Psychometric properties of the Medical Student Well-Being Index among medical students in a Malaysian medical school

Muhamad Saiful Bahri Yusoff a,*, Mohd Jamil Yaacob b, Nyi Nyi Naing c, Ab Rahman Esa d

a Medical Education Department, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia
b Psychiatry Department, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia
c Research Methodology & Biostatistics Unit, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia
d Public Health Department, Faculty of Medical and Health Sciences, Universiti Sultan Zainal Abidin, 20400 Kuala Terengganu, Terengganu, Malaysia

ARTICLE INFO

Article history:
Received 26 December 2011
Received in revised form 8 August 2012
Accepted 2 September 2012

Keywords:
Medical student
Medical Student Wellbeing Index
Stress
Depression
Anxiety

ABSTRACT

This study evaluated the convergent, discriminant, construct, concurrent and discriminative validity of the Medical Student Wellbeing Index (MSWBI) as well as to evaluate its internal consistency and optimal cut-off total scores to detect at least moderate levels of general psychological distress, stress, anxiety and depression symptoms. A cross sectional study was done on 171 medical students. The MSWBI and DASS-21 were administered and returned immediately upon completion. Confirmatory factor analysis, reliability analysis, ROC analysis and Pearson correlation test were applied to assess psychometric properties of the MSWBI. A total of 168 (98.2%) medical students responded. The goodness of fit indices showed the MSWBI had a good construct ($\chi^2 = 6.14$, $p = 0.803$, RMSEA < 0.001, RMR = 0.0034, GFI = 0.99, AGFI = 0.97, CFI = 1.00, IFI = 1.02, TLI = 1.04). The Cronbach’s alpha value was 0.69 indicating an acceptable level of internal consistency. Pearson correlation coefficients and ROC analysis suggested each MSWBI’s item showed adequate convergent and discriminant validity. Its optimal cut-off scores to detect at least moderate levels of general psychological distress, stress, anxiety, and depression were 1.5, 2.5, 1.5 and 2.5 respectively with sensitivity and specificity ranged from 62 to 80% and the areas under ROC curve ranged from 0.71 to 0.83. This study showed that the MSWBI had good level of psychometric properties. The MSWBI score more than 2 can be considered as having significant psychological distress. The MSWBI is a valid and reliable screening instrument to assess psychological distress of medical students.

© 2012 Elsevier B.V. All rights reserved.

1. Introduction

Mental health is vital to the overall wellbeing of all individuals, which directly or indirectly contributes to the overall wellbeing of societies and countries (WHO, 2003a). In 2020, WHO projects that mental illness will be the second contributor to the global burden of diseases (WHO, 2003b). These facts indicate a significant growing of pressure in individuals’ daily lives. Medical students are not immune to this, in fact, studies found a high prevalence of psychological disturbance among them (Cooper et al., 1989; Guthrie et al., 1998; Yusoff and Rahim, 2010; Yusoff et al., 2010). Studies have revealed that more than 20% of medical student suffered from psychological distress (Yusoff and Rahim, 2011). Psychological distress among medical students associated with anxiety and depression (Rosal et al., 1997; Shapiro et al., 2000), interpersonal conflict (Clark and Rieker, 1986), sleeping problems (Niemi and Vainiokki, 2006), and poor academic and clinical performance (Linn and Zeppa, 1984). It also reported having a negative impact on students’ abilities to establish rapport with patients, to concentrate and focus on the study as well as in making decisions, which led to, dissatisfaction with their future clinical practice (Clark and Rieker, 1986). It also linked to suicide (Hays et al., 1996), drug abuse (Newbury-Birch et al., 2000; Pickard et al., 2000), and abuse of alcohol (Flaherty and Richman, 1993). It appears that medical training is hazardous to psychological health of medical students (Wolf, 1994). From that notion, medical education is not an optimal and safe environment for wellbeing of new and young medical students (Wolf, 1994). These facts highlighted that the crucial need for medical schools to identify psychological distress (the psychological distress broadly refers to stress, anxiety, depression and mental health related problems) among their medical students so that early intervention could be done. Among the existing psychological health instruments, the Medical Student Wellbeing Index (MSWBI) is a new and promising screening tool to screen psychological distress among medical
students. It is valid (i.e. content-related validity), reliable (i.e. Cronbach's alpha value was 0.68), short (i.e. only seven items compared to other instruments that have more than 10 items), simple, consumes less time and easy to be answered (Dyrbye et al., 2010). Unfortunately, to the author knowledge, only one study (Dyrbye et al., 2010) reported its validity and reliability despite its potential. From that notion, further research is necessary to verify its validity and reliability as well as to optimize its role and usefulness as a screening health measurement instrument specifically for medical students.

