Characterization of an open access medical news platform readership during the COVID-19 pandemic

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Table of Contents

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Abstract

Background: There now exists many alternatives to direct journal access, such as podcasts, blogs, and news sites for physicians and the general public to stay up-to-date with medical literature. Currently however, there is a scarcity of literature that investigates these readership characteristics of open access medical news sites and how they may have shifted with coronavirus disease 19 (COVID-19).

Objective: The current study aimed to employ readership and survey data to characterize open access medical news readership trends in relation to COVID-19 in addition to overall readership trends regarding pandemic related information delivery.

Methods: Anonymous aggregate readership data was obtained from 2 Minute Medicine® (www.2minutemedicine.com), an open-access, physician-run medical news organization that has published over 8000 original physician-written text and visual summaries of new medical research since 2013. In this retrospective observational study, the average article views, actions (defined as the sum of views, shares, and outbound link clicks), read times, and bounce rate (probability to leave a page in <30s) were compared between COVID-19 articles published between January 1 to May 31, 2020 (N = 40) to non-COVID-19 articles (N = 145) published in the same time period. A voluntary survey was also sent to subscribed 2 Minute Medicine readers to further characterize readership demographics and preferences scored by Likert Scale.

Results: COVID-19 articles had significantly more median views than non-COVID-19 articles (296 vs. 110, U = 748.5, P < 0.001). There were no differences in average read times or bounce rate. Non-COVID-19 had more median actions than COVID-19 articles (2.9 vs. 2.5, U = 2070.5, P < 0.05). On a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree), survey data revealed that 66% (78/119) of readers Agreed or Strongly Agreed that they preferred staying up to date with emerging literature surrounding COVID-19 using sources such as 2 Minute Medicine versus direct journal access. A greater proportion of survey takers also indicated open access news sources to be one of their primary means of staying informed (71.7%) than direct journal article access (50.8%). A lesser proportion of readers indicated reading one or less full length medical study following introduction to 2 Minute Medicine compared to prior (16.9% vs. 31.8%, P < 0.05).

Conclusions: There is a significantly increased readership in one open-access medical literature platform during the pandemic, reinforcing that open-access physician-written sources of medical news represent an important alternative to direct journal access for readers to stay up to date with medical literature.

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Keywords: COVID-19, Medical News, Text Summaries, Readership Trends

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Introduction

On March 11, 2020, the coronavirus disease 2019 (COVID-19) was declared a pandemic by the World Health Organization (WHO), roughly 11 weeks following the report of its first detected case [1]. With its high transmissibility and global impact, COVID-19 has attracted tremendous interest from researchers, clinicians, and the general population worldwide. Within the first 3 months of its discovery, bibliometric analyses indicate that there were already a greater number of peer-reviewed COVID-19 studies published than articles on Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) combined in their first year of discovery [2,3]. This has additionally translated to a significant interest from mass media, as substantial increase in COVID-19 related news has been observed in the early months of 2020 [4]. Prior literature has found that overall news consumption increases significantly during a national crisis, which appears to have been the case with the current outbreak as there is evidence suggesting increased information seeking behaviour following declaration of the pandemic [5-7].

Compared to the past, many alternatives to direct journal access and mainstream media exist for clinicians and the general public to stay informed with medical news and research, including, but not limited to, social media, blogs, journal newsletters, open access medical news sites, and podcasts. Though there is evidence that suggests differences in utilization of these alternative sources can have subsequent downstream effects on consumer health behaviour, there is little characterization on the consumption of these sources both prior to and following the pandemic [8]. Specifically, there is a notable scarcity of investigations examining readership trends and characteristics of open access medical news organziations.

To further characterize consumption of medical literature during the COVID-19, the present study sought to investigate readership trends for one physician-run open access medical news organization in addition to readership preferences regarding information delivery for COVID-19 related research.

