University of New England, Australia

May 12, 2015

Editor PeerJ

**Reg: Sex differences in beliefs and attitudes towards mental illness: An examination of mental health literacy in a community sample” (#2015:04:4611:0:0:REVIEW)**

Thank you for the feedback on our manuscript. We have addressed all of the comments, see below.

Sincerely,

Ray Gibbons, Einar B. Thorsteinsson, and Natasha Loi

**Reviewer Comments**

**Reviewer 1 (Anonymous)**

**Basic reporting**

The paper is structured appropriately, clearly written for the most part, and offers a readable summary of the concept of mental health literacy and the findings in the area to date in the Introduction. However, often the references in the Introduction do not cite the most up-to-date publications. For example, the reference to Shapiro, Skinner and Kessler (1984) on line 63 could be replaced with a paper by Burgess and colleagues which makes the same point, but is specific to the Australian population, and was published more recently (Burgess, P. M., Pirkis, J. E., Slade, T. N., Johnston, A. K., Meadows, G. N., & Gunn, J. M. (2009). Service use for mental health problems: Findings from the 2007 National Survey of Mental Health and Wellbeing. Australian & New Zealand Journal of Psychiatry, 43(7), 615-623. doi: 10.1080/00048670902970858).

**Reply**: **The Shapiro et al. reference has been removed and the Burgess et al. citation added.**

Lines 65-71 have no reference, but seem to refer to either one of these papers:  
  
Reavley, N. J., & Jorm, A. F. (2011). Recognition of mental disorders and beliefs about treatment and outcome: Findings from an Australian National Survey of Mental Health Literacy and Stigma. Australian & New Zealand Journal of Psychiatry, 45(11), 947-956. doi: 10.3109/00048674.2011.621060  
or  
Reavley, N. J., & Jorm, A. F. (2012). Public recognition of mental disorders and beliefs about treatment: Changes in Australia over 16 years. British Journal of Psychiatry, 200, 419-425. doi: 10.1192/bjp.bp.111.104208  
  
These papers could also be used to update the references in lines 228-9 and 245.

**Reply**: **Reference to Reavley and Jorm in lines 65-71 has now been removed.**

**Reavley and Jorm (2011) have been added to lines 228-229 in place of Jorm et al. (1997). Reavley and Jorm (2012) were added to line 245 in place of Jorm et al. (2006).**

While the history of mental health literacy is clearly explained in the Introduction, the review of sex differences in mental health literacy is more vague. The paragraph beginning on line 72 seems to be quite important to the paper’s premise, but is disjointed and seems to skim over previously found sex differences in other studies. It may be worthwhile expanding on the findings of the Holzinger et al (2012) review, as it seems to pertain more to adult populations and discusses results that are relevant to the attitudes asked about in this study (e.g. reactions to people with mental illnesses).

**Information relating to Holzinger et al. has been added into this section:**

**“Some findings suggest that sex differences exist when it comes to public attitudes and beliefs towards mental illness (e.g., Angermeyer et al., 1998; Cotton, Wright, Harris, Jorm & McGorry, 2006; Holzinger, Floris, Schomerus, Carta & Angermeyer, 2012; Jorm et al., 1997), with Holzinger et al. (2012) confirming that females are more likely to advocate professional help than males and female patients are likely to face less societal rejection than male patients. With respect to prevalence of mental illness, females are seen as being at a greater risk of developing mood and anxiety disorders than males (e.g., Alonso et al., 2004). Regarding mental health literacy, Cotton et al. (2006) investigated young Australians between 12 and 25 years of age. They also revealed that male youths exhibited significantly worse recognition of depressive symptoms than female youths, with 61% of females able to correctly identify depression compared to 35% of males. Furthermore, male youths were less likely than female youths to view seeing a psychologist or counsellor as an appropriate treatment for psychosis. Furthermore, Holzinger et al. (2012, p. 74) attest that females are more informed about mental illness than males as they have “A stronger tendency to…to conceive problems in psychological terms….”**

The importance of the study and the hypotheses are well written, although the sentence “High mental health literacy…[may] potentially decrease an individual’s vulnerability to suicide” needs a reference. 

