



25-Sep-2021

BMJ-2021-067726 entitled "Association of Logic's Hip Hop Song 1-800-273-8255 with Lifeline Calls and Suicides in the United States: A Time-Series Analysis"

Dear Prof. Niederkrotenthaler,

Thank you for sending us this paper and giving us the chance to consider your work. We sent it out for external peer review and discussed it at the manuscript committee meeting. Unfortunately we do not consider it suitable for publication in its present form. However if you are able to amend it in the light of our and/or reviewers' comments, we would be happy to consider it for the BMJ Christmas issue.

The reviewers' comments are at the end of this letter. The editors' comments are listed below:

We hope that you will be willing to revise your manuscript and submit it within 4 weeks. When submitting your revised manuscript please provide a point by point response to our comments and those of any reviewers.

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I hope you will find the comments useful. Please don't hesitate to contact me if you wish to discuss this further.

Yours sincerely  
Nazrul Islam, MBBS, MSc, MPH, PhD  
Research Editor, The BMJ  
nislam@bmj.com

**\*\*Report from The BMJ's manuscript meeting\*\***

At the manuscript meeting the Editor makes the final decisions on accepting original papers submitted to the journal. At the manuscript meeting each article is discussed by The BMJ's international team of research editors and one statistician. When making decisions we take into account each paper's originality, scientific merits, and interest to a general readership in comparison with other submitted papers. We take reviewers' reports fully into account too, but the final decision on acceptance or rejection of a paper rests with the editors.

These comments are an attempt to summarise the discussions at the manuscript meeting. They are not an exact transcript.

Members of the committee: Elizabeth Loder (chair); Angie Wade (statistician); Joseph Ross; Tiago Villanueva; Di Wang; Jessica Kimpton; Navjoyt Ladher; Nazrul Islam

Paper: BMJ-2021-067726

Decision: put points

Detailed comments from the meeting:

\* The Editors appreciate the importance of the research question. However, there is a very strong causal language in the manuscript. Given its observational nature, please revise the manuscript to tone down the findings and the interpretations.

\* The Editors agree with the reviewers that many important aspects of the regression modeling and statistical analyses were missing for a robust assessment of the analytic approach. Please elaborate the rationale for choosing the ARIMA model, all the model assumptions (including if and how they were met), detailed model specification and parameters in the appendix, and sensitivity analysis. Please see the comments from the reviewers and our statistical advisor (who will review the modeling details of the revised version).

\* The release date of this song "Logic's Hip Hop Song 1-800-273-8255" was very close to the release of the Netflix show "13 Reasons Why". The study did attempt to address this, but please explain why the period was only restricted between the Netflix release date to June 30, 2017.

\* Could you please comment if the calls to LifeLine were unique users.

\* The authors mentioned World Suicide Prevention Day, but did not discuss the effect of this event (Sept.10, which coincided with their second observation period) on the observed findings.

\* Please elaborate field-specific technical phrase such as Papageno effect?

\* Please elaborate on Brandwatch database.

\* There could be other factors that may have been at play; reviewer Cartagena mentions the deaths of musicians Chester Benningfield and Avicii. Musician Chris Cornell who died by suicide in May 2017. Please elaborate how these were considered in the analysis.

\* Statistical advisor's comments \*\*

\* More information should be given on the qualitative assessment methods that revealed the two additional peaks. More information on the modelling process of all 5 peaks that determined the durations of impact as given in table 1. Similarly re the models considered within the SPSS modeller and the selection of a 3 week prior cut-off. What were the estimated seasonal trends, time trends etc.? The fit of the model selected to this pre period should be shown/reported.

\* Previous research showed the Netflix show was associated with an increase of 5.5% (in what?) over a 3 months period within a specific age group. How was the 30 day period of 'effect' of the Netflix show selected and was this considered constant over age groups?

\* Was the Netflix show associated with changes to both lifeline calls and suicides?

\* Do the adjustment trends seen in table 2 behave as expected? (Why would association be higher for events later than release, which was closest to the Netflix period?)

\* Care should be taken with causal inference terminology. (Eg. suicide data analysis repeated using only those media events where there was a significant association (not effect)).

