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# Stigma among Singaporean Youth: A Study on Adolescent Attitudes Toward Serious Mental Illness and Social Tolerance in a Multi-ethnic Population.

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**Abstract**

Objectives: Stigma against mental illnesses is one of the significant obstacles faced by the mental health service users and providers. It can develop at a young age and is also influenced by culture. Youths in Southeast Asian countries are underrepresented in mental health research so this study aims to explore the dimensions of stigma and social tolerance, and examine its correlates in the younger, multi-ethnic population of Singapore.

Design: An online survey collected data with socio-demographic questions, the Attitudes Towards Serious Mental Illness (Adolescent version), Social Tolerance scales and an open text question on words or phrases participants associated with the term “mental illness”. Principal components analysis and multiple regression models were conducted to investigate the factor structure of the attitudes and social tolerance scales and their socio-demographic correlates.

Participants: Participants included 940 youths aged 14-18 years old who were residing in Singapore at the time of the survey and were recruited through local schools.

Results: About a quarter of the students (22.6%) reported participating in mental health awareness campaigns while nearly half (44.5%) associated pejorative words and phrases with the term mental illness. The Attitudes Towards Serious Mental Illness (Adolescent version) scale yielded five factors while the Social Tolerance scale yielded two. Ethnicity, gender and nationality were significantly correlated with factors of both scales. Chinese youths showed higher sense of physical threat and lower social tolerance than those of other ethnicities. Females showed more wishful thoughts, social concern and social responsibility towards the mentally ill than males.

Conclusions: The dimensions of stigma and social tolerance are different in Asian cultures compared to Western cultures. Socio-demographic differences in attitudes towards the mentally ill can also be found among youths living in Singapore. Misconceptions and negative attitudes towards mental illness are common and should be addressed in educational campaigns.

**Strengths and limitations of this study**

This study is the first to assess stigma towards the mentally ill in a multi-ethnic sample of youths residing in Singapore.

Students from six schools in four different regions of the country were included in the study.

The study highlights potential misconceptions Southeast Asian youths have about mental illness which should be addressed in awareness programs.

Due to the voluntary nature of the study, the attitudes of non-responders towards mental illness may be different from that of participants and was not captured.

## Introduction

Stigma against mental illnesses is one of the significant obstacles faced by the mental health service users and providers, and can be described as prejudice and discrimination against individuals with mental illness due to a lack of knowledge, ignorance or misinformation (Link & Phelan, 2001). Negative attitudes also give rise to the desire for social distance, a form of behavioural discrimination which involves reluctance to interact or engage with persons with mental illness (Link et al., 1999). Individuals with mental illness often feel a sense of low self-esteem/well-being as they are rejected and discriminated against by others due to stigma (Link, Struening, Neese-Todd, Asmussen & Phelan, 2001). Accordingly, they are reluctant to be identified as having a mental illness, resulting in high rates of treatment avoidance (Kessler et al., 2001). Thus, stigma is one of the greatest barriers to seeking treatment for those with mental illness (Corrigan, 2004).

Negative attitudes towards mental illness are influenced by culture and affect people's behaviour differently depending on their cultural background. Singapore is a multi-ethnic island city-state in Southeast Asia with a population of 5.61 million in 2016. The population consists mainly of three main ethnic groups, Chinese (74.3%), Malay (13.4%) and Indian (9.1%), while 3.2% are of other ethnic groups (Department of Statistics, Singapore, 2016). A nationwide study of the local population in 2009 titled the Singapore Mental Health Study (Chong et al., 2012a) highlighted the significant treatment gap for various mental illnesses in Singapore. Only 31.7% of people with mental illness were found to have sought help. For disorder-specific help seeking, the percentage of people who did not seek help were as high as 96.2% for those with alcohol abuse, 90% for those with obsessive compulsive disorder and 59.6% for those with major depressive disorder (Chong et al., 2012b).

A follow-up study called the Mind Matters study explored the potential reasons for the large treatment gap (Chong et al., 2016). Mind Matters was a nationwide study of mental health literacy conducted in Singapore in 2014 by the Institute of Mental Health with a total sample of 3006 Singapore residents. The findings of this study showed low mental health literacy and high stigma among the adult population aged 18-65 years old. However, the study showed that younger age was associated with better mental health literacy and attitudes towards those with mental illness (Subramaniam et al., 2016).

While this finding is encouraging, this is not to say that younger people have no stigma towards the mentally ill. Attitudes toward various aspects including the conceptions and stigma toward the mentally ill are thought to form even at an early age (Link, 1987). Indeed, a review of children's attitudes towards the mentally ill suggested that children start showing stigma as young as the age of 5 years old (Wahl, 2003). The review showed that younger children show negative attitudes towards and have less sophisticated conceptualizations of mental illness than older children or adolescents. While older children had better understanding of mental illness as emotional and psychological disturbances, the review suggested that negative attitudes increased with age in both children and adolescents. Studies have also shown that youth are reluctant to interact closely with those with mental illness by indicating desire for social distance (Wahl et al., 2012; Reavley & Jorm, 2011). Furthermore, a review of the epidemiology of child and adolescent psychiatric disorders reports that many psychiatric disorders can manifest early on in life and

negatively affect several aspects of a young person's life (Costello, Egger & Angold, 2005) including poor well-being, self-esteem, social relationships in and out of school, and academic achievement. Stigma further compounds these problems by reducing well-being and acting as a barrier to help-seeking (Corrigan & Watson, 2002). Therefore, mental health stigma not only affects adults but can affect youths of schooling age during an important phase of development in their life.

Few studies have explored the attitudes of Asian youths living in Asia, with even fewer exploring the views of Malay and Indian youths. Although previous research has largely focused on youths in Western countries, their findings are limited due to the lack of generalizability to Asian cultures. Asian values of collectivism are associated with higher levels of stigma (Papadopoulos, Foster & Caldwell, 2013) and cultural factors play a role in affecting desire for social distance (Lauber et al. 2004). Young Asians also live in changing times and cultures and anti-stigma approaches used for adults or western youths may not be relevant to them. Studies of Chinese youths in Singapore showed that some youths believed in the Asian physiological explanation of mental illness (eg. Traditional Chinese beliefs of a body out of balance or harmony) or attributing mental illness to religious and supernatural influences (Mathews, 2011). These beliefs could be related to some youths' preference for seeking help from Traditional Chinese Medicine physicians (Lee, 2008). Although participants in these studies also showed beliefs in psychological causes of mental illness and preference for seeking help from mental health professionals, the findings suggests that one's cultural background may influence one's views of mental illness. However, stigma levels and social distance have not been well-studied among youths in Singapore. More importantly, no studies appear to have included youths from the other two main ethnic groups in Singapore - Malay and Indian - and this group is underrepresented in mental health literacy research.

Thus, the aims of the current study were to explore the dimensions of stigma and social distance, and examine their correlates in the younger, multi-ethnic population of Singapore.

## Methods

### *Participants*

Participants were youths aged 14-18 years old residing and studying in Singapore at the time of data collection. The youths were recruited from schools after ethics approval was obtained. Students in grades Secondary 3 to Second Year Junior College (equivalent to grades 9 to 12 of high school in the United States) were included in the study. The inclusion criteria comprised those who were able to read and understand English, as well as able to use the internet to complete the online survey. A total of 1000 responses were recorded on the online survey.

### *Procedure*

Ethics approval was obtained from the National Healthcare Group Domain Specific Review Board and the Ministry of Education to approach youths for the study. 10 schools registered with the Ministry of Education were approached using a convenience sampling method and 6 agreed to participate in the study. The participating schools included both single-sex and mixed-sex schools based in the north, north-east, central and south regions of Singapore. Approximately 2500 students were informed of the study. Written informed consent was obtained from both the participant and their parent or guardian before participants were recruited for the study. Consent forms were distributed to interested students via the schools so that anonymity and confidentiality were maintained. A link to an online survey form was sent to participants via their preferred email address and they were allowed to complete it in their own time in a place that

they were comfortable in.

The online survey was designed using the online survey tool, QuestionPro, which allowed the online survey to end automatically when the quota of 1000 was reached. It was launched and completed in 2016. The survey consisted of socio-demographic questions as well as scales pertaining to attitudes towards the mentally ill. It also included an open text question where participants could list words or phrases they associated with the term "mental illness." In general, the survey took 10-20 minutes to complete.

*Measures*

Socio-demographic Data

Questions relating to socio-demographic background were included to gather information on age, gender, ethnicity, education level and nationality. Nationality was divided into two groups: Singapore citizens and permanent residents who are defined as citizens of other countries but are permitted to live and work in Singapore.

Attitudes Towards Serious Mental Illness – Adolescent Version Scale (ATSMI-AV; Watson, Miller & Lyons, 2005)

The ATSMI-AV is a validated 21-item self-report scale that measures attitudes towards mental illness. Responses to statements are based on a 5-point Likert scale where 1 indicates "Completely Disagree" and 5 indicates "Completely Agree". The scale explores perceptions of violence, social avoidance, embarrassment if one were diagnosed as having a mental illness and personal invulnerability to mental illness. Previous research identified five factors comprising Threat, Social Control/Concern, Wishful Thinking and Categorical Thinking and Out of Control (Watson, Miller & Lyons, 2005). However, previous research was conducted on a Western population and a factor analysis is required for the present study.

Social Tolerance scale (Koller, Chen, Heeney, Potts & Stuart, 2014)

The Social Tolerance scale measures social tolerance through desire for social distance (7 items) and social responsibility for mental health issues (4 items). Items are rated on a 5 point scale ranging from "Strongly Agree" to "Strongly Disagree". According to the scale developers, the Cronbach's alpha for the scale was 0.87. However, similar to the ATSMI-AV, a factor analysis is warranted to verify the factors for the Social Tolerance scale in the present sample.

Words & Phrases Associated with "Mental Illness"

An open text question asked participants to list at least 3 words or phrases that are associated with the term "mental illness". For example, a participant may indicate words/phrases such as, "crazy", "violent" or "very dangerous".

*Analysis*

The means and standard deviations were calculated for continuous variables while the

frequencies and percentages were calculated for categorical variables. The factor structures of the ATSMI-AV and Social Tolerance scales were examined using exploratory principal component analysis (PCA) with orthogonal, varimax rotation. Exploratory PCA was used as the factors of the ATSMI-AV and Social Tolerance scales have not been adequately analysed across cultures. For example, there was only one study that conducted factor analysis of the ATSMI-AV in a Western population. Thus, exploratory PCA was used to examine the factors of the ATSMI-AV and Social Tolerance scales in a multi-ethnic Asian culture. Factor extraction was assessed based on the following criteria: Kaiser-Meyer-Oklin (KMO) value (>.60), Barlett's Test of Sphericity ($p$ <.001), Kaiser-Guttmann criterion (eigenvalue >1), and factor loadings (>.40).

A series of multiple regression models were performed to examine the socio-demographic (age, gender, ethnicity, education, and nationality) correlates of the ATSMI-AV and Social Tolerance subscales. Data were analysed with the Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc, Chicago, IL, USA) with statistical significance level set at .05 for all procedures.

**Results**

In total, 1000 responses were recorded in the online survey database of which 940 responses were included for analysis after data cleaning. The excluded cases were removed due to unreliable data such as drop-out/withdrawn cases, pattern answers and duplicate submissions. The socio-demographic breakdown of the sample is shown in Table 1. The mean age of the sample was 15.9 years and 443 participants were female. Of the 940 students, only 212 (22.6%) said that they had taken part in a mental health awareness event (like a talk or presentation) about mental health issues. When asked to "list words they think of when they hear the words 'Mental Illness'", 418 (44.5%) listed pejorative words and phrases like "crazy", "weird", "scary", "stupid", "should avoid" and "dangerous". The top 5 most commonly used words are listed in Table 2.

The responses to the survey questions regarding their attitudes towards the mentally ill are shown in Table 3. Of the participants, 29.8% felt "that there really isn't anything called mental illness" and 34.3% believed that there are medications that can help those with mental illness.

The first PCA was conducted on the 21-item ATSMI-AV. Results of the PCA with varimax rotation yielded five factors with eigenvalues greater than 1. Two items ("I sometimes worry that I may have a mental illness" and "I don't think that there is any way that I can become mentally ill") were weakly correlated and did not load onto any factors; these were excluded from subsequent analyses. The factorability of the remaining 19-items was supported by KMO value of .82, Barlett's Test of Sphericity ($p$ <.001) and Cronbach's alpha (.78). The five factors accounted for 49.07% of the variance. Question items and corresponding loadings are presented in Table 4.

The four items that loaded onto the first factor were related to the perception that mentally ill individuals are threatening (e.g. Mentally ill people scare me). Thus, the first factor was labelled as "Physical Threat", Cronbach's alpha (.76). Four items loaded onto the second factor labeled "Wishful Thinking", Cronbach's alpha (.73), which was related to unrealistic perceptions about the recovery from mental illness (e.g. People who are mentally ill could be well if they tried hard enough). Four items also loaded onto the third factor, labeled "Categorical Thinking", Cronbach's alpha (.60), which reflected black or white thinking (e.g. If you become mentally ill your life is pretty much over). The three items that loaded onto the fourth factor, "Label Avoidance", Cronbach's alpha (.60), comprised items related to shame towards receiving a mental illness diagnosis or being associated with mentally ill individuals (e.g. I would be very embarrassed

if I were diagnosed as having a mental illness). The final factor had four items which related to social concerns associated with mental illness (e.g. I think that society makes up the diagnosis of mental illness just to control people). Hence, the final factor was labelled as "Social Construction/Concern", Cronbach's alpha (.53).

The second PCA was conducted on the 11-item Social Tolerance scale. Results of the PCA with varimax rotation yielded two factors with eigenvalues greater than 1. The factorability of the 11-items was supported by KMO value of .86, Barlett's Test of Sphericity ($p$ <.001) and Cronbach's alpha (.83). These two factors accounted for 53.34% of the variance. Question items and corresponding loadings are presented in Table 5.

Six items loaded onto the first factor labelled "Social Distance", Cronbach's alpha (.82), which was related to negative reactions associated with being in close physical proximity with mentally ill individuals (e.g. I would be upset if someone with a mental illness always sat next to me in class) or forming close relationships with mentally ill individuals (e.g. If I knew someone had a mental illness I would not date them). The second factor had five items related to providing social support to mentally ill individuals (e.g. I would visit a classmate in hospital if they had a mental illness). Therefore, the second factor was labelled as "Social Responsibility", Cronbach's alpha (.75).

For the socio-demographic correlates of the ATSMI-AV subscales, only ethnicity was found to be significantly associated with "Physical Threat". Specifically, Chinese students had a higher sense of physical threat than non-Chinese students ($p$ <.01). Gender ($p$ <.05) and nationality ($p$ <.01) were observed to be significantly associated with "Wishful Thinking". Females had more wishful thoughts than males while permanent residents have more wishful thoughts than Singaporeans. Gender ($p$ < .05) and nationality ($p$ <.05) were also found to be significantly associated with "Categorical Thinking"; males endorsed more categorical thoughts than females while permanent residents had more categorical thoughts than Singaporeans. Only gender was significantly associated with "Social Construction/Concern" where females were found to have greater social concerns than males ($p$ <.001). None of the socio-demographic variables were associated with "Label Avoidance".

For the socio-demographic correlates of the Social Tolerance subscales, only ethnicity was found to be significantly associated with "Social Distance". Specifically, Chinese students had lower tolerance for contact with mentally ill individuals compared to non-Chinese students ($p$ <.001). Gender and ethnicity were both observed to be significantly associated with "Social Responsibility"; males ($p$ <.001) and Chinese ($p$ <.01) students had lower tolerance to engage in supportive action towards others with a mental illness compared to females and non-Chinese students respectively. Table 6 presents the results of the multiple regression analyses for the socio-demographic correlates of ATSMI-AV and Social Tolerance.

