

16-Feb-2020

BMJ-2020-054280 entitled "Traffic Accidents as a Risk of Watching Football (Soccer) at Home: An Observational Study"

Dear Dr. Yam,

Thank you for sending us your paper. We sent it for external peer review and discussed it at our manuscript committee meeting. We recognise its potential importance and relevance to general medical readers, but I am afraid that we have not yet been able to reach a final decision on it because several important aspects of the work still need clarifying.

Ordinarily the problems identified would lead to a rejection decision, but as we have 8 months before Christmas, we'd like to give you a chance to respond to the many concerns of the reviewers and editors. When the revision comes back we will make a judgment about whether these responses are adequate, and our statistician will then do a more detailed report. At present there is not really enough information provided about the methods to make that sort of review possible.

We hope very much that you will be willing and able to revise your paper as explained below in the report from the manuscript meeting, so that we will be in a better position to understand your study and decide whether the Christmas BMJ is the right journal for it. We are looking forward to reading the revised version and, we hope, reaching a decision.

Please remember that the author list and order were finalised upon initial submission, and reviewers and editors judged the paper in light of this information, particularly regarding any competing interests. If authors are later added to a paper this process is subverted. In that case, we reserve the right to rescind any previous decision or return the paper to the review process. With this particular paper, however, we see that you may need to add a statistician to your author group and provided that person meets criteria for authorship we would allow that change in the list of authors.

Please also remember that we reserve the right to require formation of an authorship group when there are a large number of authors.

When you return your revised manuscript, please note that The BMJ requires an ORCID iD for corresponding authors of all research articles. If you do not have an ORCID iD, registration is free and takes a matter of seconds.

Dr Elizabeth Loder

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

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

Members of the committee were: xxx (chair), yyy (statistician), [and list other eds who took part]

Decision: Request revisions. If revised version seems strong, Professor Riley will do a statistical report

Present at the manuscript meeting: Wim Weber (chair); Richard Riley (statistician); David Ludwig; Tim Feeney; Tiago Villanueva; Elizabeth Loder

* We are interested in the research question, which is the sort of slightly unusual angle that makes it a good fit for our Christmas issue.

* Papers published in the Christmas issue of The BMJ have to meet our methodological and reporting standards, however, even if they address an unusual or quirky research question. In its present form, this paper falls short. We'd like to give you the opportunity to address these shortcomings, in view of the fact that we have quite a bit of time before the Christmas issue. We can't make guarantees of publication, however. A revised paper will still need to be scrutinised by our statistician and it is possible he or we will not feel satisfied with the revised paper.

* Many editors commented that the study is poorly reported. Methods are interspersed in the results and introduction sections, and there is no discrete methods section in the paper.

* Team market value seems like a very crude proxy for "popular games". A game between a top team and the team in last place in the league may be more popular than one between two middle of the table teams, who may accrue a higher market value (take Wolves vs Arsenal for example). We can't see Asian fans staying awake to watch Liverpool vs Norwich City... In fact, only a handful of matches are really high stakes and we wonder why you did not focus on those: derbys, matches that decide national championships, Champions League or Europa League (it is not Europa Champion League!) finals...

* Some aspects of the paper seems quite speculative. For example, you do not provide evidence that taxi drivers in Singapore are committed watchers of European football. We would want to see viewership numbers, to see if more watched games through the middle of the night were associated with more accidents later that day (presumably because people are driving around tired). A

* The modeling is difficult to judge given the absence of a statistical methods section, although some things are described in the results section. One editor commented that "looking at the graphs doesn't give me much confidence in the linearity. I would want more information on things like severity of accidents."

* Our statistical consultant commented that he can't follow the methods, or what the control days are that were used for comparison.

* Is the information about cars and drivers specific to the taxi cars?

* You have not considered non-linear relationships between market value of the football match and the number of accidents.

* How did you account for multiple football matches screened live on the same day?

