A UNIQUE PHENOMENON OF THE PANDEMIC 2020:[*]
Mortality among COVID-19 Patients is the Lowest on Sundays and Mondays.

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Abstract.

Background. The Weekly Mortality Cycle among CoViD-19 patients has been studied.

Methods. Mortality data obtained from the 'Worldometer' website were analyzed with a comparison of absolute values, percentages and p-value.

Results. For patients suffering from CoViD-19, the most favorable or the safest days of the week were Sundays and Mondays.

Conclusion. The weekly cycle with decreased mortality on Sundays and Mondays is a unique phenomenon observed among victims of CoViD-19. Presumably the decreased mortality on certain days of the week was related to the optimized therapeutic protocols used on the "safest days". If the factors, which reduced mortality on certain days of the week could be identified, their positive effect should be spread to other days of the week to decrease mortality among patients suffering from CoViD-19.

Keywords. CoViD-19, Mortality, Weekly Cycle, Weekly Mortality Cycle, Pandemic.

Abbreviation. HLM – is a ratio between a number of deaths on the day with the highest mortality and a number of deaths on the day with the lowest mortality.

Abbreviations for the days of the week were used in all tables and in the certain places of the main text: 'Sun' means Sunday(s), 'Mon' – Monday/s, 'Tue' – Tuesday/s, 'Wed' – Wednesday/s, 'Thu' - Thursday/s, 'Fri' – Friday/s and 'Sat' – Saturday/s.

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[*] Professor Igor A. Gundarov, a Doctor of Medicine, a specialist in the field of epidemiology and medical statistics, comments this study at the Section # 11.

Introduction.

On December 31, 2019, Wuhan Municipal Health Commission announced a pneumonia epidemic.[1] On the same day the WHO's China Country Office was informed of the cases of pneumonia of unknown cause detected in Wuhan City, Hubei Province of China.[2]

On January 3, 2020, the first complete genome of the novel coronavirus (2019-nCoVs) was identified. Several detection tests have been developed by Chinese Center for Disease Control and Prevention.[3] On February 11, 2020, a new disease was named "the coronavirus disease 2019" or CoViD-19.[4] On March 11, 2020, World Health Organization declared CoViD-19 pandemic.[5]

1. Mortality Among People Infected with SARS-CoV-2 and its Dynamic.

Mortality rate is one of the most important parameters of any infectious disease. So, collection of the date dealing with the current pandemic should be done with great care otherwise coronavirus mortality overestimation can lead to wrong decisions.[6]

In the first report provided by a group of experts from Imperial College London, there were 41 confirmed cases with 2 deaths; the estimated number of infected people was 1,723,[7] (the estimated mortality rate was around - 0.12 %). In the second report provided by the same group of experts, there were 440 confirmed cases with 9 deaths, and the estimated number of infected people was around 4000,[8] (the estimated mortality rate was around - 0.23 %). The most pessimistic prognosis was predicted by the same group of scientists on March 18, 2020.[9]

According to the subsequent studies, the mortality rate among SARS-CoV-2 infected people was less than 1 %,[10] and could vary around 0.3-0.5 %.[11]

Objective: To study the dynamic of weekly mortality rate among people infected with SARS-CoV-2.

Methods: The database of the "Worldwide Daily Mortality" due to CoViD-19 was collected from the 'Worldometer' website[12] on December 7, 2020, and then presented in Table. 1. The database of the "Worldwide Daily New Cases" infected with SARS-CoV-2 were collected from the same source, but that table was omitted in the manuscript. Forty weeks were analysed (01.03.30–05.12.20).

For each week, weekly mortality and weekly new cases were calculated using simple addition of data for seven days, from Sunday to Saturday. Weekly mortality rate was estimated with dividing "weekly mortality" by "weekly new cases" for each week (Tab. 2). The dynamics of weekly mortality is shown in Figure 1.

Results: According to the current study, the highest mortality was observed from the mid of March to the mid of May, with the highest rate (9.36%) during the week No. 7 (April 12-18), when the clinical trials in the group of people infected with SARS-CoV-2 were in the initial phase yet.

Table 1.
Global Mortality Due to CoViD-19 from January 24 to December 5, 2020 [collected on December 7, 2020].

week, #	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Comments	HLR
						**16	15	** Jan 24	
i	24	26	26	38	43	46	*45	* Feb 1	1.917
ii	58	64	66	73	73	86	89		1.534
iii	97	108	97	146	122	143	143		1.505
iv	106	98	136	117	121	113	100		1.388
v	158	81	64	37	58	65	54		4.270
No. 1	*73	67	85	83	102	106	106	* Mar 1	1.582
2	229	197	277	333	358	452	421		2.294
3	708	655	837	1001	1126	1417	1666		2.544
4	1690	1998	2586	2642	3118	3551	3847		2.276
5	3498	4289	4754	*5349	6400	6197	6307	* Apr 1	1.830
6	5260	5761	7839	6928	7822	7246	6405		1.490
7	5772	5786	7552	8263	7016	8534	6701		1.479
8	5045	5740	7362	6697	6862	6487	6223		1.459
9	3945	4701	7000	6675	5909	*5884	5665	* May 1	1.774
10	3807	4307	5950	6773	5773	5634	4428		1.779
11	4447	3700	5765	5269	5402	5234	4477		1.558
12	3717	3616	4712	4764	5139	4887	4333		1.421
13	3312	3516	3900	5365	4783	4968	4212		1.620
14	3444	*3239	4779	5024	5749	5040	4455	* Jun 1	1.775
15	3670	3350	4866	5280	5139	4789	4431		1.576
16	3502	3599	6665	5386	5367	5252	4599		1.903
17	3595	4039	5486	5208	5398	4977	4726		1.526
18	3684	3694	5142	*4969	5299	5310	4707	* Jul 1	1.441
19	3782	3692	5602	5696	5654	5602	5150		1.543
20	4380	3920	5682	5980	5967	5762	5252		1.526
21	4478	4123	5827	7314	6479	6356	5848		1.774
22	4445	4253	5680	7073	6839	6493	*5717	* Aug 1	1.663
23	4577	4470	6341	7049	6644	6602	5771		1.577
24	4929	4540	6513	6921	6720	6128	5675		1.524
25	4706	4405	6335	6779	6357	6213	5547		1.539
26	4598	4325	6202	6466	6223	5837	5497		1.495
27	4353	4346	*5978	6457	6004	5863	5003	* Sep 1	1.486
28	4247	3872	4429	6230	6021	5792	5116		1.609
29	4002	4264	6000	6007	5412	5453	5200		1.501
30	3992	3810	5364	6048	5558	5462	5101		1.587
31	3795	3536	5498	5836	*5623	5622	4874	* Oct 1	1.650
32	4123	4270	5576	5938	6431	5894	5267		1.560
33	3974	3782	5002	6101	6119	6226	5720		1.646
34	4110	4440	6190	6856	6502	6555	5747		1.668
35	4659	5113	7055	7167	7170	7521	6665		1.614
36	*5480	5761	8250	9182	8869	9260	7722	* Nov 1	1.690
37	6129	6748	9358	10193	9687	10003	9226		1.663
38	7117	7629	10578	11283	11068	11169	9332		1.585
39	7829	8170	11786	12286	11281	10832	9523		1.569
No. 40	7585	8462	*11943	12516	12834	12166	10191	* Dec 1	1.692

* A first day of each month.
** January 24, 2020 was the first day mentioned in the database of the 'Worldometer' website.

Table 2.

Weekly deaths, weekly new cases and mortality rate; Forty weeks were analysed (01.03.20-05.12.20).

