PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Associative stigma among mental health professionals in Singapore: a cross-sectional study
AUTHORS	Picco, Louisa; Chang, Sherilyn; Abdin, Edimansyah; Chua, Boon Yiang; Yuan, Qi; Vaingankar, Janhavi; Ong, Samantha; Yow, Kah Lai; Chua, Hong Choon; Chong, Siow Ann; Subramaniam, M

VERSION 1 – REVIEW

REVIEWER	Heather Stuart Queen's University, Kingston, Ontario, Canada
REVIEW RETURNED	04-Dec-2018

GENERAL COMMENTS	The following comments are offered for the authors' consideration: Literature Review: Include the paper on Images of Psychiatry and Psychiatrists, Stuart et al. There are also numerous papers gauging how medical students perceive psychiatry as a career. These should be included in the literature review (many of these are referenced in the Images paper). It should also be noted that this paper includes data for 15 countries, including Singapore. A companion paper also includes a psychometric validation of a scale that could be used to assess stigma expressed by others to psychiatry and psychiatrists (with many items similar to the ones used in this paper). Thus, it is not accurate to indicate that there are no studies examining associative stigma in Singapore or that there are no validated scales. Methods: In the methods it is stated that data were collected on 200 nurses and 200 allied health staff in order to explore the difference in associative stigma between the two groups. However, this was not identified as an empirical objective of the study, nor does it appear to have been addressed in the analysis. Measures: Respondents were recruited from among staff that worked in a mental health setting. Given that, some of the items that were used do not appear to tap associative stigma in this group (for example, both item 3's). The first item three seems to better reflect self-stigma whereas the second item 3 seems to reflect a world view that views mental health work as making a positive contribution to the social group—I would guess that most people working in the field would support this notion. A clearer conceptual definition of associative stigma as mental health workers perceive it is needed. How can the reader be sure that these items measure associative stigma. No psychometric analysis is presented. Discussion: Given that associative stigma seems to be the negative attitudes and behaviours experienced by mental health staff from

	members of the public, it is not clear how knowing that there are staff who are high, medium, and low in associative stigma will help develop stigma reduction programs. The authors indicate that targeted interventions toward population sub-groups who stigmatize mental health care staff would be helpful; however this goes beyond the data (no population data were collected so it is not clear that there are sub-groups that would benefit from targeted interventions). A more fulsome discussion of the practical implications of these findings is needed. Technical Notes: There are over 300 mental illnesses; yet the authors refer to “mental illness” in the singular. This homogenizes these illnesses and may invite stereotyping. Suggest that mental illnesses be presented as plural or as “a mental illness”. This should be corrected throughout. The authors refer to “stigma and discrimination”. This suggests that the term “stigma” is somehow akin to an attitude. Current thinking is that stigma is a complex social process involving stereotyping, prejudice and discrimination. The correct terminology would be “prejudice and discrimination” (which the author do use in places), reserving the term stigma as an overarching concept. A clear (referenced) definition of stigma would help with this and should be included in the introductory paragraphs. (See Link and Phelan, Conceptualizing Stigma).

REVIEWER	Robert Rosenheck Yale Medical School, New Haven, CT
REVIEW RETURNED	08-Jan-2019

GENERAL COMMENTS	This is a well done study of an potentially important subject. The measure has face value and the analysis is sound. The study could be better rooted in the quality if life of the respondents. One is left not knowing how important this stigma is in the lives of he professionals involved. This is a new field and if it it is ti flourish, studies nee dot demonstrate more robustly why it is important. How does this relate to other types of job dissatisfaction and what are its consequences. What is presented here is solid and convincing, but we need to know more about why we and others should be concerned.

REVIEWER	Philip Yanos John Jay College/Graduate Center, CUNY I am the author of the "Clinician Associative Stigma Scale," discussed in my review.
REVIEW RETURNED	20-Jan-2019

GENERAL COMMENTS	This manuscript presents new findings in the growing area of associative stigma experiences among mental health clinicians. It is novel in presenting findings on this fledgling topic and for its report of data from Singapore. Below are comments on ways to improve the manuscript. In their review, the authors leave out some important papers on the topic of clinician associative stigma, including a manuscript reporting findings from the creation of a scale to measure associative stigma (the Clinician Associative Stigma Scale). Although the authors

	cannot be faulted for not being aware of these studies when they were conducting their study, they have since been published for over a year and should be included in their review: Yanos, P. T., Vayshenker, B., Deluca, J., & O'Connor, L. K. (2017). Development and validation of a scale of mental health clinicians' experiences of associative stigma. Psychiatric Services, 68, 1053-1060. Lin, X., Rosenheck., R., Sun., B., Xie., G., Zhong., G., Tan., C., Li., Z., Yu., M., & He., H. (in press). Associative stigma experienced by mental health professionals in China and the United States. Social Psychiatry and Psychiatric Epidemiology. The statistical analyses used appear to be sound and make a contribution to the associative stigma literature, as they identify subgroups and the characteristics that are associated with them. This moves beyond prior work which has primarily identified independent correlates of associative stigma among clinicians. The authors also make a contribution in their interpretation of the findings in light of the multicultural nature of Singaporean society, noting differences in degree of associative stigma between persons of different ethnicity. However, I disagree with their interpretation that great associative stigma among persons of Indian ethnicity can be explained by greater stigma in this group, as there is considerable evidence for high endorsement of stigma among persons of Chinese ethnicity. I think that a more nuanced explanation, that possibly considers the way that health professions are regarded in these respective communities, might also be considered (see also the discussion in Lin et al., in press). It might also be helpful if the authors could consider the findings in their study in light of the newly created scale (cited above) and consider to what extent the items that they used are similar or different from the items in that scale. This might also help to contextualize the study's findings in light of the other research that has been conducted on this topic.