**Discussion**

Less than a quarter (22.6%) of students reported participating in mental health awareness or educational campaigns before. Overall, a large proportion of the participants appear to have misconceptions towards mental illness. The PCA of the ATSMI-AV yielded five factors, physical threat, wishful thinking, social concern, label avoidance and categorical thinking. The PCA of the Social Tolerance scales yielded two factors, Social Distance and Social Tolerance though the items in each factor was not exactly the same as that used by Koller et al. (2014). Significant associations were found between subscale factors and socio-demographic factors.

Almost half the sample (44.5%) associated negative words with mental illness. Many youths associated words like “crazy”, “weird” and “strange” with mental illness, though local slangs like “siao (meaning crazy/insane)” and other pejorative associations such as “violent”, “dangerous”, “stay away”, “stupid”, “noisy” and “annoying” were also found. “Depression/Depressed” was the most commonly listed word (20.2%) which indicates that youths were familiar with depression as a mental illness. The words “crazy” (18.7%), “different” (15.9%) and “weird” (13.1%) were the next most commonly listed words, supporting the notion that youths still make negative associations with mental illness and educational campaigns are needed to address this area. The fifth most listed word was “autism/autistic” (9.9%) which also highlights that youths were familiar with autism as a mental illness.

With negative views of mental illness, it is not surprising that about half of the respondents (46.2%) said they would be embarrassed if they were diagnosed with mental illness. Nearly a quarter (22.7%) said they would not want others to know if they had a mentally ill relative. Around 1 in 3 (35.1%) also said their friends would see them as weak if they had a mental illness. This suggests that mental illness is seen as a mark of shame among local youths and something that their peers would stigmatize.

In spite of this, more than 80% of students said they would visit a classmate in hospital if they had a mental illness (83.6%), “tell a teacher if a student was being bullied because of their mental illness” (89.6%) and “stick up for someone who had a mental illness if they were being teased” (87.5%). Only 3.5% had the misconception that mental illness is contagious and slightly more than half (52.1%) were open to volunteering for mental health related causes. While these positive findings are encouraging, there is room for improving mental health knowledge and reducing stigma among youths – possibly with the help of campaigns targeted towards youth that are age and culture appropriate.

To our knowledge the ATSMI-AV (Watson et al., 2005) has not been used in the local sample and thus we used factor analysis to explore its components. The items that loaded onto Wishful Thinking were identical to those by Watson et al. (2005). Social Construction/ Concern was also the same minus one item “I sometimes worry that I may have a mental illness” which did not load onto any factors in our analysis. Two separate factors were related to threat in our sample (Physical Threat and Label Avoidance) though the items fell under a single overarching factor of Threat by Watson et al. (2005). The remaining items Out of Control and Categorical Thinking factors in the study by Watson et al. (2005) were combined into one factor in our sample as Categorical thinking.

The factor analysis of the Social Tolerance scale also gave a slightly different factor structure from that suggested by Koller et al. (2014). The authors suggested 7 items for Social Distance and 4 for Social Responsibility. The two factors found in our analysis were similar except for one item (“I would visit a classmate in hospital if they had a mental illness”) loaded onto the Social Responsibility factor in our sample instead of Social Distance unlike the findings by Koller et al. (2014). This difference in factor structure may be indicative of cultural differences in social norms between Asian and Western populations, and that social distancing may thus present differently.

In terms of the socio-demographic correlates, ethnicity was correlated with one of the physical threat stigma subscale factors and both subscales for social tolerance. Those of Chinese ethnicity felt more physical threat, had more desire for Social Distance and less Social

Responsibility than those of other ethnicities. Some of these findings are similar to those found in the adult population (Subramaniam et al., 2016) where Indian and Malay participants scored lower on a Social Distance measure despite having higher personal stigma. Corrigan et al. (2001) found that individuals from minority ethnic groups are less likely to support prejudicial attitudes about mental illness. They postulated that this was because people from minority ethnic groups experience mental health stigma more harshly than those in the majority group (1998) and appear less likely to endorse prejudice about mental illness (Schnittker et al., 1999). Another possible explanation is the Chinese concept of 'face' which describes a person's moral standing in society. Having mental illness may be a mark of 'losing face' which can greatly affect one's access to social capital and bring shame to oneself and one's family (Yang and Kleinman, 2008). Although collectivist constructs of 'face' exist in many Asian ethnic groups, some researchers argue that the Singaporean concept of 'face' presents uniquely to the country and that Chinese Singaporeans place more emphasis on 'saving face' than the other ethnic groups despite all participants residing in the same country (Lim, 2016). Those of Chinese ethnicity may thus feel more threatened by mental illness as a mark of shame, which in turn leads to greater feelings of physical threat, more desire for Social Distance and less sense of Social Responsibility towards the mentally ill.

Gender differences were found on three ATSMI-AV subscales and for Social Responsibility. The gender differences for ATSMI-AV subscales in our sample were different to those found by Watson et al. (2005). Watson et al. found that boys scored higher on Threat, a finding that was not replicated here. However, males in our sample did endorse more Categorical Thinking and Watson et al. (2005) had similar findings with males scoring higher on Categorical Thinking, a factor which shared some common scale items. Males also scored lower for Social Responsibility than females, suggesting they were less likely to endorse supportive action towards the mentally ill. Conversely, females showed more Social Concern and Wishful Thinking than males. Ng and Chan's (2000) study on Hong Kong secondary school students appear to show similar findings with females showing higher benevolence towards the mentally ill and males showing more stereotyping, restrictive, pessimistic and stigmatizing attitudes towards mental illness. Female adults in Singapore also scored lower for stigma in previous nationwide studies (Subramaniam et al., 2016).

Differences between youths with Singaporean citizenship and permanent residents were also found. Permanent residents endorsed more Wishful Thinking and Categorical Thinking. A possible explanation for this finding could be that permanent residents may constitute a mix of different foreign ethnicities including those of the main Singapore ethnic groups. Thus, permanent residents may be classified as a heterogeneous group but actually have diverse views.

The findings of this study should be considered in light of its limitations. Firstly, the voluntary nature of the study may create bias in the responses as students who refused to participate may hold more prejudicial attitudes towards mental illness. Secondly, despite the anonymous nature of the survey, the participants may have shown social desirability bias when responding to the questions, particularly if they felt that their schools had access to their data.

Despite the limitations, the present study has notable strengths which include the large sample size and inclusion of the different ethnic groups which was absent from previous studies involving Singaporean youths. It is also one of the few, if not the only study thus far to investigate the constructs of mental illness stigma and social distance in youths residing in Singapore.

Overall, a significant proportion of youths in Singapore report having little education about mental health which could explain the stigma endorsed by the sample. Future research could use qualitative methods to understand the construct of stigma better in the Asian context, particularly

in light of changing values in younger generations. Future studies may also replicate the measures used to evaluate the effectiveness of public education campaigns being rolled out by relevant agencies.

**Footnotes**

**Contributors**

SP and JL are joint first authors. SP, JL, MM and BYC conducted the fieldwork. Analysis was done by JL. SP led the project. SP, MM, BYC, SS, SPL, JAV, EA, DSSF, CSA and MS helped to design and deliver the project. All authors revised and approved the final version of the manuscript.

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**Competing interests**

None declared.

**Data sharing statement**

Additional data are available on request.

## References


1. Chan JY, Mak WW, Law LS (2009). Combining education and video-based contact to reduce stigma of mental illness: "The Same or Not the Same" anti-stigma program for secondary schools in Hong Kong. Soc Sci Med, 68(8), 1521-1526.
2. Chong SA, Abdin E, Sherbourne C, Vaingankar JA, Heng D, Yap M, Subramaniam M (2012a). Treatment gap in common mental disorders: the Singapore Perspective. Epidemiology and Psychiatric Sciences 21(2), 195-202.
3. Chong SA, Abdin E, Vaingankar JA , Kwok KW, Subramaniam M (2012b). Where do People with Mental Disorders in Singapore go to for Help? Annals of the Academy of Medicine Singapore 41(2), 154-60.
4. Chong SA, Abdin E, Picco L, Pang S, Jeyagurunathan A, Vaingankar JA, Kwok KW, Subramaniam M (2016). Recognition of mental disorders among a multiracial population in Southeast Asia. BMC Psychiatry 16, 1-10.
5. Corrigan P (2004). How stigma interferes with mental health care. The American psychologist, 59(7), 614-25.
6. Corrigan PW, Watson AC (2002) The Paradox of Self-Stigma and Mental Illness. Clinical Psychology: Science and Practice, 9(1), 35-53.
7. Costello EJ, Egger H, Angold A (2005) 10-year research update review: the epidemiology of child and adolescent psychiatric disorders: I. Methods and public health burden. Journal of the American Academy of Child and Adolescent Psychiatry. 44(1), 972-86.
8. Kessler RC, Berglund PA, Bruce ML, Koch JR, Laska EM, Leaf PJ, Manderscheid RW, Rosenheck RA, Walters EE, Wang PS (2001) The prevalence and correlates of untreated serious mental illness. Health Services Research, 36(6 Pt 1), 987-1007.
9. Koller M, Chen, S, Heeney B, Potts A, Stuart H (2014) Opening Minds in High School: Durham Talking About Mental Illness (TAMI) In school Activities: Post Summit. Mental Health Commission of Canada. (http://www.mentalhealthcommission.ca/sites/default/files/Stigma_OM_Durham_TAMI_In_School_Activities_Post%252520Summit_ENG_0_0.pdf) Accessed Nov 2016.
10. Lauber C, Nordt C, Falcato L, Rössler W (2004) Factors Influencing Social Distance Toward People with Mental Illness Community Mental Health Journal 40(3), 265-274.
11. Lim JYT (2016) Faces of Singapore & Mediation In J Lee, M Lim & JH Phua (Ed.), Contemporary Issues in Mediation Volume 1 (pp59-72) Sngapore, World Scientific Publishing Co. Pte. Ltd.
12. Link BG (1987). Understanding Labeling Effects in the Area of Mental Disorders: An Assessment of the Effects of Expectations of Rejection. American Sociological Review, 52(1), 96-112.
13. Link BG, Phelan JC (2001) Conceptualizing Stigma. Annual Review of Sociology, 27, 363-385.
14. Link BG, Struening EL, Neese-Todd S, Asmussen S, Phelan JC (2001) Stigma as a barrier to recovery: The consequences of stigma for the self-esteem of people with mental illnesses. Psychiatric Services, 52(12), 1621-6.

15. Mathews M (2011). Assessment and Comparison of Culturally Based Explanations for Mental Disorder Among Singaporean Chinese Youth. International Journal of Social Psychiatry 57(1), 3-17.
16. Papadoulos C, Foster J, Caldwell K (2013) 'Individualism-Collectivism' as an Explanatory Device for Mental Illness Stigma Community Mental Health Journal 49: 270. doi:10.1007/s10597-012-9534-x
17. Poon LY, Tay, E, Lee YP, Lee, H, Verma S (2016) Making in-roads across the youth mental health landscape in Singapore: the Community Health Assessment Team (CHAT). Early Intervention in Psychiatry 10(2), 171-177.
18. Population Trends, 2016 Department of Statistics Singapore. (http://www.singstat.gov.sg/docs/default-source/default-document-library/publications/publications_and_papers/population_and_population_structure/population2016.pdf). Accessed 20 October 2016)
19. Reavley NJ, Jorm AF (2011) Young People's Stigmatizing Attitudes towards People with Mental Disorders: Findings from an Australian National Survey. Australian & New Zealand Journal of Psychiatry 45(12) 1033-1039.
20. Subramaniam M, Abdin E, Picco, L, Pang S, Shafie, S, Vaingankar, JA, Kwok, KW, Verma K, Chong SA (2016) Stigma towards people with mental disorders and its components- a perspective from multi-ethnic Singapore. Epidemiology and Psychiatric Sciences 28, 1-12.
21. Wahl OF (2003) Childrens' views of mental illness: A review of the literature. Psychiatric Rehabilitation Skills. 6:134–158.
22. Wahl O, Susin J, Lax A, Kaplan L, Zatina D (2012) Knowledge and Attitudes About Mental Illness: A Survey of Middle School Students. Psychiatric Services 63(7) 649-54.
23. Watson AC, Miller FE, Lyons JS (2005) Adolescent attitudes towards serious mental illness. The Journal of Nervous and Mental Disease, 193(11), 769-72.
24. Yang LJ, Kleinman A (2008) 'Face' and the Embodiment of Stigma in China: The Cases of Schizophrenia and AIDS. Social Science & Medicine 67(3), 398-408.

| TABLE 1. Sociodemographic breakdown of sample (N=940) | | |
|---|---|---|
| | N | % |
| Mean age in years | 15.9 | |
| Females | 443 | 47.1% |
| Males | 497 | 52.9% |
| Nationality | | |
| Singaporean Citizen | 805 | 85.6% |
| Permanent Resident | 135 | 14.4% |
| Ethnicity | | |
| Chinese | 773 | 82.2% |
| Malay | 41 | 4.4% |
| Indian | 75 | 8.0% |
| Other | 51 | 5.4% |

| TABLE 2. Frequency of the top 5 most common words associated with the term "mental illness" | | |
|---|---|---|
| | N | % |
| Depression/Depressed | 190 | 20.2 |
| Crazy | 176 | 18.7% |
| Different | 149 | 15.9% |
| Weird | 123 | 13.1% |
| Autism/Autistic | 93 | 9.9% |

| TABLE 3. Proportion of students who replied "Agree or Strongly Agree" to survey items | | |
|---|---|---|
| | N | % |
| If I had a mentally ill relative, I wouldn't want anyone to know. | 213 | 22.7 |
| Most of my friends would see me as being weak if they thought that I had a mental illness. | 330 | 35.1 |
| I would be very embarrassed if I were diagnosed as having a mental illness. | 434 | 46.2 |
| Mentally ill people scare me. | 211 | 22.5 |
| I would cross the street if I saw a mentally ill person coming in order to avoid passing him/ her. | 126 | 13.4 |
| Think that mentally ill people are strange and weird. | 132 | 14 |
| I think that there really isn't anything called mental illness; some people are just different. | 280 | 29.8 |
| Schools and parents are mostly responsible for making people mentally ill. | 169 | 18 |

| | | |
|---|---|---|
| I think that society makes up the diagnosis of mental illness just to control people. | 98 | 10.4 |
| I think that you could catch mental illness from another person. | 33 | 3.5 |
| I sometimes worry that I may have a mental illness. | 330 | 35.1 |
| Mentally ill people can get well if they are treated with love and kindness. | 586 | 62.3 |
| There are medications now that can cure mental illness. | 322 | 34.3 |
| People who are mentally ill could be well if they tried hard enough. | 315 | 33.5 |
| If a relative of mine became mentally ill, I know that I could convince them to get well. | 265 | 28.2 |
| I can't see myself hanging out with a mentally ill person. | 191 | 20.3 |
| Mentally ill people are easy to spot. | 186 | 19.8 |
| If you become mentally ill your life is pretty much over. | 103 | 11 |
| I don't think there is any way that I can become mentally ill. | 122 | 13 |
| Eating the wrong things or taking drugs can make you mentally ill. | 283 | 30.1 |
| Mentally ill people tend to be more violent than other people. | 224 | 23.8 |
| I would be upset if someone with a mental illness always set next to me in class. | 137 | 14.6 |
| I would not be close friends with someone I knew had a mental illness. | 140 | 14.9 |
| I would visit a classmate in hospital if they had a mental illness. | 786 | 83.6 |
| I would try to avoid someone with a mental illness. | 149 | 15.9 |
| I would not mind it if someone with a mental illness lived next door to me. | 604 | 64.3 |
| If I knew someone had a mental illness I would not date them. | 366 | 38.9 |
| I would not want to be taught by a teacher who had been treated for a mental illness. | 150 | 16 |
| I would tell a teacher if a student was being bullied because of their mental illness. | 842 | 89.6 |
| I would stick up for someone who had a mental illness if they were being teased. | 822 | 87.5 |
| I would tutor a classmate who got behind on their studies because of their mental illness. | 736 | 78.3 |
| I would volunteer my time to work in a program for people with a mental illness. | 490 | 52.1 |

