

# The Importance of Knowing the Basic First Aid Measures During Social Isolation of the Elderly

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## Research article

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# Abstract

**Background:** The vulnerability of the elderly population increases with natural and other disasters. Consequent social isolation affects their health. Health problems, which can lead to emergencies, can be an even greater burden during times of social isolation. Early identification and action in terms of first aid for the most common emergencies that threaten an individual's health or life affect these conditions. We aimed to examine the knowledge of first aid in the most common emergencies that threaten elderly people's health and life among a Slovenian population, focusing on the elderly people's knowledge.

**Methods:** A cross-sectional population-based survey was conducted on 1079 respondents. Data were collected with a structured questionnaire. Statistically significant differences in average ratings among different age groups were determined with one-way ANOVA followed by a post hoc test. Significant differences between the categories of age groups were determined using the  $\chi^2$  square test followed by appropriate post hoc testing for multiple comparisons. By regression analysis (Spearman's rho and Pearson Correlation), we determined the correlations.

**Results:** Our survey results indicated that Slovenes are aware of the importance of first aid knowledge and feel personally responsible for acquiring and developing this knowledge. The most surprising finding of our research is the high level of knowledge of recognising some of the most common conditions that occur in old age and taking action in response to them. Simultaneously, most of the knowledge tested does not depend on the person's age or the time since that person was last educated in first aid. Nevertheless, out of all age groups, those older than 80 stand out. The respondents' general opinion is that the elderly over 80 years of age need less first aid knowledge. Furthermore, their first aid knowledge is also somewhat worse, especially when recognising sudden illness.

**Conclusions:** Older than 80 are the most vulnerable psycho physically and socially, especially in natural and other disasters such as a pandemic. In the same time, their disaster preparedness from a first aid perspective is poor. There is a need to raise awareness and provide guidance on emergency preparedness to older people.

## Background

As the global population ages [1], the percentage of old patients accessing medical care also increases [2]. They face various health problems, which can lead to emergencies such as stroke, hypoglycaemia in people with diabetes, hip injuries due to falls, out-of-hospital cardiac arrest (OHCA), and similar [1, 3]. Due to the increased risk, elderly people are a vulnerable group of the population [4, 1]. Their vulnerability increases with natural and other disasters, leading to higher mortality of the elderly population [5, 6, 7]. After disasters, the elderly face more problems than other age groups [8]. They are more likely to face a variety of health and mobility problems, such as inadequate financial resources, lack of personal transport, and insufficient social networks [9, 10]. After earthquakes, the occurrence of post-traumatic stress disorder is higher among the elderly than among other age groups [8]. In both the societal and the

scientific dialogues surrounding the COVID pandemic, however, older people have been treated as vulnerable, helpless, and in need of society's protection [11]. They are the main target group of most of the policies due to their high risk of presenting complications from COVID-19 [12]. One of the primary protective measures during the pandemic is physical distance. The physical distancing regulations instituted to control COVID-19 have had significant psychosocial consequences [13]. While robust social restrictions (quarantine and social distancing) are necessary to prevent the spread of COVID-19, it is critical to bear in mind that social distancing should not be the same as social disconnection [14, 15]. During the COVID pandemic, social disconnection causes loneliness and social isolation [14], defined as an objective lack of interactions with others or the wider community [15]. However, social isolation among older adults is also a 'serious public health concern' because of their heightened risk of cardiovascular, immune, neurocognitive, and mental health problems [16]. Notably, there is a large body of literature documenting the negative health effects of social isolation [17, 18]. Forced isolation, loneliness, and fear of contracting the disease are tough challenges, especially for frail, elderly people [19, 20, 21, 22]. In contrast, people with adequate social relationships have a greater likelihood of survival compared to those with poor or insufficient social relationships [23]. It has recently been documented that social distancing during COVID-19 pandemic also negatively affects mental and physical health in older people [24]. Health problems, which can lead to emergencies, are greatest burden for the elderly during times of social isolation. Before the pandemic, most cardiac arrest victims were in their late sixties, 85% of them collapse at home, and half are witnessed by a family member or friend who usually is over the age of 55 [25]. Notably, higher numbers of OHCA in 2020, coupled with a reduction in short-term outcomes, were correlated to the COVID-19 pandemic [26, 27, 28, 29, 30]. The lockdown, as well as the spread of COVID-19 among healthcare workers, led to a reduction, and in some cases to the suppression, of home care services (day-care, home care assistance, Alzheimer services) usually provided to frail older people [21]. This situation presents unique problems to healthcare providers and systems [2]. Therefore, in the current situation, promoting self-help and positive coping and reducing isolation appear imperative. Active outreach seems a necessity, especially for older adults [31].

