Medical Care at Mass Gatherings: The Case of TIF-HELEXPO

Trade Fairs and Events

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The provision of medical care during major events is a significant issue, both for organisers and for the emergency services that support these events. Nevertheless, research on this matter is limited. This research attempts to approach the matter through the study of fairs and events held at TIF-HELEXPO during the 2015-2018 period (1,774 medical incidents). Result analysis indicated that there are no significant differentiations in the number of medical incidents with regard to gender, age, country of origin, status, type of illness, and outcome of incidents; however, there were differentiations in the frequency of incidents, with regards to the character of the fair and the event.

Keywords: mass events, fairs, medical incidents, patient presentation rate

Introduction

Providing medical care during mass events is an important matter, both for organisers and for the emergency services participating in the events. However, available research data are limited, as the field of study is relatively recent and needs to be further explored. Specifically, in Greece, where, in recent years, the fair and event sector in general has been on the rise, with the significant contribution of TIF-HELEXPO, the matter of dealing with medical incidents is of special interest.

The object of this research is to explore medical incidents that appear at mass public gathering events, such as trade fairs and other events (festivals, theme parks, etc.). Specifically, this research focuses on the case of trade fairs and events organised by TIF-HELEXPO in the city of Thessaloniki. The goal of the research is to analyse the data on medical incidents that were handled by the TIF-HELEXPO clinic in recent years. The research aims to contribute both to recording and analysing the medical incidents that appear at Greek fairs, as well as the impact of the character of the fairs on the presentation of the medical incidents. For that reason, the analysis is carried out by dividing the events organised by TIF-HELEXPO into the following categories: (a) fairs addressed to the general public (business-to-customer [B2C]); (b) fairs addressed to sector businesses (business-to-business [B2B]); (c) mixed fairs (B2C and B2B); and (d) other fairs or events.
TIF-HELEXPO is one of the most important fair and congress organisers in Greece, the Eastern Mediterranean, and Southeastern Europe. TIF-HELEXPO is the national Greek organising entity of fairs and congresses, operating as an adviser to the state. At present, it has two exhibition centres in Thessaloniki and Athens. TIF-HELEXPO organises more than 25 International Trade Fairs in Greece, while it co-organises the Greek participation in the world’s top exhibitions. It also hosts on its exhibition grounds a significant number of fairs that are organised by the third organisers (TIF-HELEXPO, 2019).

Some of the main fairs organised by TIF-HELEXPO are the following: Thessaloniki International Fair, Agrotica, Zootechnia, Infacoma, Kosmima, Thessaloniki Book Fair, Furnidec, Philoxenia, Detrop, Oenos, Sportexpo, Hotelia, Artozyma, Freskon, Aquatherm, etc. Furthermore, TIF-HELEXPO grounds also host other types of events, such as the Asterocosmos Christmas Park and theme parks, such as the Chocolate Factory, the Secret Worlds of Evgenios Trivizas, etc. (TIF-HELEXPO, 2019).

Specifically, the city of Thessaloniki has an important tradition in holding fairs, which has presented a continuous journey for the last 90 years, organising international sectoral and general trade fairs (Kourkouridis, Dalkrani, Pozrikidis, & Fragopoulos, 2017). The first Thessaloniki International Fair was held on 3 October 1926, while TIF-HELEXPO moved to its current facilities in 1937. In 1999, the national exhibition body split into two companies, TIF and HELEXPO, while, in 2013, it was merged anew into one company, TIF-HELEXPO. The seat of the company is located at the Thessaloniki exhibition centre, which covers an area of 180,000 square metres in the centre of the city, with 62,000 square metres of exhibition space (TIF-HELEXPO, 2019).

Medical services on TIF grounds are provided by the medical care company “Nosokomastospiti” (Nurse At Home), which covers every fair and event that takes place at the TIF exhibition space, 365 days a year. The “Nosokomastospiti” Company makes sure that all events run smoothly and that all visitors and people working at the events are safe (at https://www.11311.gr).

Literature Review

A first review of the research data literature that is available was carried out by Michael and Barbera (1997), finding that there is an important, almost linear, relationship between the number of audience members attending a mass gathering per unit of time and the number of patients requesting medical care. A significantly higher patience presentation rate was identified at religious events, rock concerts, and events in hot spaces.