In a general term, validity describes the ability of a measurement to measure attributes that it intended to measure (Miller, 1990; Streiner and Norman, 2008; Van der Vleuten, 2000; Wass et al., 2001). Reliability refers to consistency or reproducibility of a measurement over time or occasions (Streiner and Norman, 2008). Reliability can be gauged in the form of internal consistency and stability (Streiner and Norman, 2008). The internal consistency of a measurement is measured based on a single administration of the measurement while the stability is measured based on several administration of the measurement on different occasions (Streiner and Norman, 2008). Validity of an instrument can be gauged in the forms of content validity, construct validity, convergent and divergent validity, concurrent validity, predictive validity and discriminative validity (Miller, 1990; Streiner and Norman, 2008; Van der Vleuten, 2000). Content validity is gauged when an instrument has enough items and adequately covers on intended outcomes through proper selection and weighting of relevant attributes to be assessed (Miller, 1990; Streiner and Norman, 2008; Van der Vleuten, 2000). Construct validity is achieved when an instrument can distinguish between groups with well-known differences in attributes. An instrument is considered to have convergent validity when it correlates with other instruments that measure similar attributes (Miller, 1990; Streiner and Norman, 2008; Van der Vleuten, 2000). Divergent validity is coined when an instrument does not correlate with other instruments that measure different attributes (Miller, 1990; Streiner and Norman, 2008; Van der Vleuten, 2000). With concurrent validity, a new instrument correlated with more established instruments that measure on intended attributes and frequently expressed in sensitivity and specificity (Streiner and Norman, 2008). Discriminative validity is referred to the ability of an instrument to differentiate between those people who have obvious disorder or trait and those who do not (Streiner and Norman, 2008). It is worth to highlight that both validity and reliability are essential qualities that an instrument must be tested to ensure it measures what it is supposed to measure and the measurements obtained are consistent and reproducible over time and occasions (Streiner and Norman, 2008; Yusoff, 2011).

This study aimed to evaluate the convergent, divergent, construct, concurrent and discriminative validity of the MSWBI as well as to evaluate its internal consistency among medical students in a Malaysian medical school. It also aimed to determine its optimum cut-off total scores in detecting moderate to severe levels of general psychological distress, stress, anxiety and depression as measured by the 21-item Depression Anxiety Stress Scales (DASS-21) (Lovibond and Lovibond, 1995; McDowell, 2006).

2. Materials and methods

A cross sectional study was done. A total of 500 medical students from year one to five were invited to participate in this study by using stratified random sampling method (i.e. 100 medical students were invited from each year of study). They were stratified according gender (40% of male and 60% of female) and race (60% of Malay and 40% of non-Malay). Letters of invitation to participate in this study were sent out to them 2 weeks before data collection. The MSWBI and DASS-21 were administered after 2 months of the new academic year begin to the participants during the face-to-face session in a hall during a weekend. The inventories were immediately returned after the participants filled up the inventories. Informed consent was obtained from the participation prior to administration of the inventories. Ethical approval was obtained from the Human Ethical Committee of Universiti Sains Malaysia prior to the study start.