REVIEWER	Jiao Sun School of Nursing,Jilin University China
REVIEW RETURNED	21-Jan-2019

GENERAL COMMENTS	METHODS 1. Page5/Line35-51: The study's participants are doctors, nurses and allied health staff (psychologists, pharmacists, occupational therapists, Physiotherapists, case managers and medical social workers) working at IMH. However, "It was estimated that a sample size of approximately 200 nurses and 200 allied health staff would be needed to explore differences in associative stigma amongst the two groups, where sample size calculations were performed using PS (power and sample size calculation) software for Comparing means." Why does the sample size not include doctors? Table 1. It is recommended to change all the tables in this manuscript to a three-line table or to re-check the journal's form requirements.

REVIEWER	Tzu-Cheg Kao Professor Department of Preventive Medicine and Biostatistics, Uniformed Services University of the Health Sciences USA
REVIEW RETURNED	18-Feb-2019

GENERAL COMMENTS	Specific Comments On Bmjopen-2018-028179 On abstract and content: Revise the objectives of abstract or content of manuscript if applicable: It is innovative to know the authors identified suitable classes using latent class analysis. The term "associate stigma" seems to refer the identified suitable classes: if it is true, then we better clarify it at the beginning for general readers. In the content, page 4, line 45-46: the objective 1 is not consistent with the objective 1 of abstract; it needs to be fixed. P. 6., Line 21: Readers may need to know what are the 5-pont scale: 1=never, 5=all the time; what are points for 2-4? p. 6, line 34-35: how the items are measured? 1=strongly disagree, 2=slightly disagree, 3=neither agree nor disagree,…? p.7, on latent class analysis section: On the 11 items to be considered for the latent class analysis (LCA) in using SAS: PROC LCA is used? On using LCA: Are the items were used as observed in 5 levels (1-5) or dichotomized or any re-categorized in other way in the PROC LCA? This needs to clarify. On Table 1: SD=standard deviation? May add it in footnote of the table 1. Add one more item on job satisfaction to Table 1. On results of table 1: May add min-max for age; similarly for job satisfaction if included in Table 1. On Table 3: This table needs to give descriptive distribution for levels of each item by the 3 latent classes, refer to the comments as above on . p.7, on latent class analysis section. If re-categorized for items, then a footnote will be needed. Sample size , N is needed for each class if applicable. A foot note is needed to give measures of items to help general readers. p. 8: line 23-56, and p. 9, line 2-6: Results related to Table 3: May need to be revised accordingly. On Table 4: footnotes are needed for: a reference group, as pointed out in p. 9, line 9-11. CI= confidence interval; watch superscript b: a small letter, NOT capital letter B in the current footnotes. For the table caption: may add: versus the reference group. Below "95% CI": add: lower (for lower limit) upper (for upper limit). On Table 5: Add a label, latent classes, above the 3 classes at the leftmost column.

	Again, add footnotes similarly like Table 4, for example, CI, SD, etc; how job satisfaction is measured.

REVIEWER	Emily J. Robinson King's College London, UK
REVIEW RETURNED	18-Feb-2019

GENERAL COMMENTS	I enjoyed reading this manuscript and think that it is addressing a really important and relevant topic. Overall, appropriate statistical methods have been used and described fairly well. However, in order to aid interpretation and make it possible for someone else to replicate this study, detail and precision is lacking in a few areas. Statistical review comments: ABSTRACT - Would it not be more appropriate to describe the first objective as looking at the 'type' of associative stigma using LCA, rather than the 'extent'? This distinction has been made in the Methods section of the Abstract (and in the Article Summary: Strengths and Limitations), where the first objective is better described as 'classifying associative stigma upon patterns of observed variables'. (This is repeated again on page 4) - It is not clear in the objectives that the authors are looking at two groups? i.e. to explore differences amongst nurses and allied health staff – this is only mentioned later on in the Methods? METHODS - In the third paragraph on page 5 (Participants and procedure), it is not explicit whether ALL doctors, nurses and allied health staff at IMH were invited? - More detail is expected when a sample size calculation has been done, such as effect sizes and level of power? This is particularly relevant given that the authors decided to cease recruitment; i.e. it should be further justified why they did not continue accepting responses (where the more the better!?) - Similarly to above, it doesn't seem clear why the authors have run a power calculation on two groups because 'exploring differences between groups' isn't part of the objectives of the study? - Is there a reason why the authors haven't described the 5-point scale as a 'Likert' scale? - Explanation of LCA is clear, however, not clear in explanation of multinomial logistic regression whether univariate or multivariate associations were tested between socio-demographic factors and latent classes? This is much clearer when describing unadjusted and adjusted linear regression for job satisfaction scores - It would be helpful to explain why multinomial regression is being used rather than ordinal as it may not be obvious to some readers? Equally, it may not be obvious that all explanatory variables are