TABLE 4. Results of the Principal Components Analysis with Varimax Rotation for ATSMI-AV

| | Loadings | | | |
|---|---|---|---|---|
| Factor and scale item | 1: Physical Threat | 2: Wishful Thinking | 3: Categorical Thinking | 4: L Avoi |
| Mentally ill people scare me. | .79 | | | |
| I would cross the street if I saw a mentally ill person coming in order to avoid passing him/her. | .78 | | | |
| I think that mentally ill people are strange and weird. | .73 | | | |
| I can't see myself hanging out with a mentally ill person. | .50 | | | |
| Mentally ill people can get well if they are treated with love and kindness. | | .74 | | |
| There are medications now that can cure mental illness. | | .66 | | |
| People who are mentally ill could be well if they tried hard enough. | | .75 | | |
| If a relative of mine became mentally ill, I know that I could convince them to get well. | | .75 | | |
| Mentally ill people are easy to spot. | | | .65 | |
| Eating the wrong things or taking drugs can make you mentally ill. | | | .64 | |
| Mentally ill people tend to be more violent than other people. | | | .62 | |
| If you become mentally ill your life is pretty much over. | | | .58 | |
| If I had a mentally ill relative, I wouldn't want anyone to know. | | | | .6 |
| Most of my friends would see me as being weak if they thought that I had a mental illness. | | | | .7 |
| I would be very embarrassed if I were diagnosed as having a mental illness. | | | | .7 |
| I think that society makes up the diagnosis of mental illness just to control people. | | | | |
| Schools and parents are mostly responsible for making people mentally ill. | | | | |
| I think that there really isn't anything called mental illness; some people are just different. | | | | |
| I think that you could catch mental illness from another person. | | | | |

| | | | | |
|---|---|---|---|---|
| Eigen values | 2.39 | 2.34 | 2.0 | 1. |
| % of variance | 11.40 | 11.15 | 9.31 | 8. |

TABLE 5. Results of the Principal Components Analysis with Varimax Rotation for Social Tolerance scale

| | Loadings | |
|---|---|---|
| Factor and scale item | 1: Social Distance | 2: Social Responsibility |
| I would be upset if someone with a mental illness always sat next to me in class. | .79 | |
| I would not be close friends with someone I knew had a mental illness. | .78 | |
| I would try to avoid someone with a mental illness. | .77 | |
| If I knew someone had a mental illness I would not date them. | .74 | |
| I would not want to be taught by a teacher who had been treated for a mental illness. | .61 | |
| I would not mind it if someone with a mental illness lived next door to me. | .51 | |
| I would stick up for someone who had a mental illness if they were being teased. | | .81 |
| I would tell a teacher if a student was being bullied because of their mental illness. | | .80 |
| I would tutor a classmate who got behind in their studies because of their mental illness. | | .70 |
| I would visit a classmate in hospital if they had a mental illness. | | .58 |
| I would volunteer my time to work in a program for people with a mental illness. | | .50 |
| Eigen values | 3.28 | 2.58 |
| % of variance | 29.85 | 23.49 |

TABLE 6. Socio-demographic correlates of ATSMI-AV and Social Tolerance

| | Physical Threat | | Wishful Thinking | | Social Construction/Concern | | Categorical Thinking | | Label Avoidance | | Contact | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *B* | 95% CI | *β* | 95% CI | *β* | 95% CI | *β* | 95% CI | *β* | 95% CI | *β* | 95% |
| Age | 0.08 | (-0.05, 0.27) | 0.03 | (-0.08, 0.23) | -0.01 | (-0.15, 0.11) | 0.02 | (-0.11, 0.18) | -0.02 | (-0.16, 0.09) | 0.001 | (-0.22, |
| Gender | 0.05 | (-0.37, 0.52) | -0.09 | (-1.02, -0.14)* | -0.21 | (-1.52, -0.80)*** | 0.07 | (0.03, 0.84)* | -0.03 | (-0.50, 0.09) | 0.05 | (-0.13, |
| Ethnicity | 0.11 | (0.40, 1.58)** | -0.008 | (-0.65, 0.51) | 0.01 | (-0.42, 0.55) | -0.03 | (-0.30, 0.76) | 0.03 | (-0.26, 0.66) | 0.14 | (0.8 2.46) |
| Education | 0.03 | (0.40, 1.58) | -0.02 | (-0.65, 0.31) | -0.04 | (-0.66, 0.14) | 0.03 | (-0.63, 0.25) | 0.06 | (-0.08, 0.68) | 0.01 | (-0.56, |
| Nationality | 0.04 | (-0.26, 1.05) | 0.12 | (0.48, 1.77)** | 0.04 | (-0.19, 0.89) | 0.09 | (0.17, 1.35)* | 0.03 | (-0.26, 0.76) | 0.07 | (-0.01, |

Note:
ATSMI-AV = Physical threat, wishful thinking, social concern, categorical thinking, and label avoidance.
Social Tolerance = Contact and support.
*p <.05
**p <.01
***P <.001

BMJ Open

# Stigma among Singaporean Youth: A Cross-sectional Study on Adolescent Attitudes Toward Serious Mental Illness and Social Tolerance in a Multi-ethnic Population.

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# Stigma among Singaporean Youth:

# A Cross-sectional Study on Adolescent Attitudes Toward Serious Mental Illness and Social Tolerance in a

# Multi-ethnic Population.

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**Word Count:** 4960

**Abstract**

Objectives: Stigma against mental illnesses is one of the significant obstacles faced by the mental health service users and providers. It can develop at a young age and is also influenced by culture. Youths in Southeast Asian countries are underrepresented in mental health research, thus this study aims to explore the dimensions of stigma and social tolerance, and examine its correlates in the younger, multi-ethnic population of Singapore.

Design: An online survey collected data with socio-demographic questions, the Attitudes Towards Serious Mental Illness (Adolescent version), Social Tolerance scales and an open text question on words or phrases participants associated with the term "mental illness". Principal components analysis and multiple regression models were conducted to investigate the factor structure of the attitudes and social tolerance scales and their socio-demographic correlates.

Participants: Participants included 940 youths aged 14-18 years old who were residing in Singapore at the time of the survey and were recruited through local schools.

Results: About a quarter of the students (22.6%) reported participating in mental health awareness campaigns while nearly half (44.5%) associated pejorative words and phrases with the term mental illness. The Attitudes Towards Serious Mental Illness (Adolescent version) scale yielded five factors while the Social Tolerance scale yielded two. Ethnicity, gender and nationality were significantly correlated with factors of both scales. Chinese youths showed higher sense of physical threat and lower social tolerance than those of other ethnicities. Females showed more wishful thoughts, social concern and social responsibility towards the mentally ill than males.

Conclusions: The dimensions of stigma and social tolerance are different in Asian cultures compared to Western cultures. Socio-demographic differences in attitudes towards the mentally ill can also be found among youths living in Singapore. Misconceptions and negative attitudes towards mental illness are common and should be addressed in educational campaigns.

**Strengths and limitations of this study**

This study is the first to assess stigma towards the mentally ill in a multi-ethnic sample of youths residing in Singapore.

Students from six schools in four different regions of the country were included in the study.

The study highlights potential misconceptions Southeast Asian youths have about mental illness which should be addressed in awareness programs.

Due to the voluntary nature of the study, the attitudes of non-responders towards mental illness may be different from that of participants and was not captured.

## Introduction

Link and Phelan [1] defined stigma as existing "when elements of labeling, stereotyping, separating, status loss, and discrimination co-occur in a power situation that allows these processes to unfold. Stigma against mental illnesses is one of the significant obstacles faced by mental health service users and providers, and can be described as prejudice and discrimination against individuals with mental illness due to a lack of knowledge, ignorance or misinformation. Negative attitudes also give rise to the desire for social distance, a form of behavioural discrimination which involves reluctance to interact with persons with mental illness [2]. Individuals with mental illness often feel a sense of low self-esteem/well-being as they are rejected and discriminated against by others due to stigma [3]. Accordingly, they are reluctant to be identified as having a mental illness, resulting in high rates of treatment avoidance [4]. Thus, stigma is one of the greatest barriers to seeking treatment for those with mental illness [5].

Negative attitudes towards mental illness are influenced by culture and affect people's behaviour differently depending on their cultural background. Singapore is a multi-ethnic island city-state in Southeast Asia with a population of 5.61 million in 2016. The population comprises of three main ethnic groups, Chinese (74.3%), Malay (13.4%) and Indian (9.1%), while 3.2% belong to other ethnic groups [6]. A nationwide study of the local population in 2009 titled the Singapore Mental Health Study [7] highlighted the significant treatment gap for mental illnesses in Singapore. Only 31.7% of people with mental illness were found to have sought help. For disorder-specific help-seeking, as many as 96.2% of those with alcohol abuse, 90% of those with obsessive compulsive disorder and 59.6% of those with major depressive disorder did not seek help[8].

A follow-up study called the Mind Matters study explored the potential reasons for the large treatment gap [9]. Mind Matters was a nationwide study of mental health literacy conducted in Singapore in 2014 by the Institute of Mental Health with a total sample of 3006 Singapore residents. The findings of this study showed low mental health literacy and high stigma among those aged 18-65 years old. However, the study showed that younger age was associated with better mental health literacy and attitudes towards the mentally ill [10].

While this finding is encouraging, this is not to say that younger people have no stigma towards the mentally ill. Attitudes toward various aspects of mental illness, including its conceptualisation and stigma toward the mentally ill are thought to form at an early age [11]. A review of children's attitudes towards the mentally ill suggested that children start showing stigma as young as the age of 5 years old [12]. The review showed that younger children show negative attitudes and have less sophisticated conceptualizations of mental illness than older children or adolescents. While older children had better understanding of mental illness as emotional and

psychological disturbances, the review suggested that negative attitudes increased with age in both children and adolescents. Studies have also shown that youth are reluctant to interact closely with those with mental illness by indicating desire for social distance [13,14]. Furthermore, a review of the epidemiology of child and adolescent psychiatric disorders reports that many psychiatric disorders can manifest early on in life and negatively affect several aspects of a young person's life [15] including poor well-being, self-esteem, social relationships in and out of school, and academic achievement. Stigma further compounds these problems by reducing well-being and acting as a barrier to help-seeking [16]. Therefore, mental health stigma not only affects adults but affects youths of schooling age during an important phase of development in their life.

Few studies have explored the attitudes of Asian youths living in Asia, with even fewer including Malay and Indian youths. Although previous research has largely focused on youths in Western countries, their findings are limited due to the lack of generalizability to Asian cultures. Asian values of collectivism are associated with higher levels of stigma [17] and cultural factors may affect desire for social distance [18]. Young Asians also live in changing times and cultures and anti-stigma approaches used for adults or Western youths may not be relevant to them. Studies of Chinese youths in Singapore showed that some youths believed in the Asian physiological explanation of mental illness (eg. traditional Chinese beliefs of a body out of balance or harmony) or attributed mental illness to religious and supernatural influences [19]. These beliefs could be related to some youths' preference for seeking help from Traditional Chinese Medicine physicians [20]. Although participants in these studies also showed beliefs in psychological causes of mental illness and preference for seeking help from mental health professionals, the findings suggest that one's cultural background may influence one's views of mental illness. However, stigma and social distance have not been well-studied among youths in Singapore. More importantly, no studies appear to have included youths from the other two main ethnic groups in Singapore - Malay and Indian - and this group is under-represented in mental health literacy research.

Thus, the aims of the current study were to explore the factor structure of two scales measuring youth stigma, the Attitudes Towards Serious Mental Illness - Adolescent Version (ATSMI-AV) scale [21] and Social Tolerance Scale [22]. It also aims to examine their correlates in the younger, multi-ethnic population of Singapore and determine the amount of exposure local youths have to mental health awareness campaigns.

## Methods

*Participants*

Participants were youths aged 14-18 years old residing and studying in Singapore at the time of data collection. The youths were recruited from schools after ethics approval was obtained. Students in grades Secondary 3 to Second Year Junior College (equivalent to grades 9 to 12 of high school in the United States) were included in the study. The inclusion criteria comprised those who were able to literate in English, and were able to use the internet to complete the online survey.

The target sample size was calculated based on Watson et al.'s [21] study where the mean score on the ATSMI-AV ranged from 1.79 to 2.6, with standard deviation ranging from 0.65 to 0.95. In order to reach significance level at $p<.05$, acceptance of margin of error at 0.03 level, and taking into account 25% refusal rate and 15% missing data, the desirable minimum sample size ranged from 666 to 990. Using a conservative estimate, a sample size of 1000 was selected for the study. A total of 1000 responses were recorded on the online survey.

*Procedure*

Ethics approval was obtained from the National Healthcare Group Domain Specific Review Board and the Ministry of Education to approach youths for the study. 10 schools registered with the Ministry of Education were approached using a convenience sampling method and 6 agreed to participate in the study. The participating schools included both single-sex and mixed-sex schools based in the north, north-east, central and south regions of Singapore. Approximately 2500 students were informed of the study via school notification boards, email blasts and presentations at the schools. Written informed consent was obtained from both the participant and their parent/guardian before participants were recruited for the study. Consent forms were distributed to students via the schools so that anonymity and confidentiality were maintained. A link to the online survey was sent to participants via their preferred email address and they were allowed to complete it in their own time in a place that they were comfortable in. Email reminders were sent to participants who had volunteered but not completed the survey and those who completed the survey were reimbursed with SGD$15 iTunes vouchers.

The online survey was designed using the online survey tool, QuestionPro, which allowed the survey to end automatically when the quota of 1000 completed responses was reached. It was launched and completed in 2016 with 1016 surveys started and 1000 surveys completed. The survey consisted of socio-demographic questions as well as scales pertaining to attitudes towards the mentally ill. It also included an open text question where participants could list words or phrases they associated with the term "mental illness"[23]. The survey took 10 to 20 minutes to complete.

*Measures*

Socio-demographic Data

Questions relating to socio-demographic background were included to gather information on age, gender, ethnicity, education level and nationality. Nationality was divided into two groups: Singapore citizens and permanent residents who are defined as citizens of other countries but are permitted to live and work in Singapore.

Attitudes Towards Serious Mental Illness – Adolescent Version Scale (ATSMI-AV [21])

The ATSMI-AV is a validated 21-item self-report scale that measures attitudes towards mental illness. Responses to statements are based on a 5-point Likert scale where 1 indicates "Completely Disagree" and 5 indicates "Completely Agree". The scale explores perceptions of violence, social avoidance, embarrassment if one were diagnosed as having a mental illness and personal invulnerability to mental illness. Previous research identified five factors comprising Threat, Social Control/Concern, Wishful Thinking and Categorical Thinking and Out of Control [21]. A factor-based scale score ranging from 1 to 5 may be calculated for each factor, with higher scores indicating higher levels of stigma towards mental illness. The first factor titled Threat (e.g. "Mentally ill people scare me") refers to the fear of direct harm to oneself or one's reputation due to contact with mentally ill individuals and consists of six items. The second factor titled Social Control/Concern (e.g. "I sometimes worry that I may have a mental illness") consists of 5 items and pertains to concerns about being diagnosed with a mental illness and subsequently labelled by society. The third factor titled Wishful Thinking (e.g. "People who are mentally ill could be well if they tried hard enough") refers to unrealistic thoughts toward recovery from mental illness and consists of four items. In contrast, the fourth factor titled Categorical Thinking (e.g. If you become mentally ill your life is pretty much over") refers to all-or-nothing thought patterns towards the concept of mental illness and consists of four items. The fifth factor titled Out of Control (e.g. "Mentally ill people tend to be more violent than other people") consists of two items and relates to the association between mental illness and deviant behaviour. As the previous study was conducted on a Western population and stigma against mental illness is known to vary across cultures, it was necessary to examine the psychometric properties of the ATSMI-AV in an Asian population.

Social Tolerance scale [22]

The Social Tolerance scale measures social tolerance through desire for social distance (7 items) and social responsibility for mental health issues (4 items). Items are rated on a 5 point scale ranging from "Strongly Agree" to "Strongly Disagree". Higher scores indicate higher levels of stigma towards mental illness. According to the scale developers, the Cronbach's alpha for the scale was 0.87. However, a factor analysis was warranted to verify the factors for the Social Tolerance scale in the present sample.

