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International Journal of Psychology and Educational Studies

Evaluation of the use of Fatal Vision Goggles in the Education of Students of Health Sciences in Basic Life Support*

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ARTICLE INFO

Article History:
Received 03.06.2020
Received in revised form 17.08.2020
Accepted 01.09.2020
Available online 28.09.2020

ABSTRACT

The harmful use of alcohol is a global problem. Fatal Vision Goggles (FVG) are used within driver education programs in Slovenia for preventing drunk driving. The Faculty of Health Sciences at the University of Ljubljana has also introduced FVG into the education of health care students. The purpose of our research is to evaluate the experience of performing cardiopulmonary resuscitation (CPR) with FVG among students of health care. The results show that performing CPR with FVG is difficult, especially regarding correctly locating the place of chest compressions. The majority, 42 participants, reported the negative effects of alcohol. Sixteen students stated that they would not perform CPR in this condition. They stated that the experience of performing CPR with FVG is instructive (n = 39), useful (n = 35) and interesting (n = 34). The findings highlight the importance of practical learning exercises using FVG for the readiness to act in a real situation and alcohol drinking prevention.

Keywords:
alcohol consumption, Fatal Vision Goggles, cardiopulmonary resuscitation

1. Introduction

The harmful use of alcohol is a global problem (Rocco et al., 2014). It seriously influences public health and is one of the main health risk factors globally. Alcohol consumption causes 3 million deaths each year globally as well as increases the disabilities and poor health of millions of people. Overall, the harmful use of alcohol is responsible for 5 % of the global burden of disease (World Health Organisation, 2018). In Slovenia, every year, an average of 927 people die because of the harmful effects of alcohol use on health and in traffic accidents caused by drunk drivers. Forty-three per cent of adults aged 25–64 are drinking highly hazardously (National Institute of Public Health and the Ministry of Health of Slovenia, 2019). According to studies, the consumption of alcohol is broadly reported among university students; moreover, the alcohol usage peaks in this group (Chu et al., 2016; Karem, Kypri, and Salamoun, 2007; Gill, 2002). They seem to consume more alcohol than their counterparts in the general population do. To reduce alcohol-related harm, the World Health Organization recommends taking evidence-based action to prevent drinking (World Health Organisation, 2018). According to the fact that alcohol intoxication is involved in 33–69% of fatal traffic incidents (World Health Organisation, 2018), Fatal Vision Goggles (FVG) have become equipment used within driver education programs for preventing drunk driving, also in Slovenia (Auto moto association Slovenia, 2017). FVG are image-distorting equipment used within driver education programs to demonstrate the concept of alcohol-induced impairment (Mc Cartney, Desbrow and Irwin, 2017). This hands-on awareness-building tool allows sober people to experience what it is like to be under the influence of alcohol. Simple activities with the FVG such as walking a line, one-leg standing, reaching out to grab a set of car keys or tossing a ball become important 'a-ha' moments as participants realise how susceptible they are to

* This study was presented as an oral presentation at the ERPA International Congresses on Education, 10-12 April, 2020.

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http://dx.doi.org/10.17220/ijpes.2020.04.015

the potentially dangerous consequences of impairment due to alcohol (Innocorp, NK). The Faculty of Health Sciences at the University of Ljubljana, Slovenia, has also introduced FVG into the education of health care students. Students are educated about first aid, including cardiopulmonary resuscitation *(CPR).* They may find themselves in a situation in which they will have to use medical skills in their free time, even if they are intoxicated because the law obliges them (Health Care and Health Insurance Act, 2006). One such example is performing *CPR*. Research findings confirm that quality CPR increases the chance of survival of the person with cardiac arrest (Kragholm et al., 2017; Goto, 2017; Hasselqvist-Ax et al., 2015). We assume that resuscitation in the intoxicated state is difficult. Alcohol is a toxic and psychoactive substance and causes changes in psychological functioning that disrupt cognitive processes. There are also negative effects of alcohol on physical performance. (World Health Organisation, 2018; Kypri and McCambridge, 2018; Rocco et al., 2014; Sullivan, Harris and Pfefferbaum, 2010).

The purpose of our research is to evaluate the experience of performing CPR with FVG among students of health care. The aim is to determine how the use of FVG influences performing CPR on the mannequin-training model, what emotions students were experiencing, and what they learned from that experience. We also wanted to learn their opinion about performing CPR if they were drunk and how they assess the usefulness of FVG as preparation for real situations.

2. Methods

Data collection took place in the context of experimental research methods. Before that, we made a critical review of Slovene and English literature. In the 2019-2020 academic year, we conducted the research in the classroom for first aid training at the Faculty of Health Sciences, University of Ljubljana. We included 78 students of the Faculty of Health Sciences University in Ljubljana and Faculty of Psychotherapy Science of the Sigmund Freud University. Before the experiment, they had theoretical and practical lectures on first-aid measures, also CPR, but without FVG. In the survey, we asked the participants to act in a hypothetical situation that required performing CPR on the mannequin-training model, with an available first aid kit. They put on FVG. We asked all students from the group to leave the classroom.

