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ORIGINAL ARTICLE

Ageing Happily in Ghana: How Does Social Inclusion Contribute?

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Abstract

Background: Promoting happiness has become increasingly important in old age for a wide range of reasons. In this study, we aim to examine the association between social inclusion (SI) and happiness among older adults in Ghana and identify the mediating factors.

Methods: The study included 1201 community-dwelling adults aged ≥50 (mean age = 66.4 ± SD 11.9 years; 63.3% female) from the 2016–2018 Ageing, Health, Psychological Well-being, and Health-seeking Behaviour Study. We assessed happiness with a self-rated and cross-culturally validated item on a five-point scale. SI was operationalised using the modified Berkman–Syme Social Network Index. The hypothesised associations were evaluated by hierarchical regressions and bootstrapping techniques from Hayes' PROCESS macro programme.

Results: The prevalence of happiness was 24.3% (all of the time), 43.6% (most of the time), 28.3% (little of the time), and 3.7% (none of the time). After controlling for potential confounders, higher SI was associated with increased levels of happiness (odds ratio (OR) = 1.36; 95% confidence interval (CI) = 1.16–2.51). Aside from family/friends contacts, all other SI domains positively influenced happiness (OR = 1.45–1.81). The link between SI and happiness was mediated by depressive symptoms (65.2%), generalised anxiety (30.1%), and sleep problems (9.5%).

Conclusions: Our data suggest that psychological factors may largely explain the positive SI-happiness link. Efforts should target these factors to promote happiness in old age. Longitudinal analysis may confirm our findings.

INTRODUCTION

Various stressful life transitions such as poor health outcomes, role loss and irregular incomes, and widowhood or loss of close relatives increasingly occur in old age.[1] These life course-related changes can compromise old age psychological well-being and increase loneliness and perceived social isolation, prime risk factors for impaired positive affect such as reduced happiness.[2] Happiness has been described as a state of emotional well-being and the degree to which an individual perceives their life favourably.[3] Research from high-income countries has shown that happiness is a fundamental goal in a meaningful life[4] and an essential ingredient for successful ageing.

There are marked associations of happiness with better health outcomes, including functional independence, reduced cardiovascular disease risk, reduced morbidity, increased resistance to infection, and lower mortality among community-dwelling and clinically older adults.[5,6] Again, happiness has been

related to better work performance, more satisfying social life/activities, prosocial behaviours (e.g., volunteering), and as an important indicator of subjective welfare.[7,8] Given that happiness is a modifiable/ malleable socioemotional condition,[9] there is a growing interest in identifying easy-reach and cost-effective strategies for its promotion, especially in low- and middle-income countries (LMICs), where happiness in old age is low.[10] This may be important for long-term policy and public health goals to sustainably preserve the quality of life during old age.

A growing body of literature has demonstrated the effect of social inclusion (SI, defined broadly as the extent to which individuals are interconnected and embedded in the community) on happiness.[11] For example, a recent systematic review of 44 studies found that most studies reported a positive association between intergenerational engagement on cognitive and social outcomes, including happiness among older adults.[12] Lee[13] analyzed data from the eighth round of the European Social Survey among 10 768 individuals aged ≥65 years (mean = 73.75) from 23 countries and found that higher levels of social exclusion (i.e., limiting individuals' abilities to participate socially) were associated with lower odds of subjective well-being. Another large-scale observational study of 1200 older adults in the UK found that SI was associated with lower emotional well-being.[14] While research connecting SI to happiness-specific construct is generally limited, this evidence is mainly lacking in sub-Saharan Africa (SSA), despite the current growth rate of the older population in the region.[15] Studies on ways to promote happiness thus become a priority in SSA. Some studies have hypothesised that social interaction may enhance cognition and improve emotion regulation, reducing mental distress toward happiness.[12] Recent systematic reviews have shown that more social interactions relate to decreases in mental/psychological problems, including depression, anxiety, and sleep problems.[16–18] Moreover, our previous analysis found that sleep problems were negatively associated with happiness among older adults after adjusting for potential confounders.[46] Gyasi *et al*.[2] have also reported significant associations of poor sleep quality, loneliness, anxiety, and boredom, with happiness. However, there is a dearth of research on the mechanisms underlying the SI-happiness association. Estimating the potential pathways of SI to happiness in old age may be crucial for strategies to promote happiness/subjective well-being.