Words & Phrases Associated with "Mental Illness"

An open text question asked participants to list at least 3 words or phrases that are associated with the term "mental illness". For example, a participant may indicate words/phrases such as, "crazy", "violent" or "very dangerous".

*Analysis*

In total, 1000 responses were recorded in the online survey database of which 940 responses were included for analysis after data cleaning. The 60 excluded cases were removed due to unreliable data such as drop-out/withdrawn cases, pattern answers and duplicate submissions. The survey responses kept for analysis were at least 80% complete. The means and standard deviations were calculated for continuous variables while the frequencies and percentages were calculated for categorical variables. The factor structures of the ATSMI-AV and Social Tolerance scales were examined using exploratory principal component analysis (PCA) with orthogonal, varimax rotation. Exploratory PCA was used as the factors of the ATSMI-AV and Social Tolerance scales have not been adequately analysed across cultures. For example, there was only one study that conducted factor analysis of the ATSMI-AV in a Western population. Thus, exploratory PCA was used to examine the factors of the ATSMI-AV and Social Tolerance scales in a multi-ethnic Asian culture. Factor extraction was assessed based on the following criteria: Kaiser-Meyer-Oklin (KMO) value (>.60), Barlett's Test of Sphericity ($p$ <.001), Kaiser-Guttmann criterion (eigenvalue >1), and factor loadings (>.40).

A series of multiple regression models were performed to examine the socio-demographic (age, gender, ethnicity, education, and nationality) correlates of the ATSMI-AV and Social Tolerance subscales. Data were analysed with the Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc, Chicago, IL, USA) with statistical significance level set at .05 for all procedures. Basic content analysis was used to analyse the qualitative data from the open text question [23]. The data were coded twice by one researcher to identify the common themes.

## Results

The socio-demographic breakdown of the sample is shown in Table 1. The mean age of the sample was 15.9 years (SD = 1.46) and 443 (47.1%) participants were female which is comparable to the overall student population targeted (mean age = 15.15 years, females = 49.2% [24]). Of the 940 students, only 212 (22.6%) said that they had taken part in a mental health awareness event.

When asked to "list words they think of when they hear the words 'Mental Illness'", 418 (44.5%) listed pejorative words and phrases like "crazy", "weird", "scary", "stupid", "should avoid" and "dangerous". Local slangs such as "siao/gila (meaning crazy/insane)" also found. Names of disorders including "anxiety", "OCD" and "schizophrenia" were listed (26%). Sympathy towards the mentally ill such as "pitiful", "sad", "need love/care" were also expressed (25.5%). 40.1% of participants who reported partaking in mental health awareness events listed pejorative words compared to 45.9% of those who had never taken part in mental health awareness events. The top 5 most commonly used words are listed in Table 2.

The first PCA was conducted on the 21-item ATSMI-AV. Results of the PCA with varimax rotation yielded five factors with eigenvalues greater than 1. Two items ("I sometimes worry that I may have a mental illness" and "I don't think that there is any way that I can become mentally ill") were weakly correlated and did not load onto any factors; these were excluded from subsequent analyses. The factorability of the remaining 19-items was supported by KMO value of .82, Barlett's Test of Sphericity ($p$ <.001) and Cronbach's alpha (.78). The five factors accounted for 49.07% of the variance. Question items and corresponding loadings are presented in Table 3.

The four items that loaded onto the first factor were related to the perception that mentally ill individuals are threatening (e.g. Mentally ill people scare me). Thus, the first factor was labelled as "Physical Threat", Cronbach's alpha (.76). Four items loaded onto the second factor labeled "Wishful Thinking", Cronbach's alpha (.73), which was related to unrealistic perceptions about the recovery from mental illness (e.g. People who are mentally ill could be well if they tried hard enough). Four items also loaded onto the third factor, labeled "Categorical Thinking", Cronbach's alpha (.60), which reflected black or white thinking (e.g. If you become mentally ill your life is pretty much over). The three items that loaded onto the fourth factor, "Label Avoidance", Cronbach's alpha (.60), comprised items related to shame towards receiving a mental illness

diagnosis or being associated with mentally ill individuals (e.g. I would be very embarrassed if I were diagnosed as having a mental illness). The final factor had four items which related to social concerns associated with mental illness (e.g. I think that society makes up the diagnosis of mental illness just to control people). Hence, the final factor was labelled as "Social Construction/Concern", Cronbach's alpha (.53).

Responses to the survey questions regarding attitudes towards the mentally ill are shown in Table 4. Of the participants, 29.8% felt "that there really isn't anything called mental illness" and 34.3% believed that there are medications that can help those with mental illness. 7% (n=66) of participants had some missing data in the ATSMI-AV.

The second PCA was conducted on the 11-item Social Tolerance scale. Results of the PCA with varimax rotation yielded two factors with eigenvalues greater than 1. The factorability of the 11-items was supported by KMO value of .86, Barlett's Test of Sphericity ($p$ <.001) and Cronbach's alpha (.83). These two factors accounted for 53.34% of the variance. Question items and corresponding loadings are presented in Table 5.

Six items loaded onto the first factor labelled "Social Distance", Cronbach's alpha (.82), which was related to negative reactions associated with being in close physical proximity with mentally ill individuals (e.g. I would be upset if someone with a mental illness always sat next to me in class) or forming close relationships with mentally ill individuals (e.g. If I knew someone had a mental illness I would not date them). The second factor had five items related to providing social support to mentally ill individuals (e.g. I would visit a classmate in hospital if they had a mental illness). Therefore, the second factor was labelled as "Social Responsibility", Cronbach's alpha (.75). 2.7% (n=25) of participants had missing data for the Social Tolerance Scale.

For the socio-demographic correlates of the ATSMI-AV subscales, only ethnicity was found to be significantly associated with "Physical Threat". Specifically, Chinese students had a higher sense of physical threat than non-Chinese students ($p$ <.01). Gender ($p$ <.05) and nationality ($p$ <.01) were observed to be significantly associated with "Wishful Thinking". Females had more wishful thoughts than males while permanent residents have more wishful thoughts than Singaporeans. Gender ($p$ < .05) and nationality ($p$ <.05) were also found to be significantly associated with "Categorical Thinking"; males endorsed more categorical thoughts than females while permanent residents had more categorical thoughts than Singaporeans. Only gender was significantly associated with "Social Construction/Concern" where females were found to have greater social concerns than males ($p$ <.001). None of the socio-demographic variables were associated with "Label Avoidance".

Table 6 presents the results of the multiple regression analyses for the socio-demographic correlates of ATSMI-AV and Social Tolerance. For the socio-demographic correlates of the Social Tolerance subscales, only ethnicity was found to be significantly associated with "Social Distance". Specifically, Chinese students had lower tolerance for contact with mentally ill individuals compared to non-Chinese students ($p$ <.001). Gender and ethnicity were both observed to be significantly associated with "Social Responsibility"; males ($p$ <.001) and Chinese ($p$ <.01) students had lower tolerance to engage in supportive action towards others with a mental illness compared to females and non-Chinese students respectively.

**Discussion**

Overall, a large proportion of the participants appear to have misconceptions towards mental illness. The PCA of the ATSMI-AV yielded five factors, physical threat, wishful thinking, social concern, label avoidance and categorical thinking. The PCA of the Social Tolerance scales yielded two factors, Social Distance and Social Tolerance though the items in each factor was not exactly the same as that used by Koller et al.[22]. Significant associations were found between subscale factors and socio-demographic factors.

While nearly a quarter were able to volunteer names of mental illnesses (26%) and express sympathy for the mentally ill, negative views were most predominant with almost half the sample (44.5%) associating negative words with mental illness. The proportion of participants who listed negative words was marginally smaller in those who reported attending mental health awareness campaigns (40.1% vs 45.9%). As the exact approach of the campaigns is unclear, further research into the efficacy of youth mental health campaigns is necessary. "Depression/Depressed" was the most commonly listed word (20.2%) which indicates that youths were familiar with depression as a mental illness. The words "crazy" (18.7%), "different" (15.9%) and "weird" (13.1%) were the next most commonly listed words, supporting the notion that youths still make negative associations with mental illness and educational campaigns are needed to address this area. The fifth most listed word was "autism/autistic" (9.9%) which also highlights that youths were familiar with autism as a mental illness.

With negative views of mental illness, it is not surprising that about half of the respondents (46.2%) said they would be embarrassed if they were diagnosed with mental illness. Nearly a quarter (22.7%) said they would not want others to know if they had a mentally ill relative. Around a third (35.1%) also said their friends would see them as weak if they had a mental illness. This suggests that mental illness is seen as a mark of shame among local youths and something that

their peers would stigmatize. This is of concern as fear of stigma is thought to play a key role in the large treatment gap found in the adult population [8], and this could also present as an issue in the youth population. Besides avoiding treatment, youths may also lack social support if they find mental illness to be an embarrassing or taboo topic. This fear of others knowing about one's mental illness may be linked to collectivist Asian values [17] and while changing cultural values is not plausible, changing the view of mental illness as a mark of shame may be important for interventions.

Despite this, more than 80% of students said they would visit a classmate in hospital if they had a mental illness (83.6%), "tell a teacher if a student was being bullied because of their mental illness" (89.6%) and "stick up for someone who had a mental illness if they were being teased" (87.5%). Only 3.5% had the misconception that mental illness is contagious and approximately half (52.1%) were open to volunteering for mental health related causes. While these positive findings are encouraging, there is room for improving mental health knowledge and reducing stigma among youths – possibly with the help of campaigns targeted towards youth that are age and culture appropriate. One review [25] suggests that education-based interventions are more effective in changing attitudes and behaviour in adolescents than contact with a mentally ill person, though both methods have significant effects. In-person contact also appears to be more effective than video contact as the former yields significant changes in both attitude and behavioural intention while the latter only creates change in attitudes. However, considering the conservative local culture of Singapore, gaining participant and/or parental consent for youths to attend interventions with in-person contact may be more challenging than video based contact. In light of these challenges, education followed by video-based contact may be the most practical approach for local mental health awareness campaigns.

To our knowledge, the ATSMI-AV [21] has not been used in the local sample, thus factor analysis was conducted to explore its components. The items that loaded onto Wishful Thinking were identical to those by Watson et al. [21]. Social Construction/ Concern was also the same except for one item "I sometimes worry that I may have a mental illness" which did not load onto any factors in the analysis. Two separate factors were related to threat in the sample (Physical Threat and Label Avoidance) though the items fell under a single overarching factor of Threat by Watson et al. [21]. The remaining items in the Out of Control and Categorical Thinking factors in the study by Watson et al. [21] were combined into one factor in this sample as Categorical thinking.

The factor analysis of the Social Tolerance scale also produced a slightly different factor structure from that suggested by Koller et al. [22]. The authors suggested 7 items for Social Distance and 4 for Social Responsibility. The two factors found in our analysis were similar except for one item ("I would visit a classmate in hospital if they had a mental illness") which loaded onto

the Social Responsibility factor instead of Social Distance, unlike the findings by Koller et al. [22]. This difference in factor structure may be indicative of cultural differences in social norms between Singaporean and Western youth populations, and that social distancing may thus present differently. As the sample largely consists of youths from the main Asian ethnic groups in Singapore (Chinese, Malay and Indian), further research in other Asian samples, including adults, is necessary to investigate if cultural differences are truly present.

In terms of the socio-demographic correlates, ethnicity was correlated with one of the physical threat stigma subscale factors and both subscales for social tolerance. While collectivist Asian values are linked with higher levels of stigma [17], it appears that there are differences between the Asian ethnic groups. Those of Chinese ethnicity felt more Physical Threat, had more desire for Social Distance and less Social Responsibility than those of other ethnicities. Some of these findings are similar to those found in the adult population [10] where Indian and Malay participants scored lower on a Social Distance measure despite having higher personal stigma. Corrigan et al.[26] found that individuals from minority ethnic groups are less likely to support prejudicial attitudes about mental illness. They postulated that this was because people from minority ethnic groups experience mental health stigma more harshly than those [27] in the majority group and appear less likely to endorse prejudice about mental illness [28]. Another possible explanation is the Chinese concept of 'face' which describes a person's moral standing in society. Having mental illness may be a mark of 'losing face' which can greatly affect one's access to social capital and bring shame to oneself and one's family [29]. Although collectivist constructs of 'face' exist in many Asian ethnic groups, some researchers argue that the Singaporean concept of 'face' presents uniquely to the country and that Chinese Singaporeans place more emphasis on 'saving face' than the other ethnic groups despite all participants residing in the same country [30]. Those of Chinese ethnicity may thus feel more threatened by mental illness as a mark of shame, which in turn leads to greater feelings of Physical Threat, more desire for Social Distance and less sense of Social Responsibility towards the mentally ill.

Gender differences were found on three ATSMI-AV subscales and for Social Responsibility. The gender differences for ATSMI-AV subscales in our sample were different to those found by Watson et al. [21]. They found that boys scored higher on Threat, a finding that was not replicated here. However, males in our sample did endorse more Categorical Thinking and Watson et al. [21] had similar findings with males scoring higher on Categorical Thinking, a factor which shared some common scale items. Males also scored lower for Social Responsibility than females, suggesting they were less likely to endorse supportive action towards the mentally ill. Conversely, females showed more Social Concern and Wishful Thinking than males. Ng and Chan's [31] study on Hong Kong secondary school students revealed similar findings with females showing higher benevolence towards the mentally ill and males showing more stereotyping, restrictive, pessimistic and stigmatizing attitudes towards mental illness. Female adults in Singapore also scored lower for stigma in previous nationwide studies [10].

Differences between youths with Singaporean citizenship and permanent residents were also found. Permanent residents endorsed more Wishful Thinking and Categorical Thinking. A possible explanation for this finding could be that permanent residents may constitute a mix of different foreign ethnicities including those of the main Singapore ethnic groups. Thus, permanent residents may be classified as a heterogeneous group but actually have diverse views.

The findings of this study should be considered in light of its limitations. Firstly, the voluntary nature of the study may create bias in the responses as students who refused to participate may hold more prejudicial attitudes towards mental illness. Secondly, despite the anonymous nature of the survey, the participants may have shown social desirability bias when responding to the questions, particularly if they felt that their schools had access to their data.

Despite the limitations, the present study has notable strengths which include the large sample size and inclusion of the different ethnic groups which was absent from previous studies involving Singaporean youths. It is also one of the few, if not the only study thus far to investigate the constructs of mental illness stigma and social distance in youths residing in Singapore. The sample was also similar to the overall target population of school going youth in terms of age and gender and the students were recruited from schools across different regions in the country.

Overall, a significant proportion of youths in Singapore report having little education about mental health which could explain the stigma endorsed by the sample. Future research could use qualitative methods to understand the construct of stigma better in the Asian context, particularly in light of changing values in younger generations. Future studies may also replicate the measures used to evaluate the effectiveness of public education campaigns being rolled out by relevant agencies.

**Footnotes**

**Contributors**

SP and JL are joint first authors. SP, JL, MM and BYC conducted the fieldwork. Analysis was done by JL. SP led the project. SP, MM, BYC, SS, SPL, JAV, EA, DSSF, CSA and MS helped to design and deliver the project. All authors revised and approved the final version of the manuscript.

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**Competing interests**

None declared.

**Data sharing statement**

Additional data are available on request.