Week Number and dates		Weekly Deaths	Weekly New Cases	*MR		Week Number and dates		Weekly Deaths	Weekly New Cases	*MR
1	01.03-07.03	622	27030	2.30		21	19.07-25.07	40425	1788346	2.26
2	08.03-14.03	2267	80847	2.80		22	26.07-01.08	40500	1831624	2.21
3	15.03-21.03	7410	192895	3.84		23	02.08-08.08	41454	1800749	2.30
4	22.03-28.03	19432	359549	5.40		24	09.08-15.08	41426	1853586	2.23
5	29.03-04.04	36794	502534	7.32		25	16.08-22.08	40342	1771117	2.28
6	05.04-11.04	47261	550941	8.58		26	23.08-29.08	39148	1808783	2.16
7	**12.04-18.04**	**49624**	**530089**	**9.36**		27	30.08-05.09	38004	1911797	1.99
8	19.04-25.04	44416	558829	7.95		28	06.09-12.09	35707	1904865	1.87
9	26.04-02.05	39779	545512	7.29		29	13.09-19.09	36338	2043230	1.78
10	03.05-09.05	36672	606805	6.04		30	20.09-26.09	35335	2042437	1.73
11	10.05-16.05	34294	615151	5.57		31	27.09-03.10	34784	2072676	1.68
12	17.05-23.05	31168	688057	4.53		32	04.10-10.10	37499	2290257	1.64
13	24.05-30.05	30056	769786	3.90		33	11.10-17.10	36924	2491069	1.48
14	31.05-06.06	31730	844284	3.76		34	18.10-24.10	40400	2979525	1.36
15	07.06-13.06	31525	902187	3.49		35	25.10-31.10	45350	3438119	1.32
16	14.06-20.06	34370	1026292	3.35		36	01.11-07.11	54524	3874278	1.41
17	21.06-27.06	33429	1170067	2.86		37	18.11-14.11	61344	4074584	1.51
18	28.06-04.07	32805	1330213	2.47		38	15.11-21.11	68176	4109382	1.66
19	05.07-11.07	35178	1464504	2.40		39	22.11-28.11	71707	4072184	1.76
20	12.07-18.07	36943	1581194	2.34		40	29.11-05.12	75697	4256119	1.78

* Mortality rate was calculated as the ratio between the number of "Weekly Deaths" and the number of "Weekly New Cases"; it is expressed in percentage.

Conclusion: There are no valid publications that have revealed change in the danger of a new virus. Therefore, one can assume that the dynamic of the mortality rate among patients with CoViD-19 (Fig. 1) depended on the treatment efficacy. Based on the previous estimation offered by a group of experts from Imperial College London[7] it may be concluded that a real amount of the infected people much higher than recorded and a real mortality rate is lower than was estimated in Tab. 2.
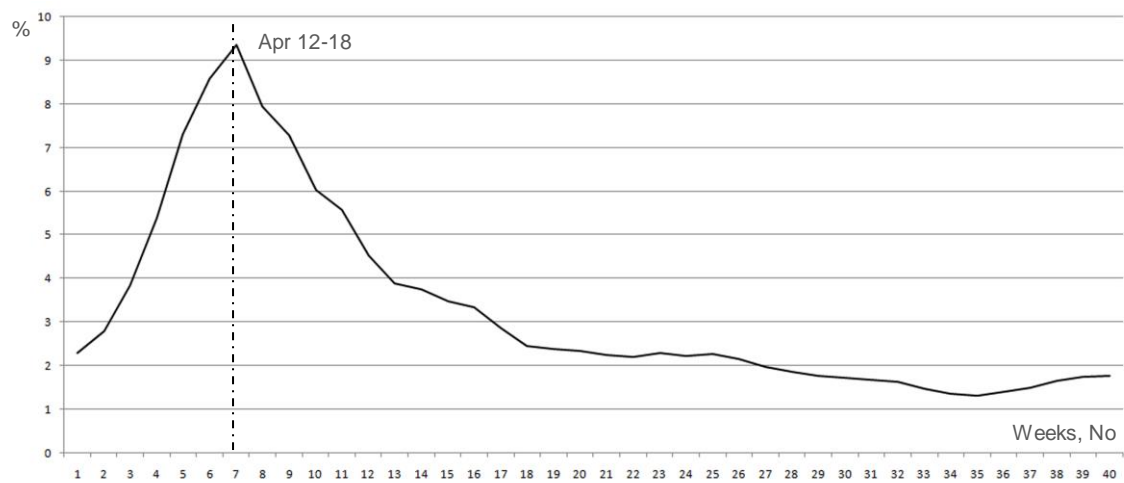
Figure 1. Weekly mortality rate calculated as a ratio between the total sum of weekly deaths due to CoViD-19 and the total sum of the weekly new cases infected with SARS-CoV-2 (week numbers see in the Tab. 2).

2. A Global Weekly Mortality Cycle Related to CoViD-19.

Background: On the CoViD-19 mortality statistics presented on the '*Worldometer*' website,[12] a weekly cycle of decreased mortality on Sundays and Mondays is evident (Fig. 2). This cycle can vary in different countries,[13] but the main trend is decreased mortality towards weekends.[14]

Objective: To study the weekly mortality cycle among CoViD-19 patients.
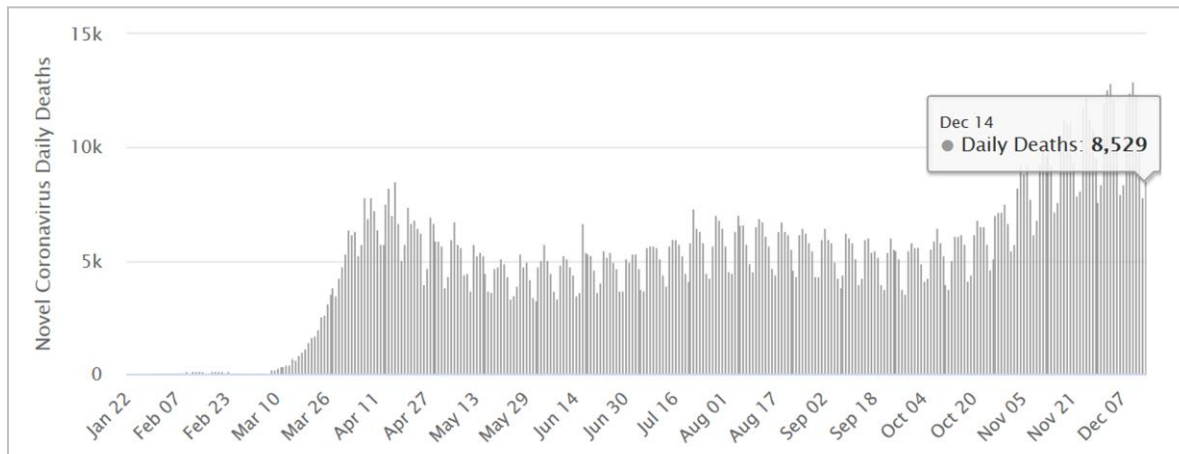
Figure 2. Daily New Deaths due to CoViD-19 worldwide (a screenshot taken on Dec. 15, 2020).

2.1. *Methods*: Since July 6, 2020, data from 'Worldometer' website were collected every 5-6 days in the form of numbers and screenshots. Data processing was divided into two parts: the first was calculating mortality on certain days of the week worldwide; the second was calculating mortality on certain days of the week in various countries.

Database of worldwide daily mortality due to CoViD-19 from January 24 to December 5, 2020, were collected on December 7, 2020 (Tab. 1).

There were comparisons between the total mortality on certain days of the week in absolute values and percentages. There was an additional criteria used, that was a ratio between a number of deaths on the day with the highest mortality and a number of deaths on the day with the lowest mortality, that can be termed as high/low mortality ratio or HLM. 40 weeks were analysed (01.03.20- 05.12.20).

Results: During the mentioned weeks there have been a total of 1,530,859 deaths from CoViD-19, worldwide. 166,688 (10.89%) patients died on Sundays, 170,185 (11.12%) on Mondays, 236,746 (15.46%) on Tuesdays, 251,387 (16.42%) on Wednesdays, 246,224 (16.08%) on Thursdays, 242,776 (15.86%) on Fridays and 216,853 (14.17%) on Saturdays.

The highest daily mortality was on Wednesday and the lowest daily mortality was on Sunday. The HLM ratio, calculated as 251,387 divided by 166,688 was 1.508 (Tab 3).

Table 3.