2.1. Instrument

The MSWBI was developed by Dyrbye et al. (2010) as a screening tool for detecting distressed medical students (the term distress is broadly referred to anxiety, depression, burnout and mental health related problems). Its content and face validity was established through experts’ judgment as well as its internal consistency through reliability analysis (Dyrbye et al., 2010). It has seven items representing manifestations of burnout, depression, fatigue, stress and quality of life. All response options were YES or NO; binary scoring system was applied where YES and NO responses were given score 1 and 0 respectively. A high score indicates a high level of psychological distress experienced. So far it was validated among US medical students (Dyrbye et al., 2010).

The general psychological distress (GPD), stress, anxiety, and depression levels were measured by the DASS-21. The DASS-21 was developed by Lovibond in 1993 for people aged 17 and older, however, may be suitable for younger age (McDowell, 2006). It is used to assess the severity of core symptoms of depression, anxiety and tension (or stress) over the previous weeks; in general it provides a broad spectrum measure of psychological distress, indicating the severity and frequency of symptoms (Lovibond and Lovibond, 1995). It a self-reporting instrument and available in two versions: 42 items (DASS-42) and 21 items (DASS-21). The DASS-42 and DASS-21 have three main scales which are, depression (DASS-D), anxiety (DASS-A) and stress (DASS-S); each scale has 14 and 7 items respectively. Each item uses four-point response scale and separate depression, anxiety and stress scores are calculated by summing item scores. This instrument is suitable used for tracking change in severity over time, e.g. before and after inter intervention (McDowell, 2006). Based on the DASS manual for student samples, (1) stress level is measured by the stress subscale of the DASS-21. It categorizes the subscale scores as normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and extremely severe (34 and above) (Crawford and Henry, 2003; Henry and Crawford, 2005; Lovibond and Lovibond, 1995); (2) anxiety level is measured by the anxiety subscale of the DASS-21. It categorizes the subscale scores as normal (0–7), mild (8–9), moderate (10–14), severe (15–19) and extremely severe (20 and above) (Crawford and Henry, 2003; Henry and Crawford, 2005; Lovibond and Lovibond, 1995); (3) depression level is measured by the depression subscale of the DASS-21. It categorizes the subscale scores as normal (0–9), mild (10–13), moderate (14–20), severe (21–27) and extremely severe (28 and above) (Crawford and Henry, 2003; Henry and Crawford, 2005; Lovibond and Lovibond, 1995); and (4) the GPD level is measured by the total score of the DASS-21. It categorizes the total scores as normal (0–25), mild (26–34), moderate (35–59), severe (60–78), and extremely severe (79 and above) (Crawford and Henry, 2003; Henry and Crawford, 2005; Lovibond and Lovibond, 1995). The total and subscale scores must be multiplied by 2 to simulate the full-scale version scores. The DASS-21 was used in this study due to it requires less time to administer, a well validated and reliable instrument; furthermore, studies showed it is superior and more consistent compared to the full-scale version (McDowell, 2006). The reliability coefficient of depression, anxiety and stress scales range from 0.81 to 0.97, and the three subscales showed discriminative ability to differentiate
between psychiatric patient and non-psychiatric patients (McDowell, 2006). To author knowledge, the English version of DASS-21 is not yet validated among Malaysian population. However, it was translated into Malay language and the internal consistency coefficient values ranged between 0.74 and 0.84 (Musa et al., 2007, 2009). The bilingual version of DASS-21 (i.e. English–Malay) was used in this study to optimize the measurement reliability and validity.

2.2. Statistical analysis

The confirmatory factor analysis (CFA), reliability analysis, receiver operating characteristics (ROC) analysis and Pearson correlation test were performed to assess psychometric properties of the MSWBI. The analyses were done by the SPSS version 18 and Analysis of Moment Structure (AMOS) software version 19.