The aim of this study was thus to examine the association of SI and happiness in a large and representative sample from the SSA context and to explore the mediating role of mental and psychological factors, including generalised anxiety, depressive symptoms, and sleep problems in this association.

METHODS

Data source

This study analyzed the Aging, Health, Psychological Well-being, and Health-seeking Behaviour (AgeHeaPsyWel–HeaSeeB) Study data. This is a nationally representative, cross-sectional demographic, socioeconomic, and health-related questionnaire conducted in Ghana between 2016 and 2018.[19] Survey participants are composed of randomly selected (using a multistage clustered sampling design approach) noninstitutionalised individuals aged ≥50 years from six districts and metropolitan areas. There is no specific definition of who is older in Ghana. While many studies define older adults with an age cut-off of 60 or more years, the World Health Organization has recommended that adults 50 years or older should be considered when analyzing old age in the sub-Saharan African context, given the unique sociodemographic and health circumstances of those ≥50 years. Indeed, the World Health Organization-sanctioned research in the region has used a ≥50-year cut-off to define older adults. We, therefore, included individuals who have attained 50 years or older in our analysis for comparison's sake and also to include those who are likely to suffer from the so-called 'disease of the elderly' in our sample for a better representation and implications.

Detailed documentation regarding study design, the recruitment of study participants, and the measurement of study data has been described extensively in the previously published literature.[19] This overall analytic sample included 1201 community-dwelling older adults. Face-to-face interviews were conducted by trained staff using a standard questionnaire. Questionnaires were translated based on a standard procedure. The survey response rate was 96%. Written informed consent was obtained from all participants. Ethical approval was obtained from the Committee on Human Research, Publications &

Ethics (CHRPE), School of Medical Sciences, Kwame Nkrumah University of Science and Technology, and Komfo Anokye Teaching Hospital, Kumasi, Ghana (Ref: CHRPE/AP/507/16).

Definition of outcomes

Happiness

We assessed happiness levels with a widely used self-rated and cross-culturally validated single item.[7,20] Participants were asked, 'Over the past four weeks, have you been a happy person, taking all things together?' with the response options none of the time = 1, little of the time = 2, most of the time = 3, and all of the time = 4. This item constitutes a valid means of evaluating an individual's level of happiness, including older people.[20] Furthermore, research has shown that this measure of happiness is highly correlated with other indicators of hedonic well-being with a reasonable degree of convergent validity.[21]

Social inclusion (SI)

SI was measured with six indicators adapted from the Social Network Index,[22] including marital status, contact with family/friends, social participation, having someone to take oneself to the hospital, sharing concerns, and feeling a strong emotional bond with others.

The Social Network Index has been used by various studies to measure SI or isolation in old age, given that the specific component items define whether individuals are in contact with the social environment or not as included in our datasets. A score of 1 was assigned for affirmative response to marital status and 0 for otherwise. For family/friends contact and social participation, we set 1 point each for once/twice per month/once/twice per week/almost every day and 0 for never/once/twice per year. For having someone to take you to the hospital, someone to share concerns, and feeling a strong emotional bond with others, we assigned 1 point each for partially true/completely true and 0 for completely false/somewhat false/neutral. We created the SI index (range: 0–6); higher scores indicate higher levels of SI ($\propto$=0.891) and further dichotomised the score with 0–2 = o and 3–6 = 1. This dichotomisation is not unique as various studies apply different cut-off points depending on the distribution of the index.

Potential mediators

Depressive symptoms were assessed with the Center for Epidemiological Studies Depression Scale (CES-D-10).[23] The participants were asked 10 questions about their feelings and behaviours over the past week. Each item was scored on a four-point scale: 1 = rarely 2 = some or a little of the time, 3 = occasionally or a moderate amount of time, and 4 = most or all of the time. The items ranged from 10 to 40; higher scores reflect greater depressive symptoms. The effectiveness of CES-D-10 in older African populations has been shown.[24,25] Cronbach's alpha = 0.806 in this study.

The Generalized Anxiety Disorder (GAD-7), a seven-item screening tool for GAD, was used to assess *anxiety*.[26] The psychometric properties of the GAD-7 have been proven.[27] Each item was rated on a four-point scale: 1 = not at all to 4 = nearly every day, with a total score ranging from 7 to 28. The higher the score, the more the anxiety levels of a respondent. Cronbach's alpha = 0.897.

