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Reliability and Validity of a Self-rated Analogue Scale for Global Measure of Successful Aging

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Objective: *Dimension-specific objective measures are criticized for their limited perspective and failure to endorse subjective perceptions by respondents, but the validity and correlates of a subjective global measure of successful aging (SA) are still not well established. We evaluated the reliability and validity of a self-rated analogue scale of global SA in an elderly Singaporean population.* **Design:** *Cross-sectional data analysis using a comprehensive questionnaire survey.* **Participants and setting:** *489 community-dwelling Singaporeans aged 65 years and over.* **Measurements:** *Self-rated SA on an analogue scale from 1 (least successful) to 10 (most successful) was analyzed for its relationship to criterion-based measures of five specific dimensions (physical health and function, mental well-being, social engagement, psychological well-being, and spirituality/religiosity), as well as outcome measures (life satisfaction and quality of life).* **Results:** *Self-rated SA was significantly correlated to measures of specific dimensions (standardized β from 0.11 to 0.39), most strongly with psychological functioning (β = 0.391). The five dimension-specific measures together accounted for 16.7% of the variance in self-rated SA. Self-rated SA best predicted life satisfaction ($R^2 = 0.26$) more than any dimension-specific measure (R^2 from 0.05 to 0.17). Self-rated SA, vis-à-vis dimension-specific measures, was related to a different set of correlates, and was notably independent of chronological age, sex, education, socioeconomic status, and medical comorbidity, but was significantly related to ethnicity.* **Conclusion:** *The self-rated analogue scale is a sensitive global measure of SA encompassing a spectrum of underlying dimensions and subjective perspectives and its validity is well supported in this study.* (Am J Geriatr Psychiatry 2014; 22:829−837)

Key Words: Successful aging, measurement, validity, reliability

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Population ageing is associated with an increasing societal burden of care, especially acutely in Asia and the developing world. Successful aging (SA) is, therefore, an important area of research that is of particular relevance and importance to the design of programs to promote well-being among older people.[1]

Diverse approaches in conceptualizing and defining SA have resulted in a number of competing operational models of SA today. The biomedical model embodied by the expanded definition by Rowe and Kahn[2] focuses on the avoidance of disease and maintenance of physical and cognitive functioning and active life engagement. Sociological models based on the continuity and other theories emphasize social functioning, and view successfully aging individuals[1,3] as maintaining high levels of social activity, interaction, and participation.[1] Psychological models of SA variously emphasize mastery/growth, positive adaptation, resilience, and the ability to possess and use psychological resources for coping with the challenges of the aging process.[4−6] There is, however, emerging consensus that SA is a multi-dimensional construct.[7,8] Furthermore, some authors have argued that positive religiosity/spirituality is a missing element in the SA literature, and should be regarded as integral to SA.[9]

Dimension-specific formulations have been criticized for failing to incorporate subjective perspectives of older adults themselves.[10,11] Many authors emphasize that it is important to elicit older people's views and perceptions of what it means for them to age well.[8,12] Research show that many older adults consider themselves to be aging successfully even though the biomedical criteria do not categorize them as such.[6,13,14] More older adults were rated as "successful agers" by a subjective measurement scale, whereas fewer were rated as successful agers when objectively defined criteria were applied.[10,15]

A single-item analogue scale is arguably a sensitive tool in measuring subjective global SA.[1] Analogously, a global measure of subjectively rated health has been found in numerous studies to predict mortality independently of disease and disability among elderly persons.[16] Self-rated SA may also be a similarly important and valid measurement construct, but few studies have established the validity of a subjective global measure of SA. In this regard, the choice of external criteria to validate subjective SA measure is also not straightforward. Nevertheless, many studies have regarded life satisfaction and quality of life as outcome indicators and criterion measures of SA.[17]

In this study, we examined the construct and criterion validity of a self-rating scale of SA in an aging Singaporean population. Based on the holistic view that SA encompasses a spectrum of underlying dimensions, we hypothesized that subjective self-rating of global SA was correlated to measures of specific dimensions of SA but was a stronger predictor of life satisfaction and quality of life. We examined the correlates of successful aging, and hypothesized that the subjective global measure of SA, vis-à-vis dimension-specific measures, was related to a different set of correlates. Given the subjective perspective of self-rated SA measures, we predicted that it would be independent of age, sex, education, and health status.