	categorical except age? - Authors should mention treatment and/or acknowledgement of missing data (even if there wasn't any)? RESULTS - It would be useful to have a flow diagram of the number (%) of emails that were sent out; then the number (%) of responses; and then the number (%) included in analysis? (STROBE diagram) - Further, do the authors have any information on the invited participants who did not respond? - For third paragraph on page 8, what counts as endorsement of the items? i.e. are the authors specifically referring to responses 'sometimes' 'often' or 'all the time'; and 'slightly agree' or 'strongly agree'? This should not be implicit to readers? - IRP's are given for Class 1 and 3, but not given for Class 2? This would be helpful for comparison? - Not sure how journal will format Table 1 but it would be much clearer if horizontal lines were added between each characteristic? - Can the authors provide a Table with the descriptive results of the associative stigma questionnaire in addition to the IRP's? E.g. n (%) agree to each question? This is not currently provided? - Footnote isn't clear for Table 4, should be: '*Institute of Mental Health; a: 'O/N' levels indicate 10 and 11 years of education respectively; b: 'A' level indicates 12 years of education' DISCUSSION - Third sentence in first paragraph should be clear that the findings reveal 'three distinct classes' in the given population only - It would be helpful to use the term 'Psychometrics' when discussing the need for a validated instrument - Although authors acknowledge it is difficult to ascertain selection bias, this could be elaborated to make it clear that they accept that those who did not respond could have had more extreme or passive views Non-statistical and minor comments: - If possible within word count, it might be helpful to have a very brief definition (in brackets?) of associative stigma in the Abstract - In the first paragraph of the Introduction, there are two sentences that should include 'can' rather than sounding definitive ("The consequences… 'can' result in…") ("…discrimination 'can have' damaging effects…") - It would be helpful to give some examples of validated stigma scales towards those with a mental illness in the top paragraph on page 5 (e.g. CAMI / MAKS / RIBS)

	- Similar to point above, are the authors aware of the work by Professor Graham Thornicroft that describes the concept of stigma as three related problems: knowledge (ignorance), attitudes (prejudice) and behaviour (discrimination)? This is relevant to the background information in the top paragraph of page 5 - In general there are some particularly long sentences that could be split, and there are areas of the manuscript that would benefit from the use of more punctuation such as commas and semi-colons - Is there a typo on page 6 question 1 (second half)? Should be: 'Most people think less of a person who works in a mental health care setting?' - Last sentence on page 9 should read: 'The moderate associative stigma class comprised staff who were more likely to report higher response probabilities for the following items: "People make jokes…"'

VERSION 1 – AUTHOR RESPONSE

Manuscript ID bmjopen-2018-028179 entitled "Associative stigma among mental health professionals: a cross-sectional study"

Reviewer: 1
Literature Review: Include the paper on Images of Psychiatry and Psychiatrists, Stuart et al. There are also numerous papers gauging how medical students perceive psychiatry as a career. These should be included in the literature rview (many of these are referenced in the Images paper). It should also be noted that this paper includes data for 15 countries, including Singapore. A companion paper also includes a psychometric validation of a scale that could be used to assess stigma expressed by others to psychiatry and psychiatrists (with many items similar to the ones used in this paper). Thus, it is not accurate to indicate that there are no studies examining associative stigma in Singapore or that there are no validated scales.

We thank the Reviewer for their feedback. With regards to the how medical students perceive psychiatry, we believe this to be a very important topic, and in fact my colleagues have explored this exact topic among medical students in Singapore which has also been published in BMJ Open (Seow et al 2018, https://bmjopen.bmj.com/content/8/8/e022201). However we feel that this is a different topic, where the current study is specifically related to associative stigma among mental health professionals and not how medical students perceive psychiatry.

We would also like the clarify that in the introduction of the manuscript we state that to our knowledge there have been no studies exploring associative stigma among mental health professionals in Singapore. This is not to say that there haven't been studies exploring the perceptions of medical students and of psychiatry in Singapore. We hope this clarifies and distinguishes the differences between the two topics and reinforces that the current study aims to specifically explore associative stigma among mental health professionals currently working in this field in Singapore.

Methods: In the methods it is stated that data were collected on 200 nurses and 200 allied health staff in order to explore the difference in associative stigma between the two groups. However, this was not identified as an empirical objective of the study, nor does it appear to have been addressed in the analysis.

The study aims have been amended to reflect that we explored socio-demographic and employment related correltes of associative stigma. As we wanted to explore various socio-demographic and employment related differences, such as the differences between nurses and allied health staff, this was addressed in the sample size calculation which allowed for this.

In the discussion, we do discuss how associative stigma differs across the different occupations (i.e nurses, doctors and allied health staff) and found that doctors and nurses were significantly more likely to experience moderate associative stigma compared to allied health staff. We hope this adequately addresses the Reviewer's comment.

Measures: Respondents were recruited from among staff that worked in a mental health setting. Given that, some of the items that were used do not appear to tap associative stigma in this group (for example, both item 3's). The first item three seems to better reflect self-stigma whereas the second item 3 seems to reflect a world view that views mental health work as making a positive contribution to the social group—I would guess that most people working in the field would support this notion. A clearer conceptual definition of associative stigma as mental health workers perceive it is needed. How can the reader be sure that these items measure associative stigma. No psychometric analysis is presented.
We thank the Reviewer for their feedback and acknowledge that stigma in general is a complex and multi-faceted construct which has been theorised and defined in many mays and can present in many ways including associative stigma. This in itself poses various challenges as there is no 'gold standard' definition which is clear cut to describe stigma and the different ways it presents. With regards to the items used in the current study and in particular those items you have highlighted above, both of these have come from peer reviewed published papers specifically exploring associative stigma among mental health professionals. In the introduction we define associative stigma as 'the process by which a person experiences stigmatization as a result of an association with another stigmatized person'. We agree that whilst it would be beneficial to have a clearer conceptual definition of associative stigma from the perspective of mental halth professionals, the current study did not examine this and we were not able to find such a definition in the existing literature. We have acknowledged the above as a general limitation and hope the Reviewer is agreeable to this.

