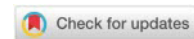


EFFECTS OF THE COVID-19 PANDEMIC ON THE VISITS FREQUENCIES IN EMERGENCY SERVICE SKOPJE

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Abstract: The pandemic caused by the COVID -19 virus has affected human health, consequently the health system and health services, both worldwide and in the Republic of North Macedonia. The idea for this research was therefore to examine the impact of the conditions imposed by the pandemic on the visits of the Emergency medical service in Skopje.

For this purpose, the frequencies of visits with transport to hospital and just visits, as well as the frequencies of emergency calls and calls only for transport in the periods: before the pandemic (March 2019-February 2020) and during the pandemic (March 2020 to February 2021) were analyzed. The overall number of visits was further analyzed by categories: age and gender.

In the period from March 2019 to March 2021, a total of 49,930 visits were performed, of which 24,115 were performed during the pandemic and 25,815 before. In the same period, a total of 13,835 emergency calls were answered, of which 6,434 were during the pandemic and 7,401 before; a total of 9780 calls for transport of patients were carried out, during the pandemic 5602 and 4178 before the pandemic. The analysis showed that the number of transports was increased and the number of emergency calls decreased during the pandemic compared to the pre-pandemic period, while the number of visits during and before the pandemic did not differ significantly. Concerning age and gender, the analysis showed that the number of visits to children, men aged 20 to 40 and women over 60 years was significantly reduced compared to pre-pandemic visits, while there was no difference in other age groups. The contributions of visits related to certain diagnostic and a particular age group are discussed in this paper.

We found that the pandemic has not influenced the pace of work, apart from the conditions, only the association between the kind of calls and the diagnoses for which the visits were made has practically changed. During the pandemic, most visits for males and females over 40 were related to COVID diagnosis, while for children, men and women under 40, accidents were the most common cause.

Keywords: COVID-19, Emergency Service, Medical emergency calls, visits

Field: Medical Sciences and Health

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is defined as a disease caused by a coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first identified in the city Wuhan, Hubei Province, China. It was originally reported to the World Health Organization (WHO) on December 31, 2019. On January 30, 2020, the WHO declared a public health emergency of international concern over the global outbreak of novel coronavirus, while on March 11, 2020, a global COVID -19 pandemic (WHO, 2020).

The first positive case in the Republic of North Macedonia was registered on February 26, 2020 and by March 18, 2020, the number of confirmed cases was 35. The Government of the Republic of North Macedonia, on its 15th regular session held on March 10, reviewed the information of the Steering Committee for the Coordination and Crisis Management System to take additional and intensified measures and activities to prevent the spread of the coronavirus upon the suggestion of the Infectious Diseases Commission of the Ministry of Health (GRNM, 2020).

Subject of numerous scientific studies in recent times at a global level was examining the effects of the pandemic and thus the quarantine on health care in the health systems of many countries. Among other things, the effects of the pandemic on emergency interventions are being researched. Only some of them are cited in this work: Andrew et al., 2021, Ikenberg et al., 2020, Jesus et al., 2021, Lavine & Hardy, 2022, Saini et al., 2022, Wartelle et al., 2021, Wongtanasarasin et al., 2020.

In order to analyze the impact of the pandemic on the work of the emergency services in Skopje, a

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study was conducted, the results of which are the subject of this work. For this purpose, an analysis of the differences in visits and calls was carried out in two periods: before and during the pandemic. The study also included an analysis of visits related by age group, gender, and patient diagnosis.

MATERIALS AND METHODS

The study is a retrospective analysis of the visits and calls to the Emergency Medical Service, Public Health Institution Health Center Skopje in Skopje, Republic of North Macedonia, for the period from March 2019 to March 2021.

For the purposes of the study, the visits and calls data are grouped by months into two periods and each lasted for a year, the period during the pandemic (March 2020 - February 2021) and the period before the pandemic (March 2019 - February 2020). The visits are categorized into two groups, visits and visits with transport of a patient to the hospital in the presence of a doctor. Other data categories are emergency calls and transport calls in which the transport of patients is done without the presence of a doctor.

The analysis of the total number of visits per month, age groups and diagnoses was also the subject of this study.

Differences between the data sets were tested with the non-parametric Kruskal-Wallis test using the XLstat statistical software.

