positive coefficient of experts were 100%, the authority coefficient of experts were 0.860. In the two rounds of expert consultation and pre-investigation in a small scale, the items and language expressions of the questionnaire were determined, the mean value of the importance score of items was above 4.0, the variation coefficient was below 0.25.

The questionnaire consisted of three sections. First, the pre-hospital emergency knowledge section included 34 multiple-choice questions. Each correct answer scored 1 point, whereas the wrong answer was given 0 points. The total questionnaire score was 34 points, with a higher score indicating higher pre-hospital emergency knowledge of the caregivers for older adults. Second, the pre-hospital emergency attitude section encompassed six items. This section used a Likert 5-point scoring method, in which "completely agree" was 5 points; "agree," 4 points; "not sure," 3 points; "disagree," 2 points; and "completely disagree," 1 point. The total score amounted to 30 points. Higher scores in this section implied a more positive attitude of the caregivers for older adults towards pre-hospital emergency. Finally, in the third pre-hospital emergency practice section, seven items were assessed using the Likert 5-point grading scale. In this grading system, "completely do" was given 5 points; "most do," 4 points; "about half do," 3 points; "occasionally do," 2 points; and "can't do at all," 1 point. The total score of this section was 35 points. Similar to the previous sections, a higher score here indicated higher pre-hospital emergency practice of the caregivers for older adults. Moreover, the KAP score of pre-hospital emergency among the caregivers for older adults was divided into excellent, medium, and bad cate-

gories. The total scores of questionnaire and each dimension total score categorized into excellent (more than 85% of the total score), medium (60% to 85% of the total score) and bad (less than 60% of the total score).[17] The Cronbach's α values of the three dimensions in the Pre-Hospital Emergency Knowledge, Attitude, and Practice Questionnaire for Caregivers were 0.727, 0.862, and 0.751, respectively, whereas the Cronbach's α value of the questionnaire was 0.896. Lastly, the content validity index of the questionnaire (S-CVI) was 0.980.

Participant data were collected using network platform. Before the survey, the data collectors explained the survey purpose and the requirements for completing the questionnaire to the respondents. The participants then provided informed consent and filled in the questionnaire anonymously. The questionnaire was immediately checked by the researchers after completion and retrieved after confirming that no items were missing. Overall, 133 valid questionnaires were obtained in this study.

All statistical analyses were performed using SPSS 25.0 software. Continuous variables were presented as mean and standard deviation (mean ± *SD*), whereas categorical variables were expressed as frequency (percentages). The Kolmogorov–Smirnov test was employed to test the normality of the data distribution. The independent sample *t*-test and variance analysis were applied to examine the differences between the personal and professional characteristics of the caregivers KAP of pre-hospital emergency. Correlation analysis based on Pearson's coefficient (*r*) was conducted to determine the direction and strength of Knowledge, Attitude, and Practice. Finally, multiple linear regression was utilized to identify the significant predictors of the outcome variables and their strengths. The significance level was 5%.

Results

Among the 133 caregivers for older adults, 52 (39.1%) were 41–50 years. Additionally, the caregivers comprised 112 (84.2%) females. A total of 48 (31.1%) caregivers had an education level of junior high school. In terms of professional skills, 56 (42. 1%) caregivers was junior workers. Lastly, 36 (27.1%) caregivers were temporary workers.

Among the 133 caregivers, 89 (66.9%) had experience in emergency for the older adults, wherein cardiac arrest and fracture were the most frequent emergencies. A total of 83 (62.4%) caregivers had directly participated in pre-hospital emergency for the older adults. The most commonly encountered emergencies by them were fractures, aspiration, and food poisoning. Additionally, most (29 [22.48%]) caregivers wanted to gain pre-hospital emergency knowledge for choking, followed by that for fracture, diabetes, and hypoglycemia. Finally, 72 (55.81%) caregivers obtained pre-hospital emergency knowledge primarily through nursing home.

The KAP scores of pre-hospital emergency among the caregivers for older adults are shown in table 1.

Table 1. Score and rank distribution of the KAP scores of pre-hospital emergency among the caregivers for older adults

Variables	Mean ± SD	Scoring rate (%)	Rank		
			Excellent	Medium	Bad
Knowledge	24.65 ± 4.49	72.5	26(19.6)	77(57.8)	30(22.6)
Attitude	24.52 ± 4.34	81.73	62(46.6)	56(42.1)	15(11.3)
Practice	24.05 ± 4.67	68.71	9(6.8)	100(75.2)	24(18)
Total score	73.22 ± 12.44	73.96	19(14.5)	91(68.2)	23(17.3)

Univariate analysis showed that the KAP of pre-hospital emergency among caregivers for older adults significantly differed with age, education level, occupational skill level, employment status, and the presence/absence of pre-hospital emergency training experience, healthcare education experience, experience in emergency for the older adults, and direct participation in pre-hospital emergency for the older adults ($P < 0.001$) (Table 2).