Discussion: Given that associative stigma seems to be the negative attitudes and behaviours experienced by mental health staff from members of the public, it is not clear how knowing that there are staff who are high, medium, and low in associative stigma will help develop stigma reduction programs. The authors indicate that targeted interventions toward population sub-groups who stigmatize mental health care staff would be helpful; however this goes beyond the data (no population data were collected so it is not clear that there are sub-groups that would benefit from targeted interventions). A more fulsome discussion of the practical implications of these findings is needed.

We thank the Reviewer for this feedback and have removed this statement from the revised manuscript.

Technical Notes: There are over 300 mental illnesses; yet the authors refer to "mental illness" in the singular. This homogenizes these illnesses and may invite stereotyping. Suggest that mental illnesses be presented as plural or as "a mental illness". This should be corrected throughout.

We have made the necessary changes in the revised manuscript

The authors refer to "stigma and discrimination". This suggests that the term "stigma" is somehow akin to an attitude. Current thinking is that stigma is a complex social process involving stereotyping, prejudice and discrimination. The correct terminology would be "prejudice and discrimination" (which

the author do use in places), reserving the term stigma as an overarching concept. A clear (referenced) definition of stigma would help with this and should be included in the introductory paragraphs. (See Link and Phelan, Conceptualizing Stigma).

We have included a definition at the beginning on the introduction in the revised manuscript.

Reviewer: 2
This is a well done study of an potentially important subject. The measure has face value and the analysis is sound. The study could be better rooted in the quality if life of the respondents. One is left not knowing how important this stigma is in the lives of he professionals involved. This is a new field and if it it is ti flourish, studies nee dot demonstrate more robustly why it is important. How does this relate to other types of job dissatisaction and what are its consequences. What is presented here is solid and convincing, but we need to know more about why we and others should be concerned.

We thank the Reviewer for their positive feedback and have included some of the suggestions above as areas for future research in the conclusion of the revised manuscript.

Reviewer: 3
This manuscript presents new findings in the growing area of associative stigma experiences among mental health clinicians. It is novel in presenting findings on this fledgling topic and for its report of data from Singapore. Below are comments on ways to improve the manuscript.

In their review, the authors leave out some important papers on the topic of clinician associative stigma, including a manuscript reporting findings from the creation of a scale to measure associative stigma (the Clinician Associative Stigma Scale). Although the authors cannot be faulted for not being aware of these studies when they were conducting their study, they have since been published for over a year and should be included in their review:
Yanos, P. T., Vayshenker, B., Deluca, J., & O'Connor, L. K. (2017). Development and validation of a scale of mental health clinicians' experiences of associative stigma. Psychiatric Services, 68, 1053-1060.

Lin, X., Rosenheck., R., Sun., B., Xie., G., Zhong., G., Tan., C., Li., Z., Yu., M., & He., H. (in press). Associative stigma experienced by mental health professionals
in China and the United States. Social Psychiatry and Psychiatric Epidemiology.

We thank the Reviewer for highlighting the above studies and have referred to these throughout the revised manuscript.

The statistical analyses used appear to be sound and make a contribution to the associative stigma literature, as they identify subgroups and the characteristics that are associated with them. This moves beyond prior work which has primarily identified independent correlates of associative stigma among clinicians.
We thank the Reviewer for this positive feedback.

The authors also make a contribution in their interpretation of the findings in light of the multicultural nature of Singaporean society, noting differences in degree of associative stigma between persons of different ethnicity. However, I disagree with their interpretation that great associative stigma among persons of Indian ethnicity can be explained by greater stigma in this group, as there is considerable evidence for high endorsement of stigma among persons of Chinese ethnicity. I think that a more

nuanced explanation, that possibly considers the way that health professions are regarded in these respective communities, might also be considered (see also the discussion in Lin et al., in press).
We have removed this statement in the revised manuscript and elaborated on the perceptions of psychiaty within Indian culture, and how this may influence and affect associative stigma.

It might also be helpful if the authors could consider the findings in their study in light of the newly created scale (cited above) and consider to what extent the items that they used are similar or different from the items in that scale. This might also help to contextualize the study's findings in light of the other research that has been conducted on this topic.
We have made specific references and comparisons to the current study and the CASS in the revised manuscript.

Reviewer: 4

METHODS
1. Page5/Line35-51: The study's participants are doctors, nurses and allied health staff (psychologists, pharmacists, occupational therapists, Physiotherapists, case managers and medical social workers) working at IMH. However, "It was estimated that a sample size of approximately 200 nurses and 200 allied health staff would be needed to explore differences in associative stigma amongst the two groups, where sample size calculations were performed using PS (power and sample size calculation) software for Comparing means." Why does the sample size not include doctors?

We thank the reviewer for highlighting this. The sample size calculations were only based on nurses and allied health staff as at the time of the survey, there were less than 100 doctors working at the Institute of Mental Health and accordingly, we decided to remove this group from the sample size calculation. We wanted to ensure the sample size was adequate to explore differences in associative stigma by employment group (i.e between nurses and allied health staff as a primary interest (and doctors where possible)).

Table
1. It is recommended to change all the tables in this manuscript to a three-line table or to re-check the journal's form requirements.
We have made these changes in the revised manuscript.

Reviewer: 5
Specific Comments On Bmjopen-2018-028179

On abstract and content: Revise the objectives of abstract or content of manuscript if applicable: It is innovative to know the authors identified suitable classes using latent class analysis. The term "associate stigma" seems to refer the identified suitable classes: if it is true, then we better clarify it at the beginning for general readers.

