A survey on first aid knowledge in members of Flemish youth movements

Luca Desmet[a], Frederik Dierick[a], Jef Van den Eynde[a], Jaan Toelen[b], Frederik Cardoen[c], Tine Ysenbaert[c]

[a] Faculty of Medicine, KU Leuven, Belgium
[b] Department of Pediatrics, UZ Leuven & Department of Development and Regeneration, KU Leuven & Institute for Child and Youth, KU Leuven, Belgium
[c] AZ St Lucas, Department of Pediatrics, Bruges, Belgium

tine.ysenbaert@stlucas.be

Keywords

CPR, First Aid, Youth Movements

Abstract

Introduction: A significant proportion of childhood deaths is caused by unintentional injury. Every weekend and during summer holidays, approximately 267.000 Flemish children follow youth movement activities and camps. During these activities, injuries have to be managed by the responsible leaders. The aim of this study was to evaluate the first aid knowledge in leaders of a youth movement.

Methods: We conducted an online survey, consisting of 15 hypothetical scenarios, on first aid knowledge in Flemish youth movements. Every individual score was matched with following variables: having followed a first aid course, having a high self-assessment of first aid knowledge and having a health related job/study.

Results: Among the 2784 participants, 63% had attended a first aid course. The total score had a median of 8.0 and was significant higher ($p < 0.001$) if the participant had followed a first aid course (beta 0.39), had a health related job/study (beta 0.80) or had a high self-assessment of first aid knowledge (beta 0.73). The questions regarding Basic Life Support had a particularly high percentage of correct answers and scored significantly better in the group that attended a first aid course in the past.

Conclusion: Members of a youth movement have an appropriate knowledge of first aid. Many participants had followed a first aid course and scored significantly better. There is still room for improvement: a training in some very common scenarios could become part of the training course for youth movement leaders.

Introduction

It is well known that adequate first aid can save lives, can limit the consequences of an acute event and can avoid losing critical time while waiting for the emergency services to arrive (1). However, in fewer than 1 in 5 out-of-hospital cardiac arrests, bystander cardiopulmonary resuscitation (CPR) is administered (2). According to a recent study of the Red Cross Belgium 8 out of 10 Belgians claim to be able to act correctly in emergency situations. (3) However, when tested, it turns out that 35% misjudge their own capabilities. In the same study, 94% of Belgians believe that first aid training should become mandatory, ideally organized by schools or employers. In order to improve the successful application of basic CPR by lay people, a lot of secondary schools in Flanders implement first aid training and CPR as part of their educational goals (4,5). Initiating first aid training at an early age, from the age of 10, contributes to less anxiety about making mistakes and an increased willingness to offer help (6,7). First aid in the context of youth movements is especially valuable as unintentional injury represents the main cause of early morbidity and mortality among children and represents 40% of all childhood deaths (8). A considerable part of the Flemish youth goes to a youth movement. Every weekend approximately 267.000 Flemish children and adolescents between 5 and 18 years old don their uniforms to spend the afternoon with their peers. About 40,000 young leaders take care of them, both in weekends and during the annual summer camp (9). Weekend and camp activities are often associated with potential risk of injury. In the Healthy Camp study, which undertook a five-year surveillance study of injuries and illnesses during US summer camps, reference is made to the high-risk activities that take place during camp (10,11). To prevent further complications, making the difference between a minor injury or a more severe one is pivotal. Ensuring that there are trained first-aid providers within the youth movement will create a safer environment for the children and the leaders as well. Currently, obtaining a first aid certificate or attending a first aid course is not an obligation for youth movement leaders in Flanders. It is therefore possible that a youth movement will go on summer camp without a medically qualified person, even if there are children participating who have an underlying medical condition. When a youth movement wants to organize a basic CPR training, there are paid courses available, although not very cheap (12). Of course some individuals already followed a first-aid course at school or as part of their job/study. In this study we will map the knowledge regarding first aid among members of a Flemish youth movement using an online case-based survey.