Methods

Readership Data

Aggregate anonymous data from this retrospective observational was obtained from 2 Minute Medicine, Inc. (www.2minutemedicine.com, Boston, MA, USA) [9]. 2 Minute Medicine is a free open-access medical news organization that publishes daily physician-written text and visual summaries of new medical research, with over 8000 summaries published since 2013. Articles published on the website between January 1 to May 31, 2020 were included in analysis. In that time span, 40 articles were published covering COVID-19 related research, and 145 articles were published covering non-COVID-19 medical research. Overall daily website traffic, average view times, average actions, and average bounce rates were longitudinally characterized for the study period.

Online Survey Data

An online survey was additionally sent out to 4,221 readers who had opted into the website's free daily electronic mailing list. Non-identifying demographic data, including age, sex, level of education, and current field of work/study were gathered. Survey items were created with the intention of directly addressing gaps in literature identified regarding perspectives and relative usage of alternative sources, and as a secondary outcome validation was beyond the scope of this study. Descriptive data were gathered on reader behaviour and preferences via Likert scales that ranged from 1 (strongly disagree) to 5 (strongly agree). Key statements used in the study include items such as "I prefer using open access medical news sites such as www.2minutemedicine.com to stay up to date with research related to COVID-19". Users were additionally asked to indicate all of their primary sources they were using to stay informed with COVID-19 related literature, including, but not limited to, direct journal access, journal newsletters, mainstream media, social media, and open access medical news sites such as 2 Minute Medicine. Other readership trends were additionally briefly investigated in the survey as users indicated their frequency of reading full-length original journal articles both prior and following introduction to 2 Minute Medicine.

Ethics

This study **was compliant with the Health Insurance Portability and Accountability Act and approved with exemption by the Institutional Review Board.**

Statistical Analysis

All statistical analysis was done using Statistical Package for the Social Sciences (SPSS) 26 (Armonk, NY) [10]. Visual inspection of the histogram, normal Q-Q plot, box plot, and the Kolmogorov-Smirnov test were completed to determine if the data followed normal distribution [11]. If the data was not normally distributed, Mann-Whitney U Test was used to compare average per-article views (over the first two weeks following publication onto website), actions (defined as sum of views, shares, and outbound link clicks), read times (in seconds), and bounce rate (defined as probability for reader to leave the webpage in <30s) [12]. In the present study, actions, read times, and bounce rate were used as measures of reader engagement.

Results

A total of 121 responses were obtained over a 7-week period (Response Rate = 121/4421, 2.7%). Demographic characteristics of respondents are summarized in Table 1. The majority of respondents reported they worked in the healthcare industry (N = 131 [94.7%]), varying from undergraduate students, graduate students, to medical students, residents, and licensed physicians, which made up the majority of the responses.

Characteristics	**N (%)**
Sex	
Male	66 (55%)
Female	54 (45%)
Age Group	
<20	1 (0.8%)
20-29	43 (35.8%)
30-39	37 (30.8%)
40-49	6 (5%)
50-59	7 (5.8%)
60-69	10 (8.3%)
>69	9 (7.5%)
Did not indicate	6 (5%)
Education	
Less than equal or equal to high school graduate	3 (2.5%)
Some college or University education	13 (10.8%)
Undergraduate Degree	18 (15%)
Master's Degree	24 (20%)
Doctoral or Professional Degree	62 (51.6%)
Field of work or study	
Healthcare worker	116 (95.9%)
Other	5 (4.1%)
Licensed Physician	26 (21.4%)
Licensed allied health professional	13 (10.7%)
Licensed Pharmacist	7 (5.7%)
Medical/Surgical Fellow	6 (4.9%)
Medical/Surgical Resident	34 (28.1%)

Pharmacy Resident	1 (0.8%)
Medical Student	6 (4.9%)
Graduate Student	10 (8.2%)
Undergraduate Student	9 (7.3%)
Pharmacy Student	2 (1.7%)
Unspecified / Other	6 (4.9%)

Table 1. Demographic data of respondents.