A few years later, Milsten, Maguire, Bissell, and Seaman (2002) found that the variables that may change the character and flow of a mass gathering are: (a) weather conditions; (b) attendance; (c) event duration; (d) indoor or outdoor event; (e) sitting or standing audience; (f) event type; (g) crowd mood; (h) alcohol and drug use; (i) crowd density; (j) location characteristics (outdoor or indoor); and (k) crowd age.

Steffen et al.’s (2012) review found that the main causes of death during mass events were irregular crowd flight and heat-related illnesses. Minor injuries and medical conditions are the main reasons contributing the need of emergency medical treatment, and factors connected to an increased danger of illness or injury during mass events are: outdoor gatherings, crowd density and mood, hot and cold weather, age and gender.

Karami et al. (2019) distinguished four types of gatherings and their most common health risks: (a) religious: infectious diseases, traffic accidents, environmental health problems; (b) festivals: alcohol and drug
use; (c) sports: injuries, infectious diseases, alcohol, and drug use; and (d) fairs (trade, book, agricultural).

Arbon (2004) created a theoretical model for the provision of medical assistance at mass gathering distinguishing three main fields: (a) psychosocial; (b) biomedical; and (c) environmental, and pointed out the interactions between the fields. Some of these characteristics of mass gatherings have been extensively studied, such as the type of event, the size of the crowd, and the weather conditions. However, some characteristics have not been extensively studied, such as the mood of the crowd.

Locoh-Donou et al. (2016) found that outdoor spaces, non-demarcated spaces, the absence of free water, the absence of air conditioning, and high temperatures are connected to increased patient presentation rates (PPR).

There are many more case studies regarding mass events of specific types, such as religious events (Shafi, Booy, Haworth, Rashid, & Memish, 2008; Bortolin et al., 2013), the Olympics (Thompson, Savoia, Powell, Challis, & Law, 1991; Wetterhall, Coulombier, Herndon, Zaza, & Cantwell, 1998), concerts (Janchar, Samaddar, & Milzman, 2000), festivals (Yazawa, Kamijo, Sakai, Ohashi, & Owa, 2007), etc. The case of fairs in specific, however, seems to have not yet been explored extensively, as case studies are relatively limited. Given that the type of event is related to the need for medical assistance, as was mentioned above, further exploration of the specific type of event is required.

For example, Gustafson et al. (1987) focused on the World Trade Fair of 1982, Knoxville Tennessee. During the six months of the fair, 11,127,786 visitors were recorded, while 24,747 were recorded as medical incidents (23/10,000 visits). As regards the causes, headaches, and purulent cysts (blisters) of the feet were the most common (5/10,000), followed by cuts and falls (2/10,000).

Pakravan, West, and Hodgkinson (2013) studied the case of an agricultural fair in Great Britain, Suffolk Show 2011, which was visited by more than 90,000 people, while 180 medical incidents were recorded in total. The PPR was 2.0, while the most common cases concerned wounds, purulent cysts (blisters), headaches, fainting, high fevers/allergies, injuries, ophthalmological problems, and insect stings.

Sun, Keim, He, Mahany, and Yuan (2013) studied the case of Shanghai Expo 2010, the largest mass gathering in global history that lasted six months (182 days) and attracted 70 million visitors to a city of 20 million people. Overall 97,708 visitors sought on-site medical care and 97,059 people were examined by doctors. Of those, 213 required hospitalisation and 2,520 were transported by hospital. The most common indication for medical examination was upper respiratory system infections, followed by intestinal illnesses, injuries, illnesses related to the heat, headaches, fever, abdominal pain, and acute outbreak of chronic illnesses. The success of Shanghai Expo 2010 as regards the presentation and handling of medical incidents is, to a great extent, due to an integrated approach for risk management, which included prevention, mitigation, readiness, reaction, and recovery.