**Reply**: **The reference, Kaneko and Motohashi (2007), has been added to the sentence relating to vulnerability to suicide.**

The Results and Discussion sections are well summarised. In the Results section, however, Figures 3, 4 and 5 seem unnecessary, as these results are reported in-text as percentage values (lines 194-213); readers do not need to see the number of participants who gave each answer if they already know the percentage values.

**Reply**: **The figures have been removed.**

The reference on line 404 of the References section is not mentioned in the text of the paper.

**Reply**: **The reference has been removed.**

**Experimental design**

The research question and hypotheses are well defined. However, the Materials and Methods section requires substantial clarification:

The paragraph beginning on line 107 explains how participants were recruited but not how they received the survey. Was the survey linked into the advertisements or were participants emailed the link after expressing their interest, for example?

**Reply**: **Additional information has been added: “Participants were recruited to complete the online questionnaire, created in Qualtrics (**[**www.qualtrics.com**](http://www.qualtrics.com)**), via invitation email through various mailing lists and via messages posted on various social networking sites such as Facebook and Twitter, and by word of mouth. All participants accessed the study via the provided URL. “**

In the Materials and Procedures section:  
How many participants received each vignette?

**Reply**: **Information has been added: “major depressive episode (*n* = 119), generalized anxiety disorder (*n* = 124), and psychosis (*n* = 130).”**

What type of anxiety disorder was presented in the anxiety vignette?

**Reply**: **Generalised anxiety disorder.**

Was the sex of the character in the vignette also randomised?

**Reply**: **Yes – information added.**

How long did the survey take participants to complete?

**Reply**: **15 minutes – information added.**

o The survey questions need to be described in more detail (lines 127-137). Lines 127-8 state that “a series of questions…were created to ascertain various aspects of their mental health literacy...(i.e., “In five words or less, what would you say, if anything, is wrong with the individual in the vignette?”) Was this the only question they were asked? If so, the sentence might read better as “Participants were first asked to identify the disorder presented in the vignette. Additional questions were designed to ascertain…” Each of the questions which have results mentioned in the Results section need to be described in the Methods section; the questions relating to the vignette character’s need for treatment or risk of self-harm are not mentioned at all, which makes it difficult for the reader to understand the references to these variables in Tables 1 and 2. 

**Reply**: **Information has been amended and included:**

**“Participants were initially asked, in an open-ended question, to identify the disorder presented in the vignette. (i.e., “In five words or less, what would you say, if anything, is wrong with the individual in the vignette?”). Additional forced choice questions, rated from 0 to 6, were designed to ascertain: (a) participants’ perceptions of the seriousness of the symptoms described (i.e., “To what extent would you rate the problems of the individual in the story as being serious?”); (b) the likelihood that treatment might be required (i.e., “To what extent would some form of treatment or intervention be required for the individual in the story?”); and (c) the perceived level of control the individual in the vignette has over the symptoms described (i.e., “To what extent are the problems of the individual in the story within his or her control?”).”**

o The format of each question should be outlined as well, e.g. participants were asked to rate the seriousness of the problem (lines 131-2), but the rating scale used is not described. Similarly, lines 135-7 do not mention whether the questions relating to sex perceptions were forced choice, open ended, rated on a scale, or otherwise; Figures 3, 4 and 5 imply that the questions were forced choice, but this should be clarified.

**Reply**: **As noted above, the questions were forced choice. The rating scale for sex perceptions is described as:**

**“Participants were required to respond by choosing whether males, females, or both were equally likely to experience problems.”**

o Does the paragraph describing correct and incorrect responses (beginning on line 138) relate only to the recognition of disorder question, or did these criteria apply to other questions in the survey? What were the criteria used to determine accurate perceptions of sex susceptibility?

**Reply: It relates to all questions. This has been clarified:**

**“The following overall guidelines were established for the purposes of providing consistency and accuracy in distinguishing between correct and incorrect responses to the above questions…”**

**The perception of sex susceptibility question was forced choice as mentioned above.**

Validity of the findings

The Discussion section could benefit from additional references which support the points made by the authors when explaining their results, e.g. line 232-3 “depression is…associated with fewer and milder social stigmas” is not referenced. The following reference may also be of use in understanding why depression is better recognised than other mental illnesses: Jorm, A. F., Christensen, H., & Griffiths, K. M. (2005). The impact of beyondblue: the national depression initiative on the Australian public's recognition of depression and beliefs about treatments. Australian & New Zealand Journal of Psychiatry, 39(4), 248-254.