Absolute Values of deaths from CoViD-19 and Percentage in total and on certain days of the week. Forty weeks were analysed (01.03.20-05.12.20). Database was collected on December 7, 2020.

week, #	Total	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLR
Total, n	1,530,859	166,688	170,185	236,746	251,387	246,224	242,776	216,853	1.508
Mean		4,167	4,255	5,919	6,285	6,156	6,069	5,421	
SD±		±1,600	±1,742	±2,474	±2,581	±2,452	±2,414	±2,024	
%	100 %	10.89%	11.12%	15.46%	16.42%	16.08%	15.86%	14.17%	

1.2. *Methods*: The comparison of the global daily mortality between various days of the week done with the calculation of the *p*-value. If *p*-value was 0.001 or less, for example, 0.0005, or 0.00005, it was presented as p<0.001. 40 weeks were analysed (01.03.20- 05.12.20).

Results: The global daily mortality on Sunday was less than global daily mortality on Tue, Wed, Thu, Fri (p<0.001) and Sat (p<0.005). The global daily mortality on Monday was less than global daily mortality on Tue, Wed, Thu, Fri (p<0.001) and Sat (p<0.01).

Discussion: If the low mortality on Sundays was related to the registration of the deceased, one could assume that all cases not recorded on Sundays must be added to the death cases on Mondays, and as a result, the number of deaths on Mondays must be not less than on other days of the week. In reality, the number of deaths on Mondays was almost as low as on Sundays.

Conclusion: For patients suffering from CoViD-19 worldwide, the most favorable or safest days of the week were Sundays and Mondays (Fig. 3).
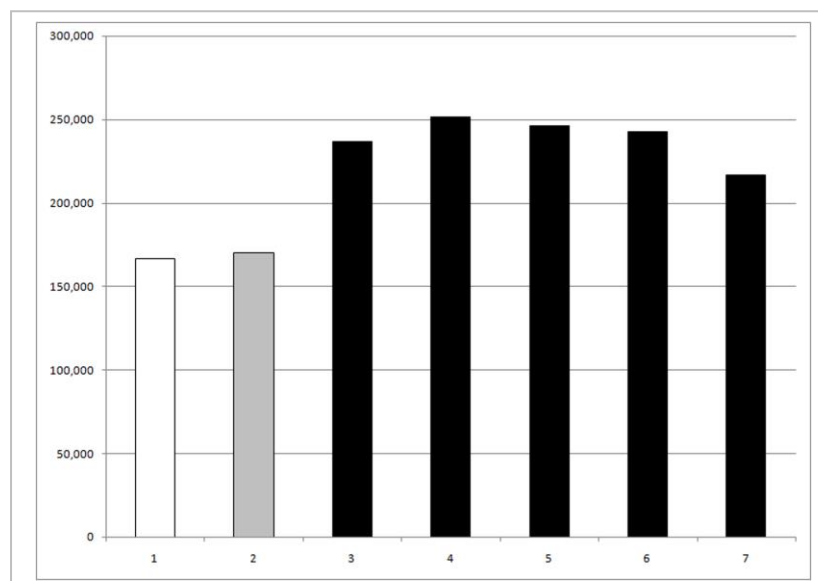
Figure 3. Global Mortality Due to CoViD-19 on Various Days of the Week (01.03.20 – 05.12.20). A vertical axis shows absolute value of deaths; a horizontal axis shows day of the week: 1. Sunday (white), 2. Monday (grey), 3. Tuesday, 4. Wednesday, 5. Thursday, 6. Friday, 7. Saturday (all black).

3. The Weekly Mortality Cycle related to CoViD-19 in Various Countries.

Background: The global trend that may be termed the "Weekly Mortality Cycle" with more or less certainty, has been revealed in twelve countries including Argentina, Brazil, Chile, France, Germany, Mexico, the Netherlands, Poland, Russia, Ukraine, the United Kingdom and the United States.

As it has been presented above, the lowest worldwide mortality due to CoViD-19 was on Sundays and Mondays. In various countries days of the week with the lowest mortality can vary nevertheless they either belong to the weekend or they are near the weekend.

Due to the fact that the time of CoViD-19 outbreak varied in the different countries, the analysed weeks varied too. All analysed periods started on a Sunday and ended on a Saturday.

3.1. *Methods*: The data on mortality from CoViD-19 in different countries were taken from the website of 'Worldometer'.[13] A comparison of the total mortality on certain days of the week in absolute values, percentages and HLM ratio in various countries was carried out (Table 4).

Table 4:
Mortality on various days of the week. There are absolute values, percentages and HLM ratio. Database was collected on December 9, 2020.

Countries: Dates:	Total	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLM
United States 22.03-05.12.20	287,469	*22,642 7.87%	26,410 9.19%	50,763 17.66%	52,624 18.31%	48,746 16.96%	46,973 16.34%	39,311 13.67%	2.324
Brazil 22.03-05.12.20	176,623	13,673 7.74%	17,008 9.63%	30,389 17.21%	31,400 17.78%	31,477 17.82%	28,211 16.00%	24,465 13.85%	2.302
Mexico 05.04-05.12.20	108,840	15,062 13.84	7,945 7.3	9,576 8.8	20,641 18.96	19,820 18.21	17,802 16.36	17,994 16.53	2.598
United Kingdom 22.03-05.12.20	60,746	5,235 8.62%	4,847 7.98%	11,121 18.31%	10,803 17.78%	9,611 15.82%	10,172 16.75%	8,957 14.74%	2.294
France 22.03-05.12.20	54,312	4,572 8.42%	7,690 14.16%	9,907 18.24%	7,734 14.24%	8,784 16.17%	9,572 17.63%	6,053 11.14%	2.167
Russia 29.03-05.12.20	42,620	4,614 10.83%	4,236 9.94%	6,672 15.66%	6,994 16.41%	6,641 15.58%	6,817 15.99%	6,646 15.59%	1.651
Argentina 29.03-05.12.20	39,578	3,867 9.77%	6,009 15.18%	6,201 15.67%	6,275 15.86%	5,977 15.10%	6,447 16.29%	4,802 12.13%	1.667
Poland 29.03-05.12.20	19,841	1,719 8.66%	1,083 5.46%	2,708 13.65%	3,709 18.69%	3,557 17.93%	3,532 17.80%	3,533 17.81%	3.425
Germany 22.03-05.12.20	18,955	1,270 6.70%	2,521 13.30%	3,470 18.31%	3,485 18.39%	3,276 17.28%	3,092 16.31%	1,841 9.71%	2.744
Chile 05.04-05.12.20	15,037	2,313 15.38%	1,753 11.66%	1,105 7.35%	1,885 12.54%	2,930 19.48%	2,507 16.67%	2,544 16.92%	2.652
Ukraine 29.03-05.12.20	13,412	1,406 10.48%	1,172 8.74%	1,990 14.84%	2,206 16.45%	2,185 16.29%	2,219 16.54%	2,234 16.66%	1.906
Netherlands 22.03-05.12.20	9,511	903 9.49%	773 8.13%	1,691 17.78%	1,642 17.27%	1,560 16.40%	1,497 15.74%	1,445 15.19%	2.188

* Absolute values on the day with the lowest mortality are highlighted by using bold font.

Results: A comparison of the total mortality on certain days of the week has revealed that in the analysed countries daily mortality on Sundays (n=5) or Mondays (n=6) was less than on other days of the week, excluding Chile, where the lowest mortality due to CoDiD-19 was on Tuesdays. The highest HLM ratio was in Poland (3.425), the lowest one was in Russia (1.651).

Conclusion: For patients suffering from CoViD-19, the safest days of the week were mostly Sundays or Mondays.