* We found it unusual that there is exactly 1.00 extra accident for each increase in the mean market value of 170 million. On inspection the beta coefficient is 0.0002, which corresponds to a ratio of counts of 1 between 2 days where the match value differs by 1-unit. Hence, the variable does not seem important, but this is probably because a 1-unit increase is tiny compared to the millions of units increase. The value may be 1.005555, which when multiplied by millions has an impact. You need to clarify what's going on here.

* It's not clear if there are any missing data and how this was handled

* There is very strong causal language in many places, eg "Watching football (soccer) games from distant time zones (e.g., at 3am local time) increases the prevalence of local auto accidents"

* There are some unhelpful statements such as: "This increased rate of traffic accident may translate to between 382.12 and 8,182.44 accidents" –the width is wide and we don't know the actual time-course here. Is this per day, per year, per season?

* You model team capital against accidents. Would it not be more appropriate to look at top teams only ?

* Our patient editor commented that the paper is missing a statement of patient and public involvement and dissemination plans.

Here is our guidance on both:

Mandatory patient and public involvement reporting

The BMJ is encouraging active patient and public involvement in clinical research as part of its patient partnership strategy. This is research which is "co produced" with patients, carers, or members of the public. Patient involvement in this context is not about being a research participant, answering surveys, or being an interviewee. It encompasses setting research priorities, defining research questions and outcome measures, providing input into study design and conduct, dissemination of results, and evaluation.

To support co production of research we request that authors provide a short paragraph as a subsection within the methods section of their papers entitled Patient and Public Involvement detailing how they involved the patients and the public in their research. We request this to both encourage the movement and ensure that BMJ readers can easily see whether, and if so how, patients and the public were involved in the research. If they were not involved in any way this information should be formally documented in the Patient and Public Involvement section.

As co production of research with patients and the public is relatively new we appreciate that not all authors will have involved them in their studies. We also appreciate that patient / public involvement may not be feasible or appropriate for all papers. We therefore continue to consider papers where they were not involved.

The Patient and Public Involvement section should provide a brief response to the following questions, tailored as appropriate for the study design reported:

- At what stage in the research process were patients/public first involved in the research and how?
- How were the research question(s) and outcome measures developed and informed by their priorities, experience, and preferences?
- How were patients/public involved in the design of this study?
- How were they involved in the recruitment to and conduct of the study?
- Were they asked to assess the burden of the intervention and time required to participate in the research?
- In addition to considering the points above we advise authors to look at guidance for best reporting of patient and public involvement as set out in the GRIPP2 reporting checklist.

Link only <https://drive.google.com/file/d/14vnXwTJ2CDn2KQsuNpuEnSwad69gc7dR/view>

Dissemination

Please confirm when and how results were (or will be) disseminated. Guidance for best practice in dissemination is set out in the following link and gives examples:

<https://www.nihr.ac.uk/funding-and-support/documents/funding-for-research-studies/manage-my-study/How-to-disseminate-your-research/dissemination-guidance.pdf>

The authors need to add a statement about dissemination with the other declarations like COI etc. Here they can just share how they plan to let people know about the paper, examples include: conference, poster, blog, social media, send to advocacy groups, press release, blog, posting on research website or adding to repository interviews, a companion opinion article in the BMJ or elsewhere etc. In addition how will you disseminate to patients and relevant communities. How were (or will) patients and the public be involved in choosing the methods and agreeing plans for dissemination of the study results to participants and wider relevant communities?

In your response please provide, point by point, your replies to the comments made by the reviewers and the editors, explaining how and where you have dealt with them in the paper.

Comments from Reviewers

Reviewer: 1

Comments:

It should be noted that it is an interesting research and an original idea. The basic assumption in this research is that high-profile football matches are of common interest in the Singapore's population and that a relatively large number of taxi drivers do follow them. This issue was not addressed in the manuscript and, I guess, can be easily added (look for Expedia poll from May 2019 stating that 3 out of 4 Singapore football fans plan their holidays around sporting events, for example).