Method

Design of the study

The survey consisted of an anonymous questionnaire with 26 questions, of which 11 were demographic in nature (age, gender, location, current education or job and self-assessment of first aid knowledge) and 15 consisted of hypothetical first aid scenarios. The KU Leuven university ethics committee approved the questionnaire and the study protocol (MP014140). The 15 questions assessing the first aid knowledge were a combination of multiple choice, open answer, image choice and ranking questions, divided into 6 main categories. The first category, named Basic Life Support (BLS), included the questions about CPR , an unconscious victim and choking. The second main category, named Bleeding, included nosebleed, abrasion with venous bleeding and arterial bleeding. The third, named Trauma, included bone fracture and dental avulsion. The fourth, named Medical Care, included questions about first aid kit, allergy and heatstroke. The fifth, named Wound Care, included the questions about burns and splinters. The sixth and last category, named Insect Bite, included the questions about a bee sting and tick bite. A total score was calculated for these questions, with one mark given for each correct answer. The maximum possible score was 15/15. The formation of the survey was based on the review of multiple-choice item-writing guidelines by Downing et al (13). The use of educational imagery and videos was included in the survey. After each answer, the participant was presented the right answer and an explanation. This format with a comprehensive explanation was chosen to make sure that the survey could also serve as an educational tool for the participants. At the end of the questionnaire participants were asked whether they had learned something about first aid from this survey.

At the beginning of the survey the participants were asked to assess their first aid knowledge by rating their knowledge on a Likert scale as 'very poor, poor, moderate, good or very good'. The respondents who assessed their own knowledge as 'good or very good' were included in a subpopulation 'high self-assessment of first aid knowledge'.

Because peer-review improves the quality of multiple-choice examinations, the survey was completed and thoroughly examined by at least 15 peers, both medical as non-medical (14). Adjustments were made based on their feedback. The only exclusion criterion of this study was not being an active member of a Flemish youth movement. In addition, incomplete surveys were also excluded from the statistical analysis.

Distribution

After the survey was designed, it was uploaded in Qualtrics, in order to convert it into a web-based survey. To reach as many members of Flemish youth movements as possible, the central authorities of 'Chirojeugd Vlaanderen', 'Scouts & Gidsen Vlaanderen', 'Katholieke Studenten Actie (KSA)', 'Vrouwelijke KatholiekeStuderende Jeugd (VKSJ)', 'Katholieke Landelijke Jeugd (KLJ)', 'FOS Open Scouting' and 'Jeugdbond voor Natuur en Milieu (JNM)' were contacted in October 2019 and asked if they could distribute the study at the national level by sending it to all of their members either using their newsletter, available e-mail lists and also their social media (Facebook groups). The study participants were not asked to list the manner in which they received the invitation for the survey.

Statistical analysis

Groups were made based on the following criteria: 'having followed a first aid course', 'studying or working in a health-related domain' (open question, dummy coded by the researchers) and 'having a high self-assessment of first aid knowledge'. Continuous variables were checked for normality and the difference between groups was tested with the t-test or Mann-Whitney U test. Categorical variables are expressed as frequency and proportions, and statistical differences were assessed with the Chi-squared test. Linear regression analysis was used to study the effect of the following pre-selected variables on the total test scores: 'age, gender, working, health-related job, first aid course, and first aid assessment score'. All tests were two-sided and a p-value less than 0.05 was deemed statistically significant. All analyses were performed using R Statistical Software (version 4.0.2 2020-06-22, Foundation for Statistical Computing, Vienna, Austria). Results are shown as mean and standard deviation (SD) when there is a normal distribution of data, if not, the results are presented as median and interquartile range (IQR).

Results

Survey responses

A total of 4405 surveys were collected with a subdivision of 1425 derived from 'Chirojeugd Vlaanderen', 1706 from 'Scouts & Gidsen Vlaanderen', 660 from 'KSA', 357 from 'KLJ', 63 from 'JNM', 67 from 'FOS Open Scouting', 38 from 'VKSJ' and 89 'others/not specified'. Out of 4405 surveys, 1621 (36.8%) were incomplete and therefore not eligible for statistical analysis, with a remaining 2784 surveys (63.2%) used for statistical analysis.

Participant demographics

Table 1 displays the demographics of the survey respondents. The median age of all respondents was 20 [19.0;22.0] years old and 70.5% were female. The largest proportion of survey respondents are a member of 'Scouts en Gidsen Vlaanderen' and 'Chiro Jeugd Vlaanderen'. The majority of respondents were students (88.8%, N=2471) and 17% (N=469) practised a health-related job or study. The largest proportion of this last group consisted of female participants (79,7%, $p<0.001$) and a significant percentage (74,4%, $p<0.001$) of them had already taken a first aid course. A notable result of the survey is that 63% (N=1758) of all participants attended a first aid course in the past. There is no significant difference in gender or youth movement compared to the respondents who did not attend a first aid course. Roughly 20% of this group followed a first aid course as part of his or her job/study. 43% (N=1197) of the study population was included in the subpopulation 'high self-assessment of first aid knowledge'. Of this group, more than 30% had a health-related job or study and 81% attended a first aid course in the past. The majority (77%, N= 169) of the respondents who have a health-related job or study estimated their first aid knowledge as 'good or very good'.

