

TEMPORAL ASSOCIATION OF COVID-19 MEDIA COVERAGE WITH A DECLINE IN HOSPITAL ADMISSIONS FOR ACUTE MYOCARDIAL INFARCTION AND STROKE

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INTRODUCTION

COVID-19 cases first emerged in China in December 2019. As the pandemic spread, fear and anxiety engulfed the globe¹. Stress is a well-known trigger for acute coronary syndromes² and stroke. Yet by March 2020, hospitals around the world reported a 20-80% decline in admissions for acute myocardial infarction (AMI) and urgent coronary angiography^{3,4}. This trend was also observed by physicians in St Louis, Missouri after the first case of COVID-19 on March 7. Soon local media coverage of the pandemic exploded creating an "infodemic" that further added to the ongoing angst whereby some patients requiring even emergent care for life threatening conditions like stroke and AMI avoided hospitals. To ascertain any relationship between local media coverage of COVID-19 and hospital admissions of AMI and stroke, we performed a retrospective time-series analysis using hospital records from St Louis metropolitan area.

METHODS

- All nine acute care hospitals in St Louis City and County (population 1,294,781) were queried for weekly admissions of AMI (ICD-10 codes I21.0-I21.4) and stroke (ICD-10 codes I63.341-I63.543, I66.3, I67.82) from December through May of 2016-2019 (control years) and December through May of 2019-2020 (years under observation).

- Total mortality for those time periods were supplied by the Missouri Department of Health and Human Services (Jefferson City, MO).

- Emergency Medical Services (EMS) calls for in-home cardiac arrest were obtained from St Louis City EMS.

- The percentage of front-page news articles regarding COVID-19 in the St Louis Post Dispatch were ascertained by review of Newspapers.com.

- The percentage of on-line COVID-19 television news coverage was calculated from <http://www.KSDK.com/news>.

- Results were analyzed by time-series causality analysis using the cross-correlation function and Spearman's correlation that utilized R statistical software (R Foundation for Statistical Computing Vienna, Austria <http://www.R-project.org>).

RESULTS

1) Weekly admissions of AMI abruptly decreased by a maximum of 37% in the second week of April 2020 compared to the weekly average of AMI admissions in December through May of 2016-2019 ($p < 0.05$). The decline is highly correlated with the spike in media coverage (Pearson's $r = -0.91$, $p < 0.0001$) at a lag of zero. (Figure 1)

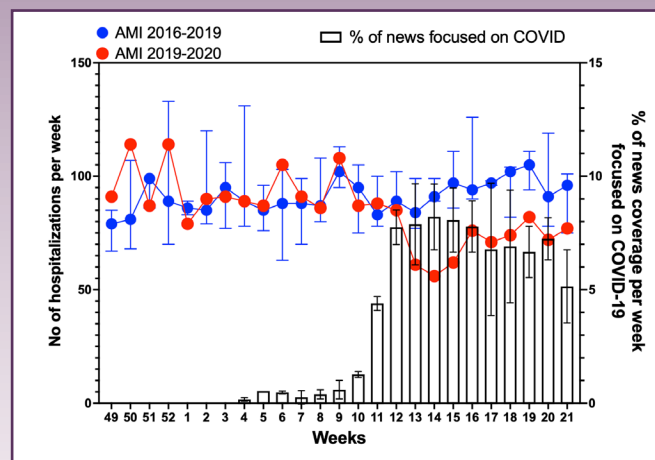


Figure 1 showing weekly admissions of AMI in 2016-2019 (blue dot) compared to 2019-2020 (red dot). Maximum decrease seen in second week of April (week 14). This correlates with maximum news coverage in the second week of April (week 14)

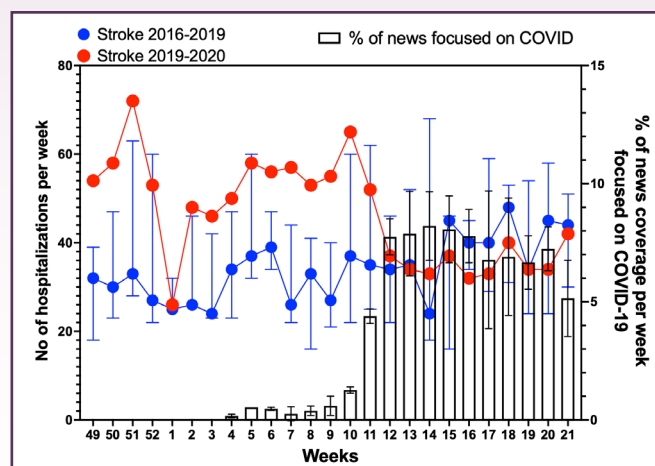


Figure 2 showing weekly admissions of stroke in 2016-2019 (blue dot) compared to 2019-2020 (red dot). Decline in admissions starting in mid March (week 11) to a maximum in second week of April (week 14). This correlates with maximum news coverage in the second week of April (week 14)

2) While the weekly number of stroke admissions were generally higher in 2019-20 than in 2016-2019. However in 2019-2020 even they started declining by mid-March to a maximum decline of 42% in the second week of April 2020 compared to the average of the same week in 2016-2019 ($p < 0.001$) which again correlated with the rise in media coverage (Pearson's $r = -0.87$, $p < 0.001$) at a lag of zero. (Figure 2)

3) Weekly all-cause mortality increased by a maximum of 49% in April 2020 ($p < 0.05$) (Figure 3)