We have made the suggested change to the revised manuscript.

In the content, page 4, line 45-46: the objective 1 is not consistent with the objective 1 of abstract; it needs to be fixed.

We have made this change in the revised manuscript.

P. 6., Line 21: Readers may need to know what are the 5-pont scale: 1=never, 5=all the time; what are points for 2-4?

We have made this change in the revised manuscript.

p. 6, line 34-35: how the items are measured? 1=strongly disagree, 2=slightly disagree, 3=neither agree nor disagree,…?

We have revised this section in the manuscript

p.7, on latent class analysis section: On the 11 items to be considered for the latent class analysis (LCA) in using SAS: PROC LCA is used?

Yes. We have indicated it in the revised manuscript.

On using LCA: Are the items were used as observed in 5 levels (1-5) or dichotomized or any recategorized in other way in the PROC LCA? This needs to clarify.

All associative stigma items were converted from 5 (1-5) levels into dichotomous (1-2). Strongly agree and slightly agree or often, sometimes and all the time were combined as one category (2) while neither agree nor disagree, slightly disagree, strongly disagree or never, rarely were combined as one category (1). We have specified this in the revised manuscript.

On Table 1: SD=standard deviation? May add it in footnote of the table 1. Add one more item on job satisfaction to Table 1.

We have added this footnote and the information pertaining to job satisfaction to the revised manuscript.

On results of table 1: May add min-max for age; similarly for job satisfaction if included in Table 1.

We have included this additional information in the revised manuscript.

On Table 3: This table needs to give descriptive distribution for levels of each item by the 3 latent classes, refer to the comments as above on . p.7, on latent class analysis section. If re-categorized for items, then a footnote will be needed. Sample size , N is needed for each class if applicable. A foot note is needed to give measures of items to help general readers.
We have made these changes to the revised manuscript.

p. 8: line 23-56, and p. 9, line 2-6: Results related to Table 3: May need to be revised accordingly.

We have made these changes to the revised manuscript.

Table 4: footnotes are needed for: a reference group, as pointed out in p. 9, line 9-11.

CI= confidence interval; watch superscript b: a small letter, NOT capital letter B in the current footnotes.

We have made these changes in the revised manuscript.

For the table caption: may add: versus the reference group. Below “95% CI”: add: lower (for lower limit) upper (for upper limit).

We have made these changes in the revised manuscript.

On Table 5: Add a label, latent classes, above the 3 classes at the leftmost column. Again, add footnotes similarly like Table 4, for example, CI, SD, etc; how job satisfaction is measured.

We have made these changes in the revised manuscript.

Reviewer: 6
I enjoyed reading this manuscript and think that it is addressing a really important and relevant topic. Overall, appropriate statistical methods have been used and described fairly well. However, in order to aid interpretation and make it possible for someone else to replicate this study, detail and precision is lacking in a few areas.

Thank you for the positive feedback and suggestions for improving the manuscript.

ABSTRACT –

Would it not be more appropriate to describe the first objective as looking at the 'type' of associative stigma using LCA, rather than the 'extent'? This distinction has been made in the Methods section of the Abstract (and in the Article Summary: Strengths and Limitations), where the first objective is better described as ‘classifying associative stigma upon patterns of observed variables’. (This is repeated again on page 4)

We have revised this sentence based on the above comment and feedback from other Reviewers.

- It is not clear in the objectives that the authors are looking at two groups? i.e. to explore differences amongst nurses and allied health staff – this is only mentioned later on in the Methods?

We have revised the objectives and aims (in the introduction) to better reflect that we are looking at employment related correlates.

METHODS

- In the third paragraph on page 5 (Participants and procedure), it is not explicit whether ALL doctors, nurses and allied health staff at IMH were invited?

We have revised this statement to reflect all doctors, nurses and allied health staff at IMH were invited to participate in the study.

- More detail is expected when a sample size calculation has been done, such as effect sizes and level of power? This is particularly relevant given that the authors decided to cease recruitment; i.e. it should be further justified why they did not continue accepting responses (where the more the better!?)

We have provided additional information pertaining to how the sample size calculation was calculated and in doing so provide an explanation as to why recruit was ceased once this sample size was achieved.

- Similarly to above, it doesn’t seem clear why the authors have run a power calculation on two groups because ‘exploring differences between groups’ isn’t part of the objectives of the study?

We have revised the study aims to better reflect this as well as the provided additional information relating to the sample size calculation.

- Is there a reason why the authors haven't described the 5-point scale as a 'Likert' scale?

We have made this change in the revised manuscript

- Explanation of LCA is clear, however, not clear in explanation of multinomial logistic regression whether univariate or multivariate associations were tested between socio-demographic factors and latent classes? This is much clearer when describing unadjusted and adjusted linear regression for job satisfaction scores

In the current analysis, multinomial logistic regression analysis was used because it is the appropriate statistical test when analysing outcome variable with more than 2 levels. We have stated this in the revised manuscript.

- It would be helpful to explain why multinomial regression is being used rather than ordinal as it may not be obvious to some readers? Equally, it may not be obvious that all explanatory variables are categorical except age?

Multinomial logistic regression and ordinal regression are appropriate statistical tests when analysing outcome variable with more than 2 levels. In the current analysis, multinomial logistic regression analysis was used instead of ordinal regression because the proportional odds assumption of ordinal regression analysis was violated in this study.

- Authors should mention treatment and/or acknowledgement of missing data (even if there wasn't any)?

No missing data was observed in demographic and job satisfaction variables. The rates of missing data in associative stigma items were very low (0.2% to 0.6%). Hence, we have used listwise deletion method in all analyses.