In times of social isolation, the elderly are even more dependent on self-help or mutual help between relatives. Early identification and action in terms of first aid (FA), in the most common emergencies that threaten an individual's health or life, affects the outcome of these conditions [32]. In order to increase general awareness about emergency medical FA measures, public education is required. The knowledge of FA can be a great help to elderly people in the case of injury or acute disease. However, the effective educational planning relies on an accurate assessment of the baseline knowledge of the population [33]. Therefore, we aimed to examine the knowledge of FA in the most common emergencies that threaten an elderly's health or life among the Slovenian population, focusing on elderly people's knowledge. The conclusions could guide the future framework of policy orientations on how to improve FA knowledge and confidence for giving FA among elderly people.

## Methods

# Study design

A cross-sectional population-based survey was conducted in 2019. Data collection was performed by The Public Opinion and Mass Communication Research Centre of the Faculty of Social Sciences of the University of Ljubljana. The survey population was adult persons who are residents of the Republic of Slovenia. The size of this population in Slovenia is 1.700,000. A representative, randomly selected sample among people older than 18 years was prepared by the Statistical Office of the Republic of Slovenia. The selection of units (persons) included in the sample is carried out on the basis of the Central Register of Population of Slovenia as a sample list. The selection is a random two-stage, where ultimately each person in the population is equally likely to be included in the sample. Participants were invited to participate in the study. Final results of the success of survey: the response rate was 59%, the participation rate was 64% and the rejection rate was 28%. There were 139 inaccessible units in the whole sample (displaced, deceased, inappropriate addresses, etc.) excluded from final analysis, which represents 7% of the total sample. The representations and statistical analysis of the data are based on a system of sampling weights that reduce the bias in the results due to the method of sampling and conducting the survey. All subjects were interviewed face-to-face by trained interviewers, and they completed a structured, pre-tested questionnaire. The interviewers interrupted the interviewees only to clarify a question if required, but they did not reveal any information about the questions.

## Questionnaire

Data were collected with a structured questionnaire (see the appendix A). A literature review of previous studies was done to identify potential items for the questionnaire. It was designed on pre-existing empirical research studies by the authors of the present paper, dealing with various aspects of first aid. The questionnaire was pre-tested and evaluated by expert evaluators. The questionnaire consisted of demographic data and three sections: 1) attributing the importance of FA knowledge and responsibility for FA to certain groups of the population, 2) recognising the most common emergencies occurring in old age, 3) FA measures in the event of the most common emergencies occurring in old age.

## Statistical analysis

The gathered data were analysed using SPSS ver. 24 software package (SPSS Inc., Chicago, IL, USA). The demographic data were interpreted using descriptive statistics. The average ratings of assessing the importance of FA knowledge for certain groups and the importance of responsibility for raising FA knowledge for certain groups were assessed using a Linkert scale (from 1-lowest grade to 5- highest grade) and expressed as means  $\pm$  SD (standard deviation). Statistically significant differences in average ratings among different age groups were determined with one-way ANOVA followed by a post hoc Tukey test with appropriate adjustment of the p-value for multiple comparisons. Dependent variables obtained by substantive questions were expressed as percentages (%) of affirmative/correct answers, and then the statistically significant differences between the different categories of age groups (independent variable)

were determined using the  $\chi^2$  square test followed by appropriate post hoc testing for multiple comparisons. Due to multiple comparisons, the level of statistical significance was adjusted ( $p < 0.05$ ). By regression analysis (Spearman's rho and Pearson Correlation), we determined the correlation between the variables FA knowledge (achieved number of points on the knowledge test) and the time that has elapsed since the last FA training (on ranked values) and the age (in years) of the respondents.

