PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Epidemiology and trends in non-fatal self-harm in three centres in England, 2000–2012: findings from the Multicentre Study of Self-Harm in England
AUTHORS	Geulayov, Galit; Kapur, Navneet; Turnbull, Pauline; Clements, Caroline; Waters, Keith; Ness, Jennifer; Townsend, Ellen; Hawton, Keith

VERSION 1 - REVIEW

REVIEWER	Helen Keeley HSE South, Ireland National Suicide Research Foundation, Ireland
REVIEW RETURNED	29-Nov-2015

GENERAL COMMENTS	While this is a perfectly reasonable discriptive approach to the topic, there is a lack of discussion regarding the clinical implications of the results. This is an experienced and distinguished group and their views regarding the effectiveness or otherwise of prevention/ intervention methods would be very welcome to those of us working in the field. Although the authors discuss the increase in certain self-harm methods there is a lack of further exploration of this issue, for instance whether there has been a change in the gender profile of some of these methods, which has been reported elsewhere, with some females using more aggresssive methods. Also, with an increase in male self-harm then the profile of presentations to ED departments is also likely to have changed, with very different demands on ED staff and a change in risk profiles. It would also be interesting to hear the authors' views regarding whether or not a national programme of standardised reporting of self-harm (as in the republic of Ireland) would be useful or if they would favour increasing the number and type of centres to get a broader perspective on the national profile of suicidal behaviours in the UK. I also wonder if there is any evidence that the change from pen and paper to electronic data recording has had any effect on the results from the involved centres.

REVIEWER	Chia-Yi Wu School of Nursing, National Taiwan University College of Medicine, Taiwan
REVIEW RETURNED	03-Dec-2015

GENERAL COMMENTS	The study reveals the epidemiology and trends in non-fatal self-harm in three centres in England, 2000 to 2012. The study was based on many evidence-based studies that the research team members have

achieved. It is generally well-written article with a few points to clarify. However, I notice that the study design, aim, methodology and writing style are very similar to another published paper in 2010 (Bergen et al.) which was corresponded by the same author. The authors should be noted the following concerns before it can be considered for further review.

1. The title and contents are similar to the 2010 paper. The main difference is that the current manuscript added more information and cases derived during 2008-2012. Although the authors did mention that the socioeconomic influence in 2008 may cause impact to self-harm pattern, still there is generally lacking of originality and cutting-edge findings for this article.

2. The authors reported that "Level of missing data varied". But whether the missing data was different from available data is unknown. I confused the case number since in page 4 it was written " more than 86,000 presentations to emergency departments"; whereas in the abstract and results it was written " 84,378 self-harm episodes".

3. The major flaw is that in Table 1 the number of 26738 is incorrect, thus making 47023 doubtful. The total number of the column "Female" in the four lists of Individual age groups should be confirmed.

4. Minor point: (1) Self-poisoning is 3 time more of the prevalence of self-cutting and should discuss more about its implication; (2) There should be some descriptions about how the consistent training was performed for the personnel in 5 different centres given that different centres have different procedures to recruit data.

REVIEWER	Ben Barr
	University of Liverpool, UK
REVIEW RETURNED	07-Dec-2015

GENERAL COMMENTS	This is an interesting paper that provides an important contribution to the growing evidence indicating adverse trends in mental health in England during recent years. A few minor comments.
	1. typo in the abstract - letter should be latter
	2. It is probably worth outlining the socioeconomic differences between the populations in each of the centres in the introduction as this is important for interpreting the results - at the moment it is only mentioned in the discussion.
	3. The authors should clarify how the denominator populations were defined and numerators aligned to these. It appears that denominators are defined as the entire resident populations of the upper tier local government areas of Manchester, Oxford and Derby - do the catchment areas of the hospital only include these populations - were cases from outside these areas excluded from the numerators - is it possible that people from these populations used other hospitals - might this have changed over time?
	4. page 10 should be 362 per 100,000 population (95%CI: 343 to 381) etc
	5. Its not entirely clear how the authors have tested the difference in trends between the 2000-2007 period and the 2008-2012 period. I assume they have included two linear splines for each period in their