3.2. *Background*: There are several combinations of days with the lowest mortality, but the most common are Sundays and Mondays. These may be termed "Sunday Protective Phenomenon" (Fig. 4) and "Monday Protective Phenomenon" (Fig. 5) respectively.
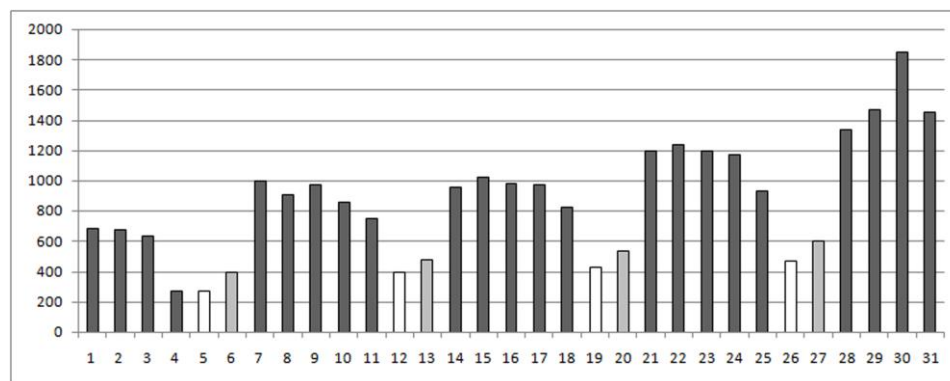
Figure 4. Daily New Deaths due to CoViD-19 in the United States, from July 1 to July 31, 2020.
A vertical axis shows absolute value of deaths; a horizontal axis shows day of the week:
Bars on the chart: Sunday is white color; Mondays is grey; Tuesdays, Wednesdays, Thursdays, Fridays and Saturdays in turn all are black. Database was collected on December 9, 2020.

In some countries analysis of the daily mortality revealed a stable weekly cycle with the one and the same day of the lowest mortality being either Sunday (Fig. 4) or Monday (Fig. 5); but in others, the day of the lowest mortality varied being both Sunday or Monday (Fig. 6).

3.2.1. "Sunday Protective Phenomenon" was discovered in Argentina, Brazil, France, Germany and the United States.

Methods: The comparison of the daily mortality between various days of the week in various countries done with the calculation of the *p*-value.

Argentina (29.03.20-05.12.20): On Sundays, the daily mortality was less than on Mon, Tue, Wed, Thu and Fri (p<0.05).

Brazil (22.03.20-05.12.20): On Sundays, the daily mortality was less than on Tue, Wed, Thu, Fri and Sat ($p<0.001$). On Mondays, the daily mortality was less than on Tue, Wed, Thu, Fri ($p<0.001$) and Sat ($p<0.005$).

France (22.03.20-05.12.20): On Sundays, the daily mortality was less than on Tue and Fri ($p<0.05$).

Germany (22.03.20-05.12.20): On Sundays, the daily mortality was less than on Tue, Wed ($p<0.01$), Mon, Thu and Fri ($p<0.05$).

The United States of America (22.03.20-05.12.20): On Sundays, the daily mortality was less than on Tue, Wed, Thu, Fri and Sat ($p<0.001$). On Mondays, the daily mortality was less than on Tue, Wed, Thu, Fri ($p<0.001$) and Sat ($p<0.005$).

3.2.2. "Monday Protective Phenomenon" discovered in Mexico, the Netherlands, Poland, Russia, Ukraine, the United Kingdom.

Methods: The comparison of the daily mortality between various days of the week in various countries done with the calculation of the *p*-value.
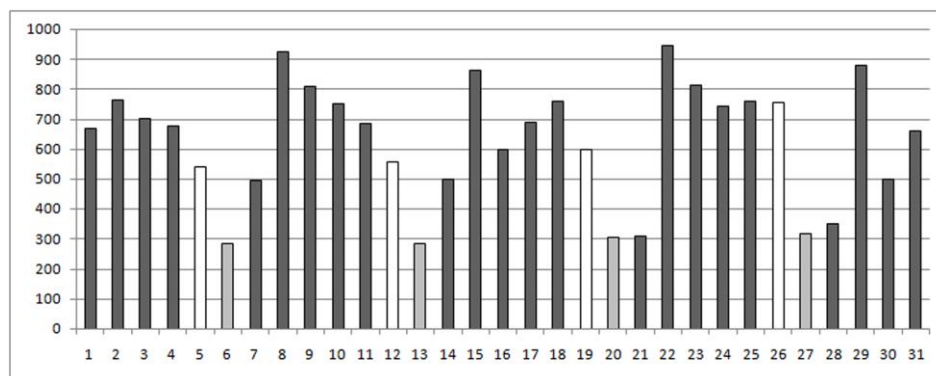
Figure 5. Daily New Death due to CoViD-19 in Mexico, from July 1 to July 31, 2020.
A vertical axis shows absolute value of deaths; a horizontal axis shows day of the week:
Bars on the chart: Sunday is white color; Mondays is grey; Tuesdays, Wednesdays, Thursdays, Fridays and Saturdays in turn all are black. Database was collected on December 9, 2020.

Mexico (05.04.20-05.12.20: On Mondays, the daily mortality was less than on Sun, Thu, Wed, Fri and Sat ($p<0.001$). On Tuesdays, the daily mortality was less than on Thu, Wed, Fri, Sat ($p<0.001$) and Sun ($p<0.005$).

The Netherlands (22.03.20-05.12.20): On Mondays, the daily mortality was less than on Tue, Wed, Thu, Fri and Sat ($p<0.05$).

Poland (29.03.20-05.12.20): On Mondays, the daily mortality was less than on Wed, Thu, Fri and Sat ($p<0.05$).

Russia (22.03.20-05.12.20): On Mondays, the daily mortality was less than on Wed, Fri ($p<0.01$), Tue, Thu and Sat ($p<0.05$). On Sundays, the daily mortality was less than on Tue, Wed, Fri, Sat ($p<0.05$) and Thu ($p<0.05240$).

Ukraine (29.03.20-05.12.20): On Mondays, the daily mortality was less than on Wed, Thu, Fri and Sat ($p<0.05$).

The United Kingdom (22.03.20-05.12.20): On Mondays, the daily mortality was less than on Tue, Wed ($p<0.01$), Thu, Fri and Sat ($p<0.05$). On Sundays, the daily mortality was less than on Tue, Wed, Thu and Fri ($p<0.05$).

3.2.3. In Chile (05.04.20-05.12.20) the day of the week with the lowest mortality was Tuesday. On Tuesdays, the daily mortality was less than on Thu, Fri ($p<0.001$), Sun, Mon and Sat ($p<0.005$). On Mondays, the daily mortality was less than on Thu ($p<0.005$).

Conclusion: The weekly mortality cycle was discovered in twelve countries, including Argentina, Brazil, Chile, France, Germany, Mexico, the Netherlands, Poland, Russia, Ukraine, the United Kingdom and the United States of America. In the majority of these countries, for patients suffering from CoViD-19, the safest days of the week were either Sundays or Mondays. In Chile, the safest days of the week were Mondays and Tuesdays (Tab. 4).
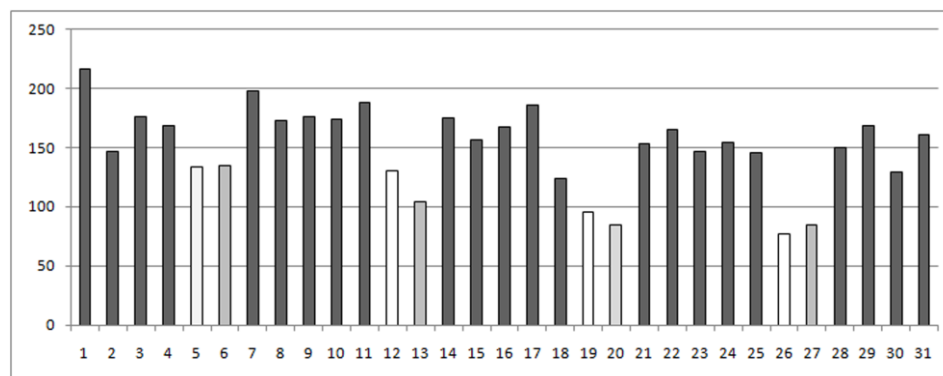
Figure 6. Daily New Deaths due to CoViD-19 in Russia, from July 1 to July 31, 2020.
A vertical axis shows absolute value of deaths; a horizontal axis shows day of the week:
Bars on the chart: Sunday is white color; Mondays is grey; Tuesdays, Wednesdays, Thursdays, Fridays and Saturdays in turn all are black. Database was collected on December 9, 2020.