## Results

The demographic data of 1079 participants are presented in Table 1. The respondents were older than 18, mostly (37%) from the age group over 60 years. Just under a third of all the respondents have a secondary or higher education. Just over half of those over the age of 60 (198/402) are under the age of 70; 15% of all the respondents are older than 80. Of those over 60, 29% have primary education or less, 26% vocational education, 22% secondary and 23% high, higher or university education. More than half of all the respondents were in FA training for the last time more than ten years ago; 72% of those over the age of 60 were in such training more than 10 years ago, and 11% of the elderly have never had such training.

Table 1  
Demographic data of all respondents (n = 1079)

sex	M	F			
	49%	51%			
age (years), all	less than 30	from 31 to 45	from 46 to 60	61 and more	
	16%	23%	24%	37%	
age (years), older than 60 years (n = 402)	61 to 69	70 to 79	80 and more		
	51%	34%	15%		
education, all	primary school	high school	gymnasium	college, university	
	17%	22%	31%	31%	
number of years from last FA course, all	1 and less	from 1 to 5	from 6 to 10	more than 10	never
	13%	18%	9%	55%	5%
number of years from last FA course, older than 60 years (n = 402)	1 and less	from 1 to 5	from 6 to 10	more than 10	never
	5%	8%	3%	73%	10%

A comparison of the assessment of the importance of FA knowledge for individual age categories in the population is shown in Table 2. The average assessment of the importance of FA knowledge for all groups is 4.49 (standard deviation = 0.607) on a scale from 1 to 5, where 1 means not important at all and 5 means very important. Therefore, the respondents from all age groups believe that FA knowledge is important or very important for all age groups of the population. All the respondents attributed the highest importance of FA knowledge to students and employed people (mean = 4.77; standard deviation = 0.509) and younger retirees (mean = 4.64; standard deviation = 0.652), which is statistically significantly more than attribution to the importance of skills for older retirees and children and adolescents. People above 46 believed this type of knowledge is more important among children and adolescents than among people younger than 30. Other differences in the assessment of the importance of FA knowledge for different population groups between different age groups were not statistically significant.

Table 2  
The importance of FA knowledge for certain age groups of population

POPULATION	AGE GROUPS OF RESPONDENTS					# p value
	all (n = 1079) $\bar{x}$	< 30 years (n = 169) $\bar{x}$	31–45 years (n = 246) $\bar{x}$	46–60 years (n = 262) $\bar{x}$	> 60 years (n = 402) $\bar{x}$	
Children and adolescents	4,29 ( $\pm$ 0,249) <sup>a</sup>	4,11 ( $\pm$ 0,954)	4,24 ( $\pm$ 0,966)	4,37 ( $\pm$ 0,874) <sup>*</sup>	4,34 ( $\pm$ 0,942) <sup>*</sup>	,020
Students and staff	4,77 ( $\pm$ 0,509) <sup>b</sup>	4,84 ( $\pm$ 0,441)	4,77 ( $\pm$ 0,502)	4,73 ( $\pm$ 0,553)	4,77 ( $\pm$ 0,509)	,177
Younger retirees	4,64 ( $\pm$ 0,652) <sup>c</sup>	4,64 ( $\pm$ 0,582)	4,59 ( $\pm$ 0,643)	4,62 ( $\pm$ 0,636)	4,67 ( $\pm$ 0,652)	,531
Older retirees	4,27 ( $\pm$ 0,924) <sup>a</sup>	4,19 ( $\pm$ 0,879)	4,28 ( $\pm$ 3,938)	4,33 ( $\pm$ 0,858)	4,26 ( $\pm$ 0,924)	,469
# - p value comparing different age groups of respondents (ANOVA); * statistically significantly different from the group up to 30 years after performing post hoc comparison						
Letters a, b, c represents statistically significant differences in the attributed importance of FA knowledge of the selected population: there is a statistically significant difference between groups with a different letter in the assessment of the importance of FA knowledge for certain groups						