The second item that, in my opinion should be better elaborated is the definition of an car incident that has an ample range and, if data exists (or a proxy like the cost of fixing the damage), the whole work can be upgraded and maybe more précised conclusions can be drawn. In case it is not possible to get those data items, it should be also noted.

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Job Title: Prof.

Institution: Bar Ilan University

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Reviewer: 2

Comments:

As a lay reviewer, I find it impossible to comment on the statistical evidence as I do not understand the processes used, nor the technical results they produce. The article also includes a high level of jargon which I imagine is only comprehensible to statisticians.

The article cannot be assessed as a carer or a patient as it has no direct effect on those with long term health conditions and does not relate to any treatments.

It would appear that the scheduling of football matches has an effect on the incidence of accidents during and after high profile games and that this is in direct proportion to the profile of the game in question.

All data used for analysis has been obtained from just one source – a large taxi operator. This company's cars clearly make up a large proportion of cars out on the road at any given time.

The author then goes on to report that when a high profile matches are shown, the accident rate goes up noticeably. The assumption is that this rise is directly related to drivers being tired, driving whilst listening to the match, or keeping an eye on the score. This implies that the taxi drivers are not only victims of these irresponsible drivers, but also perpetrators.

If accidents logged by all drivers were analysed there may well be a different picture. It would seem rather restrictive to focus on this one company, resulting in an unbalanced view.

Also, if taxi's are busier due to matches, then they are transporting passengers. Many of these will be listening to the match, but cannot be culpable for any accidents – it could be assumed that they could have commentary on whilst travelling which is distracting the driver.

In conclusion, as the taxi company are recording higher than average accidents during high profile matches, then training of drivers and banning the use of radios, internet devices, etc. whilst driving would seem the first step in reducing the carnage.

A taxi driver will spend lengthy periods of time driving and therefore tiredness must creep in at some point during their shift. This will add to the statistics, but is not necessarily as a direct result of the football.

There is a suggestion that kick off times could be brought forward from 7pm to 6pm. London is an hour behind the majority of European cities. Therefore this would result in a 5pm kick off in the UK – the time when most people are traveling home from work and would therefore either need to take time out of work or miss the match. This would have financial implications for both industry and the television companies.

International Sport and domestic sport is taking place all around the world at different times of the day and night depending upon residence. Whilst the point is made that Asia is a highly populated region, shifting the times of any sport will have an effect somewhere around the world.

Overall, this research appears to be largely irrelevant as the source of information is questionable, and the limited possibility of solving the problem, other than stopping live streaming in order to play in full at a reasonable hour, questions its validity.

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Job Title: Retired

Institution: NA

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Reviewer: 3

Comments:

This is a well written paper and is easy to read and understand.

The results are easily understandable and not published before.

The authors have made clear they are not suggesting a causal relationship.

I have some comments:

The data is 5 years old and merits and explanation re why so delayed.

The other 'variables' /associations could have played apart and were these careful statistically analysed?

Age, gender, total duty hours.

Were the drivers asked if they were fans of football/sleep deprivation (and its cause), excitement and if they watched the matches?

Was there co-relation with previous accidents?

Any other cities looked at and if these can be reproduced?

There are many assumptions in the paper which need some explanation.

It is possible that all these have been looked at already but not explicit in the submission.

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Please enter your name: Dr Amit Arora

Job Title: Consultant Physician and Geriatrician

Institution: University Hospital of North Midlands and Midlands Partnership Foundation Trust

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: No

Funds for a member of staff?: No

Fees for consulting?: No

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Reviewer: 4

Comments:

With great pleasure I read the paper entitled "Traffic Accidents as a Risk of Watching Football (Soccer) at Home: An Observational Study" by Yam et al. submitted for publication to the BMJ.

