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Mindfulness in Different Sociodemographic Strata: Partial Validation of the Mindful Attention Awareness Scale in an Indian Sample

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Abstract

Background: Mindfulness-based interventions are increasing in clinical and nonclinical populations. It is important to have a culturally validated instrument to measure the construct. **Aims:** We intended to evaluate the Mindful Attention Awareness Scale (MAAS) in an Indian sample, for its reliability and dimensionality along with any differences among the sociodemographic strata. **Settings and Design:** The design of the study was an online-based survey. **Materials and Methods:** An anonymous survey was conducted involving adult participants with a convenience and snowball sampling method. Mindfulness based on MAAS responses and demographic details were collected. **Statistical Analysis:** Cronbach's alpha, t-test, analysis of variance, Tukey's honestly significant difference test, and factor analysis were used for analysis. **Results:** The average mindfulness score was 4.3 ± 0.78, and skewness was -0.39. The score was normally distributed. The reliability for the MAAS (Cronbach's $\alpha = 0.830$) was acceptable. The split-half reliability correlation was 0.66. The mean of item scores varied from 3.52 to 4.85, and the standard deviation varied from 1.2 to 1.6. The factor analysis explained 53% variance and identified four factors named as "inattention to the present," "lost in thought," "lack of circumstantial awareness," and "late realization of feelings." MAAS scores were significantly different across age, marital status, and occupation but did not differ by gender, education, or economic status. **Conclusions:** It appears that MAAS can be used in the Indian population; however, there is a need for further validation studies, in different specific populations.

Keywords: India, mindfulness, scale, sociodemography, validation

INTRODUCTION

Mindfulness is identified as a skill that allows individuals to make conscious choices between stimulus and response, prevent any dysfunctional patterns of behaviors, and improve their well-being.[1] Mindfulness theory has the potential to find solutions for current and future problems due to changes in demographics and technology. Often, the sources of these problems are social settings, ethnic diversity, work, and the workplace.[2] Mindfulness-based interventions have become more common and an industry of more than a billion dollar which includes services, experiences, and even products.[3] There has been a recent surge in research and psychotherapies based on mindfulness.[4]

Mindfulness focuses on five dimensions such as the intention and context of practice, bare attention, attentional control,

wholesome emotions, and ethical judgment.[5] There is a contention that the psychological literature often overlooks various dimensions of mindfulness indicated within canonical Buddhist teachings. The Buddhist literature mentions different types of mindfulness in Pali words. *Sati* (awareness with the spirit of recollection), *appamada* (awareness with ethics), and *sampajañña* (awareness with a sense of spiritual development) are some dimensions. These dimensions follow the law of conditionality which involves five different sequences of causality: physical, biological, mental, ethical, and spiritual. The spiritual path comprises five stages such as integration, skillful intention, spiritual death, spiritual rebirth, and

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spontaneous compassionate activity.[6] This indicates the initial conceptualization of mindfulness as multidimensional.

Literature also suggests demographic variables influence mindfulness. Gender along with self-efficacy, self-compassion, and mindfulness predicted well-being.[7] There were gender differences regarding mindfulness.[8] Women had a significantly higher score in the "observing and acting with awareness" subscales, but men scored higher on the "acting with awareness."[9] Considering age, it has been reported that older adults had higher mindfulness scores than younger adults.[9] However, another study reported no statistically significant difference in mindfulness across gender, age, and perceived family functioning.[10]

Mindfulness was also linked to relationship satisfaction, empathy, and communication in marriages, families, and parent–child relationships.[11] Studies associate trait mindfulness with romantic relationship outcomes.[12] Mindfulness-based interventions are also proposed by researchers for divorced and separated single mothers to suggest coping strategies and mental health.[13]

Mindfulness-based studies and interventions have been done on various occupational groups: undergraduate students,[14] under and unemployed,[15] different specialist doctors,[16] teachers,[17] tourists,[18] nurses,[19] military services personnel,[20] and sales persons.[21] Beyond various professions, mindfulness studies are also available for working climate.[22] Mindfulness is positively related to income and socioeconomic status,[8] and mindfulness-based interventions have been found useful for economically disadvantaged families.[23]