RESULTS

Table 1 shows the frequency of visits, with and without transport to the hospital during and before the pandemic. The same table also lists the frequencies of emergency calls and calls for transport, which relate only to transporting a patient to a hospital without a doctor present. In the period from March 2019 to March 2021, a total of 49,930 visits were made by the Emergency medical service in Skopje. Of the total number of visits, 48.3% (24,115) were conducted during the pandemic period and 51.7% (25,815) were done before the pandemic. For the same period, 13,835 emergency calls and 9780 transport calls were answered. According to the data in Table 1, the number of emergency calls before the pandemic was higher than the number of calls during it. For transport calls, the situation is reversed, the number of calls during the pandemic is higher than the number of calls in the pre-pandemic period.

The frequency of the total numbers of visits, emergency calls and calls for transports per month in both periods are shown in Figure 1, Figure 2, and Figure 3, respectively. In addition, Table 2 provides the total number of visits for children, male (M) and female (F) classified by age group, during and before the pandemic, and in both periods.

Table 1. Frequency of visits and calls during and before the pandemic

	During the pandemic		Before the pandemic	
	<i>n</i>	%	<i>n</i>	%
Visits	15047	47.4	16671	52.6
Visits with transport	9068	49.8	9144	50.2
Emergency calls	6434	46.5	7401	53.5
Calls for transport	5602	57.3	4178	42.71

Figure 2. Frequency of emergency calls per mounts in both periods

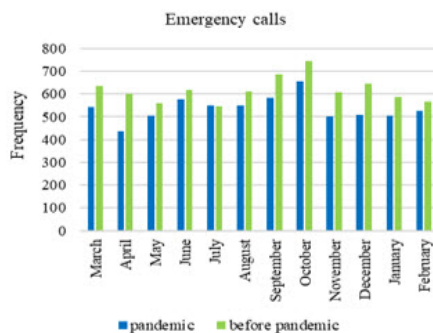


Figure 1. Total numbers of visits per mounts in both periods

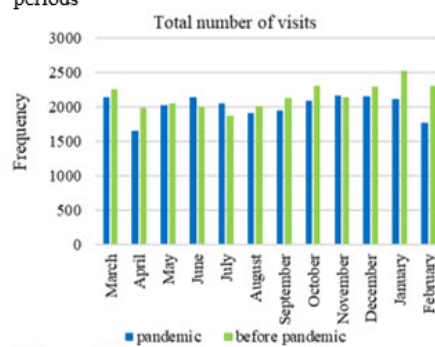


Figure 3. Frequency of calls for transport per mounts in both periods

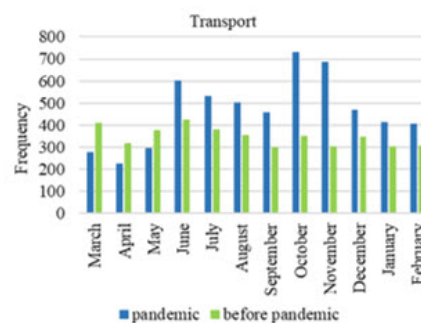


Table 2. Total numbers of visits for children, male (M) and female (F) classified by age group during and before the pandemic together, as well as in the both periods

Age group	During the pandemic		Before the pandemic		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Children	715	3.0	1070	4.14	1785	3.6
M (20-40y)	2112	8.8	2516	9.75	4628	9.3
F(20-40y)	1263	5.2	1279	4.95	2542	5.1
M (40-60y)	3693	15.3	3606	13.97	7299	14.6
F (40-60y)	2517	10.4	2420	9.37	4937	9.9
M (>60y)	6823	28.3	7006	27.14	13829	27.7
F (>60y)	6992	29.0	7918	30.67	14910	29.9

M-male, F-female

DISCUSSIONS

In the period from March 2019 to March 2021, a total of 49,930 visits were made by the Emergency medical service in Skopje. Of the total number of visits, 48.3% (24,115) were conducted during the pandemic period and 51.7% (25,815) were done before the pandemic (Table 1).

In the period of pandemic, the average monthly number of visits with transport to the hospital was 756, while for the period before that was 762 (Table 1). The maximum number of visits during the pandemic was done in December and the maximum number of visits in the period before refers to October. The results of the statistical test revealed that there were no significant differences between the frequencies of visits with transport in the periods during and before the pandemic (KW, $p=0.2260$). Furthermore, the average monthly number of visits (without transport) was only 1254 in the pandemic, while for the period before was 1389. The maximum number of visits was done in March during the pandemic and the maximum number of visits was in January in the period before. The difference in visits without transport during and before the pandemic period proved to be statistically insignificant (KW, $p=0.4877$) at a 95% confidence level. The analysis showed that the differences in the frequencies of the total number of visits (with and without transport) in the period during and the period before the pandemic did not differ significantly (KW $p=0.2167$) at a 95% confidence level (Figure 1).