This paper reports that watching high-profile football games in other time zones can be dangerous for roadside. The authors claim that this is especially problematic in Asia, because drivers lose sleep watching high profile games played in Europe which occur during local times in which they typically sleep, leading to a higher prevalence of traffic accidents.

I really like the idea behind this study. However, I have several aspects that need further attention.

1.) Please give a more detailed overview which games you included. More football fans will watch games in the final phase of the tournaments. Also, tournaments will be more watched than national football league games. Furthermore, there are games in the final phase of a national football league that are more exciting and more widely watched (i.e. when a game decides who will be national champion). Finally, the best way to control for all these aspects is to have objective data on the number of TV-spectators of every game. Is it possible to get such data and control for that? If not, at least control to some degree on how "exciting" a game was.

2.) Page 9, last line: 8,182.44: this number is based on the assumption that the general population is watching football as much as in taxi drivers. I would rather guess that taxi drivers watch football more often than the general population.

3.) How can you exclude the possibility that taxi drivers are distracted by watching the game during driving? At least in my country (Europe) a lot of taxi drivers have TV screens, ipads, or can watch on their mobile phones. Of course, it is not allowed to watch during driving, but anyway, I think it is reasonable to assume that at least some of the taxi drivers are distracted by watching (or even listening) to matches while driving. I think this even more applies for all other drivers (not taxi drivers) as taxi drivers will likely be more adherent to the rule to not watch screens during driving. On the other hand, taxi drivers represent more than 5% of all vehicles during the night. Could you elaborate to this aspect?

4.) Can you increase your data-pool? You now report on 13,000 taxi drivers of a single company. Do you have data from traffic accidents on a national level in Singapore? Or Uber? Or public transport drivers? Or increase the time period?

5.) Usually, there are "hot-spots" in cities where more traffic accidents happen. So geographical differences exist with respect to where traffic accidents occur. Do you have data on that?

6.) Why did you report your data in US Dollars? The clubs are in Europe, the original data of the market values are in Euros, and you submit this paper to an European journal. I see no value in reporting the values in US Dollars. One could make an argument for Pounds (as the journal is British), however, I see no reason to report US Dollars.

7.) Finally, I don't like the title, it does not read fluent. Please change.

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Please enter your name: David Niederseer

Job Title: Consultant Cardiologist

Institution: University Hospital Zurich, Switzerland

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: No

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Reviewer: 5

Comments:

Review of "Traffic Accidents as a risk of watching football at home: an observational study"

This study addresses an interesting hypothesis that watching European football games in Asian time zones increases traffic accidents in Singapore. While there is reason to justify this hypothesis, the study methods are insufficiently explained in the current draft and the discussion and conclusions are overstated given the limitations of the study design, which should be more thoroughly described.

Throughout the paper the authors use causal language – "effect" of watching football, "increases" prevalence- all language should be associations rather than causal as this is not an experimental study. Overall this study presents a novel and interesting hypothesis, but would be improved from more critical discussion of the limitation of the data and avenues for future research rather than drawing conclusions about policy changes or determining that changing game times will improve the rate of traffic accidents (as this was not modeled and it is difficult to say whether that would make a difference).

Abstract:

The reviewer would not consider this to be a longitudinal study, as the study was not designed to collect multiple events from the same individual, but rather just included historical data over a few years.

Missing a word in the first sentence of the conclusions.

Introduction:

- Is there evidence from TV networks about how many people are tuning in where? Or watching the matches live vs recording them?
- Reason for choosing Singapore justified as affecting both those who stayed up late and those who did not (not sure why this is specific to Singapore)
- Information on the study population should be moved to methods section

Methods

- There is no section labeled methods- add subheading. Also, there is insufficient information on modeling technique, processes for model selection and building, etc. Please add information on model selection.
- Do authors know how complete accident records are from the taxi company? Is there information on who is at fault from insurance claims, etc?

Results

- Page 6: Generalizability refers normally to applying to broader populations. It is unclear how testing for interaction in this case increase generalizability.
- Can authors stratify by key variables including weather and weekday/weekend, even though interaction was not significant?