Results from the survey

Table 2 presents the main results from the case-based survey. The total score had a median of 8.00/15.00 with an interquartile range of [7.00;10.00]. The participants who followed a first aid course had a significantly higher total score (9.00 [7.00;10.00] with $p<0.001$) and scored significantly higher on all questions related to BLS ($p<0.001$). As for the other categories, those who followed a first aid course scored higher on most of the questions except for tick bite (p 0.333), arterial bleeding (p 0.139), abrasion with venous bleeding (p 0.153), dental avulsion (p 0.143) and heatstroke (p 0.081). Having a health-related job/study resulted in a significantly higher total score (9.00 [8.00;11.00] and $p<0.001$) and a significantly higher score on all questions regarding bleeding, wound care and trauma (all $p<0.001$). The questions with no significantly higher score were those about tick bite (p 0.193), heatstroke (p 0.128), first aid kit (p 0.145) and choking (p 0.021). Those participants with a high self-assessment of first aid scored significantly higher on the questions regarding insect bites ($p<0.001$), wound care ($p<0.001$), trauma ($p<0.001$), medical care ($p<0.05$) and basic life support ($p < 0.001$). Only one question regarding bleeding (i.e. abrasion with venous bleeding) was not significantly different (p 0.175). In addition, having a high self-

Table 1: Patient characteristics

Variable	Relapse	First Aid Course		Health-related study/job		High self-assessment of First Aid	
	Total (n=2,784)	n=1,758	P-value	n=469	P-value	n=1197	P-value
Age	20.0 [19.0;22.0]	20.0 [19.0;22.0]	<0.001	20.0 [19.0;21.0]	0.027	20.0 [19.0;22.0]	<0.001
Gender			0.533		<0.001		0.754
Male	813 (29.2%)	526 (29.9%)		95 (20.3%)		358 (29.9%)	
Female	1963 (70.5%)	1227 (69.8%)		373 (79.5%)		836 (69.8%)	
Other	8 (0.29%)	5 (0.28%)		1 (0.21%)		3 (0.25%)	
Youth movement			0.849		0.792	0.121	
Chiro	854 (30.7%)	528 (30.0%)		147 (31.3%)		358 (29.9%)	
Scouts	1193 (42.9%)	765 (43.5%)		206 (43.9%)		536 (44.8%)	
KLJ	222 (7.97%)	143 (8.13%)		37 (7.89%)		102 (8.52%)	
KSA	421 (15.1%)	263 (15.0%)		62 (13.2%)		160 (13.4%)	
Other	94 (3.38%)	59 (3.36%)		17 (3.62%)		41 (3.43%)	
Student	2471 (88.8%)	1514 (86.1%)	<0.001	432 (92.1%)	0.015	1028 (85.9%)	<0.001
Working	313 (11.2%)	244 (13.9%)	<0.001	37 (7.89%)	0.015	169 (14.1%)	<0.001
Health-related study/job	469 (16.8%)	349 (19.9%)	<0.001	—	—	361 (30.2%)	<0.001
First Aid course	1758 (63.1%)	—	—	349 (74,4%)	<0.001	970 (81.0%)	<0.001

Chiro: Chirojeugd Vlaanderen; Scouts: Scouts en Gidsen Vlaanderen; KSA: Katholieke Studenten Actie; KLJ: Katholieke Landelijke Jeugd;
Values are presented as median (IQR) or n (%). P<0.05 was considered significant.

Table 2: Results from the survey.