In the period from March 2019 to March 2021, a total of 13,835 emergency calls were answered by the Emergency Medical Service, of which 46.5% (6,434) were answered during the pandemic and 53.5% (7401) before. Statistically significant is the difference between the period before the pandemic, which corresponds to a higher number of emergency calls, compared with the period during the pandemic (KW, $p=0.0018$). During the pandemic, the maximum number of frequencies corresponds to the second wave of the pandemic in October (Figure 2). While the pre-pandemic maximum number was also shown for that month.

In the period from March 2019 to February 2021, a total of 9,780 patient transports to healthcare facilities were carried out by the Emergency service. The number of transports during the pandemic is higher than in the period before (KW, $p=0.0567$ – the test result is significant at the 90% confidence level). During the pandemic, the frequencies of transported patients follow the trend of the first and second pandemic waves, while the trend of the transport frequencies in the period before the pandemic deviates from this and corresponds to statistical variations (Figure 3).

Further evaluation included investigation of visits regarding age group and gender. As expected, the lowest number of visits during and before the pandemic was for children, while the largest number was for the over-60s age group. A total of 715 visits were made to children during the pandemic, with an average of 60 visits per month. In the pre-pandemic period, the total number of visits was 1070 with an average of 89 visits per month. The differences between visits to children during and before the pandemic are statistically significant (KW, $p=0.0007$). The maximum number of visits to children was done in March during and before the pandemic. During the pandemic, the number of visits to children is lower than in the pre-pandemic period in all the months except July. During the pandemic, most visits to children are related to the: traffic accidents (20.8%) and epilepsy (17.2%). COVID -19-related visits to children were 4.5% of the total number of visits during the pandemic. In the period before the pandemic, the maximum contribution of the total number of visits refers to: trauma injuries (20.3%), traffic accidents (17.7%) and epilepsy (15.9%).

During the pandemic, a total of 2112 visits were conducted among males in the 20-40 y age group with an average of 176 visits per month, while there is a statistically significant difference (KW, $p=0.0079$) compared with the period before the pandemic, when 2516 visits were done, with an average of 210 visits per month. The maximum number of visits for men in this age group was done in March during and before the pandemic. In both periods, most visits among males aged 20 to 40 were related to: traffic accidents (22.2%) and trauma injuries (13.6%) in period of pandemic, and trauma injures (14.7%) and traffic accidents (19.2%) in the pre-pandemic period. Visits to men aged 20-40 y associated with COVID-19 account for 6.1% of the total visits during the pandemic.

For the period during the pandemic, a total of 1263 visits were made among women in the 20 to 40 y age group with an average value of 105 visits per month, similar to the period before (KW, $p=0.9309$) when the total number of visits was 1279 with an average value of 109 visits per month. The maximum number of visits to women in this age group was done in September during the pandemic and in February before the pandemic. For females aged 20-40y, during the pandemic, most visits were related to: traffic accidents (13.9%) and neurosis, stress (9.4%). The same cause was the largest contributor to the total number of visits occurred before the pandemic: traffic accidents (13.7%) and neurosis, stress (9.5%). Visits to women aged 20 to 40 y associated with COVID-19 were 7.4% of the total number of visits during the pandemic.

At the period of the pandemic, a total of 3693 visits were made to males in the 40-60 age group, with an average frequency of 308 visits per month. With a similar frequency in the period before the pandemic, the total number of visits was 3606, with an average of 301 visits per month (KW, $p=0.4525$). The maximum number of visits for men in this age group was done in November during the pandemic, and in March before the pandemic. During the pandemic, the highest number of visits among men aged 40 to 60 refers to visits related to COVID-19 (13.4%) and traffic accidents (7.2%) of the total number of visits during the pandemic. In the period before the pandemic, the largest contributors to the total number of visits were caused by: trauma (8.1%) and traffic accidents (7.4%).

A total number of 2,517 visits were made to women in the 40-60 age group during the pandemic, with an average of 210 visits per month. The difference in frequency of visits before the pandemic was statistically insignificant (KW, $p=0.4185$) and it was 2420, with an average value of 202 visits per month. The maximum number of visits to women in this age group was done in January during the pandemic, and in March before the pandemic. During the pandemic, the highest number of visits to women aged 40 to 60 refers to: COVID-19 (14.1%) and ca (12.6%). In the period before the pandemic, the largest contributions to the total number of visits refers to: (14.9%) neuroses, stress (9.0%) and diseases of the nervous system (9.0%).