METHODS

Participants and Study Design

This study (Singapore Study of Successful Aging) formed part of a second wave population-based study of aging and health (Singapore Longitudinal Aging Studies) that enrolled 2,800 community-dwelling older adults aged 55 years and greater living in the south-central and southwest of Singapore in 2009−2011. Participants were recruited through door-to-door census and completed an extensive range of interviews and physical examinations.

The participants in the Singapore Study of Successful Aging were a subsample (N = 500) of the Singapore Longitudinal Aging Studies cohort who were aged 65 years and greater living in one locality (Bukit Merah) in the south-central region. Eligible participants were Singaporean citizens or permanent residents who were able to give informed consent. Participants too frail or unable to complete the interview, for reasons such as from post-stroke aphasia or profound dementia, were excluded. Respondents who consented to participate in the study represented a response rate of 78.5%. The study was approved by the National University of Singapore institutional review board.

Questions from the Stein Research Institute for SA Questionnaire developed at the University of

California, San Diego[13,18] were adapted for local use. The original questionnaire was translated into Chinese and Malay, and items deemed culturally and linguistically biased were given their semantic equivalents in the local languages/dialects. The questionnaire was administered in face-to-face interviews conducted in the language and dialect of preference at the respondents' homes by a multi-ethnic team of trained research nurses.

Measurements

Self-rating of global successful aging. Participants were asked to rate their own level of SA on an analogue scale from 1 to 10 (1 = least successful to 10 = most successful). The statement asked: Where do you rate yourself in terms of "successful aging?"[13,18] To assess the test–retest reliability of the scale, research nurses subsequently administered the scale to the same participants in a convenience sample (N = 33) twice: at baseline and about 2 weeks later.

Physical Health and Function

Chronic illness. The presence of illness was assessed by asking participants to indicate whether they had been diagnosed and treated for any one or more from a list of 20 chronic medical conditions, including high blood pressure, diabetes, coronary heart disease, cardiac failure, stroke, arthritis, asthma/COPD, cancer, and others.

Instrumental activities of daily living.[19] Participants were asked how much help they required for performing eight tasks which include using telephone, traveling, shopping, preparing meals, housework, doing laundry, taking medicine, and managing money.

Self-reported health status. Participants were asked to rate their own health on a five-point scale (1 = poor to 5 = excellent).

Measures of Mental/Cognitive Well-being

Cognitive Failures Questionnaire [CFQ[20]]. Daily living failures in memory, perception, and motor control were assessed by 20 items from the CFQ questionnaire including questions such as "Do you forget appointments?" and "Do you leave important phone calls, or letters unanswered for days?" Each item was scored on a five-point scale (1 = never to

5 = very often). Summed scores ranged from 0 to 80 and higher scores indicate poorer cognition.

Geriatric Depression Scale-15 items (GDS-15). Depressive symptoms were assessed and scored (0, 1) on 15 items using a locally translated and validated version of the GDS-15.[21] A GDS-15 score of 5 or higher denotes clinically relevant threshold level of depressive symptoms.

Self-reported Mental Health. Participants were asked to rate their own mental health from a scale of 1–5 (1 = poor to 5 = excellent).

Social Engagement

Leisure-time activities. Participants reported how often during the past month (1 = never to 6 = everyday) they participated in social, productive, and individual activities from a list that included reading, volunteering, cooking, visiting family and friends, and engaging in sports activities/exercises such as swimming or walking.

Social Support/network with Friends and Family. This was assessed by how often friends or family members made participants feel loved and cared for; were willing to listen when participants need to talk about their worries/problems; were willing to help participants with daily tasks such as shopping; gave participants advice about medical, financial, or family problems; made too many demands on participants; were critical of what participants do; and whether participants felt lonely. Each item was scored on four-point scale with higher scores indicating greater support.