Over the study period, COVID-19 articles had a total of 68,129 views (Mean = 1792, SD = 6491), while articles not related to pandemic coverage accrued 19,650 views (Mean = 137, SD = 122). Analysis via the Mann-Whitney U test revealed that COVID-19 articles published within the observed time frame had significantly more median views than non-COVID-19 articles (296 vs. 110, U = 748.5, $P < 0.001$). There was no difference in average view times or bounce rate between the two types of articles. Non-COVID-19 articles had significantly more median actions than COVID-19 articles (2.9 vs. 2.5, U = 2070.5, $P < 0.05$).

Daily visitors over the study period are displayed in Figure 1. Average mean visitor count daily was 1724 (SD = 1549). Daily visitor counts were relatively stable between January 1 to February 29 (Mean = 1298, SD = 292), but experienced a significant peak in daily readership in the month of March (Mean = 2816, SD = 3134), with a peak visitor count of 12806 daily readers on March 24. The mean daily visitor count between April 1 to May 31 was 1586 (SD = 437). Average visit time over the study period per page was 168 seconds (SD = 16), and is visualized in Figure 2. The lowest average daily read time was found on March 23 (116s), March 24 (115s), and March 25 (120s).

In terms of survey responses, on a Likert scale of 1 (Strongly disagree) to 5 (Strongly agree), data from 119 responses (2 respondents did not answer) revealed that 66% (78/119) readers Agreed or Strongly Agreed that they preferred staying up to date with emerging literature surrounding COVID-19 using sources such as 2 Minute Medicine versus direct journal access as shown in Figure 3.

When asked to indicate all of the sources respondents used to stay up to date with COVID-19 literature, a greater proportion of survey takers also indicated open access news sources to be one of their primary means of staying informed (N = 86, 71.7%) than direct journal article access (N = 61, 50.8%), as shown in Figure 4. Journal newsletter updates (N = 70, 58.3%), social media usage (N = 53, 44.2%), and mainstream news media sources (N = 46, 38.3%) were other recognized sources of information. Five other sources were additionally recognized as sources of information, including work or school announcements, podcasts, institutional newsletters, and search engine notifications. In terms of impact of 2 Minute Medicine on subsequent information consumption, a Fisher's exact test demonstrated that a lesser proportion of readers indicated to be reading one or less full-length medical studies a month following introduction to 2 Minute Medicine compared to prior (16.9% vs. 31.8%, $P < 0.05$).

Discussion

Principal Results

Results in this study demonstrate that average article view counts for COVID-19 related coverage were significantly higher than articles covering other medical news during the pandemic. While this suggests greater overall interest in COVID-19 related news versus other medical news, there were no associated findings in measures of audience engagement in terms of average view times or bounce rate. Interestingly however, the average amount of actions, consisting of views, shares, and outbound link clicks taken per article were found to be significantly higher for non-COVID-19 medical news articles, with nearly an average of 3 actions for the latter. It is hypothesized this is a reflection of these articles, which tend to cover subspecialty or other niche areas of medicine, attracting readers that may be more heavily involved in these fields and have a higher probability of reading the primary-source article as opposed to focus headlines or paragraphs.

Longitudinal trending of daily visitor counts demonstrated relatively stable overall site traffic for the first 3 months of 2020. A large spike in daily readership was observed between March 23 to March 26, followed by variable daily site traffic before returning to relative stability in the third and fourth weeks of April. Interestingly,

while prior literature has documented increased information seeking behaviour in first 1 or 2 days following local announcements of outbreaks, this large spike in site traffic appeared to be primarily attributable to a site published summary that covered research surrounding hydroxychloroquine and its potential therapeutic application for COVID-19 [7]. Daily visitor counts then dropped in the following weeks, but remained above the baseline average, possibly indicative of readership retention. Furthermore, while average read times remained fairly stable, with a less than 10% standard deviation over the study period, a substantial decrease in average read times coincided with this peak in visitor count, with a decreased average read time of 30.3%. While this is not confirmed in site analysis, it is believed that this decrease in average read time may be reflective of a larger reach to the general public compared to the normal demographic of the site's readers – historically searching for trending topics attracts readers who are skimming or reading portions of articles as opposed to full-length. Overall, results indicate that secondary sources such as medical news sites may have readership data more heavily influenced by the gravity and attractiveness of individual research articles as opposed to other potential factors such as infection count, or other trends related to the pandemic, though this will need to be further validated in future studies. To our knowledge, these findings represent the first characterization of open access medical news readership trends during an international health crisis.