There are several instruments to measure mindfulness, for example, the Five-Factor Mindfulness Questionnaire (FFMQ),[8] Freiburg Mindfulness Inventory (FMI),[24] Mindful Attention Awareness Scale (MAAS),[25] Cognitive and Affective Mindfulness Scale,[26] and Langer Mindfulness Scale.[27] These instruments measure different aspects of mindfulness (e.g. state or trait). Currently, the MAAS is argued to be the more appropriate measurement of mindfulness than the FMI.[28] It has been translated into different languages and validated in various regions.[1]

Health research considers mindfulness to be an important construct but there is a lack of well-validated measures,[29] especially in the Indian population. Not much research has investigated the demographic difference of the mindfulness construct. Even though the mindfulness concept originates from Buddhist philosophy, it is to be noted that there are no validation attempts reported from an Indian sample. In addition, the possibility of cultural influence on the MAAS scale has not been explored along with the demographic differences in extant literature.

Based on the above background, the objective of this research was to study the usability of the MAAS instrument in an Indian population and to understand the variability of mindfulness in different sociodemographic profiles.

MATERIALS AND METHODS

The study was conducted as a public health survey. A questionnaire was designed which included information about the study, consent, MAAS, and demographic details.

The Mindfulness Attention Awareness Scale[25] is a 15-item scale designed to assess a core characteristic of mindfulness. It has 1–6 scale responses based on the frequency of experience when 1 is almost always to 6 is almost never. The score of the scale suggests the mean of the 15 items, where higher scores reflect higher levels of dispositional mindfulness.[25] Respondents were asked to rate their everyday experience using the Likert Scale of MAAS.

The demographic section of the questionnaire included gender, age, marital status, education, economic status of the family, and occupation. The age was categorized as young adults (aged 25 years or below), adults (26–59), and older adults (60 years or more). Education was categorized as higher secondary or below, graduates, professional education (e.g. engineering, medicine, and others), and master's degree. The economic status of the family was categorized as lower, lower middle, upper middle, and upper class. The demographic characteristics were self-reported.

Data collection was done online. The questionnaire was circulated to contacts of the researchers, and the contacts and respondents were requested to share among their contacts. In effect, it was a convenience and snowball sampling method. A maximum of three reminders were sent to the email IDs. The period of data collection was from October 6, 2021, to August 12, 2022.

Statistical analysis

An initial analysis was done to understand the reliability of the instrument through Cronbach's alpha. Subsequently, the mean differences in the scores among different groups were calculated through a *t*-test and analysis of variance. Tukey's honestly significant difference (HSD) test was done to identify specific groups differing in their mean. The mean difference was calculated at the aggregate and item score levels. The standard deviation (SD) indicated the variability. The data analysis was done through SPSS-27 (IBM Corp, Armonk, NY: USA).

Ethics

The study project was approved by the Institutional Review Board as a public health survey. Ethical principles were adhered to for this online survey. Detailed information about the survey and consent form was provided. Anonymity and voluntariness were highlighted. Respondents could withdraw at any time before submitting their responses. This survey did not seek any identifiable personal data. There were options for the participants to contact the lead researcher and the organization for any query or support related to the survey.

RESULTS

Sample characteristics

The demographic characteristics of the sample (*n*: 413) and their MAAS score are given in Table 1. The sample had a higher

proportion of males, adults, unmarried, and professionally educated (Engineers, MBA, and Doctors) individuals. The occupation of respondents included students (36.1%), employed (43.8%), business owners or self-employed (10.7%), and not-working (retired and homemaker (9.4%). This indicated diverse demographic characteristics appropriate for the testing of the scale. The Likert scale scores for MAAS items were regrouped for clarity [Table 2]. The MAAS items 1 and 13 were comparable in distribution; for other items, there were higher proportions of respondents who appeared to be mindful.