The paragraphs beginning on lines 248 and 253 could be joined, as they seem to discuss the same finding.

The Discussion would also benefit from a clearer explanation of what this study adds to the literature on sex differences in mental health literacy in the Australian public and a brief comment on the strengths of the study.

The concluding sentence (lines 322-325) introduces new information into the manuscript; it might instead be better placed earlier in the Discussion, with some comments on how the results could inform research and practice, e.g. should education programs targeting mental health literacy in males focus more strongly on information about a specific disorder, how to help someone correctly identify a mental illness, or on reducing the stigma associated with the belief that people with mental illnesses lack personal control?

**Reply**: **The Jorm et al. (2005) reference has been added. The information in the above mentioned paragraphs (beginning on lines 248 and 253) has been moved.**

In the limitations section, the papers referred to as the Jorm et al and Link et al citations on lines 295-96 do not show that males are less likely than females to participate in mental health literacy research; both studies involved nationally representative samples, so rates of participation would have been equivalent to population demographics, and neither discuss how often males refused to participate compared to females.

On lines 313-4, “exploration of the possible reasons behind participants’ mental health literacy” requires further explanation; it is not clear what this means. Similarly, the difference between “youths” and “adolescents” is unclear on line 315.

It may be worthwhile mentioning that while there are published studies that compare the mental health literacy of different age groups within the adult and adolescent categories (e.g. Farrer, L., Leach, L., Griffiths, K. M., Christensen, H., & Jorm, A. F. (2008). Age differences in mental health literacy. BMC Public Health, 8(125). doi: 10.1186/1471-2458-8-125; Yap, M. B. H., Wright, A., & Jorm, A. F. (2011). First aid actions taken by young people for mental health problems in a close friend or family member: Findings from an Australian national survey of youth. Psychiatry Research, 188, 123-128. doi: 10.1016/j.psychres.2011.01.014; Jorm, A. F., Morgan, A. J., & Wright, A. (2008). First aid strategies that are helpful to young people developing a mental disorder: Beliefs of health professionals compared to young people and parents. BMC Psychiatry, 8, 42. doi: 10.1186/1471-244X-8-42), there has not yet been a study that compares adolescents and adults within the same survey, although often Australian mental health literacy surveys for youth and adults use similar questions, and so can be compared (cf the Jorm, Morgan and Wright reference above).

**Reply**: **The sentence containing the Jorm et al. and Link et al. citations has been removed. Reference to “youths” on line 315 has been removed. The above mentioned references relating to age differences have been added to the text.**

**Comments for the author**

It would be helpful to the reader if the expression was tidied to improve clarity, e.g. instead of “a male protagonist vignette” (lines 263, 265-266, and elsewhere in the Discussion), try “a vignette with a male protagonist” or “the John vignette”; in line 93, “the hypotheses proposed to be explored by the present research are as follows” could simply read “the study’s hypotheses are as follows”; the concluding sentence (lines 322-325) states that there are “numerous areas of public mental health literacy that may be improved,” but only offers one example of this. The italics on lines 169, 170 and 180 are inconsistent with the rest of the variables mentioned in the manuscript.

**Reply**: **This sentence has been amended: “Individuals who received a vignette with a male protagonist….”**

**This sentence has been amended: “As such, the hypotheses are as follows….”**

**The concluding sentence has been amended: “These findings help to identify the area of public mental health literacy that may be improved in the Australian general public, namely education programs targeted towards increasing awareness of mental illness in the male population.”**

**The italics from the above lines have been removed.**

**Reviewer 2 (Santushi Amarasuriya)**

**Basic reporting**

Title and Abstract   
1) Consider rephrasing the title to capture what was examined in the study in light of the hypotheses. At the moment the title seems to be only relevant to the examination done in relation

to the second hypothesis. 

**Reply**: **The title has now been re-worded as: Beliefs and Attitudes towards Mental Illness: An examination of Mental Health Literacy in a Community Sample**

2) Also include findings relevant to the other hypotheses in the abstract.