Measures of Psychological Well-being

Resilience. Resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC),[22] a 25-item questionnaire with each item scored on a five-point scale (0 = not true at all to 4 = true nearly all the time). Scores ranged from 0–100; higher scores indicate greater resilience. Factor analysis of the scale in older cohorts[23] yielded four factors: 1) personal control and goal orientation, 2) adaptation and tolerance for negative affect, 3) leadership and trust in instincts, and 4) spiritual coping.

Mastery. The Pearlin Mastery Scale (LASA-D)[24] was used to assess the extent of participants' sense of control over life outcomes. Examples of questions include: "I often feel helpless in dealing with the

problems of life" and "What happens to me in the future mostly depends on me." Each item was scored on a four-point scale (1 = strongly agree to 4 = strongly disagree), and higher summed scores indicate greater mastery.

Optimism. The Life Orientation Test-revised (LOT-R),[25,26] measuring individual differences in generalized optimism versus pessimism, was used. Examples include "In unclear times, I usually expect the best" and "I rarely count on good things happening to me." Each of the six items were scored on a five-point scale (1 = strongly disagree to 5 = strongly agree) and higher summed scores indicate greater optimism.

Measures of Spirituality and Religiosity

Participants were asked five questions relating to spiritual/religious activities and beliefs. Items were "How often do you attend church, synagogue, or other religious meetings?"; "How often do you spend time in private spiritual activities, such as prayer/mediation"; "In my life, I experience the presence of the Divine"; "My spiritual beliefs are what really lie behind my whole approach to life"; and "I try hard to carry my spiritual beliefs over into all other dealings in life". Each item was scored on a six-point scale (0 = never/definitely not true to 5 = more than once a week /definitely true). Greater scores (range: 0–25) indicate more spiritual/religious engagement.

Outcome Measures

Health-related quality of life. This was measured using the 36-item Short-Form Health Survey (SF-36),[27,28] which has been validated for use in the local population.[29] Weighted summed scores were calculated for Physical Component Score (PCS) and Mental Component Score (MCS), ranging from zero (lowest level of functioning) to 100 (highest possible level of functioning).

Life satisfaction. Life satisfaction was measured using two measures. The Satisfaction with Life Scale SWLS,[30] a validated five-item measurement scale, assesses general satisfaction with life. Sample questions include "In most ways my life is close to my ideal" and "The conditions of my life are excellent", each scored on a seven-point scale (1 = not at all true to 7 = absolutely true); higher summed scores indicate better life satisfaction. Global self-satisfaction was measured using a single item asking respondents to rate their overall satisfaction with life during older adulthood (65+ years) on a 10-point scale (1 = not at all satisfied to 10 = very satisfied).

Dimensional Measures of Successful Aging

The raw scores of component measures of physical well-being (IADL, chronic illness and self-reported health status), mental well-being (CFQ, GDS-15, and self-reported mental health), social well-functioning (level of social/productive/individual activities, and amount of social support/ network from friends and family), and psychological well-functioning (CD-RISC, LASA-D, and LOT-R) were recoded for higher scores to indicate better functioning. The scores were converted to z-scores and averaged into a single summary measure of physical well-being, mental well-being, social well-functioning, psychological well-functioning, and spiritual well-being.

Statistical Analyses

Data from 489 participants were analyzed after excluding those with incomplete data. The relationships between dimensional and global measures of SA were explored in linear regression models that analyzed each of the dimensional measures individually as predictor variables of self-rated global SA score (DV), and in hierarchical models added sequentially the five dimensional measures and evaluated the change in model R^2.

We evaluated the criterion validity of the self-rated global SA by examining it as an independent variable in linear regression analyses predicting two outcome indicators, life satisfaction, and quality of life. The latter included two measures of life satisfaction: the single item of global life satisfaction and the SWLS; and the SF-36 PCS and MCS measures of quality of life. Its model R^2 values were compared with those of separate models of dimensional measures of SA predicting life satisfaction and quality of life measures.