## References


1. Link BG, Phelan JC. Conceptualizing Stigma. Annu Rev Sociol. 2001;27:363-385.
2. Link BG, Phelan JC, Bresnaham M, Stueve A, Pescosolido BA. Public conceptions of mental illness: Labels, causes, dangerousness, and social distance. Am J Public Health. 1999;89:1328-1333.
3. Link BG, Struening EL, Neese-Todd S, Asmussen S, Phelan JC. Stigma as a barrier to recovery: The consequences of stigma for the self-esteem of people with mental illnesses. Psychiatr Serv. 2001;52(12):1621-6.
4. Kessler RC, Berglund PA, Bruce ML, Koch JR, Laska EM, Leaf PJ, Manderscheid RW, Rosenheck RA, Walters EE, Wang PS. The prevalence and correlates of untreated serious mental illness. Health Serv Res. 2001;36(6 Pt 1):987-1007.
5. Corrigan P. How stigma interferes with mental health care. Am Psychol. 2004;59(7):614-25.
6. Department of Statistics Singapore, Ministry of Trade & Industry, Republic of Singapore. Population Trends, 2016 [Internet]. Singapore; 2016 [cited 2016 Oct 20] Available from: http://www.singstat.gov.sg/docs/default-source/default-document-library/publications/publications_and_papers/population_and_population_structure/population2016.pdf.
7. Chong SA, Abdin E, Sherbourne C, Vaingankar JA, Heng D, Yap M, Subramaniam M. Treatment gap in common mental disorders: the Singapore Perspective. Epidemiol Psych Sci. 2012;21(2):195-202.
8. Chong SA, Abdin E, Vaingankar JA , Kwok KW, Subramaniam M. Where do People with Mental Disorders in Singapore go to for Help? Ann Acad Med Singap. 2012;41(2):154-60.
9. Chong SA, Abdin E, Picco L, Pang S, Jeyagurunathan A, Vaingankar JA, Kwok KW, Subramaniam M. Recognition of mental disorders among a multiracial population in Southeast Asia. BMC Psychiatry. 2016;16:1-10.
10. Subramaniam M, Abdin E, Picco, L, Pang S, Shafie, S, Vaingankar, JA, Kwok, KW, Verma K, Chong SA. Stigma towards people with mental disorders and its components- a perspective from multi-ethnic Singapore. Epidemiol Psych Sci. 2016;28: 1-12.
11. Link BG. Understanding Labeling Effects in the Area of Mental Disorders: An Assessment of the Effects of Expectations of Rejection. Am Sociol Rev. 1987;52(1):96-112.
12. Wahl OF. Childrens' views of mental illness: A review of the literature. Psychiatr Rehabil Skills. 2003;6:134–158.
13. Wahl O, Susin J, Lax A, Kaplan L, Zatina D. Knowledge and Attitudes About Mental Illness: A Survey of Middle School Students. Psychiatr Serv. 2012;63(7):649-54.

14. Reavley NJ, Jorm AF. Young People's Stigmatizing Attitudes towards People with Mental Disorders: Findings from an Australian National Survey. Aus NZ J Psychiat. 2011;45(12):1033-1039.

15. Costello EJ, Egger H, Angold A. 10-year research update review: the epidemiology of child and adolescent psychiatric disorders: I. Methods and public health burden. J Am Acad Child Psy. 2005;44(1):972-86.

16. Corrigan PW, Watson AC. The Paradox of Self-Stigma and Mental Illness. Clin Psychol- Sci Pr. 2002;9(1):35-53.

17. Papadoulos C, Foster J, Caldwell K. 'Individualism-Collectivism' as an Explanatory Device for Mental Illness Stigma. Community Ment Hlt J. 2013; 49:270.

18. Lauber C, Nordt C, Falcato L, Rössler W. Factors Influencing Social Distance Toward People with Mental Illness. Community Ment Hlt J. 2004;40(3):265-274.

19. Mathews M. Assessment and Comparison of Culturally Based Explanations for Mental Disorder Among Singaporean Chinese Youth. Int J Soc Psychiatr. 2011;57(1):3-17.

20. Lee B. Relationships between adolescents' preferred sources of help and emotional distress, ambivalence over emotional expression, and causal attributions of symptoms: a Singapore study. Brit J Guid Couns. 2008;37:435–457.

21. Watson AC, Miller FE, Lyons JS. Adolescent attitudes towards serious mental illness. J Nerv Ment Dis. 2005;193(11):769-72.

22. Koller M, Chen, S, Heeney B, Potts A, Stuart H. Opening Minds in High School: Durham Talking About Mental Illness (TAMI) In school Activities: Post Summit. Mental Health Commission of Canada [Internet]. Canada: Mental Health Commmission of Canada; 2014 [cited 2016 Nov 20] Available from: http://www.mentalhealthcommission.ca/sites/default/files/Stigma_OM_Durham_TAMI_In_School_Activities_Post%252520Summit_ENG_0_0.pdf

23. Pinfold V, Toulmin H, Thornicroft G, Huxley P, Farmer P, Graham T. Reducing psychiatric stigma and discrimination: evaluation of educational interventions in UK secondary schools. Brit J Psychiat. 2003;182(4):342-346.

24. Ministry of Education, Singapore. Education Statistics Digest, 2016 [Internet]. Singapore; 2016 [cited 2017 May 18] Available from https://www.moe.gov.sg/docs/default-source/document/publications/education-statistics-digest/esd-2016.pdf.

25. Corrigan PW, Morris SB, Michaels, PJ, Rafacz JD, Rusch N. Challenging the Public Stigma of Mental Illness: A Meta-Analysis of Outcome Studies. Psychiatr Serv. 2012;63(10);963-973.

26. Corrigan PW, Edwards AB, Green A, Diwan SL, Penn DL. Prejudice, Social Distance, and Familiarity with Mental Illness. Schizophrenia Bull. 2001;27(2):219-225.

27. Rush L. Affective reactions to multiple social stigmas. J Soc Psychol. 1998;138:421-430.

28. Schnittker J, Freese J, Powell B. Nature, Nurture, Neither, Nor: Black-White Differences in Beliefs about the Causes and Appropriate Treatment of Mental Illness. Soc Forces. 2000;78(3):1101-1132.

29. Yang LJ, Kleinman A. 'Face' and the Embodiment of Stigma in China: The Cases of Schizophrenia and AIDS. Soc Sci Med. 2008;67(3):398-408.

30. Lim JYT. Faces of Singapore & Mediation. In: Lee J, Lim M, Phua JH, editors. Contemporary Issues in Mediation Volume 1. Singapore: World Scientific Publishing Co. Pte. Ltd; 2016. p. 59-72.

31. Ng P, Chan KF. Sex differences in opinion towards mental illness of secondary school students in Hong Kong. Int J Soc Psychiatr. 2000;46(2):79-88.

| TABLE 1. Sociodemographic breakdown of sample (N=940) | | |
|---|---|---|
| | N | % |
| Mean age in years | 15.9 (SD = 1.46) | |
| Females | 443 | 47.1% |
| Males | 497 | 52.9% |
| Nationality | | |
| Singaporean Citizen | 805 | 85.6% |
| Permanent Resident | 135 | 14.4% |
| Ethnicity | | |
| Chinese | 773 | 82.2% |
| Malay | 41 | 4.4% |
| Indian | 75 | 8.0% |
| Other | 51 | 5.4% |

| TABLE 2. Frequency of the top 5 most common words associated with the term "mental illness" | | |
|---|---|---|
| | N | % |
| Depression/Depressed | 190 | 20.2 |
| Crazy | 176 | 18.7% |
| Different | 149 | 15.9% |
| Weird | 123 | 13.1% |
| Autism/Autistic | 93 | 9.9% |

TABLE 3. Results of the Principal Components Analysis with Varimax Rotation for ATSMI-AV

| | Loadings | | | | |
|---|---|---|---|---|---|
| Factor and scale item | 1: Physical Threat | 2: Wishful Thinking | 3: Categorical Thinking | 4: Label Avoidance | 5: Social Construction/Concern |
| Mentally ill people scare me. | .79 | | | | |
| I would cross the street if I saw a mentally ill person coming in order to avoid passing him/her. | .78 | | | | |
| I think that mentally ill people are strange and weird. | .73 | | | | |
| I can't see myself hanging out with a mentally ill person. | .50 | | | | |
| Mentally ill people can get well if they are treated with love and kindness. | | .74 | | | |
| There are medications now that can cure mental illness. | | .66 | | | |
| People who are mentally ill could be well if they tried hard enough. | | .75 | | | |
| If a relative of mine became mentally ill, I know that I could convince them to get well. | | .75 | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mentally ill people are easy to spot. | | | .65 | | |
| Eating the wrong things or taking drugs can make you mentally ill. | | | .64 | | |
| Mentally ill people tend to be more violent than other people. | | | .62 | | |
| If you become mentally ill your life is pretty much over. | | | .58 | | |
| If I had a mentally ill relative, I wouldn't want anyone to know. | | | | .63 | |
| Most of my friends would see me as being weak if they thought that I had a mental illness. | | | | .75 | |
| I would be very embarrassed if I were diagnosed as having a mental illness. | | | | .72 | |
| I think that society makes up the diagnosis of mental illness just to control people. | | | | | .76 |
| Schools and parents are mostly responsible for making people mentally ill. | | | | | .64 |
| I think that there really isn't anything called mental illness; some people are just different. | | | | | .58 |
| I think that you could catch mental illness from another person. | | | | | .41 |
| Eigen values | 2.39 | 2.34 | 2.0 | 1.85 | 1.77 |
| % of variance | 11.40 | 11.15 | 9.31 | 8.79 | 8.42 |

| TABLE 4. Proportion of students who replied "Agree or Strongly Agree" to survey items | | |
|---|---|---|
| | N | % |
| If I had a mentally ill relative, I wouldn't want anyone to know. | 213 | 22.7 |
| Most of my friends would see me as being weak if they thought that I had a mental illness. | 330 | 35.1 |
| I would be very embarrassed if I were diagnosed as having a mental illness. | 434 | 46.2 |
| Mentally ill people scare me. | 211 | 22.5 |
| I would cross the street if I saw a mentally ill person coming in order to avoid passing him/ her. | 126 | 13.4 |
| Think that mentally ill people are strange and weird. | 132 | 14 |
| I think that there really isn't anything called mental illness; some people are just different. | 280 | 29.8 |
| Schools and parents are mostly responsible for making people mentally ill. | 169 | 18 |
| I think that society makes up the diagnosis of mental illness just to control people. | 98 | 10.4 |
| I think that you could catch mental illness from another person. | 33 | 3.5 |
| I sometimes worry that I may have a mental illness. | 330 | 35.1 |
| Mentally ill people can get well if they are treated with love and kindness. | 586 | 62.3 |
| There are medications now that can cure mental illness. | 322 | 34.3 |
| People who are mentally ill could be well if they tried hard enough. | 315 | 33.5 |
| If a relative of mine became mentally ill, I know that I could convince them to get well. | 265 | 28.2 |
| I can't see myself hanging out with a mentally ill person. | 191 | 20.3 |
| Mentally ill people are easy to spot. | 186 | 19.8 |
| If you become mentally ill your life is pretty much over. | 103 | 11 |

| | | |
|---|---|---|
| I don't think there is any way that I can become mentally ill. | 122 | 13 |
| Eating the wrong things or taking drugs can make you mentally ill. | 283 | 30.1 |
| Mentally ill people tend to be more violent than other people. | 224 | 23.8 |
| I would be upset if someone with a mental illness always set next to me in class. | 137 | 14.6 |
| I would not be close friends with someone I knew had a mental illness. | 140 | 14.9 |
| I would visit a classmate in hospital if they had a mental illness. | 786 | 83.6 |
| I would try to avoid someone with a mental illness. | 149 | 15.9 |
| I would not mind it if someone with a mental illness lived next door to me. | 604 | 64.3 |
| If I knew someone had a mental illness I would not date them. | 366 | 38.9 |
| I would not want to be taught by a teacher who had been treated for a mental illness. | 150 | 16 |
| I would tell a teacher if a student was being bullied because of their mental illness. | 842 | 89.6 |
| I would stick up for someone who had a mental illness if they were being teased. | 822 | 87.5 |
| I would tutor a classmate who got behind on their studies because of their mental illness. | 736 | 78.3 |
| I would volunteer my time to work in a program for people with a mental illness. | 490 | 52.1 |

TABLE 5. Results of the Principal Components Analysis with Varimax Rotation for Social Tolerance scale

| | Loadings |
|---|---|

| | | |
|---|---|---|
| Factor and scale item | 1: Social Distance | 2: Social Responsibility |
| I would be upset if someone with a mental illness always sat next to me in class. | .79 | |
| I would not be close friends with someone I knew had a mental illness. | .78 | |
| I would try to avoid someone with a mental illness. | .77 | |
| If I knew someone had a mental illness I would not date them. | .74 | |
| I would not want to be taught by a teacher who had been treated for a mental illness. | .61 | |
| I would not mind it if someone with a mental illness lived next door to me. | .51 | |
| I would stick up for someone who had a mental illness if they were being teased. | | .81 |
| I would tell a teacher if a student was being bullied because of their mental illness. | | .80 |
| I would tutor a classmate who got behind in their studies because of their mental illness. | | .70 |
| I would visit a classmate in hospital if they had a mental illness. | | .58 |
| I would volunteer my time to work in a program for people with a mental illness. | | .50 |
| Eigen values | 3.28 | 2.58 |
| % of variance | 29.85 | 23.49 |

TABLE 6. Socio-demographic correlates of ATSMI-AV and Social Tolerance

| | Physical Threat | | Wishful Thinking | | Social Construction/Concern | | Categorical Thinking | | Label Avoidance | | Contact | | Support | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI |
| Age | 0.08 | (-0.05, 0.27) | 0.03 | (-0.08, 0.23) | -0.01 | (-0.15, 0.11) | 0.02 | (-0.11, 0.18) | -0.02 | (-0.16, 0.09) | 0.001 | (-0.22, 0.22) | -0.05 | (-0.23, 0.05) |
| Gender | 0.05 | (-0.37, 0.52) | -0.09 | (-1.02, -0.14)* | -0.21 | (-1.52, -0.80)*** | 0.07 | (0.03, 0.84)* | -0.03 | (-0.50, 0.09) | 0.05 | (-0.13, 1.08) | 0.16 | (0.57, 1.35)*** |
| Ethnicity | 0.11 | (0.40, 1.58)** | -0.008 | (-0.65, 0.51) | 0.01 | (-0.42, 0.55) | -0.03 | (-0.30, 0.76) | 0.03 | (-0.26, 0.66) | 0.14 | (0.85, 2.46)*** | 0.10 | (0.28, 1.31)** |
| Education | 0.03 | (0.40, 1.58) | -0.02 | (-0.65, 0.31) | -0.04 | (-0.66, 0.14) | 0.03 | (-0.63, 0.25) | 0.06 | (-0.08, 0.68) | 0.01 | (-0.56, 0.77) | 0.01 | (-0.38, 0.47) |
| Nationality | 0.04 | (-0.26, 1.05) | 0.12 | (0.48, 1.77)** | 0.04 | (-0.19, 0.89) | 0.09 | (0.17, 1.35)* | 0.03 | (-0.26, 0.76) | 0.07 | (-0.01, 1.79) | 0.007 | (-0.52, 0.63) |

Note:

ATSMI-AV = Physical threat, wishful thinking, social concern, categorical thinking, and label avoidance.

Social Tolerance = Contact and support.