The reliability statistics (Cronbach's α: 0.830, *n*: 413) indicated the scale to be reliable and the value was similar to earlier studies. The split-half reliability (Cronbach's alpha scores were 0.714 (*n*: 8) and 0.733 (*n*: 7), correlation: 0.661, and Guttman split-half coefficient was 0.794) indicated adequate internal consistency.

The aggregate score of the MAAS scale indicated (*n*: 413) a mean of 4.3, minimum of 1.7, maximum of 6.0, SD of 0.78, and skewness of − 0.39. The score normality distribution was plotted through a Q-Q plot [Figure 1].
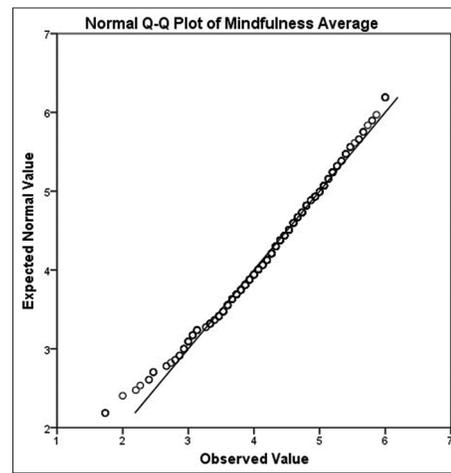
Factor analysis
Prior studies did not converge on the unidimensionality of 15 items in the MAAS scale.[30] Thus, a factor analysis was deemed necessary for the Indian sample of this study. The Kaiser–Meyer–Olkin (KMO) sampling adequacy was 0.890, and Bartlett's test of Sphericity (Approx. Chi-square = 1390.81, df: 105, and *P* < 0.001) indicated the factorability of the items. The principal component analysis with the varimax rotation method was used for factor extraction. Four factors were extracted which explained 52.9% of the total variance. The rotated component matrix is presented in Table 3.

The factor analysis indicated that MAAS explains about 53% of the variance. The first factor explains 17.3% and includes MAAS3, MAAS7, MAAS8, MAAS9, MAAS10, and MAAS14. Statements pertaining to these items indicate difficulty in focusing on the present, automatic act, and inattention. This could be termed as "excessive future goal focus and inattention to present."

The second factor includes items such as MAAS2, MAAS12, and MAAS15 indicating thinking something else, a status that can be called "lost in thought." This factor explains the 13.5% variance.

The third factor explains around 12.0% variance. It includes four items such as MAAS4, MAAS6, MAAS11, and MAAS13 in the original scale with keywords not paying attention to current experience, forgetting the name immediately, hearing

Figure 1: Q-Q plot for the average of the Mindful Attention Awareness Scale score

Variables	Categories	*n* (%)	MAAS (mean±SD)	*t/F*	*P*
Gender	Male	241 (58.4)	4.28±0.75	0.81	0.42
	Female	172 (41.6)	4.22±0.81		
Age (years)	Young adult (≤25)	175 (42.4)	4.10±0.68	6.378	0.002
	Adults (26–59)	211 (51.1)	4.35±0.84		
	Older adults (≥60)	27 (6.5)	4.51±0.67		
Marital status	Unmarried	233 (56.4)	4.18±0.76	3.44	0.033
	Married	167 (40.4)	4.37±0.81		
	Widower/separated	13 (3.1)	4.07±0.55		
Education	School	20 (4.8)	4.26±0.63	0.524	0.666
	General graduate	109 (26.4)	4.17±0.81		
	Professional graduates	180 (43.6)	4.28±0.78		
	Masters	104 (25.2)	4.29±0.76		
Economic status	Lower middle	22 (5.3)	4.32±0.74	1.117	0.328
	Upper middle	241 (58.4)	4.20±0.77		
	Upper	150 (36.3)	4.32±0.79		
Occupation	Students	149 (36.1)	4.06±0.63	6.032	0.001
	Employed	181 (43.8)	4.31±0.87		
	Business	44 (10.9)	4.41±0.80		
	Not working	39 (9.2)	4.55±0.63		

Table 1: Difference of the mean Mindful Attention Awareness Scale score by different demographic strata