The CFA was performed using AMOS to examine the goodness of fit of the MSWBI latent construct. The measurement model fit with the data was checked with model chi-square goodness-of-fit, and approximate fit indexes (Kline, 2010). Insignificant model chi-square goodness-of-fit (set at 0.05) signifies model fit. For approximate fit indexes, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), relative fit index (RFI), incremental fit index (IFI), Tucker–Lewis fit index (TLI) and comparative fit index (CFI) of above 0.9 would indicate model fit (Kline, 2010; Piaw, 2009). For another approximate fit index, root mean square error of approximation (RMSEA), a value less than 0.08 root mean squared residual (RMR) value less than 0.05 would signify reasonable model fit (Stevens, 2009). The MSWBI was considered as having good construct validity if the goodness of fit indicators signifies model fit.

Reliability analysis was performed using SPSS to determine the reliability of the MSWBI. Internal consistency of the items was measured using Cronbach’s alpha coefficient. For an estimation of reliability, statistical reliability of individual items was done. Items with the corrected-item total correlation of more than 0.3 were selected, and items with the corrected-item total correlation of lesser than 0.3 were removed. The Cronbach’s alpha value of deleted item could determine which item highly contributed to reliability of MSWBI. If the Cronbach’s alpha value for those items-deleted decreased, it would indicate that the items highly contributed to alpha value. In contrast, if the Cronbach’s alpha value for those items-deleted increased, it would indicate that the items poorly contributed to alpha value. The items of MSWBI represent a measure of satisfactory internal consistency if the Cronbach’s alpha value in between 0.7 and 0.9 (Downing, 2004; Streiner and Norman, 2008).

The Pearson correlation test was performed to determine the discriminant and convergent validity of the MSWBI. The Pearson’s correlation coefficient was used to see the forms of correlation between assessment tools. In general, the correlation coefficient lesser than or equal to 0.20 was considered as weak correlation, more than 0.2 but lesser than 0.8 was considered as moderate correlation, and equal to or more than 0.8 was considered as strong correlation (Zou et al., 2003).

The ROC analysis was performed using SPSS version 18 to determine the sensitivity, specificity, area under the ROC curve and optimum cut-off score of the MSWBI at different severity levels of GPD, stress, anxiety and depression. The severity levels of the GPD, stress, anxiety, and depression, were measured by the DASS-21. The recommended scoring system was used in this study as described in the previous section. The sensitivity and specificity and area under ROC curve value more than 0.70 was considered as having acceptable predictive and discriminative values (Swets, 1988; Thomas, 2009). The sensitivity and specificity values were considered as an indicator for concurrent validity while the ROC under curve value was taken as an indicator for discriminative validity of the MSWBI. Total scores of the MSWBI at the acceptable level of sensitivity, specificity and area under ROC curve value were considered as cut-off score.

3. Result

A total of 460 (92%) students responded to the invitation and only 171 (34.2%) medical students agreed to participate in the study. The major reason for non-participation in the study is due to it was conducted during weekend. Out of 171 medical students who agreed to participate, only 168 (98.2%) filled in the two inventories completely. The demographic profile of the participants was summarized in the Table 1. They responded to the MSWBI completely within 5 min.

The CFA showed that all the goodness of fit indices (Table 2) suggested that the one-factor model with seven items as proposed by Dyrbye et al. (2010) had a good construct. This finding verifies the construct validity of the MSWBI.

The reliability analysis showed all items had CITC more than 0.3 except item 2 and 4 (Table 3). The CAC slightly improved if the two items deleted. Nevertheless, the results suggested that the MSWBI has an acceptable level of internal consistency, indicating it was a reliable tool.