In review of survey results, the survey data collected appeared to corroborate the findings of the site data comparisons. Unsurprisingly, the majority of respondents to the survey, who were subscribers of 2 Minute Medicine, were primarily composed of those directly involved in healthcare. Survey results indicated that users preferred open access medical news sources such as 2 Minute Medicine to be a primary source of information surrounding pandemic related research, in both an overall agreement on the Likert scale and also a greater proportion of respondents indicating them as a primary news source versus direct journal access, journal newsletters, and mainstream media. The migration to using sources such as open access new sources and newsletters may be increasing prevalent due to the explosive growth in the volume of scientific literature being published per year [12]. The use of these alternative sources may provide readers a means to sort through this literature and identify the highest impact research to guide their reading. Interestingly, the usage of 2 Minute Medicine appeared to have influenced the respondents' overall consumption of medical literature as readers indicated to be reading a greater number of articles via direct journal access following introduction to the website. In terms of the demographic data acquired in the study, it is of note that despite increased interest in 2 Minute Medicine and its articles covering COVID-19 related research, the vast majority of subscribers to the website continue to be composed of respondents directly involved in the healthcare field. As such, further investigations may be needed to characterize the readership trends and preferences of the general public.

To our knowledge this is the first study that describes open access medical news readership trends and preferences in sources alternative to direct journal access during the COVID-19 pandemic. In an outbreak where an abundance of research is being published amidst the high global interest in the pandemic, having a better understanding of how information is consumed by both healthcare workers and the general public may provide a better understanding of the respective behaviours associated with the pandemic. Prior literature has demonstrated that different sources of information are at variable risks of misinformation that may have subsequent impacts on consumer behaviour [13-17]. For example, a prior study conducted by Allington et al. (2020) has found a positive correlation between the usage of social media and frequency of COVID-19 related conspiracy theories, and a negative relationship between COVID-19 health-protective behaviours and use of social media [8].

Limitations

In terms of limitations of the study, as the survey was only sent out to subscribers 2 Minute Medicine – the vast majority of whom are in the field of healthcare, the generalizability of these findings to the general public are unknown. The sample used for the survey will also invariably skew data in favor of preference towards open access medical sites via sampling bias as a result of respondents being active subscribers of the organization. Further studies should more-broadly survey healthcare professionals to repeat this finding. Finally, it is recognized that the survey used in the present study lacks any validity evidence, and wording of questions may have been framed positively towards 2 Minute Medicine, which may have introduced bias in collection of results. Additionally, while demographic on survey respondents were gathered, individual demographic data on site visitors were not obtained for the purposes of this study, leading to a lack of understanding of the visitors to the site itself. Finally, as survey data gathered on frequency of full length original studies being read were not gathered prospectively the current study can only provide limited information regarding the interaction between open access medical news consumption and original research

consumption.

Conclusions

Results in this study indicate that readership on an open access medical news site had significantly increased as a result of COVID-19. Overall site traffic remained relatively stable in the first two months of the study period, with a substantial spike in traffic in mid-March. Based on comparisons between article view counts and also survey data, it appears as though open access medical news sites may represent an important source for physicians and other healthcare workers to stay up to date with relevant COVID-19 literature. The introduction to such sites may also have subsequent impacts on overall medical literature consumption and increase the frequency of direct journal access.

Acknowledgements

None

Conflicts of Interest

All authors declare a financial interest (whether in compensation, equity, or both) in 2 Minute Medicine, Inc. which provided the publishing platform, aggregate readership data, and readership audience for testing the hypothesis and surveying the readers.