4. The Weekly Mortality Cycle in the States of the United States with the highest mortality.

Background: Due to the fact that the United States had the highest numbers of deaths related to CoViD-19,[15] the weekly mortality cycle was analysed in the twenty five States with the highest mortality (~ 4000 cases and above). Database was collected on December 10-11, 2020.

Table 5.

Total Mortality and Mortality on Various Days of the Week in the certain States of the United States.
There are absolute values, percentages and HLM ratio. Database was collected on December 10-11, 2020.

Countries: Dates:	Total, n	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLM
United States 22.03-05.12.20	287,469	*22,642 7.87%	26,410 9.19%	50,763 17.66%	52,624 18.31%	48,746 16.96%	46,973 16.34%	39,311 13.67%	2.324
1. New York** 22.03-05.12.20	34,894	**4,759** 13.64%	4,770 13.67%	5,528 15.84%	5,561 15.94%	4,691 13.44%	4,931 14.13%	4,654 13.34%	1.689
2. Texas 22.03-05.12.20	23,174	**1,461** 6.30%	1,781 7.69%	3,712 16.02%	4,327 18.67%	4,768 20.57%	4,048 17.47%	3,077 13.28%	3.264
3. California 22.03-05.12.20	19,855	**990** 4.99%	1,831 9.22%	3,667 18.47%	3,889 19.59%	3,441 17.33%	3,600 18.13%	2,437 12.27%	3.928
4. Florida 22.03-05.12.20	19,072	**1,195** 6.27%	1,487 7.80%	3,447 18.07%	3,452 18.10%	3,515 18.43%	3,308 17.34%	2,668 13.99%	2.941
5. New Jersey 22.03-05.12.20	17,412	1,424 8.18%	**1,289** 7.40%	3,164 18.17%	3,237 18.59%	3,288 18.88%	2,590 14.88%	2,420 13.90%	2.551
6. Illinois 22.03-05.12.20	13,996	1,074 7.67%	**942** 6.73%	2,343 16.74%	2,763 19.74%	2,503 17.89%	2,182 15.59%	2,189 15.64%	2.933
7. Pennsylvania 22.03-05.12.20	11,349	**647** 5.70%	766 6.75%	2,022 17.82%	2,436 21.46%	2,168 19.10%	1,844 16.25%	1,466 12.92%	3.765
8. Massachusetts 22.03-05.12.20	10,962	1,444 13.17%	**1,172** 10.69%	1,241 11.32%	2,150 19.62%	1,722 15.71%	1,684 15.36%	1,549 14.13%	1.834
9. Michigan 22.03-05.12.20	10,290	**494** 4.80%	1,107 10.76%	2,058 20.00%	1,381 13.42%	1,962 19.07%	1,380 13.41%	1,908 18.54%	4.166
10. Georgia 22.03-05.12.20	9,686	**570** 5.88%	945 9.76%	1,760 18.17%	1,703 17.58%	1,624 16.77%	1,702 17.57%	1,382 14.27%	3.088
11. Ohio 22.03-05.12.20	6,953	**365** 5.25%	593 8.53%	1,349 19.40%	1,579 22.71%	1,106 15.91%	1,199 17.24%	762 10.96%	4.326
12. Arizona 22.03-05.12.20	6,927	386 5.57%	**120** 1.73%	1,174 16.95%	1,485 21.44%	1,277 18.44%	1,159 16.73%	1,326 19.14%	12.38
13. Louisiana 22.03-05.12.20	6,527	945 14.48%	686 10.51%	1,111 17.02%	1,218 18.66%	984 15.08%	1,176 18.02%	**407** 6.23%	2.993
14. Indiana 22.03-05.12.20	6,150	**433** 7.04%	527 8.57%	1,330 21.63%	989 16.08%	954 15.51%	989 16.08%	928 15.09%	3.072
15. North Carolina 29.03-05.12.20	5,511	**334** 6.06%	335 6.08%	1,104 20.04%	1,083 19.65%	975 17.69%	937 17.00%	743 13.48%	3.305
16. Connecticut** 22.03-05.12.20	5,141	**447** 8.69%	853 16.59%	641 12.47%	978 19.02%	788 15.33%	848 16.50%	586 11.40%	2.188
17. Tennessee 29.03-05.12.20	4,898	**280** 5.72%	475 9.70%	931 19.01%	802 16.37%	938 19.15%	879 17.94%	593 12.11%	3.350
18. Maryland 22.03-05.12.20	4,831	**466** 9.64%	515 10.66%	869 17.99%	768 15.90%	734 15.19%	712 14.74%	767 15.88%	1.865
19. Missouri 22.03-05.12.20	4,628	354 7.65%	**271** 5.86%	1,083 23.40%	793 17.14%	742 16.03%	798 17.24%	587 12.68%	3.996
20. South Carolina 22.03-05.12.20	4,512	**327** 7.25%	374 8.29%	769 17.04%	831 18.42%	754 16.71%	691 15.31%	766 16.98%	2.541
21. Virginia 22.03-05.12.20	4,208	**286** 6.80%	302 7.18%	818 19.44%	797 18.94%	721 17.13%	673 15.99%	611 14.52%	2.860
22. Minnesota 29.03-05.12.20	3,974	503 12.66%	**247** 6.21%	426 10.72%	786 19.78%	744 18.72%	688 17.31%	580 14.60%	3.182
23. Mississippi 29.03-05.12.20	3,934	305 7.75%	**248** 6.30%	932 23.69%	796 20.24%	547 13.91%	571 14.51%	535 13.60%	3.758
24. Alabama 29.03-05.12.20	3,873	**142** 3.67%	251 6.48%	730 18.85%	896 23.15%	707 18.26%	671 17.30%	476 12.29%	6.310
25. Wisconsin 29.03-05.12.20	3,690	164 4.44%	**157** 4.26%	843 22.85%	672 18.21%	645 17.48%	589 15.96%	620 16.80%	5.369

* Absolute values on the day with the lowest mortality are highlighted by using bold font.
** Weekly Mortality Cycle has not been revealed in these States; in other States mentioned in this table Weekly Mortality Cycle has been revealed and confirmed.

Methods: There were comparisons between the total mortality on certain days of the week in absolute values, percentages and a calculation of HLM ratio (Table 5). Additionally a comparison of daily mortality between certain days of the week with the calculation of the *p*-value has been done.

Results: In the majority of analysed states, for patients suffering from CoViD-19, the safest days of the week were either Sundays (n=16) or Mondays (n=8).

Significant differences in mortality due to CoViD-19 between various days of the week were revealed in the states of Alabama, Arizona, California, Florida, Georgia, Illinois, Indiana, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia and Wisconsin (p<0.05 ÷ p<0.0001).

The highest HLM ratio was in Arizona (12.375), the lowest HLM ratio was in New York (1.689).

In the State of Louisiana (22.03.20-05.12.20), twenty three Saturdays out of thirty seven had no even one fatal case due to covid-19.

Conclusion: The weekly mortality cycle was discovered in the United States as a whole country and in the certain states. The safest days of the week were either Sundays or Mondays.

5. Countries with the Unconfirmed Weekly Mortality Cycle.

In Bangladesh, Belgium, Canada, Czechia, Colombia, India, Indonesia, Iran, Italy, Peru, Romania, Spain, South Africa, Sweden and some other countries, the difference in total mortality between certain days of the week was not significant (p>0.05). Nevertheless, in the majority of countries examined, the days with the lowest mortality were either Sundays (Tab. 6) or Mondays (Tab. 7).

Table 6. Countries where Daily Mortality due to COVID-19 was the lowest on Sundays.
Mortality in various days of the week: there are absolute values, percentages and HLM ratio.
Database was collected on December 9, 2020.