Lastly, K. Zeitz, C. Zeitz, and Kadow-Griffin (2015) studied the case of the Royal Adelaide Show, an agricultural and gardening fair that lasted nine days, hosted in Adelaide in 2002. Research interest was focused specifically on the case of injuries during the fair. Total attendance over all nine days of the fair came to 622,234 people. Overall, 1,028 patients received medical assistance, while 265 of them presented injuries. Forty-two of the injuries concerned people working at the fair. Nine of them had to be transferred to the hospital. The most common reason for medical assistance was minor injuries, followed by more serious injuries. The majority of injuries that occurred at the event were of secondary importance.
Methodology

The data used in this research concern medical incidents handled by the clinic of TIF-HELEXPO from 2015 to 2018. It concerns a total of 1,774 medical incidents recorded by the TIF-HELEXPO clinic over 35 fairs and events. Specifically, the medical incidents in question presented during the following fairs and events:

- Thessaloniki International Fair in: 2015, 2016, 2017, 2018 (the main and largest fair in Greece),
- Kosmima in 2015, 2016, 2017 (jewellery fair),
- Philoxenia in 2015, 2016, 2017 (top tourism fair),
- Hotelia in 2018 (a hotel equipment fair),
- Asterocosmos in 2015 (Christmas recreation park),
- Agrotica in 2016 and 2018 (the largest agricultural machinery, equipment, and machinery fair in Greece and Southeastern Europe),
- Infacoma-Aquatherm in 2016 (Infacoma covers various sectors of building materials, machinery, insulation materials, etc., while Aquatherm covers the air conditioning sector),
- Detrop-Artozyma in 2016 and 2018 (Detrop is the only specialised food and beverage fair in Greece, while Artozyma is a baking and confectionary fair),
- Detrop-Oenos in 2017 (Oenos is an international wine fair),
- Furnidec in 2016, 2017, and 2018 (fair on furniture manufacture and trade in Greece),
- Sportexpo in 2016, 2017, and 2018 (a fair addressed to anyone involved in any type of sports activities),
- Autofestival-Dance Festival in 2017 (car and dance fair, correspondingly),
- Freskon in 2016, 2017, and 2018 (fruit and vegetable trade fair),
- Book Fair in 2016, 2017, and 2018 (annual art fair),
- Zootechnia in 2017 (the only specialised livestock and poultry fair in the Balkans).

The purpose of the research, besides recording and analysing the incidents overall, is the exploration of some of the additional characteristics of the fairs. For that reason, the fairs were grouped into three categories, depending on their character:

1. Fairs addressed to the general public (B2C): This category includes tagged image file format (TIF), the Book Fair, Sportexpo, and Art Thessaloniki.
2. Fairs addressed to Businesses of the sector (B2B): This category includes Freskon, Infacoma, Furnidec, and Kosmima.
3. Mixed fairs (B2C & B2B): This category includes Agrotica, Zootechnia, Detrop, Oenos, Artozyma, Philoxenia, and Hotelia. During their first days of operation, these fairs are purely commercial events and they accept only trade visitors, and over the final one or two days they are open to the general public.
4. Other fairs or events, such as theme parks, smaller sectoral exhibitions, and festivals-events, include the Asterocosmos event, AutoFest, and dance festival.

The patient presentation rate (PPR) for each fair was calculated as the number of presented patients per 10,000 participants. Also, certain statistics were calculated. Specifically, the age category of patients, their status at the fair (exhibitor, visitor, and staff), and their country of origin was calculated. Furthermore, the rate of presentation of the various conditions the TIF-HELEXPO clinic staff was called upon to deal with was calculated, as was the outcome of the specific incidents.

Findings and Discussion

In the 35 TIF-HELEXPO fairs and events that were studied, 1,774 medical incidents were identified in total. Patient age, in each individual fair and in all the fairs overall, ranged between 41 to 65 and 19 to 40, as seen in Figure 1.
MEDICAL CARE AT MASS GATHERINGS

Figure 1: Medical incident ages at TIF-HELEXPO fairs and events.

Note. NS: not stated.

Figure 2 shows that the patients who visited the TIF-HELEXPO clinic during the fairs and events being examined consisted of 42.56% visitors, 36.64% staff, and 20.80% exhibitors. Also, the vast majority were Greeks (97.58%), while only 2.14% lived in other countries (see Figure 3).

Figure 2: Status of patients who visited the clinic at TIF-HELEXPO fairs and events.
The conditions of the patients who visited the TIF-HELEXPO clinic are presented in Table 1. The most common condition of medical incidents overall were abrasions at a rate of 19.79%, followed by headaches at a rate of 16.57%, and weakness/dizziness at a rate of 9.08%. The data corresponds in individual fair and event categories.