The respondents believe that all subjects are important or very important (rated on a scale of 1 to 5, where 1 means not important at all and 5 means very important) for contributing to FA knowledge (mean = 4.2; standard deviation = 0.066). The respondents attribute the highest responsibility for raising FA to different organizations or individuals, and there are no statistically significant differences between them ( $p > 0.05$ ). They attribute a statistically significantly lower level of responsibility for raising FA knowledge to the media or a personal physician than to organizations and individuals. Different age groups of

respondents are unanimous in this opinion, as there are no significant differences between them ( $p > 0.05$ ; except in the case of a personal physician, for which the ANOVA test is used to determine the sig. due to significant global effect, which is not proven by post hoc tests). (Table 3)

Table 3

Assessment of the attributed responsibility of the selected stakeholders involved in the dissemination of first aid knowledge

STAKEHOLDERS	AGE GROUPS OF RESPONDENTS					# p value
	all (n = 1079)	< 30 years (n = 169)	31–45 years (n = 246)	46–60 years (n = 262)	> 60 years (n = 402)	
	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	
Personal doctor	4,08 ( $\pm$ 1,140) a	3,97 ( $\pm$ 1,003)	3,98 ( $\pm$ 1,210)	4,05 ( $\pm$ 1,152)	4,20 ( $\pm$ 1,135)	0,042 *
Mass media	3,90 ( $\pm$ 0,992) b	3,88 ( $\pm$ 0,981)	3,87 ( $\pm$ 1,047)	3,95 ( $\pm$ 0,964)	3,90 ( $\pm$ 0,983)	0,797
Different organizations	4,35 ( $\pm$ 0,885) c	4,43 (0,769)	4,37 ( $\pm$ 0,855)	4,31 ( $\pm$ 0,848)	4,34 ( $\pm$ 0,969)	0,571
Individual	4,33 ( $\pm$ 0,934) c	4,42 ( $\pm$ 0,842)	4,33 ( $\pm$ 0,882)	4,29 ( $\pm$ 0,889)	4,33 ( $\pm$ 1,026)	0,583
# - p value comparing different age groups of respondents (ANOVA); * - there was no significant differences after post hoc test was performed						
Letters a, b, c represents statistically significant differences in the attributed responsibility of the selected stakeholders: there is a statistically significant difference in attributing the meaning of responsibility between groups (stakeholders) that have a different letter ( $p < 0.05$ ; significance for letters c is $p = 0,588$ )						

The correlation between the variables FA knowledge (combined from the number of points achieved on the knowledge test; maximal total score is 14) and the time elapsed since the last FA training (in time categories), are statistically significantly different from zero. The latter implies that there is a correlation between variables. However, this relationship is negligible (-0.083). The variables number of points scored on the knowledge test and age of the respondents (in years) are not correlated. (Table 4)

Table 4

Results of regression analysis; testing the correlation between the variables FA knowledge with time since last FA training (time categories) or age (years) of respondents

			FA knowledge test score	Time since last FA training
Spearman's rho	FA Knowledge score	Correlation Coefficient	1,000	-,083*
		Sig. (2-tailed)	.	,006
	Time since last FA training (categories)	Correlation Coefficient	-,083*	1,000
		Sig. (2-tailed)	,006	.
			FA knowledge test score	Age (years)
Pearson Correlation	FA Knowledge score	Pearson Correlation	1	,043
		Sig. (2-tailed)		,163
	Age (years)	Pearson Correlation	,043	1
		Sig. (2-tailed)	,163	
* - Correlation is significant at the 0.01 level (2-tailed).				