Table 2: Frequency distribution of mindfulness responses

MAAS items	Almost always to somewhat frequently, *n* (%)	Somewhat infrequently to almost never, *n* (%)	Mean±SD
1. Experiencing emotion, …	193 (46.7)	220 (53.3)	3.7±1.35
2. Break/spill, carelessness, …	111 (26.9)	302 (73.1)	4.48±1.44
3. Difficult to stay focused, …	125 (30.3)	288 (69.7)	4.2±1.34
4. Walk quickly without paying attention …	144 (34.9)	269 (65.1)	3.99±1.54
5. Tend not to notice feeling…	165 (40.0)	248 (60.0)	3.83±1.48
6. Forget a person's name …	171 (41.4)	242 (58.6)	3.92±1.68
7. Running on automatic …	97 (23.5)	316 (76.5)	4.52±1.33
8. Rush through activities …	99 (24.0)	314 (76.0)	4.44±1.35
9. Lose touch…	97 (23.5)	316 (76.5)	4.31±1.29
10. Do jobs or tasks automatically	73 (17.7)	340 (82.3)	4.8±1.29
11. Listening to someone with one ear, …	158 (38.3)	255 (61.7)	3.97±1.5
12. Drive places on automatic pilot …	91 (22.0)	322 (78.0)	4.68±1.42
13. Preoccupied with the future or the past …	196 (47.5)	217 (52.5)	3.52±1.59
14. Doing things without paying attention …	84 (20.3)	329 (79.7)	4.58±1.34
15. Snack without being aware …	73 (17.7)	340 (82.3)	4.85±1.45

SD: Standard deviation, MAAS: Mindful Attention Awareness Scale

Table 3: Factor analysis - rotated component matrix

MAAS items	Component			
	1	2	3	4
10. Do jobs or tasks automatically, ...	0.758	0.053	0.019	0.152
7. Running on automatic …	0.737	0.118	0.188	0.073
8. Rush through activities …	0.647	0.381	0.174	−0.014
3. Difficult to stay focused, …	0.527	0.204	0.221	0.165
14. Doing things without paying attention …	0.504	0.421	0.464	−0.057
9. Lose touch…	0.468	0.117	0.058	0.369
15. Snack without being aware …	0.106	0.715	0.068	0.078
2. Break/spill, carelessness, …	0.154	0.699	−0.048	0.139
12. Drive places on automatic pilot …	0.286	0.629	0.260	0.168
13. Preoccupied with the future or the past …	0.069	−0.003	0.801	0.099
11. Listening to someone with one ear,...	0.124	0.396	0.579	−0.007
4. Walk quickly without paying attention …	0.343	0.119	0.460	0.201
6. Forget a person's name …	0.185	−0.105	0.418	0.359
5. Tend not to notice feeling…	0.107	0.088	0.025	0.796
1. Experiencing emotion, …	0.107	0.222	0.184	0.660

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser Normalization, a. Rotation converged in seven iterations.
MAAS: Mindful Attention Awareness Scale

but not listening, and preoccupation with past or future. This can be called as "no circumstantial awareness."

The fourth factor explains about 10% variance and includes MAAS1 and MAAS5 items of the MAAS scale. The original statement indicates a state where an individual recognizes emotions or feelings much later. This factor can be called the "late realization of feelings."

Demographic variations

The overall MAAS score (mean ± SD) did not show any significant difference between males (*n*: 241, 4.28 ± 0.75) and females (*n*: 172, 4.22 ± 0.81). The average MAAS score differed significantly across age groups F: 6.38, $P < 0.005$. The Tukey's HSD test indicated that the younger adults showed significant differences between adults and older adults.

However, the mindfulness score between adults and older adults did not vary significantly.

The average score of MAAS differed significantly by marital status (F: 3.44, $P < 0.05$). The unmarried group had a significantly lower score compared to the married group ($P < 0.05$). Other groups did not show any significant difference. The average score for mindfulness by education did not vary significantly by education.