Country: / Dates:	Total	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLM
Italy / 01.03-05.12.20	59,482	***6,856** 11.53%	7,410 12.46%	8,954 15.05%	8,775 14.75%	9,197 15.46%	9,230 15.52%	9,060 15.23%	1.346
Spain / 08.03-05.12.20	46,443	**5,254** 11.31%	5,446 11.73%	7,980 17.18%	7,681 16.54%	7,149 15.39%	7,297 15.71%	5,636 12.14%	1.519
South Africa / 03.05-05.12.20	21,561	**2,135** 9.90%	2,675 12.41%	3,692 17.12%	3,315 15.38%	3,620 16.79%	3,302 15.31%	2,822 13.09%	1.729
Canada / 22.03-05.12.20	12,455	**1,333** 10.70%	1,502 12.06%	1,838 14.76%	1,879 15.09%	2,169 17.41%	1,872 15.03%	1,862 14.95%	1.627
Romania / 22.03-05.12.20	12,186	**1,442** 11.83%	1,475 12.11%	1,991 16.34%	1,883 15.45%	1,815 14.89%	1,873 15.37%	1,707 14.01%	1.381
Czechia / 29.03-05.12.20	8,802	**1,090** 12.38%	1,274 14.48%	1,368 15.54%	1,360 15.45%	1,239 14.08%	1,381 15.69%	1,090 12.38%	1.267

* Absolute values on the day with the lowest mortality are highlighted by using bold font.

Table 7. Countries where Daily Mortality due to COVID-19 was the lowest on Mondays. Mortality in various days of the week: there are absolute values, percentages and HLM ratio. Database was collected on December 9, 2020.

Country: / Dates:	Total	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLM
India 05.04-05.12.20	138,456	18,562 13.41%	**17,829** 12.88%	19,965 14.42%	20,814 15.03%	20,760 14.99%	20,636 14.90%	19,890 14.37%	1.167
Colombia 29.03-05.12.20	37,626	5,330 14.17%	**4,985** 13.25%	5,212 13.85%	5,414 14.39%	5,443 14.47%	5,732 15.23%	5,510 14.64%	1.150
Peru 22.03-05.12.20	36,146	5,415 14.98%	**5,032** 13.92%	5,086 14.07%	5,066 14.01%	5,041 13.95%	5,280 14.61%	5,226 14.46%	1.083
Indonesia 22.03-05.12.20	17,557	2,338 13.32%	**2,330** 13.27%	2,535 14.44%	2,674 15.23%	2,719 15.49%	2,548 14.51%	2,413 13.74%	1.167
Belgium 15.03-05.12.20	17,129	2,385 13.93%	**2,073** 12.10%	2,321 13.55%	2,840 16.58%	2,643 15.43%	2,388 13.94%	2,479 14.47%	1.370

* Absolute values on the day with the lowest mortality are highlighted by using bold font.

Table 8. Countries where Daily Mortality due to COVID-19 was the lowest on Tuesdays, Fridays or Saturdays. Mortality in various days of the week: there are absolute values, percentages and HLM ratio. Database was collected on December 9, 2020.

Country: / Dates:	Total	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLM
Iran 01.03-05.12.20	49,973	6,965 13.94	7,261 14.53	7,265 14.54	7,335 14.68	7,323 14.65	6,969 13.94	**6,855** 13.72	1.070
Sweden 15.03-05.12.20	7,137	1,022 14.32	1,041 14.59	**986** 13.81	1,055 14.78	1,037 14.53	1,004 14.07	992 13.9	1.070
Bangladesh 05.04-05.12.20	6,805	957 14.06	982 14.43	1,055 15.5	1,008 14.82	995 14.62	**898** 13.2	910 13.37	1.174

Remarks:

The highest HLM ratio was in South Africa (1.729), the lowest one was in Iran and Sweden (1.070).

The first patients with CoViD-19 were identified in China,[16] but the local epidemic ended in March, 2020; next waves of the epidemic were not reported (Fig. 7).

6. Revision of some numbers dealing with mortality due to CoViD-19.

In several countries after revision of death records related to CoViD-19, some amount of the fatal cases were added, and this fact can be recognized as a sharp spike of deaths in the daily mortality chart.

Sudden increase of deaths number happened in China on April 17, 2020, when 1,290 new fatal cases were added (Fig. 6).[16] The local authorities provided the following explanation: "The revisions were made in accordance with related laws and regulations, as well as the principle of being responsible for history, the people and the deceased".[17]

Similar corrections happened in Canada on May 31, 2020, when 222 new fatal cases were added,[18] in Chile on June 7, 2020, when new 653 fatal cases were added,[19] and in India on June 16, 2020, when new 2006 fatal cases were added.[20] In all these cases to calculate weekly mortality cycle an average daily mortality of the affected week was applied.
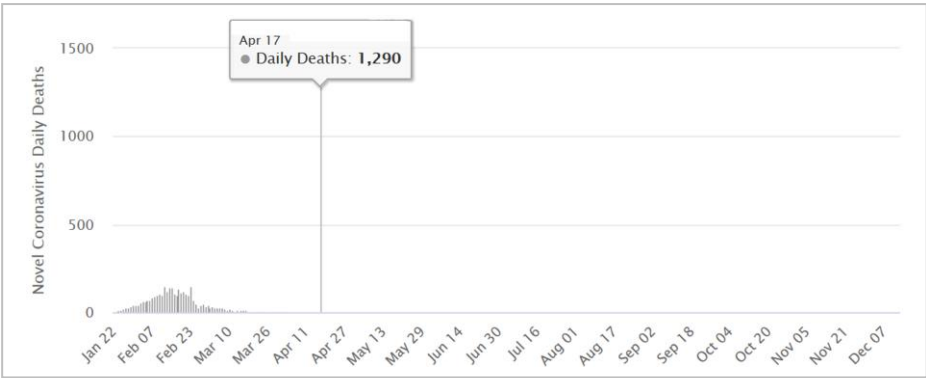
Figure 7. Sudden increase of death number in China on April 17, 2020 [a screenshot, on Dec 10, 2020].
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In some cases a sharp spike of deaths in the daily mortality chart reflected a real increase mortality in the certain day (Fig. 8), that was in Georgia on April 7, 2020: "April 7 worst virus day so far in Georgia; big increases in cases, deaths, hospitalizations".[21]
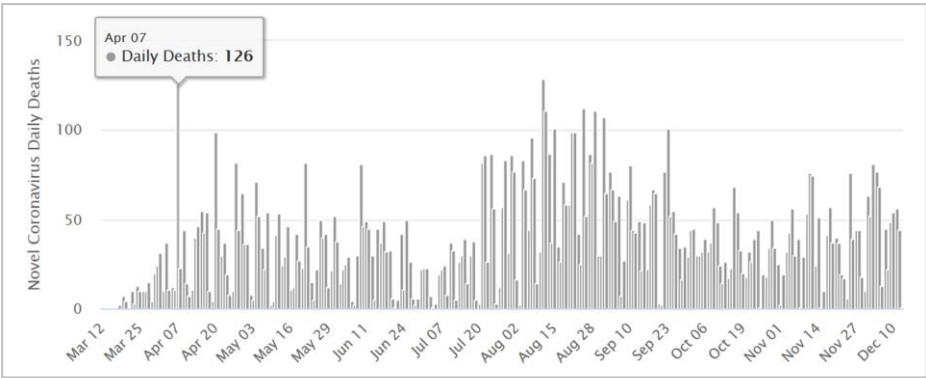
Figure 8. Sudden increase of death number in Georgia on April 7, 2020 [a screenshot, on December 10, 2020].

There was also an opposite correction that took place in France: a number of CoViD-19 victims was decreased by 217 cases on May 19, 2020 (Fig 9).[21]
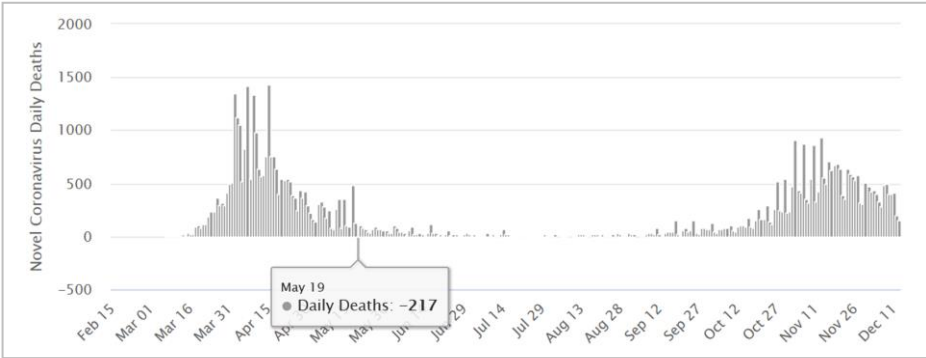
Figure 9. In France a number of CoViD-19 victims was decreased by 217 cases on May 19, 2020
[a screenshot, on December 10, 2020].