About 90% of all the respondents knew the signs and symptoms of a stroke or heart attack. The proportion of them was lower in the case of worsening diabetes (hypoglycaemia). About two-thirds of all respondents would recognise it (Table 5). In the oldest (> 60 years) age group, the proportion of the respondents who knew the signs and symptoms of hypoglycaemia was almost 26 % lower than in the age group of 46–60 years, which was statistically significantly different ( $\chi^2 = 31.196$ ;  $p < 0.001$ ) and the share of correct answers in the oldest age group was also statistically significantly lower compared to other age groups younger than 46 years ( $p < 0.001$ ). There are no significant differences between the groups in the case of the proportion of correct responses regarding heart attack or stroke recognition. There are also no significant differences between age groups in the knowledge of the correct measures in the case of heart attack and stroke; here, too, the share of correct answers is 89% (heart attack) and 98% (stroke). In contrast to the recognition of hypoglycaemia, those over 60 years of age know the FA measures in the case of hypoglycaemia statistically significantly better than respondents under 46 years of age. In the group over the age of 60 65% more people can take correct FA action in the event of hypoglycaemia than in the group under the age of 30 ( $\chi^2 = 45.625$ ;  $p < 0.001$ ). The proportion of correct answers is by far the lowest (16%) in relation to basic resuscitation procedures, as most respondents would prefer to use an AED instead of chest compressions.



Table 5

Recognition of health conditions (emergencies) and knowledge of correct FA emergency measures in respondents from different age groups

AGE GROUPS OF RESPONDENTS					
HEALTH CONDITIONS	< 30 years (n = 169)	31–45 years (n = 246)	46–60 years (n = 262)	> 60 years (n = 402)	all (n = 1079)
correct RECOGNITION of health condition					
Hypoglycaemia	72 % <sup>a</sup>	68 % <sup>a</sup>	74 % <sup>a</sup>	55 % <sup>b</sup>	65 %
Stroke	91 % <sup>a</sup>	89 % <sup>a</sup>	90 % <sup>a</sup>	87 % <sup>a</sup>	89 %
Heart attack	94 % <sup>a,b</sup>	94 % <sup>a,b</sup>	95 % <sup>b</sup>	89 % <sup>a</sup>	93 %
correct FA MEASURES					
Hypoglycaemia	43 % <sup>a</sup>	60 % <sup>b</sup>	68 % <sup>b,c</sup>	71 % <sup>c</sup>	63 %
Stroke	98 % <sup>a</sup>	98 % <sup>a</sup>	99 % <sup>a</sup>	97 % <sup>a</sup>	99 %
Heart attack	90 % <sup>a</sup>	90 % <sup>a</sup>	87 % <sup>a</sup>	90 % <sup>a</sup>	89 %
CPR	19 % <sup>a</sup>	18 % <sup>a</sup>	17 % <sup>a</sup>	13 % <sup>a</sup>	16 %
a, b, c: there is a statistically significant difference in the proportion of correct answers between age groups with different letters; CPR - cardiopulmonary resuscitation					

If we take a closer look at the knowledge of people over 60, we find that a statistically significant difference in the proportion of correct answers occurs in recognition of hypoglycaemia: 45% of people aged 61 to 69 have more knowledge than people over 80, which is statistically significant ( $\chi^2 = 7.018$ ;  $p = 0.030$ ). The same is true for recognising a heart attack (Table 6). Approximately 70% of all people over 60 know the correct measures in case of hypoglycaemia; the proportions of correct answers in identifying other conditions and correct FA measures range between 87 and 97%, and there are no statistically significant differences between different groups of the elderly ( $p > 0.05$ ). Most respondents would prefer to use an AED over chest compressions when performing basic resuscitation procedures. The proportion of those older than 80 is lower than in younger age groups, but statistically insignificant ( $\chi^2 = 2.561$ ;  $p = 0.278$ ).

Table 6

Recognition of emergency medical conditions and knowledge of emergency measures of FA among respondents over 60 years of age

AGE GROUPS OF RESPONDENTS				
HEALTH CONDITIONS	61 – 69 let (49,3 %, n = 198)	70–79 let (34,8 %, n = 140)	> 80 let (15,9 %, n = 64)	all (n = 402)
	correct RECOGNITION of health condition			
Hypoglycaemia	61 % <sup>a</sup>	53 % <sup>a,b</sup>	42 % <sup>b</sup>	55 %
Stroke	86 % <sup>a</sup>	91 % <sup>a</sup>	80 % <sup>a</sup>	87 %
Heart attack	91 % <sup>a</sup>	94 % <sup>a</sup>	73 % <sup>b</sup>	89 %
HEALTH CONDITIONS	correct FA MEASURES			
Hypoglycaemia	76 % <sup>a</sup>	70 % <sup>a</sup>	61 % <sup>a</sup>	71 %
Stroke	98 % <sup>a</sup>	96 % <sup>a</sup>	98 % <sup>a</sup>	97 %
Heart attack	88 % <sup>a</sup>	89 % <sup>a</sup>	97 % <sup>a</sup>	90 %
CPR	11 % <sup>a</sup>	14 % <sup>a</sup>	19 % <sup>a</sup>	13 %
a, b, c: there is a statistically significant difference in the proportion of correct answers between age groups with different letters; CPR - cardiopulmonary resuscitation				