negative binomial model or may have run separate models for each time period - either way this should be clarified in the methods
6. Since this study uses time series data - the model should probably use standard errors that are robust to serial correlation in the data - although I wouldn't expect this to make much difference.
7. Its not clear how the correlation between suicides rates in England and self harm rates in this study has been calculated - this would seem to be a simple Pearson correlation between the annual values of each of these measures. I'm not sure that tells us much as many unrelated things will follow a similar secular trend and hence be correlated. It may not be necessary to conduct a formal statistical test - its clear enough from the figures that these are related. Formally investigating the association between these two times series should really involve times series methods such as AR models.
8. It is hard for the reader to follow the different denominators (which seem to relate to the availability of data) used for the psychological assessment (35960-53% of all episodes) , psychiatric history (39279 - ?% of all episodes) and repetition of self harm (44662 - ?% of all people). A flow chart might help clarify the different denominators used for each analysis and how these relate to the overall study numbers 84,378 from 47048 people.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: Helen Keeley
Institution and Country: HSE South, Ireland, National Suicide Research Foundation, Ireland

Please leave your comments for the authors below

While this is a perfectly reasonable discriptive approach to the topic, there is a lack of discussion regarding the clinical implications of the results. This is an experienced and distinguished group and their views regarding the effectiveness or otherwise of prevention/ intervention methods would be very welcome to those of us working in the field.

Authors' response: We thank the reviewer for their comments. We have discussed the implications of this study in our paper. We highlight the importance of obtaining accurate data on rates of self-harm which can be used as a mental health indicator. We note the concern about the increase in certain methods of self-harm such as self-cutting and stressed the importance of offering these patients a psychosocial assessment given their heightened risk of subsequent suicide. We emphasise the finding that only a little over half of patients who self-harm receive a psychosocial assessment and that this figure is consistent with other reports and has not improved despite clear NICE guidance that all patients who self-harm should undergo a comprehensive assessment. We also emphasise the need to include efforts to increase overall rates of assessment and particularly in patients who self-cut, who are least likely to receive an assessment.
Following the reviewer's comments we have further discussed the implications of the present study in relation to the economic recession (see p. 17 1st paragraph) and commented on the challenges of managing patients who self-poison (see p. 17, last paragraph).

Although the authors discuss the increase in certain self-harm methods there is a lack of further exploration of this issue, for instance whether there has been a change in the gender profile of some of these methods, which has been reported elsewhere, with some females using more aggresssive methods. Also, with an increase in male self-harm then the profile of presentations to ED departments is also likely to have changed, with very different demands on ED staff and a change in risk profiles.

Authors' response: We have examined the changes in methods of self-harm by patients' characteristics. In terms of gender, there were no differences in the patterns seen in males and females i.e. both showed an increase in the number of presentations involving certain methods of self-injury such as hanging/asphyxiation and self-cutting. We have added this information to the Results and Discussion (see p. 14, 2nd paragraph and p. 17, last paragraph).

It would also be interesting to hear the authors' views regarding whether or not a national programme of standardised reporting of self-harm (as in the republic of Ireland) would be useful or if they would favour increasing the number and type of centres to get a broader perspective on the national profile of suicidal behaviours in the UK.