**Reply**: **Additional results relating to the other hypotheses have been added to the Abstract**.

3) When considering the second hypothesis, it would seem that the examination of sex differences in mental health literacy was being done separately for the three disorders. Hence, it would seem more relevant to report findings in relation to such an examination (i.e., findings in relation to perceptions of need for treatment among males and females for the three disorders) than the overall gender differences observed. 

**Reply**: **We have now reworded the hypotheses to increase clarity.**

Introduction   
4) I feel that the flow and structure of the introduction could be improved to provide a stronger rationale for the hypotheses.   
- For example, findings regarding recognition of disorders are presented at two points in the introduction (lines 41-44 and 63-71). Consider combining these sections into one paragraph.

**Reply**: **Information has been moved to improve the flow of this paragraph in particular. In addition, irrelevant material has been excised. As such, this paragraph now reads:**

**“Studies have shown that the general public historically exhibit poor mental health literacy towards various aspects of mental illnesses (Goldney, Fisher & Wilson, 2001; Jorm et al., 1997; Jorm, Christensen & Griffiths, 2005). For instance, Jorm et al. (1997) revealed that only 39% of Australian respondents could accurately recognize symptoms of depression. The beliefs and attitudes of the general public has been shown to be frequently discordant with those held by mental health professionals, with the public frequently viewing medication, hospitalisation, and psychiatric treatment as harmful (Goldney et al., 2001; Jorm et al., 1997). A study by Link, Phelan, Bresnahan, Stueve and Pescosolido (1999) showed that many symptoms and disorders are not accurately identified by the public as being a mental illness. The results indicated that while there was an overall improvement in mental health literacy, with the public more ably recognizing depression, more positively rating a range of interventions, and holding beliefs and attitudes more consistent with those of mental health professionals, gains still need to be made with respect to schizophrenia and anxiety disorders which are still under-recognised. Interestingly, according to Andrews (1999, p. 317), both mental health “patients and the media do not distinguish between the non-specific help from counsellors and the specific treatment to be expected from mental health professionals”. This inability to discriminate between the types of services offered lends further weight to the research suggesting that the general public’s mental health literacy is still largely lacking (Goldney et al., 2001; Jorm et al., 2005; Jorm & Kelly, 2007).. An individual’s mental health literacy, including his or her beliefs and attitudes towards mental illness, therefore, may influence or contribute to the formulation of ‘lay appraisals’.”**

- As the second and third hypotheses are examining two different aspects it might be better to discuss research relevant to each of these separately instead of together (lines 72-80). It would also be helpful if there is more review of research relevant to each of these. 

**Reply**: **We thank you for your suggestion. When we examined this section and the citations presented again, we did consider the suggestion to separate the paragraphs. However, we found to do so would be detrimental to the flow of the argument we were making and so have retained the format.**

- As there are various aspects of mental health literacy that could be examined, ensure that this section provides a rationale for the elements that were examined. I assume the discussion of ‘lay appraisals’ has been provided in relation to aspects such as perceptions of severity of illness, personal control etc. However, a rationale for the examination of these specific aspects has not been provided. 

**Reply**: **Information has been added as to why these particular disorders were selected for study. The section discussing this is as follows:**

**“Interestingly, according to Andrews (1999, p. 317), both mental health “patients and the media do not distinguish between the non-specific help from counsellors and the specific treatment to be expected from mental health professionals”. This inability to discriminate between the types of services offered suggests that the general public’s mental health literacy is still largely lacking (Goldney et al., 2001; Jorm et al., 2005; Jorm & Kelly, 2007) even for high prevalence disorders such as depression, anxiety, and psychosis.. An individual’s mental health literacy, including his or her beliefs and attitudes towards mental illness, therefore, may influence or contribute to the formulation of ‘lay appraisals’.**

**Evidence suggests that long before an individual sees a mental health professional, ‘lay appraisals’ or ‘lay diagnoses’ are made by individuals, family members, friends, and co-workers regarding the early signs of mental illness (Hollingshead, 2007). Given the pervasiveness of these disorders (e.g., ABS, 2008; Sane Australia, 2014), individuals often have assumptions regarding prognosis as well as opinions relating to the perceived seriousness of the condition, help-seeking or the need for treatment (Angermeyer, Matschinger & Holzinger, 1998), and the amount of control they exert over the disorder itself.”**

- Some of the literature discussed appears not quite relevant to what was examined in the study. Hence, consider replacing these sections with a review of literature relevant to the study (e.g., lines 47-55). 