	Relapse	First Aid Course		Health-related study/job		High self-assessment of First Aid	
Item	Total (n=2,784)	n=1,758	P-val*	n=469	P-value*	n=1197	P-value*
CPR	2085 (74.9%)	1448 (82.4%)	<0.001	421 (89.8%)	<0.001	1034 (86.4%)	<0.001
Unconscious victim	2547 (91.5%)	1656 (94.2%)	<0.001	453 (96.6%)	<0.001	1148 (95.9%)	<0.001
Choking	2545 (91.4%)	1636 (93.1%)	<0.001	442 (94.2%)	0.021	1122 (93.7%)	<0.001
Nosebleed	1109 (39.8%)	768 (43.7%)	<0.001	242 (51.6%)	<0.001	588 (49.1%)	<0.001
Venous bleeding/Abrasion	1258 (45.2%)	813 (46.2%)	0.153	261 (55.7%)	<0.001	559 (46.7%)	0.175
Arterial bleeding	569 (20.4%)	375 (21.3%)	0.139	149 (31.8%)	<0.001	301 (25.1%)	<0.001
Bone fracture	1525 (54.8%)	1046 (59.5%)	<0.001	324 (69.1%)	<0.001	779 (65.1%)	<0.001
Dental avulsion	920 (33.0%)	599 (34.1%)	0.143	201 (42.9%)	<0.001	460 (38.4%)	<0.001
First Aid kit	1089 (39.1%)	760 (43.2%)	<0.001	198 (42.2%)	0.145	551 (46.0%)	<0.001
Heatstroke	2573 (92.4%)	1637 (93.1%)	0.081	425 (90.6%)	0.128	1122 (93.7%)	0.028
Allergy	2567 (92.2%)	1647 (93.7%)	<0.001	450 (95.9%)	<0.001	1135 (94.8%)	<0.001
Burn	1263 (45.4%)	845 (48.1%)	<0.001	259 (55.2%)	<0.001	615 (51.4%)	<0.001
Splinter	490 (17.6%)	349 (19.9%)	<0.001	119 (25.4%)	<0.001	271 (22.6%)	<0.001
Bee sting	450 (16.2%)	327 (18.6%)	<0.001	126 (26.9%)	<0.001	274 (22.9%)	<0.001
Tick bite	1824 (65.5%)	1164 (66.2%)	0.333	320 (68.2%)	0.193	830 (69.3%)	<0.001
Total score	8.00 [7.00;10.00]	9.00 [7.00;10.00]	<0.001	9.00 [8.00;11.00]	<0.001	8.00 [7.00;9.00]	<0.001

Values are presented as n (%) or median (IQR). P<0.05 was considered significant.
**Compared to complementary group (no First Aid Course / no Health-related study/job / no High self-assessment of First Aid)*

assessment of first aid resulted in a significant higher total score (8.00 [7.00;9.00] with p <0.001) compared to those who estimated their first aid knowledge less well (7.00 [5.00;8.00]).

2690 participants (96,7%) claimed to have learned something about first aid from this survey.

Linear regression models for total score

When looking at the different variables, age and work proved to be the only demographic data with a statistically significant correlation with the overall score. For each increase in age by 1 year, the total score improves with 0,15 (p <0.001) (Table 3).

Table 3: Linear regression models for total score.

	Univariable model			Multivariable model		
Variable	**Beta**	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**
Age	0.15	0.12, 0.18	<0.001	0.11	0.08, 0.13	<0.001
Female gender	-0.05	-0.23, 0.13	0.6	—	—	—
Working	0.55	0.30, 0.81	<0.001	—	—	—
Health-related job	1.4	1.2, 1.6	<0.001	0.80	0.58, 1.00	<0.001
First Aid course	1.0	0.86, 1.2	<0.001	0.39	0.22, 0.56	<0.001
Self-assessment score	1.0	0.91, 1.1	<0.001	0.73	0.63, 0.84	<0.001

CI: confidence interval. P<0.05 was considered significant.

Having a health-related job, having followed a first aid course and the self-assessment score are all significantly correlated (p<0.0001) with the total score. This significance remains after multivariate analysis with respective beta values of 0.80 (95% CI [0.58, 1.00] p < 0.001), 0.39 (95% CI [0.22, 0.56] p < 0.001) and 0.73 (95% CI [0.63, 0.84] p < 0.001).

With a beta of 0.55, being employed also has a significant impact (95% CI [0.30, 0.81] p<0.001) on the total score. However, after multivariate analysis, this correlation disappeared.

Discussion

We conducted a case-based online survey in Flemish youth movements to assess the level of first aid knowledge among their leaders. We managed to reach 4405 members of a youth movement, most of whom are members of one of the main youth movements in Flanders (Chiro Jeugd Vlaanderen, Scouts en Gidsen Vlaanderen, KSA and KLJ). A total of 2784 participants fully completed the survey and were used in the statistical analysis. The average percentage of participation is lower than for studies where a survey among the youth movement leaders was organized by the organization itself (24% in a Chiro survey) (15). We also noted that the participation rate was higher for females, which is in line with other voluntary surveys in young adults (16).

During youth movement activities, various accidents can occur. In addition, the circulation of infectious diseases is not uncommon in youth camps. Several studies have shown that outbreaks of diarrhoea during summer camps are common as well as medical problems caused by heat waves (17-19). Little data is available on the incidence of medical interventions during youth movement activities. The Healthy Camp Study is to date the only example of a long-term illness and injury surveillance study conducted with a representative sample of US summer camps (10,11). The overall injury rate was low: 0.47 injuries per 1000 camp days for resident camps and 0.42 injuries per 1000 camp days for day camps.

To our knowledge, no data exist on the incidence of accidents in youth movements in Flanders. In personal communication, KSA and KLJ confirm that respectively 354 and 274 accidents were declared to insurance companies in 2019-2020, which are presumably underestimated figures given that infections or mild traumata might not have been reported.