The total score of mindfulness by economic status was tested for mean difference. The lower middle class, middle class, and upper middle class did not show any significant difference in their scores [Table 1]. The total score of mindfulness by occupation indicated that students, employed, businesspersons, retired/not working/unemployed showed significant differences

between the groups ($P < 0.01$). Tukey's HSD indicated that the students' mindfulness score was significantly lower compared to all other groups ($P < 0.05$). The total scores of other groups did not significantly differ from each other.

Discussion

This study tried to validate MAAS in an Indian population and explore variations of mindfulness in different demographic strata. To the best of our knowledge, this is the first validation of this scale in an Indian sample.

The results suggested that MAAS can be reliably used in the Indian population. The Q-Q scatterplot indicates that the mindfulness score is normally distributed in the sample and represents the single construct. The normal distribution of the average MAAS score was corroborated by other studies.[29] The scale reliability in this study was 0.83 similar to the reliability scores in other studies. Studies reported the Cronbach's α scores from 0.83 to 0.92.[1,29,31] The split-half reliability also indicated internal consistency corroborating prior studies.[1]

A Brazilian translation of the MAAS found the scores as unidimensional with adequate validity, except for the criterion validity.[1] The single-dimensional structure of MAAS was also confirmed by an exploratory and confirmatory factor analysis, with high reliability (Cronbach's α = 0.92).[31] Another study, however, did not observe the unidimensional factor structure of MAAS in a confirmatory factor analysis for the "male" subsample.[29] The convergent validity of MAAS was indicated by significant positive correlations with other scales (e.g. satisfaction with life scale, and four subscales of FFMQ scores), negative correlations with other related constructs indicated discriminant validity, and repeated measures indicated temporal stability.[31]

A comparison between MAAS and a short version of the FMI found both as valid, reliable, and unidimensional measures with a moderate correlation between the scores of the two instruments indicating convergent validity. Both FMI and MAAS scores adequately predicted burnout and work engagement and, thus, showed predictive validity, but MAAS was better in convergent and predictive validity.[28]

Uni- or multidimensionality

The factor analysis of this study for the 15 items of MAAS indicated a 4-factor structure. Many research noted the unidimensionality of MAAS but a few differed with this observation.[30] Factor analysis in this study also reports four factors. It is to be noted that the convergent analysis study for FFMQ research found four factors such as observing, acting with awareness, not judging, and nonreactive dimensions to be convergent.[8]

In this study, we find that inattention to present activity, being lost in thought, not having circumstantial awareness, and a late realization of feelings characterizes mindfulness factors of MAAS. Earlier research also found that the unidimensional

factor structure of MAAS was not observed for the "male" subsample.[29] Furthermore, the inability of MAAS items to discriminate between mindfulness levels was observed, and therefore, changes to items were suggested.[32]

Prior studies, however, found MAAS as a single-factor structure and invariant across the groups.[33] A 5-item short version of the MAAS was proposed, and the original instrument was examined as a single factor model.[34]

The unidimensional measure of mindfulness and the original proposition of mindfulness as a multidimensional construct present a contradiction.[6] Some argue that dispositional mindfulness has to be mapped onto well-established personality constructs. Dispositional mindfulness is a multidimensional construct and exists independently from other forms of mindfulness such as learned or cultivated mindfulness. Different personality traits and mindfulness have associations, yet the latter is conceptually unique.[35]

The mean of the following items, MAAS4 (walk quickly without paying attention), MAAS5 (not to notice feeling), MAAS6 (forgetting names), MAAS11 (listening to someone with one ear), and MAAS13 (preoccupation with the future or the past), was close to the theoretical mean (3.5). The SDs of the following items, MAAS4, 6, 11, and 13, were higher (1.5) compared to others. The SD of MAAS 5 was 1.48. Furthermore, the coefficient of variation (SD/mean) of MAAS1, MAAS11, MAAS4, MAAS5, MAAS6, and MAAS13 was ≥ 0.37, but the CV for all other items varied from 0.27 to 0.32. Thus, these items in the scale require close scrutiny.