Finally, we used forward stepwise multiple regression analyses to identify significant independent correlates of global and dimensional measures of SA, using p less than 0.20 for inclusion and p less than 0.05 for retention in the model. All analyses were done using Statistical Package for Social Sciences, version 18 (SPSS, Inc., Chicago, IL).

RESULTS

Study Sample Characteristics

The study sample characteristics are shown in Table 1. The mean age of participants was 72 years, there were slightly more women, and the majority were of Chinese ethnicity. The mean score of self-rated SA was 6.8. Test–retest reliability of the scale was very high (r = 0.93, N = 33, p <0.001).

Relationship Between Dimensional and Global Measure of SA

Simple regression modeling (Table 2) showed that all the dimensional measures of SA used were significantly correlated with self-rated global measure of SA, with the psychological measure being most strongly correlated and accounting for the most variance (16%). In hierarchical models, the consecutive inclusions of mental, social, psychological, and spiritual dimensions onto the base biomedical model (physical health and functioning) resulted in statistically significant incremental increase in the variance of self-rated global SA accounted (model R^2 values). The complete multi-dimensional measure of SA using all the components accounted for almost 17% of the variance in self-rated SA.

Prediction of Life Satisfaction and Quality of Life

Table 3 showed the results from linear regression analyses comparing the performance of the self-rated global versus dimensional measures of SA in predicting life satisfaction and quality of life. Compared with dimensional measures of SA, self-rated SA measure was most strongly associated with both single-item and multiple-item measures of life satisfaction. Next to the psychological measure of SA, self-rated SA was most strongly associated with SF-36 MCS measure of quality of life, but was least associated with SF-26 PCS measure of quality of life.

Correlates of Successful Aging

In stepwise regression analyses of sociodemographic predictors of dimensional and self-rated measures of SA (Table 4), chronological age was the only significant sociodemographic correlate ($F_{(1, 397)} = 34.89$, p <0.001) for the biomedical model of SA. Chronological age,

TABLE 1. Characteristics of Study Sample (N = 489)

	N Mean	% (SD), range
Age, yr, mean (SD)	72.2	(5.7), range: 65–93
Sex		
Female	294	60.1
Male	195	39.9
Ethnicity		
Chinese	416	85.1
Malay	52	10.6
Indian	21	4.3
Marital status		
Single	31	6.3
Married	263	53.8
Widowed	161	32.9
Separated, divorced	30	6.1
Living arrangement		
Alone	104	21.3
With spouse/children	355	72.6
With friends, others	26	5.3
Education		
6 years or less	378	78.9
More than 6 years	101	20.7
Housing type		
2-room or smaller	147	30.1
3-room or larger	321	65.6
Chronic illness		
More than 3	43	8.8
Self-rated health		
Good to excellent	353	72.2
IADL (8 items)		
Independent on all items (0)	377	77.1
Self-rated successful ageing	6.8	(1.6), range: 2–10
Social/productive/physical activities score	11.0	(4.82), range: 1–24
Social support score	16.7	(3.7), range: 4–21
GDS-15 score	1.2	(2.1), range: 0–13
GDS-15 score <5	442	90.4
Cognitive failure scores	61.8	(9.8), range: 21–80
Resilience score	60.3	(11.4), range: 18–100
Mastery score	19.2	(2.4), range: 11–38
Optimism score	20.1	(2.4), range: 14–27
Religiosity and spirituality score	11.7	(8.3), range: 0–25
SF-36 MCS	54.3	(7.1), range: 24.76–67.92
SF-36 PCS	47.5	(8.1), range: 19.82–60.50
Global self-satisfaction	7.1	(1.9), range: 1–10
SWLS score	24.5	(5.7), range: 8–35

Notes: Test: Descriptive statistics for mean and proportion.