\* Please add these following two sections as these are mandatory for The BMJ

PPI: Please add the reason(s) for not involving members of the public in your own words (e.g.) funding or training restrictions, access to software, COVID etc, also it may be that speaking to patients inspired this review if this was the case it is fine to add that although there was no direct PPI in this paper due to \_\_\_\_\_ we did speak to patients about the study and we asked a member of the public to read our manuscript after submission. Please place the PPI declaration at the end of the methods.

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Reviewer(s)' Comments to Author:

Reviewer: 1

Recommendation:

Comments:

Association of Logic's Hip Hop Song 1-800-273-8255 with Lifeline Calls and Suicides in the United States: A Time-Series Analysis

- The paper is well written, well structured and very easy to follow. It is a very interesting read.
- It is interesting to see new methodologies applied for the evaluation of mental health 'interventions'.
- The use of social media data is also important as it shows the potential of big data for research.
- Research questions and outcome measures are clearly defined.
- Limitations of the study are clearly stated.
- Table and graphs are clearly labelled.

I would like, however, that the authors include the following additional details:

1. There is very little in the paper about their decision to use an ARIMA model, the assumptions behind the model and its suitability to analyse the effect of a nationwide strategy to prevent suicides.
2. It would be very relevant, to know how ARIMA models are able to establish causal effects on the outcome measures.
3. The authors mention discrete pulses modelling, but they don't explain what this is in the context of time series.

4. Is the sample size that you have well distributed across the country? This could help to determine if there were some other local interventions that could have also helped to increase the number of calls to the help line (and/or to reduce the number of suicides during the period of analysis).
5. It is not clear why the time of analysis is 34 days, while the authors mention that they have 17 years of data.
6. Overall, I believe there is not enough methodological background, for instance you could refer to <https://bmcmedresmethodol.biomedcentral.com/track/pdf/10.1186/s12874-021-01235-8.pdf>
7. The authors do not mention how the assumptions of ARIMA models are checked for this study, for example, stationary or seasonability.
8. While the authors consider that the suicide of celebrities usually increases the number of calls, but increases the number of suicides, I am not sure they can rule out the possibility that the excess calls and the reduction of suicides are exclusively due to the analysed hip hop song. For instance, Chester Bennington (Linkin Park) died in August 2017 and Avicii (DJ) in April 2018
9. Could some descriptive information be provided with regards to age, gender and location of the calls? (Even if the sample size is smaller, it may be important to present them)

Additional Questions:

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Reviewer: 2

Recommendation:

Comments:

The findings of the paper would be of landmark importance if they were to show that a positive media event was associated with reduced suicide rates and a number of other behavioural indicators of a reduction in suicide soon afterwards. Before being able to recommend publication of this paper, there are a number of methodological issues that require further explanation and possibly exploration.

The authors have examined tweets, and calls to a national suicide helpline. Traditionally suicide researchers might have examined self-harm presentations to health facilities and more recently website and other social media use. The authors do not explain their choices of outcome and why they did not consider others. I am not sure why people who are suicidal would select to use twitter as opposed to other social media. On the DBSA website, a major self-help organisation in the US, there are another 24 helplines listed as well as the Lifeline. The shift in Lifeline use might simply reflect that the title of the music track and video was the telephone number of the lifeline reflecting curiosity in Lifeline rather than general help seeking for suicidality. Twitter might reflect the need to immediately communicate about the track, video or awards rather than any request for help or expression of suicide intent. In relation to suicide, there should be some sensitivity analysis by age at least since one would expect the majority of an decrease in suicides to be specifically found in younger age groups who would listen to the track, watch the video or the award shows. Even if the results were not significant, an excess of suicides in younger age groups would be more compelling. Although the study used a standard definition of suicide, the determination of suicide verdicts is know to vary widely so there is usually a sensitivity analysis considering suicide plus open verdicts and suicide alone.

There are some other aspects of the methods which need explanation and justification. The decision to use a 34 day cut-off period after the release of the track, MTV and Grammy award seems arbitrary, idiosyncratic and unexplained. It is neither a calendar month nor a sum of weeks and since suicide is

greater on some days of the week rather than others, a 28 or 35 day period would seem more satisfactory.