Abbreviations

COVID-19: Coronavirus disease 2019

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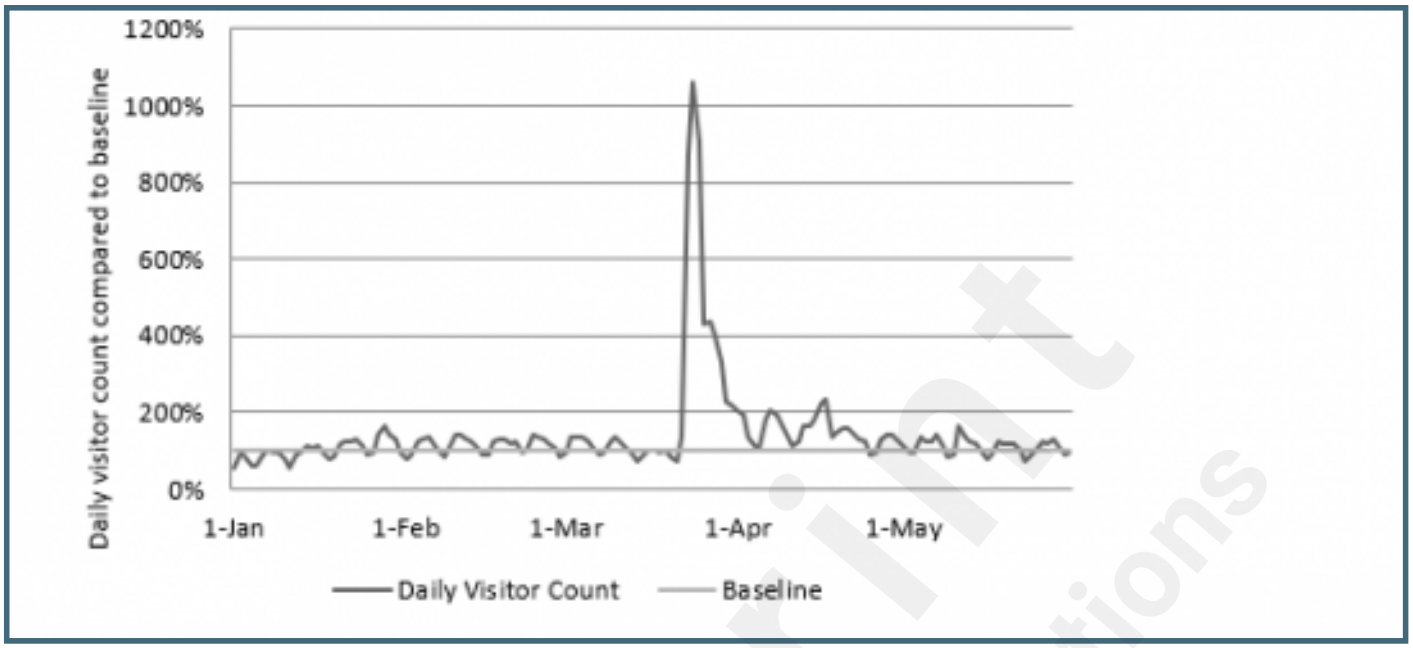
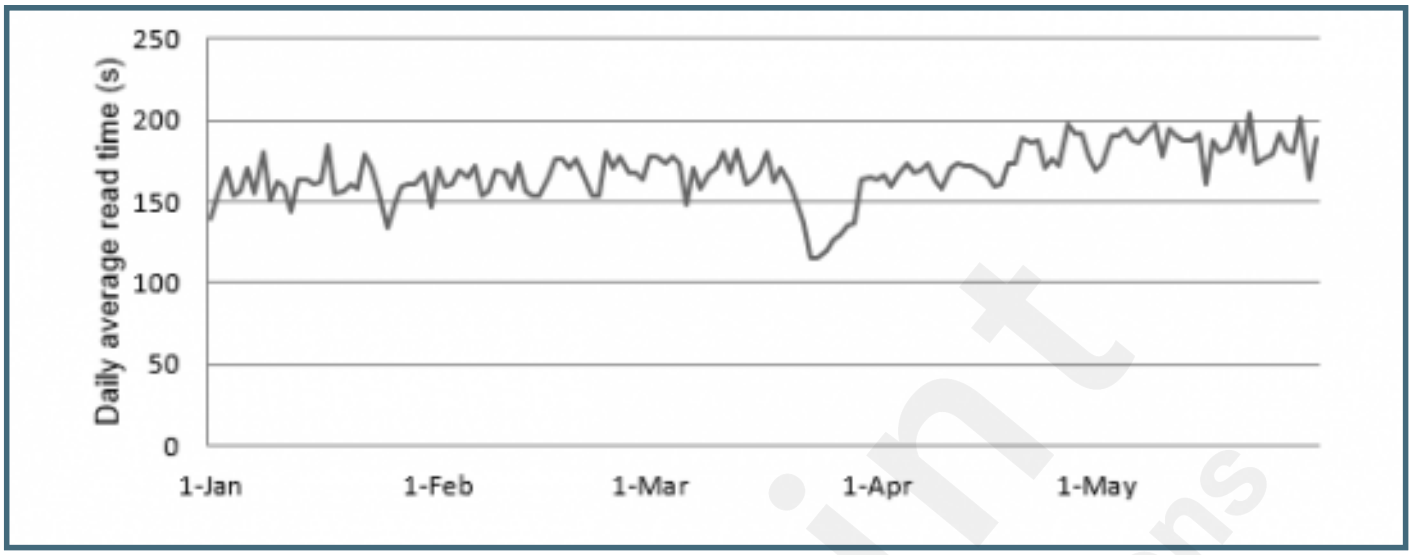
Supplementary Files