During the pandemic a total of 6823 visits were made to men aged over 60, with an average of 569 visits per month. In the period before the pandemic, the total number of visits was 7006, with an average of 584 visits per month. The differences between visits in both periods were statistically insignificant (KW, $p=0.7728$). The maximum number of visits for men in this age group was done in November during the pandemic and in January before the pandemic. During the pandemic, the highest number of visits among men over the age of 60 refers to visits related to: ca (12.6%) and COVID-19 (14.1%). In the period before the pandemic, the largest contributions to the total number of visits were related to the diagnosis: ca (11.6%) and cvi (9%).

During the pandemic a total of 6,992 visits were made to women aged over 60, with an average of 583 visits per month. In the period before the pandemic, the frequencies of visits were significantly higher (KW, $p=0.0433$) with a total visit number of 7918, and an average of 660 visits per month. The maximum number of visits to women of this age group was done during the pandemic in January and in the same month in the period before the pandemic. During the pandemic, the highest number of visits among women aged 40-60 refers to: COVID-19 (10.8%) and ca (10.2%). In the period before the pandemic, the largest contributors to the total number of visits were diagnoses: ca (15.1%) and hypertension (11.4%).

It also assumed whether there was a difference between the number of visits by gender in a given age group during and before the pandemic. There is a statistically significant difference in the total number of visits for men in the age groups 20 to 40 years and 40 to 60 years during and before the pandemic, and it is higher compared with the number for women (KW, $p<0.0001$). During the pandemic, the total number of visits to men and women over the age of 60 does not differ. On the other hand, in the period before the pandemic, the number of visits among women over 60 is higher than the number among men.

CONCLUSIONS

In the period from March 2019 to March 2021, the Emergency service, Skopje answered a total of 49930 calls, of which 48.3% (24115) during the pandemic and 51.7% (25815) in the period before the pandemic. The total of 13,835 were emergency calls, 46.5% (6,434) were during the pandemic and 53.5% (7,401) before the pandemic. In addition, a total of 9780 transport (without a doctor) were carried out during the observation period, of which 57.3% (5602) during the pandemic and 42.71% (4178) in the period before.

Analysis of the results showed that the number of calls did not differ during the pandemic and before. On the other hand, the pandemic contributed to the number of emergency calls to decrease and the number of calls only for transport to increase. Despite statistically insignificant fluctuations in calls per month, the number of calls follows the increasing trend during the first, second and third waves of the pandemic.

A further analysis of the frequency of visits in relation to age group, gender and diagnosis only proved to be meaningful in certain groups (Table 2). In general, the lowest number of visits during and before the pandemic was for children, while the largest number was for the over the age of 60 group. For the age groups 20 to 40 years and 40 to 60 years, the frequency of visits for men was significantly higher than for women during and before the pandemic. During the pandemic, the total number of visits by men and women over the age of 60 does not differ. On the other hand, in the period before the pandemic, the number of visits among women over 60 is higher than among men.

For children, the number of visits has been reduced during the pandemic compared to the period before. Traffic accidents and epilepsy caused the largest share of visit frequency in the two studied periods, while visits related to COVID-19 are the reason for 4.5% of all diagnoses.

Males in the 20–40 age group were mainly visited for traffic accidents and trauma injures in both periods, while females in this age group had traffic accidents and neurosis. COVID -19 -related visits are the reason for 6.1% for men and 7.4% for women. The dominant contributor to the number of visits during the pandemic was the COVID -19 for the age groups 40 to 60 years: men (13.4%) and women (14.1%) and over 60 years: men (14.1%) and women (10.8). In addition to COVID -19, during the pandemic most visits for men aged 40-60 and over 60 were related to accidents or ca, respectively, while for women of the same age group were related to ca diagnosis.

Finally, as a general conclusion, it can be stated that the pandemic, except for the conditions, did not affect the pace of work, only the relationship between the types of calls and the diagnoses for which the visits were made was practically changed. During the pandemic, most of the visits to both men and women over the age of 40 were related to COVID-19 diagnosis, while in children, men and women under the age of 40 the most common cause was accidents.

Finally, as a general conclusion, the pandemic has not affected the pace of work, except for the conditions, only the relationship between the type of calls and the diagnoses for which the visits were made has practically changed. During the pandemic, most visits to men and women over 40 were related to COVID-19 diagnosis, while to children, men and women under 40, accidents were the most common cause.

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