*p <.05

**p <.01

***P <.001

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

| | Item No | Recommendation |
|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract<br>**Completed: Page 1.** |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found<br>**Completed: Page 2.** |
| **Introduction** | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported<br>**Completed: Page 4-5.** |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses<br>**Completed: Page 5.** |
| **Methods** | | |
| Study design | 4 | Present key elements of study design early in the paper<br>**Completed: Page 1 in Title and Page 5 after Introduction.** |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection<br>**Completed: Page 5-6.** |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants<br>**Completed: Page 5.** |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable<br>**Completed: Page 6 under Measures.** |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group<br>**Completed: Page 6 under Measures.** |
| Bias | 9 | Describe any efforts to address potential sources of bias<br>**Completed: Page 5-6 under Procedure.** |
| Study size | 10 | Explain how the study size was arrived at<br>**Completed: Page 5 under Participants.** |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why<br>**Completed: Page 7 under Analysis.** |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding<br>**Completed: Page 7 under Analysis.** |
| | | (*b*) Describe any methods used to examine subgroups and interactions<br>**Completed: Page 7 under Analysis.** |
| | | (*c*) Explain how missing data were addressed<br>**Completed: Page 7 under Analysis.** |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy<br>**N/A** |
| | | (*e*) Describe any sensitivity analyses<br>**N/A** |
| **Results** | | |

| | | |
|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed<br>**Completed: Page 7.** |
| | | (b) Give reasons for non-participation at each stage<br>**Completed: Page 7 reasons for exclusion were added to manuscript.** |
| | | (c) Consider use of a flow diagram<br>**N/A** |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders<br>**Completed: Page 7.** |
| | | (b) Indicate number of participants with missing data for each variable of interest<br>**Completed: Page 8.** |
| Outcome data | 15* | Report numbers of outcome events or summary measures<br>**Completed: Page 7-8** |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included<br>**Completed: Page 7-8** |
| | | (*b*) Report category boundaries when continuous variables were categorized<br>**N/A** |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period<br>**N/A** |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses<br>**Completed: Page 7-8** |
| **Discussion** | | |
| Key results | 18 | Summarise key results with reference to study objectives<br>**Completed: Page 8-9.** |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias<br>**Completed: Page 11.** |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence<br>**Completed: Page 11.** |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results |
| **Other information** | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based<br>**Completed: Page 12.** |

*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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# Stigma among Singaporean Youth:

# A Cross-sectional Study on Adolescent Attitudes Toward Serious Mental Illness and Social Tolerance in a

# Multi-ethnic Population.

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**Abstract**

Objectives: Stigma against mental illnesses is one of the significant obstacles faced by mental health service users and providers. It can develop at a young age and is also influenced by culture. Youths in Southeast Asian countries are under-represented in mental health research, thus this study aims to explore the dimensions of stigma and social tolerance, and examine its correlates in the younger, multi-ethnic population of Singapore.

Design: An online survey collected data with socio-demographic questions, the Attitudes Towards Serious Mental Illness (Adolescent version) scale, Social Tolerance scales and an open text question on words or phrases participants associated with the term "mental illness". Principal components analysis and multiple regression models were conducted to investigate the factor structure of the attitudes and social tolerance scales and their socio-demographic correlates.

Participants: Participants included 940 youths aged 14-18 years old who were residing in Singapore at the time of the survey and were recruited through local schools.

Results: About a quarter of the students (22.6%) reported participating in mental health awareness campaigns while nearly half (44.5%) associated pejorative words and phrases with the term mental illness. The Attitudes Towards Serious Mental Illness (Adolescent version) scale yielded five factors while the Social Tolerance scale yielded two. Ethnicity, gender and nationality were significantly correlated with factors of both scales. Chinese youths showed higher sense of physical threat and lower social tolerance than those of other ethnicities. Females showed more wishful thoughts, social concern and social responsibility towards the mentally ill than males.

Conclusions: The dimensions of stigma and social tolerance are different in Asian cultures compared to Western cultures. Socio-demographic differences in attitudes towards the mentally ill were found among youths living in Singapore. Misconceptions and negative attitudes towards mental illness are common, demonstrating a clear need for effective stigma reduction campaigns.

**Strengths and limitations of this study**

This study is the first to assess stigma towards the mentally ill in a multi-ethnic sample of youths residing in Singapore.

Students from six schools in three different regions of the country were included in the study.

The study highlights potential misconceptions Southeast Asian youths have about mental illness which should be addressed in mental health awareness programs.

Due to the voluntary nature of the study, the attitudes of non-responders towards mental illness may be different from that of participants and was not captured.

## Introduction

Link and Phelan [1] defined stigma as existing "when elements of labeling, stereotyping, separating, status loss, and discrimination co-occur in a power situation that allows these processes to unfold". Stigma against mental illnesses is one of the significant obstacles faced by mental health service users and providers, and can be described as prejudice and discrimination against individuals with mental illness due to a lack of knowledge, ignorance or misinformation. Negative attitudes also give rise to the desire for social distance, a form of behavioural discrimination which involves reluctance to interact with persons with mental illness [2]. Individuals with mental illness often feel a sense of low self-esteem/well-being as they are rejected and discriminated against by others due to stigma [3]. Accordingly, they are reluctant to be identified as having a mental illness, resulting in high rates of treatment avoidance [4]. Thus, stigma is one of the greatest barriers to seeking treatment for those with mental illness [5].

Negative attitudes towards mental illness are influenced by culture and affect people's behaviour differently depending on their cultural background. Singapore is a multi-ethnic island city-state in Southeast Asia with a population of 5.61 million in 2016. The population comprises of three main ethnic groups, Chinese (74.3%), Malay (13.4%) and Indian (9.1%), while 3.2% belong to other ethnic groups [6]. A nationwide study of the local population in 2009 titled the Singapore Mental Health Study [7] highlighted the significant treatment gap for mental illnesses in Singapore. Only 31.7% of people with mental illness were found to have sought help. For disorder-specific help-seeking, as many as 96.2% of those with alcohol abuse, 90% of those with obsessive compulsive disorder and 59.6% of those with major depressive disorder did not seek help[8].

A follow-up study called the Mind Matters study explored the potential reasons for the large treatment gap [9]. Mind Matters was a nationwide study of mental health literacy conducted in Singapore in 2014 by the Institute of Mental Health with a total sample of 3006 Singapore residents. The findings of this study showed low mental health literacy and high stigma among those aged 18-65 years old. However, the study showed that younger age was associated with better mental health literacy and attitudes towards the mentally ill [10].

While this finding is encouraging, this is not to say that younger people have no stigma towards the mentally ill. Attitudes toward various aspects of mental illness, including its conceptualisation and stigma toward the mentally ill are thought to form at an early age [11]. A review of children's attitudes towards the mentally ill suggested that children start showing stigma as young as the age of 5 years old [12]. The review showed that younger children show negative attitudes and have less sophisticated conceptualizations of mental illness than older children or adolescents. While older children had better understanding of mental illness as emotional and

psychological disturbances, the review suggested that negative attitudes increased with age in both children and adolescents. Studies have also shown that youth are reluctant to interact closely with those with mental illness by indicating desire for social distance [13,14]. Furthermore, a review of the epidemiology of child and adolescent psychiatric disorders reports that many psychiatric disorders can manifest early on in life and negatively affect several aspects of a young person's life [15] including poor well-being, self-esteem, social relationships in and out of school, and academic achievement. Stigma further compounds these problems by reducing well-being and acting as a barrier to help-seeking [16]. Therefore, mental health stigma not only affects adults but affects youths of schooling age during an important phase of development in their life.

Few studies have explored the attitudes of Asian youths living in Asia, with even fewer including Malay and Indian youths. Although previous research has largely focused on youths in Western countries, their findings are limited due to the lack of generalizability to Asian cultures. Asian values of collectivism are associated with higher levels of stigma [17] and cultural factors may affect desire for social distance [18]. Young Asians also live in changing times and cultures and anti-stigma approaches used for adults or Western youths may not be relevant to them. Studies of Chinese youths in Singapore showed that some youths believed in the Asian physiological explanation of mental illness (eg. traditional Chinese beliefs of a body out of balance or harmony) or attributed mental illness to religious and supernatural influences [19]. These beliefs could be related to some youths' preference for seeking help from Traditional Chinese Medicine physicians [20]. Although participants in these studies also showed beliefs in psychological causes of mental illness and preference for seeking help from mental health professionals, the findings suggest that one's cultural background may influence one's views of mental illness. However, stigma and social distance have not been well-studied among youths in Singapore. More importantly, no studies appear to have included youths from the other two main ethnic groups in Singapore - Malay and Indian - and they are under-represented in mental health literacy research.

Thus, the aims of the current study were to explore the factor structure of two scales measuring youth stigma, the Attitudes Towards Serious Mental Illness - Adolescent Version (ATSMI-AV) scale [21] and the Social Tolerance Scale [22]. It also aims to examine their correlates in the younger, multi-ethnic population of Singapore and determine the amount of exposure local youths have to mental health awareness campaigns.

## Methods

*Participants*

Participants were youths aged 14-18 years old residing and studying in Singapore at the time of data collection. The youths were recruited from schools after ethics approval was obtained. Students in grades Secondary 3 to Second Year Junior College (equivalent to grades 9 to 12 of high school in the United States) were included in the study. The inclusion criteria comprised those who were literate in English, and were able to use the internet to complete the online survey.

The target sample size was calculated based on Watson et al.'s [21] study where the mean score on the ATSMI-AV ranged from 1.79 to 2.6, with standard deviation ranging from 0.65 to 0.95. In order to reach significance level at $p<.05$, acceptance of margin of error at 0.03 level, and taking into account 25% refusal rate and 15% missing data, the desirable minimum sample size ranged from 666 to 990. Using a conservative estimate, a sample size of 1000 was selected for the study. A total of 1000 responses were recorded on the online survey.

*Procedure*

Ethics approval was obtained from the National Healthcare Group Domain Specific Review Board and the Ministry of Education to approach youths for the study. 10 schools registered with the Ministry of Education were approached using a convenience sampling method and 6 agreed to participate in the study. The participating schools included both single-sex and mixed-sex schools based in the North, North-East and Central Regions of Singapore, and were a mix of government run, government-aided and independent schools. In order to reach our target age group, the schools involved were secondary schools (secondary 3-5; 14-17 years old) and junior colleges (17-18 years old). Of the participating schools in the North Region, one was a mixed-sex junior college (government-run) and one a mixed-sex secondary school (government-run). The participating North-East schools comprised one girls' secondary school (government-aided, autonomous) and one mixed-sex secondary school (government-run). In the Central Region were one girls' secondary school (independent) and one mixed-level school comprising both a boys' secondary school and mixed-sex junior college (independent) in the southern area. Approximately 2500 students were informed of the study via school notification boards, email blasts and presentations at the schools. Written informed consent was obtained from both the participant and their parent/guardian before participants were recruited for the study. Consent forms were distributed to students via the schools so that anonymity and confidentiality were maintained. A link to the online survey was sent to participants via their preferred email address and they were allowed to complete it in their own time in a place that they were comfortable in. Email reminders were sent to participants who had volunteered but not completed the survey and those who completed the survey were reimbursed with SGD$15 iTunes vouchers.

The online survey was designed using the online survey tool, QuestionPro, which allowed the survey to end automatically when the quota of 1000 completed responses was reached. It was launched and completed in 2016 with 1016 surveys started and 1000 surveys completed. The

survey consisted of socio-demographic questions as well as scales pertaining to attitudes towards the mentally ill. It also included an open text question where participants could list words or phrases they associated with the term "mental illness"[23]. The survey took 10 to 20 minutes to complete.

*Measures*

Socio-demographic Data

Questions relating to socio-demographic background were included to gather information on age, gender, ethnicity, education level and nationality. Nationality was divided into two groups: Singapore citizens and permanent residents who are defined as citizens of other countries but are permitted to live and work in Singapore.

Attitudes Towards Serious Mental Illness – Adolescent Version Scale (ATSMI-AV [21])

The ATSMI-AV is a validated 21-item self-report scale that measures attitudes towards mental illness. Responses to statements are based on a 5-point Likert scale where 1 indicates "Completely Disagree" and 5 indicates "Completely Agree". The scale explores perceptions of violence, social avoidance, embarrassment if one were diagnosed as having a mental illness and personal invulnerability to mental illness. Previous research identified five factors comprising Threat, Social Control/Concern, Wishful Thinking and Categorical Thinking and Out of Control [21]. A factor-based scale score ranging from 1 to 5 may be calculated for each factor, with higher scores indicating higher levels of stigma towards mental illness. The first factor titled Threat (e.g. "Mentally ill people scare me") refers to the fear of direct harm to oneself or one's reputation due to contact with mentally ill individuals and consists of six items. The second factor titled Social Control/Concern (e.g. "I sometimes worry that I may have a mental illness") consists of five items and pertains to concerns about being diagnosed with a mental illness and subsequently labelled by society. The third factor titled Wishful Thinking (e.g. "People who are mentally ill could be well if they tried hard enough") refers to unrealistic thoughts toward recovery from mental illness and consists of four items. In contrast, the fourth factor titled Categorical Thinking (e.g. If you become mentally ill your life is pretty much over") refers to all-or-nothing thought patterns towards the concept of mental illness and consists of four items. The fifth factor titled Out of Control (e.g. "Mentally ill people tend to be more violent than other people") consists of two items and relates to the association between mental illness and deviant behaviour. As the previous study was

conducted on a Western population and stigma against mental illness is known to vary across cultures, it was necessary to examine the psychometric properties of the ATSMI-AV in an Asian population.

Social Tolerance scale [22]

The Social Tolerance scale measures social tolerance through desire for social distance (7 items) and social responsibility for mental health issues (4 items). Items are rated on a 5 point scale ranging from "Strongly Agree" to "Strongly Disagree". Higher scores indicate higher levels of stigma towards mental illness. According to the scale developers, the Cronbach's alpha for the scale was 0.87. However, a factor analysis was warranted to verify the factors for the Social Tolerance scale in the present sample.

Words & Phrases Associated with "Mental Illness"

An open text question asked participants to list at least 3 words or phrases that are associated with the term "mental illness". For example, a participant may indicate words/phrases such as, "crazy", "violent" or "very dangerous".

*Analysis*

In total, 1000 responses were recorded in the online survey database of which 940 responses were included for analysis after data cleaning. The 60 excluded cases were removed due to unreliable data such as drop-out/withdrawn cases, pattern answers and duplicate submissions. The survey responses kept for analysis were at least 80% complete. The means and standard deviations were calculated for continuous variables while the frequencies and percentages were calculated for categorical variables. The factor structures of the ATSMI-AV and Social Tolerance scales were examined using exploratory principal component analysis (PCA) with orthogonal, varimax rotation. Exploratory PCA was used as the factors of the ATSMI-AV and Social Tolerance scales have not been adequately analysed across cultures. For example, there was only one study that conducted factor analysis of the ATSMI-AV in a Western population. Thus, exploratory PCA was used to examine the factors of the ATSMI-AV and Social Tolerance scales in a multi-ethnic Asian culture. Factor extraction was assessed based on the following criteria: Kaiser-Meyer-Oklin (KMO) value (>.60), Barlett's Test of Sphericity ($p$ <.001), Kaiser-Guttmann criterion (eigenvalue >1), and factor loadings (>.40).

A series of multiple regression models were performed to examine the socio-demographic (age, gender, ethnicity, education, and nationality) correlates of the ATSMI-AV and Social Tolerance subscales. Data were analysed with the Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc, Chicago, IL, USA) with statistical significance level set at .05 for all procedures. Basic content analysis was used to analyse the qualitative data from the open text question [23]. The data were coded twice by one researcher to identify the common themes. A chi-square test was used to examine the relationship between self-reported exposure to mental health awareness events and endorsement of the different qualitative themes.

**Results**

The socio-demographic breakdown of the sample is shown in Table 1. The mean age of the sample was 15.9 years (SD = 1.46) and 443 (47.1%) participants were female which is comparable to the overall student population targeted (mean age = 15.15 years, females = 49.2% [24]). Of the 940 students, only 212 (22.6%) said that they had taken part in a mental health awareness event.

Analysis of the qualitative data gathered from participants asked to "list words they think of when they hear the words 'Mental Illness'" yielded three main themes: 1) pejorative associations; 2) names of disorders; and 3) sympathy. 418 (44.5%) respondents listed at least one pejorative word or phrase such as "crazy", "weird", "scary", "stupid", "should avoid" and "dangerous". Local slangs such as "siao/gila (meaning crazy/insane)" were also found. Names of disorders including "anxiety", "OCD" and "schizophrenia" were listed (26%). Sympathy towards the mentally ill such as "pitiful", "sad", "need love/care" were also expressed (25.5%). The top 5 most commonly used words are listed in Table 2. No significant differences in the types of words listed were found between participants who self-reported partaking in mental health awareness events and those who did not. The groups did not differ in pejorative associations (40.1% vs 45.9%, $\chi^2(1)= 2.25$, p= 0.13), naming mental illnesses (23.6% vs 26.8%, $\chi^2(1)= 0.89$, p= 0.35), or in expressing sympathy (24.5% vs 25.8%, $\chi^2(1)= 0.15$, p= 0.70).