7. Updating Global Mortality Data and Weekly Mortality Cycle related to CoViD-19.

Background: During the current observation death numbers on the 'Worldometer' website related to the whole world and to the various countries were updating constantly.

Objective: To study if updating and correction of the mortality data affects the global weekly mortality cycle related to CoViD-19.

8.1. *Method*: In order to know how update of the database affects the absolute values of the total global mortality and mortality on the various days of the week, a comparison of death numbers for the first 23 weeks of pandemic (26.01.20–04.07.20) obtained at the different dates, has been done (Tab. 9).

Table 9. Global Mortality Due to CoViD-19 on Various Days of the Week (26.01.20 – 04.07.20).
There are absolute values, ±Δ and HLM ratio. Data were obtained on different dates.

Date	Total	± Δ	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLM
06.07	532,817	n/a	57,351	60,200	84,380	85,075	85,151	84,617	76,043	1.485
12.07	532,972	+ 155	57,360	60,208	84,401	85,093	85,181	84,641	76,088	1.485
02.08	536,657	+ 3,685	57,872	60,643	84,891	85,679	85,674	85,226	76,672	1.480
06.08	537,221	+ 564	57,947	60,712	84,954	85,740	85,801	85,304	76,763	1.481
17.08	539,314	+ 2,657	58,575	61,464	85,213	85,703	86,085	85,385	76,889	1.470
27.08	538,730	− 584	58,719	61,708	84,941	85,420	86,050	84,985	76,907	1.465
03.09	538,718	− 12	58,719	61,708	84,941	85,420	86,038	84,985	76,907	1.465
07.09	541,679	+ 2,961	59,242	61,935	85,405	85,723	86,357	85,641	77,376	1.458
15.09	541,679	0	59,242	61,935	85,405	85,723	86,357	85,641	77,376	1.458
20.09	541,709	+ 30	59,244	61,936	85,411	85,729	86,362	85,645	77,382	1.458
20.10	545,031	+ 3,322	59,621	62,457	85,787	86,117	86,964	86,183	77,902	1.459
20.11	546,394	+ 1,363	59,817	62,613	85,917	86,394	87,152	86,391	78,110	1.457
15.12	546,547	+ 153	59,831	62,624	85,934	86,414	87,177	86,414	78,153	1.457

Results: During the current study the total numbers of deaths related to the time frame between January 26 and July 4, 2020, were not stable. There was a fluctuation of the death numbers in the various days of the week, nevertheless the lowest numbers of deaths were on Sunday and the highest numbers of deaths were mostly on Thursday. A ratio between the death numbers on Thursday and Sunday decreased from 1.485, on July 6, to 1.457, on December 15, 2020.

8.3. *Method*: In order to know how update of the database affects the absolute values of the total global mortality and mortality on the various days of the week, an additional comparison of death numbers for other 18 weeks (29.03.20-01.08.20), obtained at the different dates, has been done (Tab. 10).

Results: During the current study the total numbers of deaths related to the time frame between March 29 and August 1, 2020, were not stable. There was a fluctuation of the death numbers in the various days of the week, nevertheless the lowest numbers of death were on Sunday and the highest

numbers of death were on Wednesday. A ratio between the death numbers on Wednesday and Sunday decreased from 1.497, on August 2, to 1.464, on December 15, 2020.

Table 10. Global Mortality Due to CoViD-19 on Various Days of the Week (29.03.20 – 01.08.20). There are absolute values, ±Δ and HLM ratio. Data were obtained on different dates.

Date	Total	± Δ	Sun	Mon	Tue	Wed	Thu	Fri	Sat	HLM
02.08	655,799	n/a	71,540	73,337	103,569	107,080	104,963	103,286	92,024	1.497
06.08	656,362	+ 563	71,615	73,406	103,632	107,141	105,089	103,364	92,115	1.496
17.08	655,904	– 458	72,038	73,964	103,294	106,701	105,038	103,032	91,837	1.481
27.08	654,940	– 964	72,086	74,127	102,928	106,335	105,270	102,532	91,662	1.475
03.09	654,917	– 23	72,084	74,127	102,929	106,334	105,255	102,528	91,660	1.475
07.09	658,879	+ 3962	72,707	74,454	103,579	106,765	105,714	103,343	92,317	1.469
15.09	658,879	0	72,707	74,454	103,579	106,765	105,714	103,343	92,317	1.469
20.09	658,938	+ 59	72,709	74,458	103,593	106,775	105,723	103,353	92,327	1.469
20.10	665,569	+ 6631	73,566	75,173	104,430	107,720	106,812	104,432	93,436	1.464
20.11	666,753	+ 1184	73,749	75,300	104,526	107,998	106,964	104,617	93,599	1.464
15.12	666,940	+ 187	73,772	75,319	104,550	108,013	106,990	104,642	93,654	1.464

Conclusion: The fluctuation of the total mortality due to CoViD-19 and mortality on the various days of the week didn't affect the Weekly Mortality Cycle in general. Nevertheless additional study is required to know a reason for decrease and increase of the death numbers related to the past dates.

8. Updating Global Mortality Data and Weekly Mortality Cycle in various countries.

Background: During the current observation death numbers on the 'Worldometer' website were updating constantly. In some countries mortality data related to the past were fairly stable, in others, the correction occurred weekly or even every 2-3 days: either up or down.

Objective: To study if the correction of the database for the days related to the past affects the weekly mortality cycle in various countries.

Methods: The database related to mortality due to CoViD-19 in various countries was collected on a regular basis. A comparison of databases collected on August 10 and September 10, 2020 are presented in Tab. 11.

Results: For the majority of countries, mortality data for the past months was stable and did not change over time [Δ = 0]. Small changes have occurred in the databases of Belgium [+9], France [–24], Iran [–37], Netherlands [+125], Italy [+152] and the Unites States of America [+284]. Significant changes have been observed in the databases of Peru [+ 4064] and the United Kingdom [– 4925].

Table 11.

Mortality in various days of the week in Brazil, Chile, Mexico, Germany, Russia, the USA and the UK, etc.

For each country, the numbers of death collected on August 10, 2020 are in the first row; the numbers of death collected on September 10, 2020 are in the second row; the difference (+/–Δ) between two numbers are in the third row.