4) EMS calls for in home cardiac arrest were unchanged (Supplemental Data)

DISCUSSION

COVID 19 generated a mystery of missing STEMIs. Many theories were proposed for this phenomenon including that the virus was somehow protective due to decline in pollution and job related stresses^{3,4}. However, CDC reported a web-based survey conducted between June 24-30 of a nationwide representative sample of 54,112 adult respondents called "COVID-19 Outbreak Public Evaluation Initiative". In this survey 40.9% of people clearly indicated avoiding medical care during the pandemic due to medical facility related COVID-19 concerns including 12% who even avoided urgent or emergent care⁵. This scare was perpetuated by continuous news coverage that highlighted outbreaks, drastic shortage of protective equipment, overwhelming situation of hospital staff and appeals to avoid hospitals while ignoring disease acuity. Holland et al demonstrated an increase in out-of-hospital cardiac arrest post "stay-at-home" mandate in Denver Colorado⁶. We observed no such increase in St. Louis. Additionally, our retrospective observations do not permit a conclusion regarding causality. Our data suggests that the world-wide decrease in hospital admissions of AMI hospital and stroke in the spring of 2020, as also seen in St. Louis Metropolitan area might be related to a news-media-induced avoidance of medical facilities, due to fear of hospital-based COVID-19 exposure.

CONCLUSION

- There was a statistically significant decline in AMI and stroke admissions in St. Louis Metropolitan area that highly correlated with an increase in local media coverage.

- The reasons for sudden decline in AMI and stroke are an unusual trend that should be vigorously pursued.

- Responsible media coverage is worth the attention of policy makers and healthcare workers to implement preventive measures for the future.

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**SUPPLEMENTAL DATA: All-Cause Deaths and In-Home Cardiac Arrest EMS Calls in ST. Louis
Metropolitan Area**

<u>Week</u>	<u>All-Cause Deaths</u>	<u>In-Home Cardiac Arrest EMS Calls</u>	
	<u>2019 - 2020</u>	<u>2017-2019</u>	<u>2019-2020</u>
49	222	12	5
50	191	14	14
51	199	13	13
52	206	19	18
1	228	14	16
2	208	19	15
3	222	13	12
4	226	17	15
5	217	15	11
6	214	14	14
7	216	12	8
8	228	15	10
9	208	14	8
10	214	8	8
11	201	9	7
12	224	12	7
13	214	10	8
14	241	10	8
15	281	12	8
16	253	10	10
17	310	12	11
18	271	9	5
19	277	4	4
20	250	10	11
21	235	9	7

Temporal Association of COVID-19 Media Coverage with a Decline in Hospital Admissions for Acute Myocardial Infarction and Stroke

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Introduction:

COVID-19 cases first emerged in China in December 2019. An air of fear and anxiety engulfed the globe as it rapidly spread across borders affecting billions. Media outlets started pouring information containing rising death tolls and horrific visuals generating a global hysteria¹. Stress is a well-known trigger for acute coronary syndromes² and stroke however, peculiarly enough, by March 2020, hospitals around the world reported a 20-80% drop in admissions for acute myocardial infarction (AMI), urgent coronary angiography^{3,4} and stroke⁵. This paradox was also observed by physicians in St Louis, Missouri after the first case of COVID-19 on March 7. The “infodemic” fueled nervousness whereby patients requiring even emergent care for life threatening conditions like stroke and AMI avoided the hospitals⁶. To ascertain any relationship between local media coverage of COVID-19 and hospital admissions of AMI and stroke, we performed a retrospective time-series analysis using hospital records from St Louis metropolitan area (population 1,294,781).

Methods:

All nine acute care hospitals in St Louis City and County were queried for weekly admissions of AMI (ICD-10 codes I21.0-I21.4) and stroke (ICD-10 codes I63.341-I63.543, I66.3, I67.82) from December through May of 2016-2019 (control years) and 2019-2020 (observation year). Total mortality for those time periods were supplied by the Missouri Department of Health and Human Services (Jefferson City, MO). Emergency Medical Services (EMS) calls for in-home cardiac arrest were obtained from St Louis City EMS. The percentage of front-page news articles regarding COVID-19 in the *St Louis Post Dispatch* were obtained from Newspapers.com, while the percentage of COVID-19 television news coverage was calculated from <http://www.KSDK.com/news>. Time-series causality analysis was done using the cross-correlation function and Pearson's correlation utilizing R statistical software (R Foundation for Statistical Computing Vienna, Austria <http://www.R-project.org>).

Results:

AMI admissions abruptly decreased by a maximum of 37% in the second week of April 2020 compared to the average of the same week in 2016-2019 ($p < 0.001$). This decline is highly correlated with the spike in media coverage (Pearson's $r = -0.91$, $r^2 = 0.95$ $p < 0.001$) at a lag of zero. Similarly, stroke cases in 2019-2020 started declining by mid-March with a maximum of 42% drop by last week of April. This correlated with a rise in media coverage for the same period (Pearson's $r = -0.87$, $r^2 = -0.93$, $p < 0.001$) at a lag of zero. Weekly all cause mortality increased to a maximum of 49% in April 2020 ($p < 0.05$). EMS calls for in home cardiac arrest were unchanged.

Conclusion:

There was a statistically significant decline in AMI and stroke admissions that highly correlated with an increase in local media coverage suggesting possible association of news-media-induced avoidance of medical facilities, due to fear of COVID-19 exposure.

References:

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