Table 1

| Patient Conditions                  | Total (%) | B2C (%) | B2B (%) | Mixed (%) | Other (%) |
|-------------------------------------|-----------|---------|---------|-----------|-----------|
| Anxiousness/panic attacks           | 0.56      | 0.78    | -       | 0.64      | -         |
| Weakness/dizziness                  | 9.08      | 11.12   | 8.70    | 7.37      | 4.01      |
| Palpitations                        | 0.28      | 0.49    | -       | -         | -         |
| Medication administration request   | 2.76      | 2.15    | 8.70    | 2.88      | 2.01      |
| Change of dressing                  | 5.86      | 5.76    | 7.25    | 10.90     | 0.33      |
| Allergy                             | 2.59      | 2.54    | 3.62    | 2.56      | 2.34      |
| Removal of stitches                 | 0.11      | 0.10    | 0.72    | -         | -         |
| Cough/respiratory infections        | 0.96      | 0.29    | -       | 2.88      | 1.67      |
| Dermatological issue                | 0.39      | 0.59    | -       | -         | 0.33      |
| Abscess incision                    | 0.06      | 0.10    | -       | -         | -         |
| Diarrhoea/vomiting/nausea           | 4.28      | 2.15    | 8.70    | 4.49      | 9.36      |
| Dysmenorrhea                        | 0.85      | 1.17    | -       | 0.64      | 0.33      |
| Burn                                | 2.14      | 2.83    | 0.72    | 0.64      | 2.01      |
| Abrasions                           | 19.79     | 21.95   | 10.14   | 12.82     | 24.08     |
| Exposure to tear gas               | 0.34      | 0.59    | -       | -         | -         |
| Epistaxis/rhinorrhagia (nosebleed)  | 0.28      | 0.29    | 0.72    | -         | 0.33      |
| Epileptic seizure                   | 0.11      | 0.10    | -       | 0.32      | -         |
| Chest pain                          | 0.34      | 0.59    | -       | -         | -         |
| Headache                            | 16.57     | 14.73   | 19.57   | 21.47     | 16.39     |
| Closed injuries                     | 8.34      | 6.63    | 2.17    | 4.49      | 21.0      |
Table 1 to be continued

| Medical Condition                        | B2C (%) | B2B (%) | Mixed (%) | Other (%) |
|------------------------------------------|---------|---------|-----------|-----------|
| Abdominal pain                           | 1.18    | 1.66    | 0.72      | 0.96      |
| Fainting                                 | 0.96    | 1.27    | -         | 1.28      |
| Intoxication                             | 0.06    | 0.10    | -         | -         |
| Art. Bl. Pr. measurement                 | 4.17    | 3.90    | 9.42      | 5.77      | 1.00     |
| Blood sugar measurement                  | 0.17    | 0.29    | -         | -         |
| Muscle/joint pain                        | 7.61    | 6.83    | 7.25      | 8.01      | 10.03    |
| Neurological complaints                  | 0.11    | 0.20    | -         | -         |
| Insect sting                             | 0.68    | 1.17    | -         | -         |
| Dentistry complaint                      | 1.01    | 0.49    | -         | 2.24      | 2.01     |
| Swellings                                | 0.23    | 0.39    | -         | -         |
| Ophthalmological complaint               | 2.54    | 3.02    | 2.90      | 2.24      | 1.00     |
| Fever/infection                          | 0.51    | 0.78    | -         | 0.32      | -        |
| Wound stitching                          | 2.09    | 1.37    | 2.90      | 5.13      | 1.00     |
| Hypertensive peak                        | 1.13    | 0.98    | 5.07      | 0.96      | -        |
| Sore throat                              | 0.51    | 0.88    | -         | -         |
| Earache/otitis/tinnitus                  | 0.62    | 0.49    | 0.72      | 0.96      | 0.67     |
| Not declared                             | 0.73    | 1.27    | -         | -         |

As regards the outcome of the medical incidents (see Table 2), it was ascertained that the majority were treated, both in the incidents at the fairs and events overall (69.9%), and in individual categories of fairs and events studied (B2C: 67.41%, B2B: 71.01%, mixed: 69.23%, and others: 78.6%).