**Reply: We have removed some of the information in this section that we found irrelevant to the study, including the information pertaining to stereotypes of mental illness.**

Minor revisions relating to editing   
• In the abstract, specify that it is the mean age that is reported in the results section and that it is for the entire sample. 

**Reply**: **This has been clarified in the Abstract: “An online questionnaire was completed by 373 participants (*M* = 34.87 years).”**

• Line 31- check if the page number of the citation is accurate

**Reply**: **This page number is correct.**

• Lines 48-49- would it be possible to paraphrase instead of providing a quotation? (if retaining related section)

**Reply**: **We have retained the quotation as it provides the information we wish to convey in this sentence.**

• Line 50- “lends further weight to the research” the study has still not been described. Therefore, it is not possible to refer to it as yet.

**Reply**: **We have re-worded this sentence as follows: “This inability to discriminate between the types of services offered suggests that the general public’s mental health literacy is still largely lacking (Goldney et al., 2001; Jorm et al., 2005; Jorm & Kelly, 2007).”**

• Line 115-116- What is meant by “three most common types of symptoms associated with mental illness”? Clarify. 

**Reply**: **This has been rewritten as follows: “Following these, participants read a vignette (random allocation to one of three vignettes with either a male or female protagonist) designed to emulate one of the three most common types of mental illness: major depressive episode (*n* = 119), generalized anxiety disorder (*n* = 124), and psychosis (*n* = 130).”**

• 238-242- the idea presented here is not clear 

**Reply**: **We have rewritten this sentence to increase clarity: “This is consistent with evidence that has shown that psychosis and depression are associated with an increased level of morbidity and mortality, when compared to the general population, and in particular, as relates to serious cardiovascular events.”**

• 253-255- rephrase sentence. Clarify what is meant by restrictive here.

**Reply**: **We have rewritten this sentence to increase clarity: “These findings are congruent with previous studies suggesting that when compared with females, males display a poorer ability to correctly identify mental illness as well as more definitive (if imprecise) attitudes towards the various aspects of mental illness (Cotton et al., 2006; Kaneko & Motohashi, 2007).”**

**Experimental design**

Introduction   
1) Line 90- there is reference to one of the aims of the study. Were there other aims? Furthermore, if this was the only aim of the study, the first hypothesis is not relevant to this aim.

**Reply**: **We have retained use of the word “aim” in this instance as it indicates the principal purpose of the study. We have reworded the hypotheses in this section to increase clarity.**

2) As mentioned in the previous section, when reading the second hypothesis it seems that examination of sex differences in mental health literacy was being done separately for the three disorders. However, some of the analyses do not reflect this. Consider whether such analyses would be suitable (in light of the low number of male participants and issues relating to the power of the analyses) or whether it is necessary to re-formulate this hypothesis. This issue is relevant for the third hypothesis as well.

**Reply**: **The hypotheses have now been reworded to increase clarity.**

3) Consider if it would be better to reformulate the hypotheses as aims. The hypotheses lack specificity when there is use of terms such as “various aspects”. Furthermore, as in fact there are various aspects examined in this study, with findings for each of these differing, it is difficult to state whether the hypotheses were supported or not. 

**Reply**: **We have edited the wording of the hypotheses to increase clarity. As such, we have retained the phrase “various aspects” as it now reads more clearly as to the aim of our research.**

Methods   
4) There is no mention that the cases of ‘John’ and “Jane’ were also randomly assigned. Please mention this.

**Reply**: **This information has been added: “Following these, participants read a vignette (random allocation to one of three vignettes with either a male or female protagonist).”**

5) Please describe the rating scales that were used for assessing perceptions about seriousness and personal control relating to the illness.

**Reply**: **This information has been added: “Additional forced choice questions, rated from 0 to 6….”**

6) There is no mention of examining perceptions about the need for treatment and risk of self-harm. Describe how these were examined. 