The inter-item correlation analysis (Table 4) showed that item 2 (i.e. burnout: depersonalization) and 4 (i.e. fatigue) had poor correlation with other items. Item 1 (i.e. burnout: emotional exhaustion), 3 (i.e. depression), 5 (i.e. stress), 6 (quality of life: mental) and 7 (i.e. quality of life: physical) correlated moderately among them. These results suggested the items were not overlapping on each other. Table 5 showed the correlation of items and total score of the MSWBI with the DASS-21 subscales. All items correlated moderately with the GPD (except item 4), stress (except item 4 and 7), anxiety (except item 2 and 4) and depression (except item 4); the correlation coefficients ranged from 0.20 to 0.42. The total score of MSWBI correlated moderately with all domains of the DASS-21; the correlation coefficients ranged from 0.37 to 0.52. It appeared that the total scores correlated better than individual item scores with the DASS-21 domains. These findings suggested that the MSWBI had an acceptable level of discriminant and convergent validity.

In overall, the ROC analysis showed that the sensitivity and specificity values across severity levels of GPD, stress, anxiety and depression ranged from 51.8 to 100% with the areas under ROC curve ranged from 0.68 to 0.88 (Table 6). At the mild level of GPD,
stress, anxiety and depression, the sensitivity values ranged from 51.8 to 84.2% with the areas under ROC curve ranges from 0.68 to 0.80 (Table 6). The cut-off scores of MSWBI to detect at least mild level of GPD, stress, anxiety and depression ranged from 0.5 to 1.5. At the moderate level of GPD, stress, anxiety and depression, the sensitivity and specificity values ranged from 62.2 to 80% with the areas under ROC curve ranged from 0.71 to 0.83 (Table 6). The cut-off scores of MSWBI to detect at least moderate level of GPD, stress, anxiety and depression ranged from 1.5 to 2.5. At the severe level of GPD, stress, anxiety and depression, the sensitivity and specificity values ranged from 61.8 to 100% with the areas under ROC curve ranged from 0.69 to 0.88 (Table 6). The cut-off scores of MSWBI to detect severe level of GPD, stress, anxiety and depression ranged from 1.5 to 3.5. Based on the results, it can be concluded that those students who obtained total scores of more than 2 can be considered as having significant psychological distress. These findings also suggested that the MSWBI had an acceptable level of concurrent and discriminative validity in detecting psychological distress among medical students.

4. Discussion

The prevalence of psychological distress among medical students is high (Dyrbye et al., 2005, 2006; Yusoff et al., 2010), so it is impractical for medical schools to intervene individually for every distressed student. Therefore, early identification of students with degrees of distress that may put them at risk for developing undesirable consequences either at individual or professional levels is essential. From that notion, a short, simple, less time consuming, valid and reliable tool that screens common dimensions of psychological distress experienced by medical students and able to identify those who at the highest risk to develop serious consequences will be useful to medical schools, as well as medical students (Dyrbye et al., 2010). In this article, the author reported on evidence of validity, reliability, feasibility and usefulness of a new and promising tool. The author believes it has the potentials to be a valuable tool for medical schools in detecting degrees of psychological distress experienced by their students that may put them at the greatest risk for developing serious consequences (Dyrbye et al., 2005).

The CFA analysis had shown that the goodness of fit indices verified the one-factor model of the MSWBI had an appropriate latent construct to measure psychological distress. This result indicated it had a satisfactory level of construct validity where it measured what it should measure (Miller, 1990; Streiner and Norman, 2008; Van der Vleuten, 2000). The reliability analysis showed internal consistency of the MSWBI was at an acceptable level as its Cronbach's alpha value was 0.69 (Downing, 2004; Streiner and Norman, 2008). This finding is in keeping a previous research (Dyrbye et al., 2010) that found the Cronbach's alpha value was 0.68. This study found that if the depersonalization item deleted (i.e. item 2) would increase the Cronbach's alpha value from 0.69 to 0.70 (Table 3). However, the author believes the depersonalization item should be remained as it is an essential element of distress as well as it caused a minimum change to the

| Table 2 |
| The results of confirmatory factor analysis. |

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\chi^2$-statistic</th>
<th>p-Value</th>
<th>Goodness of fit indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-factor model*</td>
<td>6.139</td>
<td>0.803</td>
<td>RMSEA</td>
</tr>
</tbody>
</table>

* Based on the proposed construct by Dyrbye et al. (2010).