GDS-15: Geriatric Depression Scale; IADL: Instrumental Activities of Daily Living; SF-36 MCS: Short-Form Health Survey Mental Component Score; SF-36 PCS: Short-Form Health Survey Physical Component Score; Global Self-satisfaction: Self-satisfaction at present older adult life stage [single item, scale from 1–10]; SWLS: The Satisfaction with Life Scale.

education, housing type, sex, and marital status were significant correlates of the social functioning model ($F_{(5, 405)} = 15.77$, p <0.001). For the psychological model, education, housing type, and ethnicity were significant final correlates ($F_{(3, 426)} = 11.55$, p <0.001). Chronological age, education, ethnicity, and housing type were

TABLE 2. Simple Correlation/ Regression Analyses of Global Successful Aging Score (Dependent Variable) Predicted by Dimensional Measures of Successful Aging (N = 498)

Independent variables: successful ageing models	Standard β	p	F-test value	df	R^2	R^2 Change
Uni-dimensional models						
Physical health and function	0.182	<0.001	15.6	1,456	0.033	
Mental well-being	0.270	<0.001	33.8	1,432	0.073	
Social functioning	0.139	<0.01	8.92	1,456	0.019	
Psychological	0.394	<0.001	87.7	1,477	0.156	
Spirituality	0.110	<0.05	6.0	1,488	0.012	
Multi-dimensional models						
Physical health and function	0.182	<0.001			0.033	0.033
Physical health and function + Mental	0.273	<0.001	33.9	1,421	0.075	0.042[a]
Physical health and function + Mental + Social	0.297	<0.001	38.0	1,393	0.088	0.013[a]
Physical health and function + Mental + Social + Psychological	0.383	<0.001	66.2	1,386	0.147	0.059[a]
Physical health and function + Mental + Social + Psychological + Spirituality	0.409	<0.001	77.4	1,386	0.167	0.020[a]

Notes: Test: Linear regression models. Total Multiple R^2: 0.167. Physical health and function: IADL; Chronic Illness, Self-reported health status; Mental: Cognitive Failures Questionnaire, GDS15, Self-reported mental health; Social: Leisure-time physical, social and productive activities, Social support/network from friends and family; Psychological: CD-RISC (Resilience), Pearlin Mastery scale, Life orientation test (Optimism); Spirituality/Religiosity: Amount of engagement in such activities.
[a]p <0.01.

significant correlates of the biopsychosocial model ($F_{(4, 361)} = 13.98$, p <0.001). Finally, for the self-rated global SA model, Indian ethnicity was the only significant negative correlate ($F_{(1, 438)} = 7.55$, p = 0.006)

DISCUSSION

In this study, we found good support for the validity of a self-rated global measure of SA. It had excellent test–retest reliability, and its significant correlations with dimensional measures of SA were consistent with its attribute as a measure encompassing the spectrum of underlying dimensions of SA (physical health, mental well-being, social functioning, psychological well-functioning, and religiosity/spirituality). Its strongest correlation with psychological functioning accords with studies indicating that older adults strongly identified psychological well-being, more than physical well-being- to be especially important for aging well.[14,18]

There was also good empirical support for the contribution of positive religiosity/spirituality, although relatively small, to SA. This is consistent with the argument by some authors that spirituality should be an element in SA, and with empirical findings in previous studies conducted with Malaysian Malays,[31] and Singaporean Chinese,[11] and Indians.[32]

Although the measures of multiple dimensions of SA were significantly associated with self-rated global measure of SA, a large proportion of the underlying dimension(s) of SA remained unmeasured. This may be due to unmeasured or unknown domains in the dimensional construct of SA, and inherent limitations of the dimensional measurement scales used. As no measurement scales are likely to fully tap and measure all the possible domains, the use of a global measure of SA is justified and supported by this study.

The criterion-based validation of the self-rated global measure of SA was supported in this study showing it as a stronger predictor of life satisfaction, in comparison with dimensional measures of SA. The self-rated global measure of SA, next to the psychological measure of SA, was also found to be strongly predictive of the SF-36 mental component score of health-related quality of life. Because the SF-36 is primarily designed to measure *health-related* quality of life, its use as a measure of quality of life has limitations in this study. This explains the poor performance of the self-rated global measure of SA in predicting the SF-36 PCS measure of physical dimension of quality of life, and the results are therefore not surprising. On the other hand, dimensional measures (particularly biomedical) were better than self-rated global SA in predicting SF12-PCS measure of quality of life.