RESULTS

- It would be useful to have a flow diagram of the number (%) of emails that were sent out; then the number (%) of responses; and then the number (%) included in analysis? (STROBE diagram)

The invitation emails were sent to eligible staff through their institution email addresses. For mental health professionals without individual email access (e.g. nurses), they were informed of the research study through their supervisors. We were therefore unable to establish the total number of eligible participants and thus the response rate could not be calculated. We have listed this as a limitation in the revised manuscript.

- Further, do the authors have any information on the invited participants who did not respond?

Unfortunately we do not have any information on those who did not respond however we have listed this as a limitation

- For third paragraph on page 8, what counts as endorsement of the items? i.e. are the authors specifically referring to responses 'sometimes' 'often' or 'all the time'; and 'slightly agree' or 'strongly agree'? This should not be implicit to readers?

We would like to thank to reviewer for highlighting this important point. We have used these criteria to dichotomize responses prior to data analyses.

- IRP's are given for Class 1 and 3, but not given for Class 2? This would be helpful for comparison?

We have added IRP's for Class 2 for comparison in the revised manuscript.

- Not sure how journal will format Table 1 but it would be much clearer if horizontal lines were added between each characteristic?

We have made these changes in the revised manuscript

- Can the authors provide a Table with the descriptive results of the associative stigma questionnaire in addition to the IRP's? E.g. n (%) agree to each question? This is not currently provided?

We have added this information the revised Table 3.

- Footnote isn't clear for Table 4, should be: '*Institute of Mental Health; a: 'O/N' levels indicate 10 and 11 years of education respectively; b: 'A' level indicates 12 years of education'

We have amended the footnote in the revised manuscript.

DISCUSSION

- Third sentence in first paragraph should be clear that the findings reveal 'three distinct classes' in the given population only

We have made this change in the revised manuscript

- It would be helpful to use the term 'Psychometrics' when discussing the need for a validated instrument

We have made this change in the revised manuscript

- Although authors acknowledge it is difficult to ascertain selection bias, this could be elaborated to make it clear that they accept that those who did not respond could have had more extreme or passive views

We have made this amendment in the revised manuscript

Non-statistical and minor comments:

- If possible within word count, it might be helpful to have a very brief definition (in brackets?) of associative stigma in the Abstract

We have made this inclusion in the revised manuscript.

- In the first paragraph of the Introduction, there are two sentences that should include ‘can’ rather than sounding definitive (“The consequences… ‘can’ result in…”) (“…discrimination ‘can have’ damaging effects…”)

We have made the above changes in the revised manuscript

- It would be helpful to give some examples of validated stigma scales towards those with a mental illness in the top paragraph on page 5 (e.g. CAMI / MAKS / RIBS)

We thank the Reviewer for highlighting the above scales, many of which various co-authors have used in their previous research. Whilst we agree that these are well known, validated stigma scales, that have been extensively used, they do not measure associative stigma, which is the area of interest of the current manuscript and therefore we feel that these address a different topic and are not particularly relevant to the current manuscript.

- Similar to point above, are the authors aware of the work by Professor Graham Thornicroft that describes the concept of stigma as three related problems: knowledge (ignorance), attitudes (prejudice) and behaviour (discrimination)? This is relevant to the background information in the top paragraph of page 5

We thank the Reviewer for highlighting the wonderful and longstanding work of Professor Graham Thornicroft. We are aware of the significant contribution he has made to the field and several of the co-authors have in fact met and collaborated with him before. In fact, in a number of previous studies undertaken by various co-authors, we have cited many of Professor Thornicroft’s papers. However in this case, the article is specifically focusing on associative stigma and therefore the introduction is based on what associative stigma is and rather cites the limited work has been undertaken in this field as we see this to be most relevant to the current manuscript.

- In general there are some particularly long sentences that could be split, and there are areas of the manuscript that would benefit from the use of more punctuation such as commas and semi-colons

We have done additional proof reading and made necessary changes to the revised manuscript.

- Is there a typo on page 6 question 1 (second half)? Should be: ‘Most people think less of a person who works in a mental health care setting?’

We have amended this statement in the revised manuscript.

- Last sentence on page 9 should read: ‘The moderate associative stigma class comprised staff who were more likely to report higher response probabilities for the following items: “People make jokes…”’

We have made this change in the revised manuscript.

VERSION 2 – REVIEW

REVIEWER	Heather Stuart Queen's University, Kingston, Ontario, Canada
REVIEW RETURNED	25-Mar-2019

GENERAL COMMENTS	Thank you for the opportunity to re-review this manuscript. I had expected a cover letter with a detailed point-by-point explanation as to the changes that were or were not made, and in the case of the latter, the rationale for this. I did not find one in the system. Instead I did find a very cursory summary letter but no detailed response to the reviewer's points (mine as well as any other reviewers). Conceptualization of Stigma: The authors have provided a clearer conceptualization of stigma based on the work of Link and Phelan and have corrected their terminology (prejudice and discrimination rather than stigma and discrimination). Use of the Term 'Mental Illness': The authors have corrected their use of the term 'mental illness' to reflect the plural. Literature Review: The authors did not update their literature review to include the Images of Psychiatry paper or the various scales that were cited in that paper. The authors indicate that previous scales have been developed and validated to measure stigma towards those with a mental illness (pg. 5). However, the Images paper contains a number of references to scales that have been developed to measure stigma experienced by medical personal such as medical students or residents. This broader literature remains under represented in this manuscript. Methods: The authors have now enlarged their objectives to include a comparison between the different employment classes. Measures: I am still unclear as to how items were generated to reflect "associative stigma" defined as the "process by which a person experiences stigmatization as a result of an association with another stigmatized person". From this perspective, feeling ashamed is typically associated with self-stigma (item 3). Similarly, the item "mental health work is dangerous" is less a reflection of a stigma process and may be a reflection of actual working conditions. A clearer conceptualization of "associative stigma" as it relates to the measure under study is still needed. Discussion: In my previous review I suggested that a more fulsome discussion of the practical implications of these findings was needed. However, little has changed in this regard. The authors have situated their findings within the current literature well, but they have not considered how they could be used to guide interventions.