Authors' response: Routinely collected data may not be adequate for this purpose as our recent paper shows (Clements, Turnbull, Hawton et al. Rates of self-harm presenting to general hospitals: a comparison of data from the Multicentre Study of Self-Harm in England and Hospital Episode Statistics. BMJ Open, in press). In that paper we report a comparison of self-harm presentations to hospital from the Multicentre Study of Self-harm in England with routinely collected hospital data (HES).We found a consistent major under-estimation of presentations for self-harm as recorded in HES emergency department data. The method of data collection used in our Multicentre Study of Self-harm ensures reliable data. We agree that using such methods in other centres in England would be desirable to get more comprehensive information. However, the type of comprehensive data collection employed in our study, including linkage to subsequent deaths, is relatively expensive so national roll-out in England, as has happened in Ireland, would probably not be feasible, but we are keen to increase the number of centres involved.
I also wonder if there is any evidence that the change from pen and paper to electronic data recording has had any effect on the results from the involved centres.

Authors' response: We have not noticed any changes in quality of data in relation to the method of data collection.

Reviewer: 2
Reviewer Name: Chia-Yi Wu
Institution and Country: School of Nursing, National Taiwan University College of Medicine, Taiwan

Please leave your comments for the authors below

The study reveals the epidemiology and trends in non-fatal self-harm in three centres in England, 2000 to 2012. The study was based on many evidence-based studies that the research team members have achieved. It is generally well-written article with a few points to clarify. However, I notice that the study design, aim, methodology and writing style are very similar to another published paper in 2010 (Bergen et al.) which was corresponded by the same author. The authors should be noted the following concerns before it can be considered for further review.

1. The title and contents are similar to the 2010 paper. The main difference is that the current manuscript added more information and cases derived during 2008-2012. Although the authors did mention that the socioeconomic influence in 2008 may cause impact to self-harm pattern, still there is generally lacking of originality and cutting-edge findings for this article.

Authors' response: The study adds an additional five year of data about the incidence of self-harm in three socioeconomically diverse cities in England which are part of the Multicentre Study of Self-harm

in England. It therefore provides an update on recent trends of self-harm behaviour and allows examination of trends in methods of self-harm and characteristics of patients which are important for planning health services and identifying risk factors of self-harm and suicide. The additional five years are of particular importance as they cover the period of the recent economic recession.

Furthermore, in response to the comments of reviewer #1, we added more information on the potential implications of the present study, highlighting its contribution to further understanding of recent developments in self-harm.

2. The authors reported that "Level of missing data varied". But whether the missing data was different from available data is unknown. I confused the case number since in page 4 it was written " more than 86,000 presentations to emergency departments"; whereas in the abstract and results it was written " 84,378 self-harm episodes".

Authors' response: The figure of 86,000 episodes includes all presentations. However, 84,535 episodes were by person 15 years and over, which are the focus of this report. We changed the figure on page 4 to 'over 84,000 episodes'.

3. The major flaw is that in Table 1 the number of 26738 is incorrect, thus making 47023 doubtful. The total number of the column "Female" in the four lists of Individual age groups should be confirmed.

Authors' response: We noticed a typo in Table 1 – the digit '5' was dropped from the figure 1,68,which should read 1,685 (please see Table 1). After adding the missing digit, the number of Females is identical to the sum of females stratified by age.

4. Minor point: (1) Self-poisoning is 3 time more of the prevalence of self-cutting and should discuss more about its implication;

Authors' response: We agree with the reviewer that this is an important point. The majority of presentations to hospitals following self-harm involve self-poisoning and this has implications for hospital management of self-harm. We added a few sentences highlighting this issue (please see p.17, last paragraph).
(2) There should be some descriptions about how the consistent training was performed for the personnel in 5 different centres given that different centres have different procedures to recruit data.

Authors' response: In the methods section we have added information about the standard training received by clinical staff who collect the data for this study.

"Regular induction training of clinical staff helps maintain the quality of data collection." (p.7, 1st paragraph).

Reviewer: 3
Reviewer Name: Ben Barr
Institution and Country: University of Liverpool, UK

Please leave your comments for the authors below

This is an interesting paper that provides an important contribution to the growing evidence indicating adverse trends in mental health in England during recent years. A few minor comments.

1. typo in the abstract - letter should be latter

Authors' response: The typo has been corrected.