Sample size is one of the important criteria in the exploratory factor analysis. The KMO measure of sampling adequacy, sample-to-variable ratio (n/p), correlation matrix, and the method of extraction influence the sample size. The rule of thumb for the n/p ratio indicates a range from 3 to 20. In this study, the n/p ratio was 27, and the KMO measure was adequate and significant.[36] There is also evidence of sample size from 30 to 1000 used in prior research.[37]

Demographic variations on mindfulness

Prior studies with different mindfulness instruments indicated inconsistent results regarding the variation concerning demographic characteristics.[29] However, many research designs used demographic characteristics as significant moderators. Some important findings of this study need further discussion.

Genders

Like many other traits, mindfulness was expected to vary between genders. However, this study did not find a significant difference in the scores of MAAS between genders. Similar observations were noted in other studies as well.[29,38] Interestingly, the incremental change due to mindfulness interventions was observed to be higher for males. Research also indicated that companies with a higher number of older, male, graduate, and racially diverse employees are likely to benefit more from mindfulness-based interventions compared to companies with different demography.[39]

Age

In this study, younger adults showed significantly lower mindfulness scores compared to adults and older adults. However, the difference between adults and older adults was not significant. A significant difference in mindfulness by age was not reported consistently.[38] The age difference was observed in the FFMQ instrument for acting with awareness and nonjudging of inner experience.[9] Thus, there are scale-related differences in capturing variability.

Marital status

In our study, the unmarried group had significantly lower mindfulness scores compared to married groups. The gender-related differences were observed in romantic relationships. The levels of overall mindfulness, acting with awareness by female partners, led to greater relationship stability but not satisfaction, mindfulness influenced the longitudinal satisfaction and stability of romantic relationships.[40] A higher variance in mindfulness among women reported in prior studies was corroborated in this study.[41]

Education

Many studies advocated integrating mindfulness-based intervention in education due to beneficial outcomes. This study did not find any significant differences in overall or item scores based on the level of education. A prior study also did not report any significant difference in mindfulness based on educational background, religion, race, and family.[38]

Economic status

There are no significant differences in overall or item scores based on economic status. No significant difference by family background was also reported earlier.[38] Literature suggested a possible integration of economic preference and mindfulness explaining variations in life outcomes.[42] However, the FMI short form showed significant differences in mindfulness by income but not by education, employment status, age, gender, or marital status.[43]

Occupation

In this study, the mindfulness score for students was significantly lower compared to all other groups ($P < 0.001$). Few studies compared the differences in mindfulness among professions. A study reported hospital nurses to have higher than normal levels of mindfulness.[19] Another study did not find a significant difference in mindfulness between mental health workers and master in social work students.[44]

Mindfulness did not differ by education but it differed by the occupation as students, possibly due to a need to comply with academic engagements. A lower score for students also indicated a possible scope for mindfulness intervention. The upper-middle-income group showed nonsignificant but a lower score. It is possible that the level of engagement externally or individually driven could cause this change in the score. An autonomous lifestyle or activity can show higher mindfulness compared to an externally driven lifestyle or activity.

Limitations

Limitations of convenience and snowball sampling in this study were to some extent overcome by a large sample size. The sample consisted of individuals who could understand English, but a translated instrument could be tested in wider groups. Admittedly, this study focused on the MAAS scale and did not compare it with other similar scales or constructs in an Indian sample which was not attempted earlier. The construct validity of MAAS by correlating with other well-being factors or including any comparative scales was not within the scope of this study. Similarly, the self-reporting of demographic variables and the noninclusion of samples from below-poverty-line strata are acknowledged as a limitation. Future validation studies might consider a more specific population and explore the translated version of the scale in local Indian languages.

CONCLUSIONS

The study results suggest MAAS can be reliably used in the Indian population. However, it requires further validation in specific study populations, for example, in clinical and nonclinical settings. There were MAAS score variations with age, marital status, and occupation but not with gender, education, and economic status. These variations are not consistent across studies. Most study designs are specific to a profession with mindfulness intervention and its impact on other related variables. Interdisciplinary and cross-sectional studies can help in gaining deeper insights. Future studies should consider comparison with well-being and other appropriate measures.

Conflicts of interest

There are no conflicts of interest.

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