Discussion:

- Important to call attention to the lack of individual level variables, as there was no data on whether those who were in accidents were watching football the prior night; further studies would be prudent before policies are changed based on such data; furthermore, taxi drivers are still presumed to work on weekends so it is unclear why moving game days would lead to sleeping in. What about policies by the taxi company to encourage drivers to watch recorded games rather than live or other incentives/disincentives for sleepy driving?
- Conclusion about saving lives does not come from the presented data- if authors can look at traffic fatalities this would be justified but if not, then conclusions should be relevant to the data presented (accidents alone)

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Please enter your name: Hannah Arem

Job Title: Assistant Professor

Institution: George Washington University Milken Institute School of Public Health

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: No

Funds for a member of staff?: No

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Reviewer: 6

Comments:

The Authors propose a novel hypothesis that sleep deprivation induced by watching high-profile football matches could induce more traffic accidents. They test this hypothesis using time-series and count model methods for a large taxi company in Singapore. They use as the independent variable the total market value of the salaries of European footballers playing on particular days. Results support the hypothesis and indicate a rise in traffic accidents during the day, following a night of a high-profile football match.

I commend the Authors for use of various methods to enhance methodological rigor, including the test which separates daytime from nighttime accidents. The hypothesis is novel, the proposed mechanism connecting football matches to traffic accidents is plausible, the rigor of the study design and analysis is strong, and the Authors' conclusions do not overstate their findings. Below I list my comments, in order of importance.

1. Show ACF and PACF of residuals in traffic accident series before conducting cross-correlation function with the football match variable.

Granger-cause logic states that X cannot be said to cause Y unless it can predict Y better than the history of Y itself. In the cross-correlational analysis, you have not provided sufficient evidence that the history of Y has been modeled (and removed) BEFORE the effect of X on Y is examined. Please report the autocorrelation and partial autocorrelation functions (ACF and PACF) for the lags of your Y series after the alleged patterns have been identified and removed. You allude to a Dickey-fuller test for trend, but trend is but one of many forms of autocorrelation that should be removed from traffic accidents before the X and residualized Y series are cross-correlated. Removal can take many forms, including the addition of dummy variables, insertion of ARIMA error terms, etc. But the key here is that the history of Y is completely unavailable for explanation of Y on a particular day. Information on the ACF and PCF of the residuals of Y is standard reporting for time-series analysts.

2. Policy implications unclear

Whereas I find the results to be compelling, the implications for policy are less clear. A full accounting of the costs/benefits of high profile football matches in GMT+8 surely would involve (1) potential health benefits of watching the game—for cardiovascular health, stimulating inspired individuals to exercise more the following day, opportunity to socialize and interact with peers and avoid social isolation); (2) economic benefits to Singapore for showing the matches—in terms of cable TV subscriptions, revenues for restaurants and bars that remain open late, etc. Surely other avid football fans could come up with other potential benefits.

For these reasons, a lack of complete accounting of the net cost/benefit of these matches would make the policy implications of findings less clear. I would modify the discussion accordingly, and/or augment the cost/benefit analysis.

3. Aggregation of start times assumes homogeneity in sleep response regardless of start time

Not all European matches start at 7pm local time. Aggregation of a high-profile match index, regardless of the mean (or most important) start time, assumes that a sleep deprivation response to a 2am (vs 4am) start time is the same. Would sleep research suggest similar responses in terms of total hours lost due to these different start times? This seems unlikely, given that 2am starts might interrupt REM sleep more than would 4am starts, and the ability to return to sleep after a 2am start may be more/less likely than would a 4am start. More information from the sleep literature would assist, so that the reader could determine whether it is reasonable to assume homogeneous sleep disruption responses to different start times of games.

Additional Questions:

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Institution: University of California, Irvine

Reimbursement for attending a symposium?: No

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