Table 2

Outcome of Medical Incidents

| Medical Condition                        | Total (%) | B2C (%) | B2B (%) | Mixed (%) | Other (%) |
|------------------------------------------|-----------|---------|---------|-----------|-----------|
| Ambulance transfer                       | 0.85      | 0.88    | -       | 0.96      | 1.00      |
| Company vehicle transfer                 | 0.45      | 0.78    | -       | -         | -         |
| Therapy                                  | 69.90     | 67.41   | 71.01   | 69.23     | 78.60     |
| Incomplete examination                   | 0.34      | 0.49    | -       | 0.32      | -         |
| Referral to clinic                       | 1.13      | 0.98    | -       | 1.28      | 2.01      |
| Referral to emergency hospital           | 2.20      | 2.15    | -       | 2.88      | 2.68      |
| Counselling                              | 7.89      | 6.73    | 12.32   | 13.78     | 3.68      |
| Further treatment                        | 10.37     | 10.44   | 14.49   | 11.22     | 7.36      |
| Recommendation of re-examination         | 6.31      | 9.17    | 2.17    | 0.32      | 4.68      |
| Not declared                             | 0.56      | 0.98    | -       | -         | -         |

The results for the exhibitions addressed to the general public (B2C) have been aggregated and are presented in Table 3. They concern 13 fairs with very high traffic, especially the Thessaloniki International Fair. Overall the specific fairs attracted 1,250,169 visitors, while the TIF-HELEXPO clinic handled a total of 1,025 incidents.

The highest rates of patient presentation were noted at TIF-2015 (13.02), with 215,000 visitors and 280 incidents, and at TIF-2016 (10.09) with 210,000 visitors and 212 incidents. The lowest rates of patient presentation were noted at Sportexpo-2018 (0.8), with 25,000 visitors and two incidents, and at Sportexpo-2017 (1.36) with 22,000 visitors and three incidents. The total patient presentation rate for the 13 B2C fairs was 8.20.
Table 3
Results for the Fairs Addressed to the General Public (Business-to-Consumer [B2C])

| Visitors | Incidents | PPR | Gender | Main conditions |
|----------|-----------|-----|--------|-----------------|
|          |           |     | Men (%) | Women (%)       |
| TIF-2015 | 215,000   | 280 | 13.02   | 57.14 42.86     | Abrasions 20.71% |
| TIF-2016 | 210,000   | 212 | 10.09   | 47.64 52.36     | Abrasions 23.11% |
| TIF-2017 | 265,000   | 199 | 7.51    | 47.74 52.26     | Abrasions 24.62% |
| TIF-2018 | 283,900   | 224 | 7.89    | 52.23 47.77     | Abrasions 26.34% |
| Sportexpo-2016 | 28,500 | 18  | 6.32 | 83.33 16.67 | Medication administration request 38.89% |
| Sportexpo-2017 | 22,000 | 3  | 1.36 | 33.33 66.67 | Weakness/dizziness 33.33% |
| Sportexpo-2018 | 25,000 | 2 | 0.8 | 50.00 50.00 | Headache 50.00% |
| Book fair-2016 | 54,000 | 31 | 5.74 | 58.06 41.94 | Abrasions 19.35% |
| Book fair-2017 | 70,000 | 18 | 2.57 | 61.11 38.89 | Headache 50.00% |
| Book fair-2018 | 45,000 | 17 | 3.78 | 47.06 52.94 | Weakness/dizziness 35.29% |
| ART Thessaloniki-2016 | 9,420 | 7  | 7.43 | 71.43 28.57 | Diarrhoea/vomiting/nausea 28.57% |
| ART Thessaloniki-2017 | 10,252 | 7  | 6.83 | 57.14 42.86 | Muscle/joint pain 42.86% |
| ART Thessaloniki-2018 | 12,097 | 7 | 5.79 | 57.14 42.86 | Headache 28.57% |
| Total       | 1,250,169| 1,025 | 8.20 | - - | - |

Table 4 presents the results for the 10 fairs that are addressed to businesses of the sector (B2B). Overall the specific fairs attracted 64,310 visitors, while the TIF-HELEXPO clinic handled a total of 138 incidents.