Meanwhile, we prepared everything necessary for the experiment, and then students entered the classroom one by one. We prepared the same scenario for all students and provided the same description of the hypothetical situation before they entered the classroom. We asked students to provide first aid to a person who was lying on the ground in a park near their home. They found that person when they were returning from the party late at night. They were drinking alcohol, which FVG simulated. The person was lying unconscious and was not breathing. We were observing the students when they were providing CPR. After CPR was performed, we collected the data with an evaluation questionnaire; the questions were based on the literature review. Participation in the experiment was voluntary and anonymous. With the evaluation questionnaire, we collected the opinions of the students about this experience and some demographical data. The evaluation questionnaire was anonymous and contained seven open questions. We coded the texts of the completed evaluation questionnaires into categories, and two independent researchers analysed the texts and combined them in the final results. With the anonymous questionnaire, we obtained demographic and some numeric data. We processed the data obtained through questionnaires and evaluation papers with Microsoft Office Excel 2017. We presented the data graphically and descriptively.

3. Results

In the sample were seventy-eight students: of them, 85% were females. Sixty-one per cent of the sample were students at the Faculty of Health Sciences in the directions of Healthcare, Occupational Therapy, and Physiotherapy, while 39% were the students of Psychotherapy Science of the Sigmund Freud University. Most (n = 72) have already been drunk.

The results show that the average self-assessment of self-esteem during performing CPR with FVG is 5.5 (‘1’ means totally not self-confident, and ‘10’ means totally self-confident). The average self-assessment of the ability to perform CPR in such a condition (drunk) if that kind of situation were to happen in reality is 4.7.

The results of participants' answers show that performing CPR with FVG is difficult, especially locating the spot of chest compressions (Table 1).

Table 1. Opinions of participants in the category Performing CPR.

Category: Performing CPR		
Subcategories	**Number of citations**	**Examples of citations**
Incorrect chest compressions	47	'It was harder to locate the right place of chest compressions.' 'The chest compressions were uneven.'
Difficult approach	18	'It was difficult to approach in such a condition.'
Slow procedures	16	'It took me a long time to figure out what I needed to do.'
Limited safety	15	'I neither took care of the security, nor could I see the danger.
Incorrect artificial breathing	5	'The artificial breaths were insufficient, as I could not find a mouth for the place of the breath.'

Participants experience how alcohol impairs a person's balance, coordination, vision, reaction time, and judgment. (Table 2). Their coordination, balance, and visual perceptions were worse.

Table 2. Opinions of participants in the category of sensory and cognitive processes.

Category: Sensory and cognitive processes		
Subcategories	**Number of citations**	**Examples of citations**
Weak coordination	43	'I almost stumbled.' 'You have no feeling for space; movement coordination got reduced.'
Though disorders, confusion	28	'I was confused.' 'Nervous and under pressure, I just froze.'
Limited visual perception	20	'Vision got blurred.'
Limited physical ability	12	'It made me sick.' 'I became dizzy and physically unstable.'
Worsened ability to make decisions	9	'In such a condition, we forget about important things.' 'Decision-making abilities are worse.'

Most often, students felt fear and helplessness during the experiment. (Table 3)

Table 3. Opinions of participants in the category Emotions experienced.

Category: Emotions experienced		
Subcategories	**Number of citations**	**Examples of citations**
Powerless	24	'It was hard… you feel so helpless.'
Fear	14	'The situation is scary and stressful.' 'I'm afraid I would hurt someone.'
Horror	9	'That would be awful, quite frustrating.'
Doubt	9	'You're not sure you're performing CPR properly.' 'I had doubts.'
Uncomfortable	9	'It's not pleasant, I don't want that.'
Guilt	7	'I would have a great feeling of guilt of being drunk if someone would not survive the accident.' 'It's irresponsible; the consequences are severe.'
Anxiety	5	'The consequences would worry me.' 'It is worrying.'
Positive impact on self-esteem	5	'Nevertheless, as such, you're still more relaxed and confident as you don't know how serious it is.«
Negative impact on self-esteem	3	'I wouldn't be so confident as I were sober.'
Other	3	'Comical.' 'For the first time, I see what it's like to be intoxicated.'

Sixteen students stated that they would not attempt to perform CPR in such a condition; six would call another person for help. (Table 4)

Table 4. Opinions of participants in the category Ability to perform CPR in a state of alcohol intoxication.

Category: Ability to perform CPR in a state of alcohol intoxication		
Subcategories	**Number of citations**	**Examples of citations**
Competent	23	'I would try to do my best.' 'Even in such a case, I can do CPR.'
Incompetent	16	'I wouldn't even think about performing CPR.' 'I'd just freeze and watch.'
Call another person for help	6	'I would call for the help of someone who is sober.'
I do not know	5	'I don't know how I would react.' 'That is the question.'

The majority, 42 participants, reported the negative impacts of alcohol. (Table 5)

Table 5. Opinions of participants in the category Effects of alcohol.