Figures

Daily visitor traffic on www.2minutemedicine.com between January 1, 2020 to May 31, 2020 compared to baseline, calculated as average visitor count in the month of January.



Daily average visit time per article on www.2minutemedicine.com between January 1, 2020 to May 31, 2020.



Daily average visit time per article on www.2minutemedicine.com between January 1, 2020 to May 31, 2020.

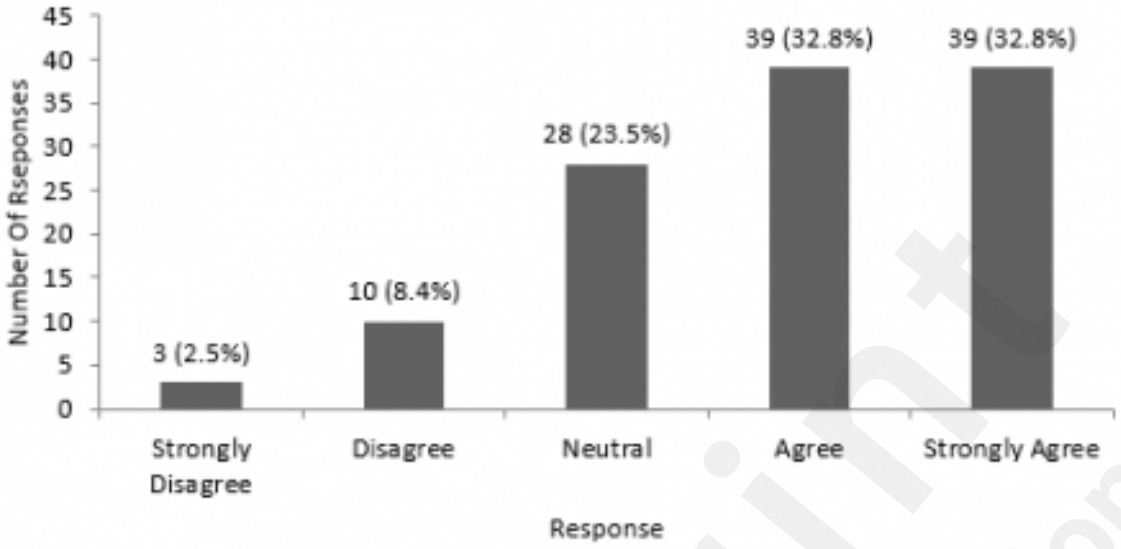


Figure 3. Likert Scale data for the question "I prefer staying up to date with emerging research surrounding COVID-19 by using sources such as 2 Minute Medicine versus reading the articles themselves".

Sources indicated as primary sources for COVID-19 literature delivery in survey data.