The discussion states that the analysis controlled for secular trends over the previous 17 years and seasonality as well as autoregression. However the statistical analysis gives no indication of how this was achieved for suicide rates and presumably that could not have been done for twitter founded in 2006 or Lifeline which started in late 2004. The details of this analysis and how it was performed is crucial to the integrity of the paper so it is essential that the authors explain how the analysis controlled for seasonality and trends in suicide rates across other years in the statistical analysis section. The 3 periods where there are excess suicides contain months with higher and lower suicide rates so it is important to control for seasonality while there have been changes over time in overall suicide rates and their distribution by age, gender and ethnicity.

There are a couple of important points of lack of clarity that require correction. In the abstract results section the authors need to be clear that the increased suicide rate was seen in the 34 days surrounding each of 3 events (rather than 34 days across the three events) added together. Adding these events together is a valid analysis to do in my view (if the 34 day cut-off is justified) because of the data showing that these were periods of maximum attention from tweets and Lifeline calls.

On page 7, lines 42-46 "Of note, prior related research found that the show was associated with a marked increase of 5.5%..." What outcome was there an increase of 5.5% in? The sentence is incomplete.

A few other points to explore. The beneficial effects of the Logic track have been given a lot of publicity nearer the event in the general media. Why has this paper taken 3 years to emerge?

The authors should also acknowledge that people who are at risk of suicide are often socially withdrawn and do not necessarily use social media or helplines, which is why suicide or serious self-harm are so important in demonstrating an effect on suicidality.

A strength of the paper that is undersold is the size of the population that was available and the lingering effects of this track on the public because of the wards and publicity. Even then there is only just enough power to show an effect on suicide rates. If this concerns about the paper can be addressed, and there is a good chance that they can be with further explanation, then it is a rare and important example of the positive effects of the media reaching part of the population (younger) that can be difficult to engage through initiatives such as World Suicide day or through health and care agencies.

An effective anti-suicide initiative will need multiple methods to be effective, and some evidence to show the value of using the media in a way such as this is important to demonstrate. The way in which the media is used may require imagination; merely repeating this might not be so effective.

Additional Questions:

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Reviewer: 3

Recommendation:



Comments:

This is a well-conducted study that investigates an important and interesting hypothesis with novel data. They find that periods of time with high social media attention to one of Logic's songs were associated with call rates to lifelines. The study is well powered to investigate the effects of call rates to lifelines, and the results on this outcome look reasonably compelling. I am much less convinced by the suggestion that the song, and by extension calls to LifeLines affected suicide rates. The estimates of the decrease in suicide rates are very imprecise. None of the events has a detectable effect on suicide rates, but there's a suggestion of an association if the estimates are combined across the three biggest negative events while ignoring the two smaller events, which had imprecise, but positive associations with suicide rates. The authors do give a justification for this - the smaller events didn't have a detectable association with lifeline calls. If the authors can demonstrate that these decisions were pre-specified then the analysis would have more credibility, but at present, I am concerned that the choice was more based on what would provide a  $p < 0.05$ .

More fundamentally, I know this is a unique event, and it is very challenging to provide causal evidence about the effect of culture such as songs on suicide rates, this is still a single event, and the amount of data, and the number of suicides, even across the whole US is very low, so the results are not as precise or compelling as they ideally need to be.

Sorry not to be more positive, it's a really cute paper and done well, but I'm just not convinced the results on suicide are precise enough to claim that the song and particularly calls to Lifeline affect suicide rates.

1. Intro - also worth noting that the song has over a billion plays on Spotify.
2. P6 ln 48 - were any of these periods pre-specified or were they all identified in the data?
3. Could you confirm that these periods were defined without consulting the outcome (lifeline calls) data?
4. P7 l42 - increase in what?
5. P7 l35 - why is the control for "13 reasons why" restricted to June 2017 - presumably it continued to be aired after this point? Are there any viewing figures available for this show?
6. P7 l59 - could you publish the code and data used to analyze your study in GitHub or as an online repo.
7. P9 l5 - doesn't the estimate of one suicide prevented from every 41 calls assume that all of the effects of Logic's song on suicide is due to phoning the helpline? Is it possible that the song affected suicide rates via other pathways?
8. P9l53 - did you investigate the effects of 13 reasons why on suicides?
9. P10 l8 - "accurate estimates without measuring exogenous variables" what assumptions are required in order to obtain unbiased estimates? E.g. with respect to time-varying confounding?
10. Why are the video release and news impact excluded from the main events? This seems quite selective. If these are included, presumably the association with suicides attenuates and is consistent with the null.

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