## Discussion

The results of our survey indicate that Slovenes are aware of the importance of FA knowledge. They believe that it is essential for different age groups (children, young people, students, employees, as well as for younger and older retirees). The result is encouraging, as it has previously been shown that it is the amateur who, by giving FA, has a significant impact on improving health and survival in the case of OHCA [32]. At the same time, it is important that our respondents, in addition to attributing responsibility to organizations such as the Red Cross, also feel to be personally responsible for raising knowledge about FA measures and do not transfer this responsibility to the media and physicians. Slabe [33] finds that in present-day Slovenian society, giving FA is seen as a high moral duty of an individual and also a responsibility for acquiring knowledge. The most surprising finding of our research is the high level of knowledge of recognising some of the most common conditions that occur in old age and taking action in response to them. Between 88 and 98% of all the respondents recognise the signs and symptoms of a stroke or heart attack and know the correct measures of FA in the event of their occurrence. The exceptions where the proportion of correct responses was lower in all the respondents were recognising and responding to hypoglycaemia and understanding correct CPR. At the same time, most of the skills

tested do not even depend on the person's age or the time since that person was most recently educated in FA. Out of all age groups, those older than 80 stand out. Notably, the general opinion of all the respondents is that the elderly over 80 years of age need less FA knowledge (Table 2). In addition, we determined that they also know somewhat less (Table 6), especially when recognising sudden illness (hypoglycemia and heart attack). Nevertheless, they are the most vulnerable, fragile psychophysically/medically, as well as socially, especially in emergencies such as a pandemic [19, 21]. Notably, loneliness in older adults is most prevalent in the 'oldest old', referring to individuals aged 80 and over [23].

People over the age of 60 are less able to recognise hypoglycaemia signs and symptoms. On the other hand, their knowledge of correct FA measures in the case of this condition is significantly better compared to younger people, which is an interesting finding. In a related study, Turk et al. [36] determined the knowledge of diabetic people in Slovenia regarding their disease. The mean score obtained is 8.0 ( $\pm$  2.4) out of a possible 14. They conclude that elderly people show a relatively low level of general knowledge of their disease. In addition, our results show that people over the age of 60 are also less able to recognise the signs and symptoms of a heart attack when compared to younger people are. If we examine the knowledge of people over the age of 60 in more detail, we find that in both emergencies (recognising hypoglycaemia and heart attacks), it is worse in people over 80. In times of social isolation during the COVID pandemic, this can lead to negative health outcomes. Existing studies suggest that patients with OHCA in 2020 were older with a high burden of hypertension, diabetes, and had physical limitations [37]. Poor outcomes with COVID-19 infection correlate with vascular risk factors such as hypertension, coronary artery disease, and diabetes mellitus [38]. The elderly COVID-19 population had a significantly higher burden of diabetes than the younger cohort did [39]. Belani et al. [40] also demonstrated that COVID-19 infection is significantly associated with acute ischemic stroke. In addition, there was a significant drop in frequency emergency service use in March 2020 [41] and the proportion of patients who had an OHCA and were admitted alive decreased in the pandemic period [27, 29]. Changes associated with reduced surviving of OHCA were longer emergency medical services arrival times, higher proportions of OHCA's occurring at home (and/or unwitnessed) and lower provision of CPR by citizen-rescuers (laypeople). During the COVID-19 period, Baert et al. [42] observed a decrease in CPR initiation regardless of whether patients were suspected of SARS-CoV-2 infection or not. Accordingly, the proportion of patients dead on arrival of the EMS was larger [27].