In this study we investigated the first aid knowledge of members of a Flemish youth movement using 15 different medical situations. We noted that 63% of all participants (N=1758) had already attended a first aid course in the past. This percentage is similar compared to reports from Sweden, USA, Australia and New Zealand (rates of 45-79%) and a survey conducted in Belgian primary school teachers (68% in the age group 21–30 years) (20-25). No prior studies have investigated first aid knowledge in youth leaders and most have only examined CPR training. Therefore these cannot be compared directly.

In this survey, we looked more closely at some important medical topics which were divided in 6 main categories as mentioned before.

The total score of the 15 survey questions assessing the first aid knowledge was not normally distributed with a median of 8.00 [7.00;10.00]. None of the participants achieved a perfect score of 15 out of 15. 7/15 was the score achieve by 20% of the participants, while 43% (N= 1195) scored 8/15 or higher. The total score was significantly higher when a first-aid course was followed, when the participant had a health-related job/study or when the participant had a high self-assessment regarding first aid.

Performing a health-related job/study has the most impact. We believe that this is due to the fact that these people are more frequently confronted with healthcare situations. Also, 74,4% of the respondents with a job or study in healthcare had followed a first aid course. The finding of a higher overall score in medically trained people is comparable to other studies (26). The variables 'First Aid assessment score' and 'having followed a first aid course' remain, after multivariate analysis, significant for a higher total score. These results are in line with the international literature (20, 27, 28). A survey amongst primary school teachers in Belgium concluded that attending a CPR course in the past had a positive effect on knowledge and also increased self-confidence (20). The results from a study from New Zealand with 494 students between 16 and 17 years old showed that the students who had received a first aid course showed greater first aid knowledge and in addition that having a positive attitude towards CPR and first aid training contributes to a higher score and more willingness to administer CPR to a stranger (28).

In our survey we divided the different questions in separate categories. One of these is BLS, where we notice that the vast majority of participants gave the correct answer (CPR N=2085 (74.9%), unconscious victim N=2547 (91.5%) and choking N=2545 (91.4%)). As one would anticipate, participants who followed a first aid course scored significantly higher on each question related to BLS than those who did not follow a first aid course. The question regarding heat stroke is the one that was answered most often correctly (N= 2573 (92.4%)). This indicates that the vast majority of participants, educated in first aid or not, know what to do in such circumstances, which is a reassuring finding as heath strokes are common during summer camps.

Several questions had a consistent low score. Among these are the questions about the bee sting (N = 450 (16.2%)), splinter removal (N = 490 (17.6%)) and arterial bleeding (N = 569 (20.4%)). The first two are very common occurrences during youth movement activities, and the correct intervention in these cases may thus need more attention in further training or youth movement leaders. The question about arterial bleeding was not significantly answered more correctly if the participant had followed a first aid course. This is worrying because this is a potentially life-threatening situation. This is certainly a working point for future first aid courses that are organized among youth movement leaders in Flanders.

Strengths and limitations of the study

The large study population of 2784 respondents who completed the survey was considered as a strength of this study. We were able to reach many Flemish youth leaders from various youth movements and districts.

Furthermore, the survey used in this study was not only a tool for acquiring information but also an educational tool.

Concerning the limitations of the study, we have to take into account possible bias. There may be a selection/participation bias as people with an interest in this topic and with good access to the digital channels that were used will be more likely to complete the survey. Those who have already taken a course or are engaged in a health-related profession or study may be more willing to test their first aid knowledge.

In addition, observational studies such as surveys are often limited in flexibility and depth. We are bound by a predesigned questionnaire which contained only one question per category. Within this questionnaire it was not possible to nuance an issue or learn more about how respondents seem to understand the question. The conclusions deduced might not be correlating if a more detailed assessment would be done.

It is worth a thought that answers provided through a digital questionnaire might not be correlating with real-life scenarios.

Regarding the statistical analysis, the statistical testing on the different topics was not subjected to correction for multiple testing. More extensive statistical comparisons might exclude some incidentally positive results.

Conclusion

From the data of our survey, we provide evidence for appropriate knowledge of first aid in the majority of youth movement leaders in Flanders, with higher scores in those that followed first aid courses in the past or are professionally involved or being educated as a student in health care. We identify knowledge gaps in common scenarios that, with the support of coordinating organizations with expertise in this field, can be addressed in order to improve first aid training for youth movements in Flanders.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest to declare with regards to the conduction and reporting of the case presented in this manuscript, in line with the editorial policy of the Belgian Journal of Paediatrics.

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