Another limitation is the conceptual ambiguity with regard to the use of life satisfaction and quality of life as appropriate outcome indicators for

TABLE 3.   Regression Analyses of Successful Aging Models as Predictors of Life Satisfaction and Quality of Life

Successful ageing models	Global Self-satisfaction					Satisfaction with Life [SWLS]					SF-36 (PCS)					SF-36 (MCS)				
	β	p	F-test value	df	R²	β	p	F-test value	df	R²	β	p	F-test value	df	R²	β	p	F-test value	df	R²
Biomedical	0.294	a	39.4	1,419	0.086ᵃ	0.223	a	21.9	1,421	0.050ᵃ	0.488	a	131.5	1,421	0.238ᵃ	0.291	a	38.9	1,421	0.085ᵃ
Social Functioning	0.225	a	24.0	1,453	0.050ᵃ	0.252	a	30.9	1,455	0.064ᵃ	0.302	a	45.7	1,455	0.091ᵃ	0.212	a	21.5	1,455	0.045ᵃ
Psychological	0.400	a	90.3	1,474	0.160ᵃ	0.411	a	96.4	1,476	0.169ᵃ	0.318	a	53.5	1,476	0.101ᵃ	0.433	a	110.1	1,476	0.188ᵃ
Biopsychosocial	0.441	a	92.6	1,384	0.195ᵃ	0.409	a	77.5	1,386	0.167ᵃ	0.457	a	101.7	1,386	0.209ᵃ	0.364	a	58.7	1,386	0.132ᵃ
Self-rated global SA	0.537	a	196.6	1,484	0.289ᵃ	0.512	a	173.2	1,487	0.263ᵃ	0.278	a	40.8	1,487	0.077ᵃ	0.369	a	76.7	1,487	0.136ᵃ

Notes: Test: Linear regression analyses.
   Biomedical Model: Physical health and function (IADL, Chronic Illness, Self-reported health status) and mental (Cognitive Failures Questionnaire, GDS15, Self-reported mental health); Social Functioning Model: Leisure-time physical, social and productive activities, Social support/network from friends and family; Psychological Model: CD-RISC (Resilience), Pearlin Mastery scale, Life orientation test (Optimism); Biopsychosocial Model: All the above + spirituality/religiosity (Amount of engagement in such activities); Global Self-satisfaction: Self-satisfaction at present older adult life stage [single item, scale from 1−10]; SWLS: Satisfaction with Life scale; SF-36 MCS: Short-Form Health Survey Mental Component Score; SF-36 PCS: Short-Form Health Survey Physical Component Score.
   ᵃp <0.001.

TABLE 4.   Stepwise Regression Analyses of Significant Independent Correlates of Global and Dimensional Measures of Successful Aging (Dependent Variables)

Model	Correlates	Unstandardized β	Standardized β	t-test	df	p
Biomedical	Age	0.659	0.242	4.98	1	0.000
Social functioning	Education	0.510	0.221	4.72	1	0.000
	Age	0.644	0.182	3.99	1	0.000
	Housing type	0.284	0.139	2.92	1	0.004
	Sex	−0.321	−0.157	−3.26	1	0.001
	Marital status	0.258	0.127	2.60	1	0.010
Psychological	Education	0.408	0.184	3.87	1	0.000
	Housing	0.287	0.144	3.02	1	0.003
	Indian ethnicity	−0.494	−0.100	−2.14	1	0.033
Biopsychosocial	Age	0.577	0.271	5.55	1	0.000
	Education	0.166	0.132	2.66	1	0.008
	Malay ethnicity	0.339	0.169	3.43	1	0.001
	Housing type	0.133	0.116	2.30	1	0.022
Self-rated global SA	Indian Ethnicity	−1.011	−0.130	−2.75	1	0.006