Because the knowledge of CPR in times of social isolation is even more important, it should be emphasized that the share of correct answers among the participants in our study in the case of CPR did not exceed 19%. Most respondents in our study, both young and old, believe that in order to help an unconscious person who is not breathing, it is more important to use an AED than to start chest compression, which is not correct [43]. Similarly, Richman et al. [44], in their observational study, found a misunderstanding of the use of AEDs in CPR among people in a senior living community. Findings of poorer CPR knowledge among the elderly are also confirmed by others [45, 46]. In addition to knowledge, there is also a strongly decreasing level of willingness to use an AED as age increased [46]. Vaillancourt et al. [47] identified the facilitators and barriers among the elderly to CPR training and CPR performance.

For both behaviors under study, attitudinal beliefs such as believing that CPR could help a victim and that it should be initiated before EMS arrival played a significant role. On the other hand, although the elderly are aware of the importance of FA knowledge, their (too) low self-confidence about this knowledge is often a problem. The elderly have lower confidence in their ability to apply resuscitation than younger people [45]. A similar result was reported by Dobbie et al. [48]; they found that the older the person is, the less likely he/she is confident to administer CPR with or without instructions from an emergency call handler. The reason may be that they are less likely to be CPR trained or show a willingness to be CPR trained. Caap and colleagues [49] also link the low level of CPR knowledge to the fact that the majority (57%) of the respondents have not yet attended a CPR course. In the present study, we found that the last time the majority of our respondents were in FA training was more than 10 years ago. Given that their knowledge does not depend on the time since the last training, the question arises as to where they have acquired this knowledge.

## Limitations

The reasons and sources of acquiring FA knowledge in other medical situations could also be explored in more detail. One of the limitations of our research is that we only found theoretical knowledge of FA. Behavior in a real situation could be different. In a real situation of cardiac arrest, Park et al. [50] found that people over 60 perform CPR at a lower quality. Takei and colleagues [51] confirmed that older eyewitnesses are less likely to perform CPR in reality. In addition, our research's limitation is also that the questionnaire was focused to be made on a representative sample of all the population of Slovenia, but not on a representative sample of the elderly, although the total number of respondents older than 60 was not small (n = 402).

## Conclusions

Because the elderly, as a vulnerable group, are subject to injuries and sudden illnesses, as well as the risks posed by COVID-19 infection, they are even more dependent on self-help and mutual assistance from partners in the event of an accident. With the poor access of the emergency medical service, the importance of FA knowledge of the elderly during the social isolation due to COVID-19 epidemic increases even more. It is encouraging that we found solid knowledge regarding some emergencies in our research. The low level of knowledge regarding understanding CPR with AEDs and recognising hypoglycaemia poses a challenge and commitment to engaging key stakeholders in FA training from all amateur people. Important emphasis should be placed on those over 80, who are most exposed and vulnerable in social isolation.

## Abbreviations

FA: first aid

OHCA: out-of-hospital cardiac arrest

CPR: cardiopulmonary resuscitation

AED: Automated external defibrillator

SD: standard deviation

## **Declarations**

### **Ethics approval and consent to participate**

The research was approved by the Republic of Slovenia National Medical Ethics Committee, Ministry of Health (Number: 0120-73/2019/6). Prior to the interviewer's visit, respondents received a letter about the purpose of the questionnaire, the possibility of refusal to participate during survey, anonymity and their protection with General Data Protection Regulation. When the interviewer visited them, they verbally agreed to participate.

### **Consent to publish**

Not applicable.

### **Availability of data and materials**

The datasets generated during and analysed during the current study are available in the ADP – Social science data archives repository, <https://www.adp.fdv.uni-lj.si/opisi/>.

### **Competing interests**

The authors declare that they have no competing interests.

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### **Authors contributions**

ED gets all credit to drafting of the manuscript (quantitative analysis of data and conception of manuscript). ED and UK conducted a design and interpretation of data. DS and IE reviewed the article and literature. UK supervised the writing and critically revised the final version to be published. The manuscript has been read and approved by all the authors, each author believes that the manuscript represents honest work. All authors agree with the potential publication of the article.

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