Positive correlations were observed between pre-hospital emergency knowledge and attitude ($r = 0.762$, $P < 0.01$), attitude and practice ($r = 0.761$, $P < 0.01$), and knowledge and practice ($r = 0.799$, $P < 0.01$) of the caregivers for older adults. The results indicated that the higher the level of pre-hospital emergency knowledge of the caregivers for older adults, the better their pre-hospital

Table 2. Results of the univariate analysis of the caregivers' basic characteristics and their KAP scores of pre-hospital emergency (mean ± *SD*)

Items		Frequency	Knowledge	Attitude	Practice
Age (years)	≤30	13	28.08 ± 1.55	27.08 ± 2.33	26.92 ± 1.44
	31–40	41	27.54 ± 2.13	26.98 ± 2.39	25.95 ± 3.49
	41–50	52	24.06 ± 3.42	23.90 ± 4.09	24.00 ± 4.03
	≥51	27	19.74 ± 5.16	20.74 ± 4.78	19.89 ± 5.57
	F		33.366	18.190	14.466
	P		<0.001	<0.001	<0.001
Gender	Male	21	25.43 ± 4.24	24.76 ± 4.45	24.38 ± 4.20
	Female	112	24.50 ± 4.54	24.47 ± 4.33	23.99 ± 4.76
	t		0.869	0.279	0.350
	P		0.387	0.781	0.727
Education level	Primary school or lower	14	18.86 ± 5.08	19.86 ± 4.31	17.79 ± 5.28
	Junior high school	48	22.88 ± 4.12	23.04 ± 4.42	22.21 ± 3.70
	Senior middle school	30	25.63 ± 2.80	25.50 ± 3.68	25.37 ± 3.15
	Junior college	23	26.96 ± 2.18	26.26 ± 2.42	26.26 ± 2.65
	Undergraduate	18	29.28 ± 1.49	28.22 ± 1.63	28.83 ± 2.83
	F		24.628	13.983	26.027
	P		0.001	0.001	0.001
Place of origin	Country	109	24.48 ± 4.74	24.27 ± 4.58	23.84 ± 4.91
	Town	19	25.68 ± 3.06	25.63 ± 2.97	25.32 ± 3.45
	City	5	24.40 ± 3.51	25.80 ± 1.92	23.80 ± 2.39
	F		0.589	1.030	0.810
	p		0.557	0.360	0.447
Professional skill level	No	34	18.56 ± 3.84	19.24 ± 4.10	18.18 ± 3.70
	Grade 5/Junior worker	56	25.18 ± 1.42	25.84 ± 2.76	25.45 ± 2.77
	Grade 4/Middle rank	6	28.33 ± 0.52	26.33 ± 2.73	25.00 ± 3.29
	Grade 2/Technician	22	28.91 ± 1.27	27.55 ± 1.82	28.41 ± 2.89
	Grade 1/Senior technician	15	28.73 ± 1.28	26.40 ± 2.35	25.40 ± 1.64
	F		98.134	36.443	48.657
	P		0.001	0.001	0.001
Employment status	Temporary employment	36	19.36 ± 4.56	19.94 ± 4.45	18.97 ± 4.57
	Fixed employment	97	26.61 ± 2.41	26.22 ± 2.81	25.94 ± 3.01
	t		−11.864	−9.665	−10.218
	P		0.001	0.001	0.001
Pre-hospital emergency training experience	Yes	101	26.70 ± 2.20	26.31 ± 2.56	25.95 ± 2.96
	No	32	18.16 ± 3.61	18.88 ± 3.96	18.06 ± 3.87
	t		16.189	12.425	12.065
	P		0.001	0.001	0.001
Healthcare education experience	Yes	104	26.55 ± 2.39	26.16 ± 2.78	25.71 ± 3.37
	No	29	17.83 ± 3.54	18.62 ± 3.76	18.10 ± 3.73
	t		15.520	11.912	10.499
	P		0.001	0.001	0.001
Experience in emergency for the older adults	Yes	89	26.90 ± 2.15	26.51 ± 2.44	26.22 ± 2.86
	No	44	20.09 ± 4.55	20.50 ± 4.56	19.66 ± 4.53
	t		9.420	8.179	8.781
	P		0.001	0.001	0.001
Directly participated in pre-hospital emergency for the older adults	Yes	83	26.98 ± 2.19	26.60 ± 2.39	26.05 ± 3.06
	No	50	20.78 ± 4.68	21.06 ± 4.64	20.74 ± 5.01
	t		10.351	9.081	7.601
	P		0.001	0.001	0.001

emergency attitude and practice. Multiple linear regression analysis demonstrated that age, professional skill level, and medical care education experience were the primary influencing factors of the pre-hospital emergency knowledge of the caregivers for older adults, while the presence/absence of direct participation in the pre-hospital emergency of the older adults was the major influencing factor of pre-hospital emergency attitude. Additionally, education level and employment status were the key influencing factors of pre-hospital emergency practice (Table 3).