The first PCA was conducted on the 21-item ATSMI-AV. Results of the PCA with varimax rotation yielded five factors with eigenvalues greater than 1. Two items ("I sometimes worry that I may have a mental illness" and "I don't think that there is any way that I can become mentally ill") were weakly correlated and did not load onto any factors; these were excluded from subsequent analyses. The factorability of the remaining 19-items was supported by KMO value of .82, Barlett's Test of Sphericity ($p$ <.001) and Cronbach's alpha (.78). The five factors accounted for 49.07% of the variance. Question items and corresponding loadings are presented in Table 3.

The four items that loaded onto the first factor were related to the perception that mentally ill individuals are threatening (e.g. Mentally ill people scare me). Thus, the first factor was labelled as "Physical Threat", Cronbach's alpha (.76). Four items loaded onto the second factor labeled "Wishful Thinking", Cronbach's alpha (.73), which was related to unrealistic perceptions about the recovery from mental illness (e.g. People who are mentally ill could be well if they tried hard enough). Four items also loaded onto the third factor, labeled "Categorical Thinking", Cronbach's alpha (.60), which reflected black or white thinking (e.g. If you become mentally ill your life is pretty much over). The three items that loaded onto the fourth factor, "Label Avoidance", Cronbach's alpha (.60), comprised items related to shame towards receiving a mental illness diagnosis or being associated with mentally ill individuals (e.g. I would be very embarrassed if I were diagnosed as having a mental illness). The final factor had four items which related to social concerns associated with mental illness (e.g. I think that society makes up the diagnosis of mental illness just to control people). Hence, the final factor was labelled as "Social Construction/Concern", Cronbach's alpha (.53).

Responses to the survey questions regarding attitudes towards the mentally ill are shown in Table 4. Of the participants, 29.8% felt "that there really isn't anything called mental illness" and 34.3% believed that there are medications that can help those with mental illness. 7% (n=66) of participants had some missing data in the ATSMI-AV.

The second PCA was conducted on the 11-item Social Tolerance scale. Results of the PCA with varimax rotation yielded two factors with eigenvalues greater than 1. The factorability of the 11-items was supported by KMO value of .86, Barlett's Test of Sphericity ($p$ <.001) and Cronbach's alpha (.83). These two factors accounted for 53.34% of the variance. Question items and corresponding loadings are presented in Table 5.

Six items loaded onto the first factor labelled "Social Distance", Cronbach's alpha (.82), which was related to negative reactions associated with being in close physical proximity with mentally ill individuals (e.g. I would be upset if someone with a mental illness always sat next to me in class) or forming close relationships with mentally ill individuals (e.g. If I knew someone had a mental illness I would not date them). The second factor had five items related to providing social support to mentally ill individuals (e.g. I would visit a classmate in hospital if they had a mental illness). Therefore, the second factor was labelled as "Social Responsibility", Cronbach's alpha (.75). 2.7% (n=25) of participants had missing data for the Social Tolerance Scale.

For the socio-demographic correlates of the ATSMI-AV subscales, only ethnicity was found to be significantly associated with "Physical Threat". Specifically, Chinese students had a higher sense of physical threat than non-Chinese students ($p$ <.01). Gender ($p$ <.05) and nationality ($p$ <.01) were observed to be significantly associated with "Wishful Thinking". Females had more wishful thoughts than males while permanent residents have more wishful thoughts than Singaporeans. Gender ($p$ < .05) and nationality ($p$ <.05) were also found to be significantly associated with "Categorical Thinking"; males endorsed more categorical thoughts than females while permanent residents had more categorical thoughts than Singaporeans. Only gender was significantly associated with "Social Construction/Concern" where females were found to have greater social concerns than males ($p$ <.001). None of the socio-demographic variables were associated with "Label Avoidance".

Table 6 presents the results of the multiple regression analyses for the socio-demographic correlates of ATSMI-AV and Social Tolerance. For the socio-demographic correlates of the Social Tolerance subscales, only ethnicity was found to be significantly associated with "Social Distance". Specifically, Chinese students had lower tolerance for contact with mentally ill individuals compared to non-Chinese students ($p$ <.001). Gender and ethnicity were both observed to be significantly associated with "Social Responsibility"; males ($p$ <.001) and Chinese ($p$ <.01) students had lower tolerance to engage in supportive action towards others with a mental illness compared to females and non-Chinese students respectively.

## Discussion

Overall, a large proportion of the participants appear to have misconceptions towards mental illness. The PCA of the ATSMI-AV yielded five factors, physical threat, wishful thinking, social concern, label avoidance and categorical thinking. The PCA of the Social Tolerance scales yielded two factors, Social Distance and Social Tolerance though the items in each factor was not exactly the same as that used by Koller et al.[22]. Significant associations were found between subscale factors and socio-demographic factors.

While nearly a quarter were able to volunteer names of mental illnesses (26%) and express sympathy for the mentally ill, negative views were most predominant with almost half the sample (44.5%) associating negative words with mental illness. The proportion of participants who listed negative words was marginally smaller in those who reported attending mental health awareness campaigns (40.1% vs 45.9%) but the differences in pejorative associations, naming of mental illnesses and expressing sympathy were not statistically significant. As it is unclear what kinds of mental health awareness campaigns were attended by self-reported attendees, further research into the efficacy of youth mental health campaigns is necessary. "Depression/Depressed" was the

most commonly listed word (20.2%) which indicates that youths were familiar with depression as a mental illness. The words "crazy" (18.7%), "different" (15.9%) and "weird" (13.1%) were the next most commonly listed words, supporting the notion that youths still make negative associations with mental illness and educational campaigns are needed to address this area. The fifth most listed word was "autism/autistic" (9.9%) which also highlights that youths were familiar with autism as a mental illness.

With negative views of mental illness, it is not surprising that about half of the respondents (46.2%) said they would be embarrassed if they were diagnosed with mental illness. Nearly a quarter (22.7%) said they would not want others to know if they had a mentally ill relative. Around a third (35.1%) also said their friends would see them as weak if they had a mental illness. This suggests that mental illness is seen as a mark of shame among local youths and something that their peers would stigmatize. This is of concern as fear of stigma is thought to play a key role in the large treatment gap found in the adult population [8], and this could also present as an issue in the youth population. Besides avoiding treatment, youths may also lack social support if they find mental illness to be an embarrassing or taboo topic. This fear of others knowing about one's mental illness may be linked to collectivist Asian values [17] and while changing cultural values is not plausible, changing the view of mental illness as a mark of shame may be important for interventions.

Despite this, more than 80% of students said they would visit a classmate in hospital if they had a mental illness (83.6%), "tell a teacher if a student was being bullied because of their mental illness" (89.6%) and "stick up for someone who had a mental illness if they were being teased" (87.5%). Only 3.5% had the misconception that mental illness is contagious and approximately half (52.1%) were open to volunteering for mental health related causes. While these positive findings are encouraging, there is room for improving mental health knowledge and reducing stigma among youths – possibly with the help of campaigns targeted towards youth that are age and culture appropriate.

A review by Corrigan et al. [25] suggests that education-based interventions are more effective in changing attitudes and behaviour in adolescents than contact with a mentally ill person, though both methods have significant effects. In-person contact appears to be more effective than video contact as the former yields significant changes in both attitude and behavioural intention while the latter only creates change in attitudes. However, this difference may be negligible as another review by Mehta et al. [26] suggests that social contact in interventions only affect short-term outcomes and show little to no effect in the mid- or long-term. The review found that mental health awareness interventions generally had a medium-sized effect on knowledge outcomes (range 0.51 to 11.77) and a small effect on attitudinal outcomes (range -0.17 to -0.45) in the mid- to long-term [26]. Considering the conservative local culture of Singapore, gaining

participant and/or parental consent for youths to attend interventions with social contact may be challenging. In light of these challenges and the lack of evidence for longer-term benefits of social contact, education-based interventions may be the most practical approach for local mental health awareness campaigns with video-based contact if needed. Emphasis should be placed on developing the educational aspects of awareness campaigns, both for longer-term outcomes and to target the low mental health literacy in the local population [10]. Interventions should also be run regularly or even as part of school curriculum as opposed to isolated events to ensure that the effect is maintained. Although challenging, efforts should be made to measure the long-term outcomes of these interventions. Dedicated experimental studies should be conducted to ensure that interventions are locally relevant and have the desired outcome. Future nationwide studies such as the Singapore Metal Health Study on prevalence and use of mental health services [7], and Mind Matters study on mental health literacy [9] may be replicated and include components that monitor stigma, mental health literacy and the treatment gap at a population level.

To our knowledge, the ATSMI-AV [21] has not been used in the local sample, thus factor analysis was conducted to explore its components. The items that loaded onto Wishful Thinking were identical to those by Watson et al. [21]. Social Construction/ Concern was also the same except for one item "I sometimes worry that I may have a mental illness" which did not load onto any factor in the analysis. Two separate factors were related to threat in the sample (Physical Threat and Label Avoidance) though the items fell under a single overarching factor of Threat by Watson et al. [21]. The remaining items in the Out of Control and Categorical Thinking factors in the study by Watson et al. [21] were combined into one factor in this sample as Categorical Thinking.

The factor analysis of the Social Tolerance scale also produced a slightly different factor structure from that suggested by Koller et al. [22]. The authors suggested 7 items for Social Distance and 4 for Social Responsibility. The two factors found in our analysis were similar except for one item ("I would visit a classmate in hospital if they had a mental illness") which loaded onto the Social Responsibility factor instead of Social Distance, unlike the findings by Koller et al. [22]. This difference in factor structure may be indicative of cultural differences in social norms between Singaporean and Western youth populations, and that social distancing may thus present differently. As the sample largely consists of youths from the main Asian ethnic groups in Singapore (Chinese, Malay and Indian), further research in other Asian samples, including adults, is necessary to investigate if cultural differences are truly present.

In terms of the socio-demographic correlates, ethnicity was correlated with one of the Physical Threat stigma subscale factors and both subscales for Social Tolerance. While collectivist Asian values are linked with higher levels of stigma [17], it appears that there are differences between the Asian ethnic groups. Those of Chinese ethnicity felt more Physical Threat, had more

desire for Social Distance and less Social Responsibility than those of other ethnicities. Some of these findings are similar to those found in the adult population [10] where Indian and Malay participants scored lower on a Social Distance measure despite having higher personal stigma. Corrigan et al. [27] found that individuals from minority ethnic groups are less likely to support prejudicial attitudes about mental illness. They postulated that this was because people from minority ethnic groups experience mental health stigma more harshly than those in the majority group [28] and appear less likely to endorse prejudice about mental illness [29]. Another possible explanation is the Chinese concept of 'face' which describes a person's moral standing in society. Having mental illness may be a mark of 'losing face' which can greatly affect one's access to social capital and bring shame to oneself and one's family [30]. Although collectivist constructs of 'face' exist in many Asian ethnic groups, some researchers argue that the Singaporean concept of 'face' presents uniquely to the country and that Chinese Singaporeans place more emphasis on 'saving face' than the other ethnic groups despite all participants residing in the same country [31]. Those of Chinese ethnicity may thus feel more threatened by mental illness as a mark of shame, which in turn leads to greater feelings of Physical Threat, more desire for Social Distance and less sense of Social Responsibility towards the mentally ill.

Gender differences were found on three ATSMI-AV subscales and for Social Responsibility. The gender differences for ATSMI-AV subscales in our sample were different to those found by Watson et al. [21]. They found that boys scored higher on Threat, a finding that was not replicated here. However, males in our sample did endorse more Categorical Thinking and Watson et al. [21] had similar findings with males scoring higher on Categorical Thinking, a factor which shared some common scale items. Males also scored lower for Social Responsibility than females, suggesting they were less likely to endorse supportive action towards the mentally ill. Conversely, females showed more Social Concern and Wishful Thinking than males. Ng and Chan's [32] study on Hong Kong secondary school students revealed similar findings with females showing higher benevolence towards the mentally ill and males showing more stereotyping, restrictive, pessimistic and stigmatizing attitudes towards mental illness. Female adults in Singapore also scored lower for stigma in previous nationwide studies [10].

Differences between youths with Singaporean citizenship and permanent residents were also found. Permanent residents endorsed more Wishful Thinking and Categorical Thinking. A possible explanation for this finding could be that permanent residents may constitute a mix of different foreign ethnicities including those of the main Singapore ethnic groups. Thus, permanent residents may be classified as a heterogeneous group but actually have diverse views.

The findings of this study should be considered in light of its limitations. Firstly, the voluntary nature of the study may create bias in the responses as students who refused to participate may hold more prejudicial attitudes towards mental illness. Secondly, despite the

anonymous nature of the survey, the participants may have shown social desirability bias when responding to the questions, particularly if they felt that their schools had access to their data. Lastly, the schools were not sampled across all regions and were not representative of all schools in Singapore.

Despite the limitations, the present study has notable strengths which include the large sample size and inclusion of the different ethnic groups which was absent from previous studies involving Singaporean youths. It is also one of the few, if not the only study thus far to investigate the constructs of mental illness stigma and social distance in youths residing in Singapore. Although not all regions of the country were covered, Singapore is a small city-state (719.1 km²) and students were recruited from schools across three of the five Regions of Singapore. Furthermore, the sample was similar to the overall target population of school going youth in terms of age and gender distribution. These strengths help increase the generalisability of the findings.

Overall, a significant proportion of youths in Singapore report having little education about mental health which could explain the stigma endorsed by the sample. Future research could use qualitative methods to understand the construct of stigma better in the Asian context, particularly in light of changing values in younger generations. This study could be replicated in the future in order to evaluate the effectiveness of public education campaigns when they are launched locally.

**Footnotes**

**Contributors**

SP and JL are joint first authors. SP, JL, MM and BYC conducted the fieldwork. Analysis was done by JL. SP led the project. SP, MM, BYC, SS, SPL, JAV, EA, DSSF, CSA and MS helped to design and deliver the project. All authors revised and approved the final version of the manuscript.

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**Competing interests**

None declared.

**Data sharing statement**

Additional data are available on request.

## References


1. Link BG, Phelan JC. Conceptualizing Stigma. Annu Rev Sociol. 2001;27:363-385.
2. Link BG, Phelan JC, Bresnaham M, Stueve A, Pescosolido BA. Public conceptions of mental illness: Labels, causes, dangerousness, and social distance. Am J Public Health. 1999;89:1328-1333.
3. Link BG, Struening EL, Neese-Todd S, Asmussen S, Phelan JC. Stigma as a barrier to recovery: The consequences of stigma for the self-esteem of people with mental illnesses. Psychiatr Serv. 2001;52(12):1621-6.
4. Kessler RC, Berglund PA, Bruce ML, Koch JR, Laska EM, Leaf PJ, Manderscheid RW, Rosenheck RA, Walters EE, Wang PS. The prevalence and correlates of untreated serious mental illness. Health Serv Res. 2001;36(6 Pt 1):987-1007.
5. Corrigan P. How stigma interferes with mental health care. Am Psychol. 2004;59(7):614-25.
6. Department of Statistics Singapore, Ministry of Trade & Industry, Republic of Singapore. Population Trends, 2016 [Internet]. Singapore; 2016 [cited 2016 Oct 20] Available from: http://www.singstat.gov.sg/docs/default-source/default-document-library/publications/publications_and_papers/population_and_population_structure/population2016.pdf.
7. Chong SA, Abdin E, Sherbourne C, Vaingankar JA, Heng D, Yap M, Subramaniam M. Treatment gap in common mental disorders: the Singapore Perspective. Epidemiol Psych Sci. 2012;21(2):195-202.
8. Chong SA, Abdin E, Vaingankar JA , Kwok KW, Subramaniam M. Where do People with Mental Disorders in Singapore go to for Help? Ann Acad Med Singap. 2012;41(2):154-60.
9. Chong SA, Abdin E, Picco L, Pang S, Jeyagurunathan A, Vaingankar JA, Kwok KW, Subramaniam M. Recognition of mental disorders among a multiracial population in Southeast Asia. BMC Psychiatry. 2016;16:1-10.
10. Subramaniam M, Abdin E, Picco, L, Pang S, Shafie, S, Vaingankar, JA, Kwok, KW, Verma K, Chong SA. Stigma towards people with mental disorders and its components- a perspective from multi-ethnic Singapore. Epidemiol Psych Sci. 2016;28: 1-12.
11. Link BG. Understanding Labeling Effects in the Area of Mental Disorders: An Assessment of the Effects of Expectations of Rejection. Am Sociol Rev. 1987;52(1):96-112.
12. Wahl OF. Childrens' views of mental illness: A review of the literature. Psychiatr Rehabil Skills. 2003;6:134–158.
13. Wahl O, Susin J, Lax A, Kaplan L, Zatina D. Knowledge and Attitudes About Mental Illness: A Survey of Middle School Students. Psychiatr Serv. 2012;63(7):649-54.