Countries: (Dates)	Total	Sun	Mon	Tue	Wed	Thu	Fri	Sat
United States: (29.03-01.08) Δ +/–	155,115 155,399 + 284	13,825 13,827 + 2	16,024 16,028 + 4	27,178 27,180 + 2	27,525 27,525 0	25,638 26,015 + 377	24,302 24,289 − 13	20,623 20,535 − 88
Brazil: (26.04-01.08) Δ +/–	89,571 89,571 0	7,398 7,398 0	9,153 9,153 0	15,378 15,378 0	15,161 15,161 0	15,498 15,498 0	14,423 14,423 0	12,560 12,560 0
Mexico: (19.04-01.08) Δ +/–	46,142 46,142 0	5,425 5,425 0	3,704 3,704 0	4,598 4,598 0	8,441 8,441 0	8,548 8,548 0	7,847 7,847 0	7,579 7,579 0
United Kingdom: (29.03-01.08) Δ +/–	44,670 39,745 − 4925	4,041 3,737 − 304	3,646 3,524 − 122	8,333 7,187 − 1146	7,598 6,745 − 853	6,834 6,147 − 687	7,723 6,726 − 997	6,495 5,679 − 816
India (10.05-01.08) Δ +/–	33,641 33,641 0	4,348 4,348 0	4,197 4,197 0	4,739 4,739 0	5,312 5,312 0	4,911 4,911 0	5,104 5,104 0	5,030 5,030 0
Italy (08.03-23.05) Δ +/–	32,441 32,593 + 152	4,035 4,054 + 19	4,314 4,335 + 21	4,778 4,801 + 23	4,678 4,699 + 21	4,657 4,677 + 20	4,993 5,017 + 24	4,986 5,010 + 24
Spain (15.03-13.06) Δ +/–	28,088 28,088 0	3,797 3,797 0	3,911 3,911 0	4,003 4,003 0	4,378 4,378 0	4,035 4,035 0	3,986 3,986 0	3,978 3,978 0
France (22.03-16.05) Δ +/–	27,063 27,039 − 24	2,325 2,324 − 1	3,564 3,561 − 3	4,494 4,490 − 4	4,051 4,046 − 5	5,148 5,143 −5	4,121 4,118 − 3	3,360 3,357 − 3
Peru (29.03-01.08) Δ +/–	19,387 23,451 + 4064	2,593 3,307 + 714	2,626 3,298 + 672	2,770 3,357 + 587	2,825 3,224 + 399	2,847 3,464 + 617	2,795 3,346 + 551	2,931 3,455 + 524
Iran (01.03-01.08) Δ +/–	16,976 16,939 − 37	2,333 2,331 − 2	2,425 2,421 − 4	2,451 2,447 − 4	2,458 2,455 − 3	2,538 2,531 − 7	2,365 2,357 − 8	2,406 2,397 − 9
Russia: (26.04-01.08) Δ +/–	13,377 13,377 0	1,499 1,499 0	1,414 1,414 0	2,093 2,093 0	2,204 2,204 0	1,966 1,966 0	2,224 2,224 0	1,977 1,977 0
Colombia (12.04-01.08) Δ +/–	10,230 10,230 0	1,343 1,343 0	1,164 1,164 0	1,356 1,356 0	1,429 1,429 0	1,694 1,694 0	1,698 1,698 0	1,546 1,546 0
Belgium (22.03-13.06) Δ +/–	9,403 9,412 + 9	1,184 1,322 + 138	1,062 1,315 + 253	1,225 1,376 + 151	1,605 1,354 − 251	1,475 1,447 − 28	1,559 1,278 − 281	1,293 1,320 + 27
Chile (17.05-01.08) Δ +/–	8,496 8,496 0	1,354 1,354 0	719 719 0	552 552 0	1,360 1,360 0	1,490 1,490 0	1,448 1,448 0	1,573 1,573 0
Germany: (29.03-23.05) Δ +/–	7,933 7,933 0	698 698 0	1,165 1,165 0	1,337 1,337 0	1,521 1,521 0	1,321 1,321 0	1,129 1,129 0	762 762 0
Canada (12.04-20.06) Δ +/–	7,615 7,615 0	887 887 0	884 884 0	1,117 1,117 0	1,158 1,158 0	1,344 1,344 0	1,095 1,095 0	1,130 1,130 0
South Africa (17.05-01.08) Δ +/–	7,509 7,509 0	744 744 0	1,042 1,042 0	1,248 1,248 0	1,020 1,020 0	1,232 1,232 0	1,160 1,160 0	1,063 1,063 0
Netherlands (15.03-20.06) Δ +/–	5,815 5,940 + 125	641 649 + 8	488 492 + 4	994 1,013 + 19	969 985 + 16	951 969 + 18	894 924 + 30	878 908 + 30
China (26.01-14.03) Δ +/–	3143 3143 0	497 497 0	415 415 0	436 436 0	442 442 0	436 436 0	472 472 0	445 445 0

Conclusion: For patients suffering from CoViD-19, the safest days of the week were mostly Sundays or Mondays. Updating and correction of global and local mortality data didn't affect Weekly Mortality Cycle in general, but affected this cycle in certain countries.

10. A Weekly Cycle relates to Human Civilization.

In the 18th century, Antoine-Yves Goguet wrote: "We can consider as the first step that men have taken to obtain a measure of time, was the establishment of the small period of seven days, which bears the name of the week. We see that, from time immemorial, it has been used by almost all peoples, and that the arrangement has been perfectly uniform".[23]

Our contemporary, Joseph Needham, expressed a modern view on the calendar and said, that some of its elements are based on those astronomical cycles which have obvious importance for man, such as the day, the month and the year; others are artificial, such as the week and the subdivisions of the day.[24] Eviatar Zerubavel, describing the characteristics of the weekly cycle, titled his book "Hidden Rhythms".[25]

11. Discussion.

On the one hand, a week as a time frame obviously exists, but on the other, there is no natural basis that could explain a weekly cycle.

As described above the weekly mortality cycle with the trend towards decreased mortality on weekends is a unique phenomenon that has been observed among victims of CoViD-19. It has an opposite pattern compared to increased hospital mortality on weekends in the United Kingdom discussed in 2015.[26]

According to the professor Igor A. Gundarov, MD,[27] the treatment of patients with CoViD-19 is still in the phase of clinical trials and mortality in this group correlates with excessive therapeutic activity, which decreases on weekends.[28]

To understand this statement one should recall the stories on the contradictory efficiency of certain medicines and therapeutic modalities used among patients infected with SARS-CoV-2. For example:

a) *Application of Hydroxychloroquine*:

On May 22, 2020, an article was published in Lancet where authors "were unable to confirm a benefit of hydroxychloroquine or chloroquine, when used alone or with a macrolide, on in-hospital outcomes for COVID-19. Each of these drug regimens was associated with decreased in-hospital survival and an increased frequency of ventricular arrhythmias when used for treatment of COVID-19".[29] On May 25, 2020, WHO suspended hydroxychloroquine trials for COVID-19.[30] On June 13,

2020, Lancet retracted an article mentioned above due to the fact that results presented there could not be proven.[31] On July 4, 2020, WHO discontinues hydroxychloroquine (and lopinavir/ritonavir) treatment arms for COVID-19.[32] On December 1, 2020, a group of researches published their study, that included the following conclusion: "Hydroxychloroquine use was associated with a 30% lower risk of death in COVID-19 hospitalized patients".[33]

b) *Application of Corticosteroids / Dexamethasone*:

On March 13, 2020, WHO guidance recommended "Do not routinely give systemic corticosteroids for treatment of viral pneumonia outside clinical trials".[34] On June 16, 2020, Prof Peter Horby said, that dexamethasone "is the only drug so far that has been shown to reduce mortality – and it reduces it significantly".[35] It reduced deaths by one-third in patients receiving invasive mechanical ventilation, by one-fifth in patients receiving oxygen without invasive mechanical ventilation, but did not reduce mortality in patients not receiving respiratory support at randomization.[36] Later conclusion on efficacy of corticosteroids was pessimistic: "There is no evidence that corticosteroids are safe and effective on the treatment of severe acute respiratory infection when COVID-19 disease is suspected".[37]

c) *Application of Invasive Mechanical Ventilation*:

According to the study done several years before CoViD-19 pandemic, the highest mortality among the severest cases of patients with Acute Respiratory Distress Syndrome, who were treated with invasive mechanical ventilation, did not exceed 50.4 %.[38]

In the very beginning of CoViD-19 pandemic mortality among CoViD-19 patients who were treated with invasive mechanical ventilation was higher than 80%, including, 81%,[39] 88.1%,[40] 92%,[41] and 97%.[42] One may suppose that fatal outcome which is higher than 68% means a standard one,[43] so although invasive mechanical ventilation is still in use, it has no therapeutic effect among patients with Acute Respiratory Distress Syndrome caused by SARS-CoV-2.

12. Conclusion.

It is vitally important to recognize factors which formed the basis of decreased mortality on Sundays, Mondays and some other "safest days" of the week. These factors can relate to various aspects of healthcare, including therapeutic protocols and work schedules, or to human habits and traditions. Presumably, they relate to the optimised therapeutic protocols used on the "safest days".

If the factors, which reduced mortality on certain days of the week, could be identified, their positive effect should be spread to other days of the week. As a result many lives of CoViD-19 patients could be saved in future.

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