The following table shows the item correlation matrix for the MSWBI:

| Table 4 |
| Inter-item correlation. |

<table>
<thead>
<tr>
<th>Item</th>
<th>Correlation coefficient (r)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Feel burned out (burnout: emotional exhaustion)</td>
<td>0.33 0.22 -0.01 0.32 0.26 0.19</td>
</tr>
<tr>
<td>2. Hardened emotionally (burnout: depersonalization)</td>
<td>1 0.16 0.09 0.10 0.16 0.10</td>
</tr>
<tr>
<td>3. Down, depressed, hopeless (depression)</td>
<td>1 0.08 0.28 0.48 0.34</td>
</tr>
<tr>
<td>4. Fallen asleep while driving (fatigue)</td>
<td>1 0.21 0.18 0.31</td>
</tr>
<tr>
<td>5. Things piling up so high (stress)</td>
<td>1 0.53 0.33</td>
</tr>
<tr>
<td>6. Bothered by emotional problems (quality of life: mental)</td>
<td>1 0.37</td>
</tr>
<tr>
<td>7. Physical health (quality of life: physical)</td>
<td>1</td>
</tr>
</tbody>
</table>

* Pearson correlation test.

The following table shows the correlation of items and total score of the MSWBI with the DASS-21 domains:

| Table 5 |
| Correlation of items and total score of the MSWBI with the DASS-21 domains. |

<table>
<thead>
<tr>
<th>Item</th>
<th>Correlation coefficient (r)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPD</td>
<td>Stress</td>
</tr>
<tr>
<td>1. Feel burned out (burnout: emotional exhaustion)</td>
<td>0.275 0.220 0.200 0.303</td>
</tr>
<tr>
<td>2. Hardened emotionally (burnout: depersonalization)</td>
<td>0.227 0.202 0.127 0.274</td>
</tr>
<tr>
<td>3. Down, depressed, hopeless (depression)</td>
<td>0.413 0.340 0.333 0.406</td>
</tr>
<tr>
<td>4. Fallen asleep while driving (fatigue)</td>
<td>0.058 0.050 0.069 0.028</td>
</tr>
<tr>
<td>5. Things piling up so high (stress)</td>
<td>0.363 0.225 0.331 0.390</td>
</tr>
<tr>
<td>6. Bothered by emotional problems (quality of life: mental)</td>
<td>0.423 0.302 0.380 0.420</td>
</tr>
<tr>
<td>7. Physical health (quality of life: physical)</td>
<td>0.214 0.132 0.197 0.230</td>
</tr>
<tr>
<td>8. Total score MSWBI</td>
<td>0.500 0.374 0.410 0.523</td>
</tr>
</tbody>
</table>

GPD, general psychological distress. * Pearson correlation test.

* CITC, corrected item-total correlation; CAID, Cronbach's alpha if item deleted; CAC, Cronbach's alpha coefficient.
overall internal consistency of the MSWBI. It should also be noted that, even though item 2 and 4 appeared to be problematic items for the internal consistency of the instrument, yet the CFA analysis showed that all the items showed a good construct validity as all the fitness indices above than the acceptable level. In addition, even removal of the two items would not significantly increase the internal consistency of the instrument. From that notion, the authors still concurred that the instrument had an acceptable level of reliability: indicating it was a reliable instrument. Apart from that, further research is required to verify its psychometric credentials in various educational settings.