The highest patient presentation rate, by far, was recorded at the Kosmima-2015 fair (111.84), where the total number of visitors was 2,593 and there were 29 incidents. Next is Freskon-2016 (54.84) with 4,630 visitors and 24 incidents, and Furnidec-2016 (45.58) with 3,949 visitors and 18 incidents. The lowest patient presentation rate was noted at the Furnidec-2018 fair (13.33), which had 3,000 visitors and four incidents. The total patient presentation rate for the 10 B2B fairs was 13.80.

Table 4
The Results for the Fairs Addressed to Businesses of the Sector (Business to Business [B2B])

| Visitors | Incidents | PPR | Gender | Main conditions |
|----------|-----------|-----|--------|-----------------|
|          |           |     | Men (%) | Women (%)       |
| Kosmima-2015 | 2,593 | 29 | 111.84 | 82.76 17.24 | Headache 24.14% |
| Kosmima-2016 | 2,763 | 9  | 32.57 | 55.56 44.44 | Abrasions 33.33% |
| Kosmima-2017 | 2,865 | 6  | 20.94 | 16.67 83.33 | Headache 66.67% |
| Infacoma-Aquatherm-2016 | 30,000 | 20 | 6.67 | 80.00 20.00 | Art. Bl. Pr. measurement 30.00% |
| Freskon-2016 | 4,630 | 24 | 51.84 | 87.50 12.50 | Medication administration request 20.83% |
| Freskon-2017 | 4,000 | 8  | 20    | 75.00 25.00 | Headache 25.00% |
| Freskon-2018 | 4,340 | 10 | 23.04 | 90.00 10.00 | Change of dressing 20.00% |
| Furnidec-2016 | 3,949 | 18 | 45.58 | 72.22 27.78 | Headache 16.67% |
| Furnidec-2017 | 6,170 | 10 | 16.21 | 90.00 10.00 | Art. Bl. Pr. measurement 16.67% |
| Furnidec-2018 | 3,000 | 4  | 13.33 | 100.00 0.00 | Weakness/dizziness 40.00% |
| Total       | 64,310 | 138 | 13.80 | - - | - |
At mixed fairs (B2C & B2B), the highest patient presentation rate was identified at Philoxenia-2015 (36.1) with 14,126 visitors and 51 incidents, as indicated in Table 5, while it is followed by Philoxenia-Hotelia-2018 (12.5) with 23,200 visitors and 29 incidents. The lowest patient presentation rate was noted at Detrop-Artozyma 2018 (3.6), which had 25,000 visitors and nine incidents. The total patient presentation rate for the 10 mixed fairs was 8.91.

Table 5

Results for Mixed Fairs (B2C & B2B)

| Visitors | Incidents | PPR | Gender | Main conditions |
|----------|-----------|-----|--------|-----------------|
|          |           |     | Men (%) | Women (%)       |
| Philoxenia-2015 | 14,126  | 51  | 36.1 | 84.31 15.69 | Headache 23.53% |
| Philoxenia-2016 | 20,623  | 19  | 9.21 | 52.63 47.37 | Abrasions 26.32% |
| Philoxenia-2017 | 20,000  | 13  | 6.5  | 61.54 38.46 | Headache 26.32% |
| Philoxenia-hotelia-2018 | 23,200 | 29  | 12.5 | 34.48 65.52 | Change of dressing 13.79% |
| Agrotica-2016   | 123,700 | 76  | 6.14 | 81.58 18.42 | Abrasions 23.72% |
| Agrotica-2018   | 143,800 | 31  | 2.16 | 74.19 25.81 | Headache 26.81% |
| Detrop-Artozyma-2016 | 32,000 | 37  | 11.56 | 67.57 32.43 | Change of dressing 13.79% |
| Detrop-Artozyma-2018 | 32,830 | 28  | 8.53 | 78.57 21.43 | Abrasions 21.62% |
| Zootechnia-2017 | 58,743  | 19  | 3.23 | 78.95 21.05 | Muscles/joint pain 44.44% |
| Total           | 350,222 | 312 | 8.91 | -     -        | -                |

In the remaining fairs and events two events were identified (see Table 6): Asterocosmos-2017, with a patient presentation rate of 19.6 (150,000 visitors and 294 incidents), and Autofestival-Dancefestival-2017, with a patient presentation rate of 18.18 (2,750 visitors and five incidents). The total patient presentation rate for the two remaining fairs and events was 19.57.