2. It is probably worth outlining the socioeconomic differences between the populations in each of the centres in the introduction as this is important for interpreting the results - at the moment it is only mentioned in the discussion.

Authors' response: We have added the following paragraph describing the population in terms of socioeconomic deprivation (see p. 6, 2nd paragraph).

"The three study centres include socio-economically diverse populations. Based on the Multiple Indices of Deprivation (IMD) 2007 in England, which ranks areas according to seven domains (income, employment, health deprivation and disability, education skills and training, barriers to housing and services, crime, living environment) to derive an overall deprivation score, Manchester was ranked the fourth most deprived local authority in England, compared to Derby, which was ranked 69th and Oxford 155th.

3. The authors should clarify how the denominator populations were defined and numerators aligned to these. It appears that denominators are defined as the entire resident populations of the upper tier local government areas of Manchester, Oxford and Derby - do the catchment areas of the hospital only include these populations - were cases from outside these areas excluded from the numerators - is it possible that people from these populations used other hospitals - might this have changed over time?

Authors' response: We assume that the reviewer is referring to the numerators and denominators used for calculating rates. For the denominators we used mid-year population estimates from the Office for National Statistics (ONS). We used city based population estimates (e.g. the city of Manchester) rather than extended area (e.g. Greater Manchester). To derive the numerator, we used postcodes to identify place of residence and used only the data of persons residing within the area equivalent to that of the ONS city catchment area. We have amended one of the sentences about the denominator to clarify this so it now reads "Mid-year population estimates for the city catchment area were obtained from the Office for National Statistics (ONS)." (see p.7, 'Rates of self-harm and suicide').

4. page 10 should be 362 per 100,000 population (95%CI: 343 to 381) etc

Authors' response: We have added the "per 100,000 population" after the figures (p. 11, 2nd paragraph).

5. Its not entirely clear how the authors have tested the difference in trends between the 2000-2007 period and the 2008-2012 period. I assume they have included two linear splines for each period in their negative binomial model or may have run separate models for each time period - either way this should be clarified in the methods

Authors' response: No formal statistical analysis was carried out to compare the two time periods (2000-2007 and 2008-2012). We tested the trends in rates of self-harm separately in the two periods, fitting a separate regression line for each and merely commented on the results from each of the models – the former showing a decreasing linear trend and the latter showing an increasing linear trend. We have further clarified this issue so it now reads "After inspecting Figure 1 and based on our a priori assumption that the economic downturn might increase rates of self-harm, we examined trends in rates by period (2000-2007 versus 2008-2012) by fitting a separate regression model for each time periods." (see p.11, last paragraph).

6. Since this study uses time series data - the model should probably use standard errors that are robust to serial correlation in the data - although I wouldn't expect this to make much difference.

Authors' response: We assume that the reviewer is referring to using a cluster approach to account for the potential lack of independence of observations in our data. We have considered using a multilevel approach clustering on study centres. However, as our sample has been recruited from three study centres, clustering on study centres would not make much sense.

7. Its not clear how the correlation between suicides rates in England and self harm rates in this study has been calculated - this would seem to be a simple Pearson correlation between the annual values of each of these measures. I'm not sure that tells us much as many unrelated things will follow a similar secular trend and hence be correlated. It may not be necessary to conduct a formal statistical test - its clear enough from the figures that these are related. Formally investigating the association between these two times series should really involve times series methods such as AR models.

Authors' response: We examined the correlation between rates of self-harm in our study and suicide rates in England using the Spearman's Rank Correlation test. We clarified this in the Methods: "The correlation between rates of self-harm and suicide rates in England were examined using Spearman's Rank Correlation test." (see p. 9, 1st paragraph).

We agree with the reviewer that it is clear from observing the graphs that suicide and self-harm follow similar trends. However, we also acknowledge that some readers may find a formal statistical approach more informative and therefore included the correlation test. We do not feel that using a more sophisticated approach such as AR is merited on this occasion as such comparison between the trends in rates of suicide and self-harm extends beyond the scope of the present paper.