Notes: Test: Stepwise multiple regression analyses, with final models shown. Candidate predictor variables: Age : 80+ years (0) vs 65−80 years (1); Sex: Female (0) vs males (1); Education: <6 years (0) vs >6 years (1); Housing Type: 3-rm or small (0) vs larger than 3-rm (1); Marital Status: Widowed, single, divorced, separated (0) vs married (1); Ethnicity 1: Chinese (0) Malay (1); Ethnicity 2: Chinese (0) Indian (1).

criterion-based evaluation. They bear close semantic resemblance to successful aging, and life satisfaction and quality of life are sometimes viewed as precursors or constituents of SA. SA, however, may be appropriately used as a predictor (or outcome) variable in different analytical contexts. An analogy is that health status is often analyzed as an outcome variable but may be viewed as a predictor variable for mortality.

We examined and found different sets of correlates of SA for self-rated global and dimensional measures of SA. It is particularly meaningful to note that the self-rated global measure of SA was not associated with chronological age, sex, education, and socioeconomic status (except Indian ethnicity). This is consistent with the subjective perspective of SA discussed earlier, and the underlying notion that perceived SA transcends the limitations of demographic, socio-economic and health status. In other words, older individuals may still consider themselves to be aging well regardless of their chronological age and sex, or even if they were uneducated or poor. Thus, its non-dependence on chronological age, sex, education, and socioeconomic status is arguably a desirable attribute in a measurement tool for use in many situations.

A caveat, however, is that the observed lack of correlations may not be surprising as correlates of SA have been found to be fairly inconsistent across studies,[10] possibly explained by cultural perceptions of aging. Two previous U.S. studies have used the self-rated global measure of SA. The first study,[13] like our study, found that self-rated SA was not related to chronological age, sex, ethnicity, marital status, education or income, whereas the second study[18] found that self-rated SA was related to chronological age and education. In different populations and culture, therefore, it is possible that, depending on the relative importance of underlying domain components of SA and the relative prevalence of their correlates, self-rated SA may have a few demographic correlates. This should be examined in further studies.

Indian ethnicity emerged as the only significant negative correlate of self-rated global SA. This ethnic group constituted the smallest percentage of the sampled population (4.3%). Indian ethnicity was also a significant negative correlate with SA in the psychological model, and this is consonant with the parallel finding that self-rated SA was mostly correlated with psychological functioning. Only Malay ethnicity was a significant positive correlate of SA in the bio-psychosocial model, but not in the global SA model. Existing literature attests to the importance of ethnicity and culture as a cross-cutting factor in SA. Culture embraces systems of ideas, values, and customs in regards to the aging process that influence societal expectations and behaviors toward older people,[33] and older individuals' personal views, expectations, and adaptations in regard to their own aging process and well-being.[34,35] Further studies of the ethnic differences and cultural dimensions of self-rated SA are desirable.

In the present study, the self-rated global SA scale was administered by face-to-face interviews in contrast with other studies, which used the same scale via take-home[13] and mail-in[18] survey methods. Due to the high illiteracy rate of this study population, face-to-face interview was deemed desirable to ensure that the respondents understood well what the question asked. The notion of successful aging and many synonymous terms is relatively recent, and its incorporation into the language of a particular culture is likely to vary depending on its stage of socioeconomic development. Hence, it is essential that the single-item scale administered by any method in any culture be based on reasonably good understanding of the term.

The present study supports the validity of a simple analogue scale measuring subjective global SA. Its measurement reflects the sensitive valuation by the respondent, capturing implicit information that are otherwise not extracted with criteria-based measures. This has important implications for policies and programmes planning. Criterion-based dimensional measures of SA, given some practical limitations, remain potentially useful in program monitoring and evaluation for relevant outcomes. On the other hand, self-rated global SA measured with a simple analogue scale may be recommended as a universally acceptable standard measurement of global SA for use in population monitoring and comparative analyses.

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