Table 3. Results of the linear regression analysis of the KAP scores of pre-hospital emergency among the caregivers for older adults

Dependent variable	Independent variable	B	SE	β	t	P	95% CI		VIF
							Lower	Upper	
Knowledge	Constant	30.765	2.221		13.850	<0.001	26.369	35.162	
	Age	–0.709	0.256	–0.143	–2.770	0.006	–1.216	–0.202	1.813
	Professional skill level	0.797	0.150	0.311	5.304	<0.001	0.500	1.095	2.348
	Healthcare education experience	–3.542	1.222	–0.327	–2.899	0.004	–5.960	–1.124	8.667
Attitude	Constant	30.872	3.149		9.804	<0.001	24.639	37.104	
	Directly participated in pre-hospital emergency for the older adults	–1.570	0.746	–0.176	–2.103	0.038	–3.047	–0.092	2.216
Practice	Constant	21.443	3.229		6.641	<0.001	15.052	27.834	
	Education level	1.470	0.317	0.385	4.635	<0.001	0.842	2.098	2.400
	Employment status	2.082	0.967	0.199	2.153	0.033	0.168	3.996	2.975

Knowledge, $R^2 = 0.818$, adjusted $R^2 = 0.806$, $F = 69.713$, $P < 0.001$. Attitude, $R^2 = 0.680$, adjusted $R^2 = 0.582$, $F = 24.019$, $P < 0.001$. Practice, $R^2 = 0.644$, adjusted $R^2 = 0.621$, $F = 28.010$, $P < 0.001$

Discussion

Currently, the number of caregivers for older adults with high education and professional skills is insufficient. Furthermore, the work of caregivers mainly involves simple life care; thus, the professional level of pre-hospital emergency needs improvement. Our study results showed that only 19.6% pre-hospital emergency caregivers of knowledge had "excellent", indicating a low level of pre-hospital emergency knowledge among the caregivers for older adults. Additionally, only 33.1% of the caregivers were aware of the postural treatment for older adults with epilepsy. The other items with low scores consisted of the assessment duration of vital signs during cardiopulmonary resuscitation and the cooling treatment for the older adults with heat stroke. These low scores may be attributed to the lack of pre-hospital emergency training, the single method for pre-hospital emergency training and the slow update of pre-hospital emergency knowledge.[18] Nursing homes can use modern network technology to conduct teaching, increase the number of class hours by combining online and offline training methods, and promptly update the pre-hospital emergency knowledge of the caregivers. Additionally, government departments can utilize joint medical colleges and universities to provide more professional and scientific training, thereby improving the professional level of pre-hospital emergency among caregivers.[19,20]

This survey demonstrated that the caregivers had the lowest confidence in the success of out-of-hospital rescue of the older adults with cardiac arrest. Furthermore, only 33.9% of the caregivers reported that they could implement cardiopulmonary resuscitation for the older adults, consistent with the results of Smith et al.[21] This finding could be because cardiopulmonary resuscitation is a high-risk procedure in the older adults due to many related complications. Therefore, the attitude of caregivers may not be positive, which results in a low possibility of cardiopulmonary resuscitation that eventually affects the prognosis of the older adults with cardiac and respiratory arrest. Nevertheless, team cooperation during pre-hospital emergency can improve the rescue efficacy. Hence, nursing homes should establish pre-hospital emergency teams, optimize the pre-hospital emergency process, encourage caregivers to share their successful experience, maximize the occupational functions of caregivers with different occupational skills level, and enhance the confidence of caregivers for older adults in the effectiveness of pre-hospital emergency.[22] Currently, the implementation of pre-hospital emergency by caregivers is low, and they primarily cooperate with medical staff. However, the attitude of caregivers towards gaining pre-hospital emergency knowledge is remarkably positive, with 78.2% willing to actively acquire essential pre-hospital emergency knowledge. A positive attitude is the basis for obtaining pre-hospital emergency knowledge. Moreover, a thorough knowledge is essential for performing professional pre-hospital emergency. Therefore, all relevant departments should strengthen the standardized and systematic training of the pre-hospital emergency knowledge of caregivers to meet

their learning needs, ultimately facilitating the effective implementation of pre-hospital emergency by caregivers.[23,24]