Table 6

Results for Other Fairs or Events

| Visitors | Incidents | PPR | Gender | Main conditions |
|----------|-----------|-----|--------|-----------------|
|          |           |     | Men (%) | Women (%)       |
| Asterocosmos-2015 | 150,000 | 294 | 19.6 | 55.10 44.90 | Abrasions 24.49% |
| Autofestival-Dancefestival-2017 | 2,750  | 5   | 18.18 | 80.00 20.00 | Diarrhoea/vomiting/nausea 40.00% |
| Total    | 152,750   | 299 | 19.57 | -     -        | -                |

Table 7 presents the aggregated results for all the exhibitions studied. Specifically, the 35 fairs examined had 1,817,451 visitors, with an average of 51,927 visitors. The TIF-HELEXPO clinic dealt with a total of 1,774 incidents, with an average of 50.69 incidents. The total patient presentation rate for all the events was 9.76.

The category with the highest patient presentation rate was the B2B fairs with 21.46. Next are the other fairs and events with 19.57, the mixed fairs with 8.91, and the B2C fairs with 8.20.
Table 7

|                     | Total  | B2C    | B2B    | Mixed  | Other  |
|---------------------|--------|--------|--------|--------|--------|
| Number of fairs     | 35     | 13     | 10     | 10     | 2      |
| Visitors            | 1,817,451 | 1,250,169 | 64,310 | 350,222 | 152,750 |
| Average visitors    | 51,927 | 96,167 | 6,431  | 35,022 | 76,375 |
| Incidents           | 1,774  | 1,025  | 138    | 312    | 299    |
| Average incidents   | 50.69  | 78.85  | 13.80  | 31.20  | 149.50 |
| PPR                 | 9.76   | 8.20   | 21.46  | 8.91   | 19.57  |

Conclusions

The level and type of medical care required at a mass event is hard to foresee, a fact that possibly impacts the effectiveness of medical care provision at mass events. Therefore, dealing with medical incidents at mass events is an important issue with increasing research interest.

The available literature data focus mainly on isolated events or event categories, and, although they offer important information, they are not adequate to understand the impact of the events themselves on the matter of medical care provision. There was significant contribution from the research that focuses on the characteristics of events (Michael & Barbera, 1997; Milsten et al., 2002; Arbon, 2004; Steffen et al., 2012; Locoh-Donou et al., 2016; Karami et al., 2019) and the way in which they impact the medical incidents that present themselves at mass events. Specifically, however, studies of fairs are limited and do not include the characteristics of fairs in their calculations; instead they include an analysis of the incidents (Gustafson et al., 1987; Pakravan et al., 2013; Sun et al., 2013; Zeitz et al., 2015). Thus, this research aims to contribute to recording and analysing the medical incidents that present at fairs, as well as to explore the impact of the character of the fairs on presentation of the medical incidents. For that reason, the fairs studied were categorised based on their character into: fairs addressed to the general public—B2C, fairs addressed to sector businesses—B2B, mixed fairs, and other fairs or events.

From the research carried out, it was ascertained that mass events, and specifically TIF-HELEXPO fairs and events, present several medical incidents, which must be dealt with immediately. Specifically, at 35 fairs with a total of 1,817,451 visitors, 1,774 incidents were presented at the TIF-HELEXPO clinic (patient presentation rate: 9.76). No significant differentiations were identified between the categories studied as regards gender, age, country of origin, status (visitor, exhibitor, and staff), type of illness, and incident outcome.

However, the results of the research agree with those of previous studies, as it is ascertained that mass gatherings are not all the same, as regards the patient presentation rate. Specifically, there were differentiations in the patient presentation rate in the different categories studied. B2B fairs had a patient presentation rate of 21.46, which may have to do with the intensive operation of the fair (many hours of operation, continuous professional meetings, and intense pressure). Furthermore, the other fairs and events had a patient presentation rate of 19.57, which may be related to the activities carried out at them, for example, in Asterocosmos, there is a skating rink operating, at which there are many accidents. Lastly, the mixed fairs had a patient presentation rate of 8.91 and B2C fairs had a rate of 8.20.

The specific results are useful in more effectively dealing with future medical incidents at TIF-HELEXPO fairs and events, as well as similar events by other organisers. Considering that many of the characteristics of
mass events impact the levels and type of medical assistance required at mass events, the research should continue in that direction.

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