**Reply**: **This information has now been added: “Additional forced choice questions, rated from 0 to 6, were designed to ascertain: (a) participants’ perceptions of the seriousness of the symptoms described (i.e., “To what extent would you rate the problems of the individual in the story as being serious?”); (b) the likelihood that treatment might be required (i.e., “To what extent would some form of treatment or intervention be required for the individual in the story….”**

**All mention of self-harm has been removed.**

7) Also provide the response options for the sex susceptibility question. 

**Reply**: **This has been added: “The final questions related to participants’ sex perceptions regarding mental illness (e.g., “Which group of people would you consider to be most likely to experience problems similar to those of the individual in the story?”). Participants were required to respond by choosing whether males, females, or both were equally likely to experience problems.”**

8) Include a section on the statistical analyses that were undertaken.

**Reply**: **A section on Statistical Analyses has been incorporated into the manuscript.**

9) There is mention of obtaining information about whether participants were from rural or urban areas, their occupation, schooling etc. Were these factors controlled for in the analysis?

**Reply**: **Demographic information relating to these kinds of factors was collected. However, due to the limited sample size and the limited ability to control for these factors, the analyses were not conducted. The data set is available, though (**[**http://dx.doi.org/10.6084/m9.figshare.1392513**](http://dx.doi.org/10.6084/m9.figshare.1392513)**), and can be used in conjunction with other data sets with similar information to enhance power in future analyses.**

Comment on how these could have affected the findings.

**Reply**: **We have included a statement in the Limitations section to discuss why we have not included this analysis: “Due to a limited sample size and the scope of the initial aims in the present study, we were not able to control for various demographics. However, the data set is available (Gibbons, Thorsteinsson, & Loi, 2015) and can be used in conjunction with similar information to enhance power in future analyses.”**

**Validity of the findings**

Results   
1) Although results relating to recognition of and sex susceptibility to the different disorders (relevant to first hypothesis) are provided, there is no mention of results in relation to the other aspects that were examined. Furthermore, consider incorporation of a discussion of these

findings in the discussion section, e.g., differences in perception for the need for treatment

**Reply**: **We have reorganised the Results section with new headings to indicate which results belong to which hypotheses.**

2) 180-189- Is this analysis relevant to any of the hypotheses? Or would this be relevant to yet another hypothesis? 

**Reply**: **This has now been reorganised under the heading “Perceived Level of Control”. This analysis has also been referred to in the hypotheses.**

3) Lines 191-201- consider presenting the Chi square statistics for sex susceptibility for each of the disorders separately. It seems that a majority of the population do not perceive differences in sex susceptibility in relation to each of the disorders. Hence, it might also be useful to compare those who identified differences as opposed to those who did not, for each of the disorders. A similar analysis in relation to the other examinations done for sex susceptibility would be useful. 

**Reply**: **In this study we have analysed only the hypotheses stated. As such, the suggested tests would go beyond our original stated aims and create additional post hoc analyses not beneficial for this manuscript.**

4) Lines 207-213- it would be helpful to provide a rationale for this examination. As the question regarding sex susceptibility is directly asking about which sex is more vulnerable to the disorder, there might be no association between the participant’s response and sex of the protagonist. Hence, this type of examination might be more relevant to an examination of methodological issues and how naming a particular sex in the vignette can affect participant responses. 

**Reply**: **We have created a new subheading, “Post Hoc Analysis: Sex Susceptibility” and included this information separate from the body of the previous results.**

Discussion 

5) It would also be useful to discuss the findings in relation to need for treatment for the different disorders being different between the sexes. 

**Reply**: **Information regarding need for treatment has been added.**

6) 245-247- it is difficult to comment on the improvement of mental health literacy in relation to perceived seriousness as a comparison has not been provided

**Reply**: **We have deleted the sentence relating to an improvement appearing to be evident.**

7) Line 265- 270- consider issues that were raised earlier that the results show that a majority of the sample perceive that there is no difference in sex susceptibility when the protagonist was either male or female. 

**Reply**: **A caveat has been added to this section: “However, it is worth noting that the majority of participants considered both males and females as equally susceptible.”**

8) Summarise the limitations section. Also consider the relevance of the limitations that have been discussed. For example, what is the relevance of the limitation provided in lines 288-292 to this study?

**Reply**: **We have removed the information contained in lines 288-292 as we appreciate that it was not relevant to the current study.**

9) Describe the implications of the findings.

**Reply**: **Added to the Conclusion section.**