REVIEWER	Philip Yanos John Jay College/Graduate Center, CUNY USA I am the author of the "Clinician Associative Stigma Scale."
REVIEW RETURNED	30-Mar-2019

GENERAL COMMENTS	The revised manuscript is responsive to reviewer comments and is greatly improved.

REVIEWER	Tzu-Cheg Kao Uniformed Services University, USA
REVIEW RETURNED	09-Apr-2019

GENERAL COMMENTS	Specific Comments On Bmjopen-2018-028179 Majority of past comments were taken for revisions,. However, some other comments may help readers: SD=? Better be defined in the context at first time. Table 3: Readers may wonder it is not consistent with the title of Table 3: why 2-class model was shown?...better to keep 3-class model. Other suggestion to help readers the best: use the prevalence as the first column shown (or endorsement rate), instead of using item response probability as currently listed. Table 4: Add footnotes to clarify on statistical model used for Table 4, and reference group=? Table 5: Add the label “job satisfaction” to help readers for the line, n, mean, SD

REVIEWER	Emily J. Robinson King's College London, UK
REVIEW RETURNED	10-Apr-2019

GENERAL COMMENTS	Thank you for revising the manuscript, most concerns have been addressed with a few exceptions below. The sample size explanation is now much clearer and descriptive; and it is also now clearer in the aims that the authors wanted to look at differences between occupations as well as differences in socio-demographics. However, there is no explanation or acknowledgement of the fact that the power calculation does not include looking at differences between doctors and other staff. It focuses only on 200 nurses vs. 200 allied staff, and doesn't include any sample size for doctors. Whereas, the aims and results include comparisons with doctors too. I understand that the total number of doctors is less than nurses and other staff but it shouldn't simply be ignored from methods and limitations. Under the LCA sub-heading, it is good to see an explanation of the dichotomisation, but this should be made clearer still, and should include the term 'endorse' to be consistent with the rest of the manuscript. It is currently written as though all options are available for all questions, and the options are not listed in order. The explanation should read something like this: "All associative-stigma item responses were dichotomised such that for the first five questions, 'sometimes' 'often' and 'all the time' defined endorsement of the items; and for the other six questions, 'strongly agree' and 'slightly agree' defined endorsement.

	Responses 'rarely' and 'never' from the first set, and 'neither agree nor disagree' 'slightly disagree' and 'strongly disagree' from the second set defined not endorsing the items." If the authors have used multinomial logistic regression instead of ordinal regression because of the proportional odds assumption being violated, then this should be stated in the methods. Choice of model is important. It is also still not clear whether associations between socio-demographic factors and the different classes were tested all at once or in a univariate or hierarchical fashion. In results paragraph when describing the latent classes 1, 2 and 3, the minimum and maximum IRPs are given for classes 1 and 3, but still haven't been given for class 2 here. In Table 1, please make clear using horizontal lines (separators) that the range 21-71 is for age; and 1-10 is for job satisfaction. This is not obvious. It would be clearer in Table 4 if the 'Ref's (currently in the third column) were moved next to the relevant category in the second column. For example: "Female (Ref) Male" At the moment the 'Ref's are making the third column with ORs difficult to read. I also still think the footnote is messy: there needs to be at least a comma separating 'respectively' and 'b='

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

Thank you for the opportunity to re-review this manuscript. I had expected a cover letter with a detailed point-by-point explanation as to the changes that were or were not made, and in the case of the latter, the rationale for this. I did not find one in the system. Instead I did find a very cursory summary letter but no detailed response to the reviewer's points (mine as well as any other reviewers).

We sincerely apologise about this- we did have a point by point response for every comment made by all six Reviewers in the original reply, and are unsure why this wasn't uploaded in the report. This has been attached this time for your reference and a similar point by point reply for the comments made in this second review.

Conceptualization of Stigma: The authors have provided a clearer conceptualization of stigma based on the work of Link and Phelan and have corrected their terminology (prejudice and discrimination rather than stigma and discrimination).

We thank the Reviewer for their positive feedback.

Use of the Term 'Mental Illness': The authors have corrected their use of the term 'mental illness' to reflect the plural.

We thank the Reviewer for their positive feedback.

Literature Review: The authors did not update their literature review to include the Images of Psychiatry paper or the various scales that were cited in that paper. The authors indicate that previous scales have been developed and validated to measure stigma towards those with a mental illness (pg. 5). However, the Images paper contains a number of references to scales that have been developed to measure stigma experienced by medical personal such as medical students or residents. This broader literature remains under represented in this manuscript.

We thank the Reviewer for their feedback. With regards to the how medical students perceive psychiatry, we believe this to be a very important topic, and in fact my colleagues have explored this exact topic among medical students in Singapore which has also been published in BMJ Open (Seow et al 2018, https://bmjopen.bmj.com/content/8/8/e022201). However we feel that this is a different topic, where the current study is specifically related to associative stigma among mental health professionals and not how medical students perceive psychiatry.