14. Reavley NJ, Jorm AF. Young People's Stigmatizing Attitudes towards People with Mental Disorders: Findings from an Australian National Survey. Aus NZ J Psychiat. 2011;45(12):1033-1039.

15. Costello EJ, Egger H, Angold A. 10-year research update review: the epidemiology of child and adolescent psychiatric disorders: I. Methods and public health burden. J Am Acad Child Psy. 2005;44(1):972-86.

16. Corrigan PW, Watson AC. The Paradox of Self-Stigma and Mental Illness. Clin Psychol- Sci Pr. 2002;9(1):35-53.

17. Papadoulos C, Foster J, Caldwell K. 'Individualism-Collectivism' as an Explanatory Device for Mental Illness Stigma. Community Ment Hlt J. 2013; 49:270.

18. Lauber C, Nordt C, Falcato L, Rössler W. Factors Influencing Social Distance Toward People with Mental Illness. Community Ment Hlt J. 2004;40(3):265-274.

19. Mathews M. Assessment and Comparison of Culturally Based Explanations for Mental Disorder Among Singaporean Chinese Youth. Int J Soc Psychiatr. 2011;57(1):3-17.

20. Lee B. Relationships between adolescents' preferred sources of help and emotional distress, ambivalence over emotional expression, and causal attributions of symptoms: a Singapore study. Brit J Guid Couns. 2008;37:435–457.

21. Watson AC, Miller FE, Lyons JS. Adolescent attitudes towards serious mental illness. J Nerv Ment Dis. 2005;193(11):769-72.

22. Koller M, Chen, S, Heeney B, Potts A, Stuart H. Opening Minds in High School: Durham Talking About Mental Illness (TAMI) In school Activities: Post Summit. Mental Health Commission of Canada [Internet]. Canada: Mental Health Commmission of Canada; 2014 [cited 2016 Nov 20] Available from: http://www.mentalhealthcommission.ca/sites/default/files/Stigma_OM_Durham_TAMI_In_School_Activities_Post%252520Summit_ENG_0_0.pdf

23. Pinfold V, Toulmin H, Thornicroft G, Huxley P, Farmer P, Graham T. Reducing psychiatric stigma and discrimination: evaluation of educational interventions in UK secondary schools. Brit J Psychiat. 2003;182(4):342-346.

24. Ministry of Education, Singapore. Education Statistics Digest, 2016 [Internet]. Singapore; 2016 [cited 2017 May 18] Available from https://www.moe.gov.sg/docs/default-source/document/publications/education-statistics-digest/esd-2016.pdf.

25. Corrigan PW, Morris SB, Michaels, PJ, Rafacz JD, Rusch N. Challenging the Public Stigma of Mental Illness: A Meta-Analysis of Outcome Studies. Psychiatr Serv. 2012;63(10);963-973.

26. Mehta N, Clement S, Marcus E, Stona AC, Bezborodovs N, Evans-Lacko S, Palacois J, Docherty M, Barley E, Rose D, Koschorke M, Shidhaye R, Henderson C, Thornicroft G.

Evidence for effective interventions to reduce mental health-related stigma and discrimination in the medium and long term: systematic review. Brit J Psychiat. 2015;207:377-384.

27. Corrigan PW, Edwards AB, Green A, Diwan SL, Penn DL. Prejudice, Social Distance, and Familiarity with Mental Illness. Schizophrenia Bull. 2001;27(2):219-225.

28. Rush L. Affective reactions to multiple social stigmas. J Soc Psychol. 1998;138:421-430.

29. Schnittker J, Freese J, Powell B. Nature, Nurture, Neither, Nor: Black-White Differences in Beliefs about the Causes and Appropriate Treatment of Mental Illness. Soc Forces. 2000;78(3):1101-1132.

30. Yang LJ, Kleinman A. 'Face' and the Embodiment of Stigma in China: The Cases of Schizophrenia and AIDS. Soc Sci Med. 2008;67(3):398-408.

31. Lim JYT. Faces of Singapore & Mediation. In: Lee J, Lim M, Phua JH, editors. Contemporary Issues in Mediation Volume 1. Singapore: World Scientific Publishing Co. Pte. Ltd; 2016. p. 59-72.

32. Ng P, Chan KF. Sex differences in opinion towards mental illness of secondary school students in Hong Kong. Int J Soc Psychiatr. 2000;46(2):79-88.

| TABLE 1. Sociodemographic breakdown of sample (N=940) | | |
|---|---|---|
| | N | % |
| Mean age in years | 15.9 (SD = 1.46) | |
| Females | 443 | 47.1% |
| Males | 497 | 52.9% |
| Nationality | | |
| Singaporean Citizen | 805 | 85.6% |
| Permanent Resident | 135 | 14.4% |
| Ethnicity | | |
| Chinese | 773 | 82.2% |
| Malay | 41 | 4.4% |
| Indian | 75 | 8.0% |
| Other | 51 | 5.4% |

| TABLE 2. Frequency of the top 5 most common words associated with the term "mental illness" | | |
|---|---|---|
| | N | % |
| Depression/Depressed | 190 | 20.2 |
| Crazy | 176 | 18.7% |
| Different | 149 | 15.9% |
| Weird | 123 | 13.1% |
| Autism/Autistic | 93 | 9.9% |

TABLE 3. Results of the Principal Components Analysis with Varimax Rotation for ATSMI-AV

| | Loadings | | | | |
|---|---|---|---|---|---|
| Factor and scale item | 1: Physical Threat | 2: Wishful Thinking | 3: Categorical Thinking | 4: Label Avoidance | 5: Social Construction/Concern |
| Mentally ill people scare me. | .79 | | | | |
| I would cross the street if I saw a mentally ill person coming in order to avoid passing him/her. | .78 | | | | |
| I think that mentally ill people are strange and weird. | .73 | | | | |
| I can't see myself hanging out with a mentally ill person. | .50 | | | | |
| Mentally ill people can get well if they are treated with love and kindness. | | .74 | | | |
| There are medications now that can cure mental illness. | | .66 | | | |
| People who are mentally ill could be well if they tried hard enough. | | .75 | | | |
| If a relative of mine became mentally ill, I know that I could convince them to get well. | | .75 | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mentally ill people are easy to spot. | | | .65 | | |
| Eating the wrong things or taking drugs can make you mentally ill. | | | .64 | | |
| Mentally ill people tend to be more violent than other people. | | | .62 | | |
| If you become mentally ill your life is pretty much over. | | | .58 | | |
| If I had a mentally ill relative, I wouldn't want anyone to know. | | | | .63 | |
| Most of my friends would see me as being weak if they thought that I had a mental illness. | | | | .75 | |
| I would be very embarrassed if I were diagnosed as having a mental illness. | | | | .72 | |
| I think that society makes up the diagnosis of mental illness just to control people. | | | | | .76 |
| Schools and parents are mostly responsible for making people mentally ill. | | | | | .64 |
| I think that there really isn't anything called mental illness; some people are just different. | | | | | .58 |
| I think that you could catch mental illness from another person. | | | | | .41 |
| Eigen values | 2.39 | 2.34 | 2.0 | 1.85 | 1.77 |
| % of variance | 11.40 | 11.15 | 9.31 | 8.79 | 8.42 |

| TABLE 4. Proportion of students who replied "Agree or Strongly Agree" to survey items | | |
|---|---|---|
| | N | % |
| If I had a mentally ill relative, I wouldn't want anyone to know. | 213 | 22.7 |
| Most of my friends would see me as being weak if they thought that I had a mental illness. | 330 | 35.1 |
| I would be very embarrassed if I were diagnosed as having a mental illness. | 434 | 46.2 |
| Mentally ill people scare me. | 211 | 22.5 |
| I would cross the street if I saw a mentally ill person coming in order to avoid passing him/ her. | 126 | 13.4 |
| Think that mentally ill people are strange and weird. | 132 | 14 |
| I think that there really isn't anything called mental illness; some people are just different. | 280 | 29.8 |
| Schools and parents are mostly responsible for making people mentally ill. | 169 | 18 |
| I think that society makes up the diagnosis of mental illness just to control people. | 98 | 10.4 |
| I think that you could catch mental illness from another person. | 33 | 3.5 |
| I sometimes worry that I may have a mental illness. | 330 | 35.1 |
| Mentally ill people can get well if they are treated with love and kindness. | 586 | 62.3 |
| There are medications now that can cure mental illness. | 322 | 34.3 |
| People who are mentally ill could be well if they tried hard enough. | 315 | 33.5 |
| If a relative of mine became mentally ill, I know that I could convince them to get well. | 265 | 28.2 |
| I can't see myself hanging out with a mentally ill person. | 191 | 20.3 |
| Mentally ill people are easy to spot. | 186 | 19.8 |
| If you become mentally ill your life is pretty much over. | 103 | 11 |

| | | |
|---|---|---|
| I don't think there is any way that I can become mentally ill. | 122 | 13 |
| Eating the wrong things or taking drugs can make you mentally ill. | 283 | 30.1 |
| Mentally ill people tend to be more violent than other people. | 224 | 23.8 |
| I would be upset if someone with a mental illness always set next to me in class. | 137 | 14.6 |
| I would not be close friends with someone I knew had a mental illness. | 140 | 14.9 |
| I would visit a classmate in hospital if they had a mental illness. | 786 | 83.6 |
| I would try to avoid someone with a mental illness. | 149 | 15.9 |
| I would not mind it if someone with a mental illness lived next door to me. | 604 | 64.3 |
| If I knew someone had a mental illness I would not date them. | 366 | 38.9 |
| I would not want to be taught by a teacher who had been treated for a mental illness. | 150 | 16 |
| I would tell a teacher if a student was being bullied because of their mental illness. | 842 | 89.6 |
| I would stick up for someone who had a mental illness if they were being teased. | 822 | 87.5 |
| I would tutor a classmate who got behind on their studies because of their mental illness. | 736 | 78.3 |
| I would volunteer my time to work in a program for people with a mental illness. | 490 | 52.1 |

TABLE 5. Results of the Principal Components Analysis with Varimax Rotation for Social Tolerance scale

| | Loadings |
|---|---|

| | | |
|---|---|---|
| Factor and scale item | 1: Social Distance | 2: Social Responsibility |
| I would be upset if someone with a mental illness always sat next to me in class. | .79 | |
| I would not be close friends with someone I knew had a mental illness. | .78 | |
| I would try to avoid someone with a mental illness. | .77 | |
| If I knew someone had a mental illness I would not date them. | .74 | |
| I would not want to be taught by a teacher who had been treated for a mental illness. | .61 | |
| I would not mind it if someone with a mental illness lived next door to me. | .51 | |
| I would stick up for someone who had a mental illness if they were being teased. | | .81 |
| I would tell a teacher if a student was being bullied because of their mental illness. | | .80 |
| I would tutor a classmate who got behind in their studies because of their mental illness. | | .70 |
| I would visit a classmate in hospital if they had a mental illness. | | .58 |
| I would volunteer my time to work in a program for people with a mental illness. | | .50 |
| Eigen values | 3.28 | 2.58 |
| % of variance | 29.85 | 23.49 |

TABLE 6. Socio-demographic correlates of ATSMI-AV and Social Tolerance

| | Physical Threat | | Wishful Thinking | | Social Construction/Concern | | Categorical Thinking | | Label Avoidance | | Contact | | Support | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI | *B* | 95% CI |
| Age | 0.08 | (-0.05, 0.27) | 0.03 | (-0.08, 0.23) | -0.01 | (-0.15, 0.11) | 0.02 | (-0.11, 0.18) | -0.02 | (-0.16, 0.09) | 0.001 | (-0.22, 0.22) | -0.05 | (-0.23, 0.05) |
| Gender | 0.05 | (-0.37, 0.52) | -0.09 | (-1.02, -0.14)* | -0.21 | (-1.52, -0.80)*** | 0.07 | (0.03, 0.84)* | -0.03 | (-0.50, 0.09) | 0.05 | (-0.13, 1.08) | 0.16 | (0.57, 1.35)*** |
| Ethnicity | 0.11 | (0.40, 1.58)** | -0.008 | (-0.65, 0.51) | 0.01 | (-0.42, 0.55) | -0.03 | (-0.30, 0.76) | 0.03 | (-0.26, 0.66) | 0.14 | (0.85, 2.46)*** | 0.10 | (0.28, 1.31)** |
| Education | 0.03 | (0.40, 1.58) | -0.02 | (-0.65, 0.31) | -0.04 | (-0.66, 0.14) | 0.03 | (-0.63, 0.25) | 0.06 | (-0.08, 0.68) | 0.01 | (-0.56, 0.77) | 0.01 | (-0.38, 0.47) |
| Nationality | 0.04 | (-0.26, 1.05) | 0.12 | (0.48, 1.77)** | 0.04 | (-0.19, 0.89) | 0.09 | (0.17, 1.35)* | 0.03 | (-0.26, 0.76) | 0.07 | (-0.01, 1.79) | 0.007 | (-0.52, 0.63) |

Note:

ATSMI-AV = Physical threat, wishful thinking, social concern, categorical thinking, and label avoidance.

Social Tolerance = Contact and support.

*p <.05

**p <.01

***P <.001

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

| | Item No | Recommendation |
|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract<br>**Completed: Page 1.** |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found<br>**Completed: Page 2.** |
| **Introduction** | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported<br>**Completed: Page 4-5.** |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses<br>**Completed: Page 5.** |
| **Methods** | | |
| Study design | 4 | Present key elements of study design early in the paper<br>**Completed: Page 1 in Title and Page 5 after Introduction.** |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection<br>**Completed: Page 5-6.** |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants<br>**Completed: Page 5.** |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable<br>**Completed: Page 6 under Measures.** |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group<br>**Completed: Page 6 under Measures.** |
| Bias | 9 | Describe any efforts to address potential sources of bias<br>**Completed: Page 5-6 under Procedure.** |
| Study size | 10 | Explain how the study size was arrived at<br>**Completed: Page 5 under Participants.** |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why<br>**Completed: Page 7 under Analysis.** |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding<br>**Completed: Page 7 under Analysis.** |
| | | (*b*) Describe any methods used to examine subgroups and interactions<br>**Completed: Page 7 under Analysis.** |
| | | (*c*) Explain how missing data were addressed<br>**Completed: Page 7 under Analysis.** |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy<br>**N/A** |
| | | (*e*) Describe any sensitivity analyses<br>**N/A** |
| **Results** | | |

| | | |
|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed<br>**Completed: Page 7.** |
| | | (b) Give reasons for non-participation at each stage<br>**Completed: Page 7 reasons for exclusion were added to manuscript.** |
| | | (c) Consider use of a flow diagram<br>**N/A** |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders<br>**Completed: Page 7.** |
| | | (b) Indicate number of participants with missing data for each variable of interest<br>**Completed: Page 8.** |
| Outcome data | 15* | Report numbers of outcome events or summary measures<br>**Completed: Page 7-8** |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included<br>**Completed: Page 7-8** |
| | | (*b*) Report category boundaries when continuous variables were categorized<br>**N/A** |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period<br>**N/A** |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses<br>**Completed: Page 7-8** |
| **Discussion** | | |
| Key results | 18 | Summarise key results with reference to study objectives<br>**Completed: Page 8-9.** |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias<br>**Completed: Page 11.** |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence<br>**Completed: Page 11.** |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results<br>**Completed: Page 12.** |
| **Other information** | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based<br>**Completed: Page 12.** |

*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at

http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.