Category: Effects of alcohol		
Subcategories	**Number of citations**	**Examples of citations**
Negative	42	'Your abilities are reduced when you are drunk.' 'Alcohol makes you incapable.'
Other	9	'It's different when you're drunk.' 'Alcoholism is a real problem in Slovenia.'
Positive	4	'You can perform CPR even if you are drunk; you're even more confident.'

Participants wrote that the experience of performing CPR with FVG was instructive, useful, and interesting.

Table 6. Opinions of participants in the category Experience performing CPR with FVG.

Category: Experience performing CPR with FVG		
Subcategories	**Number of citations**	**Examples of citations**
Instructive	39	'You can imagine how it is in a real situation.' 'A good accessory (goggles) because you can learn a lot from the situation.'
Useful	35	'Useful; it can help us.'
Interesting	34	'Good idea, an interesting experience.'
Encourage thinking	22	'It makes you think what it would be like if it really happened.'
Unreal	9	'It did not affect me personally; these goggles only affected my vision; they did not impair other senses.' 'It's not real; you can rely on other senses.'
Suggestions to include in other areas	8	'It would make sense to include this experience in schools.' 'Also in driver's ed courses.' 'All students should try that.'

The situation of performing CPR with FVG aids in understanding the importance of being sober when helping others. (Table 7)

Table 7. Opinions of participants in the category Insights.

Category: Insights	
Subcategories	**Examples Of citations**
Meaning of CPR	'I realised the importance of first aid knowledge that everyone should have.' 'How important CPR is and how important minutes, seconds are in such a situation.' 'If I have the knowledge, I can help others.'
Meaning of mutual assistance	'It is important that we are able to help a person in need anytime. '
Importance of sobriety	'It is not worth reducing someone's chance of survival because of alcohol.' 'You have to be sober; this is very important for the life of the injured person. ' 'Normal limits of alcohol… you never know what can come.
Importance of preventive	'It is important to warn young people about the dangers of alcohol and drugs.' 'We need to reduce alcohol-related accidents.'
Other	'How very helpless you are in this condition.' 'I made the right decision not to drink alcohol anymore.' 'It put me firmly on the ground.'

4. Discussion and conclusions

In-person CPR training has long been the gold standard, but additional accessories and new technologies have evolved (Nas et al., 2019). The European Resuscitation Council guidelines (European Resuscitation Council, 2015) and international guidelines for first aid and resuscitation (International Federation of Red Cross and Red Crescent, 2016) support the use of simulations in teaching basic resuscitation procedures. In our experiment, we evaluated the use of FVG involved in the scenario of basic resuscitation procedures (CPR). We ascertain the positive effects of FVG use; they influence their readiness to act in real accidents and stimulate their critical thinking towards unhealthy drinking of alcohol.

Most students stated that they had already experience intoxication, which confirms that the alcohol-drinking problem is current. The results of the experiment confirm the negative effects of intoxication on psychophysical abilities, and consequently on the ability to perform CPR. In order to perform CPR effectively, it is necessary to perform proper chest compressions (European Resuscitation Council, 2015). According to the students', with FVG, it is more difficult to find the right place, press deep enough, and at the right pace when performing CPR. They also have similar opinions about properly administering artificial respiration. They stated that performing all the procedures related to CPR was slow, difficult, and often dangerous. CPR is even more difficult due to limited visual perception, confusion, and weak coordination. All of that was accompanied by many emotional reactions, including fear, doubt, and guilt. An important finding of our research is that sixteen students stated that they would not perform CPR in such a condition.

Moreover, even though students know how to perform CPR, the average self-assessment about self-esteem is low: 5.5/10 with FVG and 4.7/10 if they were drunk. It needs to be considered that FVG simulate only part of the feeling of intoxication, as they affect vision and coordination while the person is still able to think soberly. However, in the students' opinions and many insights, the experience of performing CPR with FVG is valuable for all participants. These are just some of the reasons that using FVG for pedagogical purposes makes sense. McCartney, Desbrow, and Irwin (2017) similarly evaluated using alcohol intoxication goggles to detect alcohol-related impairment in simulated driving. They concluded that FVG might benefit at specific driving performance measurements in repeated impairments due to alcohol. The equipment may offer an alternative approach to the impact on alcohol intoxication on simulated driving performance.

When planning the learning process, also CPR training, it should be considered that most adults find it easy to accept information in interactive environments (LaVelle and McLaughlin, 2008) and when they are actively involved in the learning process (Clemow, 2007). One novel training methods is virtual reality (Semeraro et al., 2017). It may represent a powerful tool for CPR training. Seventy-three per cent of the participants in the research (Semeraro et al., 2017) believe that virtual reality could play an important role in the future of training. Finally, we need to follow the interesting development of the learning process, but it is essential to combine it with traditional ways of learning.

5. Limitations of the Study

This study has several limitations. Although experimental in design, one of the limitations of this study is the small sample size. FVG only affected vision but did not deprive other senses, so we obtained only partial results about the effect of alcohol intoxication when performing CPR.

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