We have however acknowledged the existing work on this topic, as reported in the Images of Psychiatry paper and how these perceptions may contribute to additional associative stigma for mental health professionals and we hope this addresses your above comment sufficiently.

Methods: The authors have now enlarged their objectives to include a comparison between the different employment classes.

Yes we have included this as an additional objective, and this was an oversight in the original manuscript submission.

Measures: I am still unclear as to how items were generated to reflect “associative stigma” defined as the “process by which a person experiences stigmatization as a result of an association with another stigmatized person”. From this perspective, feeling ashamed is typically associated with self-stigma (item 3). Similarly, the item “mental health work is dangerous” is less a reflection of a stigma process and may be a reflection of actual working conditions. A clearer conceptualization of “associative stigma” as it relates to the measure under study is still needed.

We thank the Reviewer for their feedback and acknowledge that stigma in general is a complex and multi-faceted construct which has been theorised and defined in many ways. It can also present in many ways including associative stigma. This in itself poses various challenges as there is no ‘gold standard’ definition which is clear cut to describe stigma and the different ways it presents. With regards to the items used in the current study and in particular those items you have highlighted above, both of these have come from peer reviewed published papers specifically exploring associative stigma among mental health professionals. In the introduction we define associative stigma as ‘the process by which a person experiences stigmatization as a result of an association with another stigmatized person’. We agree that whilst it would be beneficial to have a clearer conceptual definition of associative stigma from the perspective of mental health professionals, the current study did not examine this and we were not able to find such a definition in the existing literature. We have acknowledged the above as a general limitation and hope the Reviewer is agreeable to this.

Discussion: In my previous review I suggested that a more fulsome discussion of the practical implications of these findings was needed. However, little has changed in this regard. The authors have situated their findings within the current literature well, but they have not considered how they could be used to guide interventions.

We thank the Reviewer for this feedback. We had previously tried to address this comment and had provided some suggestions, whilst also highlighting there is a scarcity of such interventions to address associative stigma. We have endeavoured to better explain how the current findings could be used to guide future interventions and hope this addresses the Reviewer’s comment adequately.

Reviewer: 3

The revised manuscript is responsive to reviewer comments and is greatly improved.

We thank the Reviewer for their positive feedback.

Reviewer: 5

Majority of past comments were taken for revisions,.

However, some other comments may help readers:

SD=? Better be defined in the context at first time.

We have made the revised change.

Table 3: Readers may wonder it is not consistent with the title of Table 3: why 2-class model was shown?...better to keep 3-class model. Other suggestion to help readers the best: use the prevalence as the first column shown (or endorsement rate), instead of using item response probability as currently listed.

We have made the revised changes.

Table 4: Add footnotes to clarify on statistical model used for Table 4, and reference group=?

We have made the revised changes.

Table 5: Add the label “job satisfaction” to help readers for the line, n, mean, SD

We have made the revised change.

Reviewer: 6

Thank you for revising the manuscript, most concerns have been addressed with a few exceptions below.

The sample size explanation is now much clearer and descriptive; and it is also now clearer in the aims that the authors wanted to look at differences between occupations as well as differences in socio-demographics. However, there is no explanation or acknowledgement of the fact that the power calculation does not include looking at differences between doctors and other staff. It focuses only on 200 nurses vs. 200 allied staff, and doesn't include any sample size for doctors. Whereas, the aims and results include comparisons with doctors too. I understand that the total number of doctors is less than nurses and other staff but it shouldn't simply be ignored from methods and limitations.

We thank the Reviewer for highlighting this and have acknowledged this both in the methods and limitations section.

Under the LCA sub-heading, it is good to see an explanation of the dichotomisation, but this should be made clearer still, and should include the term 'endorse' to be consistent with the rest of the manuscript. It is currently written as though all options are available for all questions, and the options are not listed in order. The explanation should read something like this:

"All associative-stigma item responses were dichotomised such that for the first five questions, 'sometimes' 'often' and 'all the time' defined endorsement of the items; and for the other six questions,

'strongly agree' and 'slightly agree' defined endorsement. Responses 'rarely' and 'never' from the first set, and 'neither agree nor disagree' 'slightly disagree' and 'strongly disagree' from the second set defined not endorsing the items.''

We thank the Reviewer for highlighting this and have made the suggested changes.

If the authors have used multinomial logistic regression instead of ordinal regression because of the proportional odds assumption being violated, then this should be stated in the methods. Choice of model is important. It is also still not clear whether associations between socio-demographic factors and the different classes were tested all at once or in a univariate or hierarchical fashion.

We thank the Reviewer for highlighting this. We found that the proportional odds assumption of the ordinal regression model has been violated using the Brant test (Brant, 1990). These were tested at once and in a hierarchical fashion and found to be significant. We have included this additional information in the revised manuscript.

In results paragraph when describing the latent classes 1, 2 and 3, the minimum and maximum IRPs are given for classes 1 and 3, but still haven't been given for class 2 here.

We apologise for this omission and have included these in the revised manuscript.

In Table 1, please make clear using horizontal lines (separators) that the range 21-71 is for age; and 1-10 is for job satisfaction. This is not obvious.

We have made the suggested changes.

It would be clearer in Table 4 if the 'Ref's (currently in the third column) were moved next to the relevant category in the second column. For example:

''Female (Ref)

Male''

At the moment the 'Ref's are making the third column with ORs difficult to read. I also still think the footnote is messy: there needs to be at least a comma separating 'respectively' and 'b='

We have made all of the above changes.