8. It is hard for the reader to follow the different denominators (which seem to relate to the availability of data) used for the psychological assessment (35960-53% of all episodes) , psychiatric history (39279 - ?% of all episodes) and repetition of self harm (44662 - ?% of all people). A flow chart might help clarify the different denominators used for each analysis and how these relate to the overall study numbers 84,378 from 47048 people.

Authors' response: We have added a detailed description of the sample, including denominators for the different variable (see pp. 9-10).

VERSION 2 – REVIEW

REVIEWER	Helen Keeley Health Service Executive, South CAMHS North Cork, Ireland National Suicide Research Foundation, Ireland
REVIEW RETURNED	26-Jan-2016

GENERAL COMMENTS	I thank the authors for their response to my previous remarks and feel that the paper is much improved with regard to providing an understanding of the current position in England of self harm trends and the relationship with suicide trends. The commentary on the impact of the recession adds important context and the concerns regarding lack of assessment of those who self-harm by cutting are well put and worth consideration by those who plan and provide services.

REVIEWER	Chia-Yi Wu

	School of Nursing, National Taiwan University College of Medicine
REVIEW RETURNED	27-Jan-2016

GENERAL COMMENTS	After careful review, the issue of similarities of research design, title, and contents with another paper published in 2010 by Bergen et al. still exists in my opinion. The two studies have much in common in general. Although the authors have revised numerical data errors in Table 1 and in the text and justified that this study has added more information regarding the consequences of economic impact during 2008-2012, I suggest the authors revise the conclusions in the abstract and in the text based on the the above-mentioned novel findings to avoid too much similar points written in the two papers. Besides, the number in Page 19, the first line of Strengths and Limitations is still wrong, which is not consistent with the revised number shown in Page 4.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: Helen Keeley
Institution and Country: Health Service Executive, South CAMHS North Cork, Ireland, National Suicide Research Foundation, Ireland Please state any competing interests or state 'None declared': none declared

Please leave your comments for the authors below

I thank the authors for their response to my previous remarks and feel that the paper is much improved with regard to providing an understanding of the current position in England of self harm trends and the relationship with suicide trends. The commentary on the impact of the recession adds important context and the concerns regarding lack of assessment of those who self-harm by cutting are well put and worth consideration by those who plan and provide services.

Reviewer: 2
Reviewer Name: Chia-Yi Wu
Institution and Country: School of Nursing, National Taiwan University College of Medicine, Taiwan Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

After careful review, the issue of similarities of research design, title, and contents with another paper published in 2010 by Bergen et al. still exists in my opinion. The two studies have much in common in general. Although the authors have revised numerical data errors in Table 1 and in the text and justified that this study has added more information regarding the consequences of economic impact during 2008-2012, I suggest the authors revise the conclusions in the abstract and in the text based on the the above-mentioned novel findings to avoid too much similar points written in the two papers. Besides, the number in Page 19, the first line of Strengths and Limitations is still wrong, which is not consistent with the revised number shown in Page 4.

Authors' response: We acknowledge that the methods described in this present paper are the same as those used by Bergen et al. (2010). As in our earlier publication, we describe the core methods that have been used to collect data in the Multicentre Study of Self-harm in England since 2000. The consistency and standardized manner in which data have been collected makes the Multicentre Study of Self-harm the most reliable and comprehensive database on hospital presentations due to self-

harm available thus far.

We feel that the conclusions in the main text accurately reflect the main findings of this study. However, we agree that the conclusions in the Abstract could be modified to better reflect our key findings and revised the Abstract accordingly (please see p.3)
We agree with the reviewer that the figure on p. 19 ('Strengths and limitations') should be 84,000 rather than 86,000. The former is the correct number of presentations excluding presentations by patients younger than 15 years. This was corrected (see 'Strengths and limitations' on p. 19).