As the authors mentioned before, an instrument is considered having convergent and divergent validity when it correlated with other instruments that measure similar attributes and did not correlate with other instruments that measure different attributes (Miller, 1990; Streiner and Norman, 2008; Van der Vleuten, 2000). To evaluate this validity, Pearson correlation analysis was performed to assess the correlations between items and total score of the MSWBI with the subscales of DASS-21. The analysis found that the MSWBI demonstrated an acceptable level of convergent and divergent validity where as expected fatigue and physical component of quality of health items had poor correlations with the DASS-21 dimensions while the emotional exhaustion, depersonalization, depression, stress and mental component of quality of health items had moderate correlations with the DASS-21 subscales. Apart from that, the total score of MSWBI was moderately correlated with the DASS-21 subscales and the correlations were stronger than the single item correlation as anticipated. These findings were evidence for the convergent and divergent validity. Perhaps, future research should examine whether the MSWBI score correlates with clinically fatigue and physical health of medical students.

With respect to concurrent and discriminative validity, the author compared the MSWBI with the DASS-21 as a more established instruments measuring on general psychological distress, stress, anxiety and depression (McDowell, 2006). The concurrent validity is commonly expressed in sensitivity and specificity, whereas the discriminative validity is expressed as the area under ROC curve. The ROC analysis showed that the MSWBI was acceptably sensitive and specific to screen psychological distress experienced by medical students except for mild symptoms of anxiety. On top of that, based on the area under ROC curve values, the MSWBI demonstrated a reasonable ability to distinguish between those who had psychological distress components as measured by the DASS-21 at different levels of severity at different MSWBI cut-off scores (Table 6). Interestingly, severity levels correspond to total score of the MSWBI; the greater severity levels of the DASS-21 components, the higher the MSWBI cut-off scores. These findings support the concurrent and discriminative validity of the MSWBI in measuring psychological distress experienced by medical students. Apart from that, based on the ROC analysis authors recommend that those who obtained a total score of the MSWBI more than 2 can be considered as having a significant psychological distress.

Apart from these findings, it is worth to highlight that participants used less than 5 min to response completely to the inventory. This fact highlight that the feasibility of administering the MSWBI to medical students within a minimum duration of time.

This study has several limitations. First, this study was conducted at a medical school in Malaysia, so the findings may not be generalized to the whole Malaysian medical student population. From that notion, a study involving multi medical schools from all over Malaysian medical schools is recommended to verify the present findings. Second, this study used only one instrument as a comparison tool to validate MSWBI construct. Therefore, it might not represent the multidimensional construct of distress; perhaps, MSWBI should be compared with other health measurement instruments such as Beck's Depression Inventory, General Health Questionnaire, and State-Trait Anxiety Inventory, to maximize the validity and usefulness of MSWBI as a screening tool. Finally, the number of study subjects was relatively small, so the current findings should be interpreted with cautious.

This study has several strengths. First, the study subjects were selected randomly, so selection bias has been minimized. Second, to the authors’ knowledge, this is the first study to explore various forms of validity of the instrument. Finally, this is also the first study to recommend an optimum cut-off score for the instrument to detect psychological distress experienced by medical students.

This study has provided validity, reliability, feasibility and usefulness evidence of the MSWBI as a tool to screen psychological distress experienced by medical students. The authors believe the MSWBI has shown significant potentials as a useful tool for medical schools to identify their medical students’ psychological health. Continued research is required to refine and verify the validity and reliability of the MSWBI as a screening tool to detect psychological distress experienced by medical students.

5. Conclusion

This study showed that the MSWBI had shown acceptable level of psychometric properties. The total score of MSWBI more than 2 can be considered as having a significant psychological distress. The MSWBI is a valid and reliable screening instrument to assess psychological distress of medical students.
Roles of funding sources

Universiti Sains Malaysia Research University (RU) Grant (1001/PPSP/812086). Roles of the grant was to support materials and services for data collection, honorarium and salary for research assistant staff.

Contributors

All authors significantly contributed in designing the study, collecting data, analysis and interpretation of data, preparing first draft and critically appraised the final draft.

Conflict of interest

All authors declared there are none conflict of interest.

Acknowledgments

Our special thanks to the academic staff of School of Medical Sciences, Universiti Sains Malaysia for their kind help in arranging list of medical students. Last but not least, we would like to express our greatest appreciation to all medical students who kindly participated in this study.

References