Our study results demonstrated that age was a major influencing factor of the pre-hospital emergency knowledge of the caregivers, with the increasing age of the caregivers associated with lower pre-hospital emergency knowledge scores. This age-related effect may be due to the memory decline and heavy daily care work, leading to reduced energy for acquiring knowledge. Nevertheless, caregivers should constantly consolidate their pre-hospital emergency knowledge and regularly learn new relevant information. Moreover, the nursing homes should attract young people to engage in older adults care using "school-enterprise cooperation" systems, adjust the work hours and intensity of new and experienced caregivers, rationally allocate human resources, and improve the overall knowledge level of caregivers.[25] Occupational skill level was another primary influencing factor of the pre-hospital emergency knowledge of the caregivers. The caregivers with high occupational skill levels exhibited greater pre-hospital emergency knowledge. Caregivers are professional care for the older adults, and this occupation integrates comprehensive nursing with physiological and pathological considerations as well as cultural emotions. Therefore, extensive training to enhance the professional standards and personal values of caregivers will in turn improve their pre-hospital emergency knowledge level.[26] Lastly, the presence/absence of medical education care experience was another primary influencing factor of the pre-hospital emergency knowledge of the caregivers. Caregivers with medical care education experience, including nurses and health managers, possessed higher levels of pre-hospital emergency knowledge, this finding could be because these caregivers have received training for emergency nursing, and their pre-hospital emergency knowledge for the older adults is also well-developed.[27] Furthermore, laid-off and unemployed individuals in relevant medical institutions are crucial nursing personnel resources for the older population. Such individuals should be encouraged to participate in pre-hospital emergency, thereby saving the training cost and improving the professional level of caregivers for the older adults.

This study further determined that the caregivers who were directly involved in the pre-hospital emergency for the older adults displayed a more positive attitude, corresponding to the results of study in Zhejiang Province.[28] This finding may be because the caregivers who directly implemented pre-hospital emergency previously recognized its value for improving the survival and prognosis of the older adults. Additionally, these caregivers are more familiar with the pre-hospital emergency process, making them more likely to rescue the older adults. Therefore, nursing homes should assign excellent caregivers opportunities to participate in pre-hospital emergency and offer incentives. This strategy will enable caregivers to establish the correct concept of pre-hospital emergency and encourage them to perform pre-hospital emergency within the scope of their service, ultimately improving the success rate of pre-hospital emergency and the quality of life of older adults.[22]

Education level was a primary influencing factor of pre-hospital emergency practice of the caregivers, with higher education level linked with higher levels of pre-hospital emergency practice. This outcome could be because caregivers with a high education level have comprehensive pre-hospital emergency knowledge and skills as well as the capacity to manage emergencies. However, the current demand of caregivers for the older population in China exceeds the supply. Moreover, the educational threshold of caregivers is relatively low, thus affecting their pre-hospital emergency level to some degree.[29] Therefore, government departments should expedite the establishment of pre-hospital emergency specialties in colleges, attract talents with higher education to enroll in pre-hospital emergency, and provide lucrative career development opportunities and better welfare security. Finally, caregivers with fixed employment exhibited higher levels of pre-hospital emergency practice. These temporary caregivers might experience employment instability and low professional identity. Additionally, the social security welfare and occupational legal system are not comprehensive, reducing the likelihood of

temporary caregivers implementing pre-hospital emergency for the older adults.[30,31] Consequently, measures are required to further strengthen the responsibilit quality and vocational education of temporary caregivers. Simultaneously, government departments should protect the legitimate rights and interests of caregivers by providing training bonuses, pension insurance, and other welfare benefits.[32]

Conclusion

In this study, we revealed that the current KAP of pre-hospital emergency among caregivers for older adults is at a low-to-medium level. Training strategies for caregivers should be developed by considering the potential differences in age, professional skill level, and the presence/absence of medical care education experience. Furthermore, methods that may help augment the pre-hospital emergency of caregivers include establishing and amending policies and laws related to caregivers, protecting the rights and interests of caregivers in pre-hospital emergency, and enabling more caregivers to participate in pre-hospital emergency.

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Collaborations

Liu Zhen-ye, Zhou Yu-ying, Lin Wen-xuan and Kuang Yan-ping were involved in the design and interpretation of the analysis, contributed to the writing of the manuscript and read and approved the final manuscript.

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