Sleep problems were assessed with two items strongly related to a fatigue-related questionnaire with modest-to-high sensitivity for detecting clinically relevant sleep problems in the general population.[28] 'Overall, in the last 30 days, (1) how much of a problem did you have with sleeping (e.g., falling asleep, waking up frequently during the night, or waking up too early in the morning)? and (2) how much of a problem did you have due to not feeling rested and refreshed during the day (for example, feeling tired, not having energy)?' Each item had five-point options from none = *1 to* extreme = 5. Previous studies have used these items.[29,30] A total score ranged from 2 to 10, with increasing scores indicating higher sleep problems—Cronbach's alpha = 0.830 in this study.

Covariates

Relevant demographic and medical information were analyzed as covariates based on previous research.[2,7,31] Respondents reported their age, gender, residence type, education level, employment, income (in Cedis), smoking, and alcohol intake (Table 1 provides details). Self-rated health was assessed by asking the participants to rate their current health: excellent = 1, poor = 5, with higher

Table 1 Characteristics of study sample – overall and by SI status

Variable	Total %/mean (SD)	SI status		*P*-value[†]
		Isolated %/mean (SD)	Included %/mean (SD)	
Number	1201	168 (14%)	1033 (86%)	-
Age, years	66.14 (11.85)	66.73 (11.53)	66.05 (11.89)	0.487
Gender				
Male	36.7	28.0	38.1	0.011
Female	63.3	72.0	61.9	
Residential status				
Rural	45.0	55.4	43.3	0.003
Urban	55.0	44.6	56.7	
Level of education				
Never	50.0	30.0	55.0	<0.001
Primary	36.1	48.1	33.2	
Secondary	8.7	10.1	8.3	
Tertiary	5.2	11.8	3.5	
Employment				
Not employed	55.6	64.9	54.1	0.009
Employed	44.4	35.1	45.9	
Household net income	307.98 (338.79)	198.70 (111.86)	324.61 (358.16)	<0.001
Smoking				
No	88.9	88.7	89.0	0.916
Yes	11.1	11.3	11.0	
Alcohol intake				
No	68.5	68.5	68.5	0.982
Yes	31.5	31.5	31.5	
Mobility limitations				
Not limited	60.1	51.2	61.6	0.011
Limited	39.9	48.8	38.4	
Number of chronic conditions	0.66 (0.79)	0.81 (0.93)	.64 (0.77)	0.011
Self-rated health	3.43 (0.84)	3.65 (0.78)	3.40 (0.84)	<0.001
Depressive symptoms	2.13 (0.77)	2.40 (0.85)	2.09 (0.75)	<0.001
Anxiety	1.94 (0.78)	2.20 (0.89)	1.89 (0.75)	<0.001
Pain interference	3.03 (1.26)	1.59 (0.49)	1.40 (0.49)	<0.001
Sleep problems	4.89 (1.89)	5.52 (1.90)	4.78 (1.87)	<0.001

[†] *P*-value is based on either an ordinal χ^2 test (for categorical variables) or an independent sample *t*-test (for continuous variables). SI, social inclusion.

scores reflecting poor health status. In addition, the number of chronic physical conditions based on self-reported diagnosed chronic conditions (hypertension/diabetes/stroke/chronic kidney diseases/arthritis/asthma/respiratory diseases/cancers/ulcers) and mobility were included. Finally, pain interference was assessed by asking respondents how pain has interfered with their normal activities, including work outside the home and housework,[32] with a standardised score ranging 0–100; higher scores indicated more pain interference.

Statistical analyses

First, we employed descriptive statistics to describe the characteristics of the sample. Means and standard deviations depicted the continuous variables, while proportions were used to show the categorical variables. Second, independent sample *t*-tests and Chi-squared tests were used to calculate the difference in the variables by SI status for continuous and categorical variables, respectively. Third, multivariable ordinal logistic regression models were fitted to evaluate the association between SI and happiness. Thus, hierarchical estimations were employed to assess the role of various sets of variables in the SI-happiness link. Model 1 controlled for age and gender. Model 2 additionally controlled for residence type, education, employment, and income. Model 3 (full model) further adjusted for smoking, alcohol intake, self-rated health, chronic physical conditions, mobility limitations, depression, anxiety, sleep problems, and pain interference. Finally, we evaluated the effect modification of the SI-happiness association by gender using an interaction term SI × gender in

Model 3. The Kolmogorov–Smirnov normality test indicated that all continuous variables were normally distributed and conformed to assumptions before analysis.

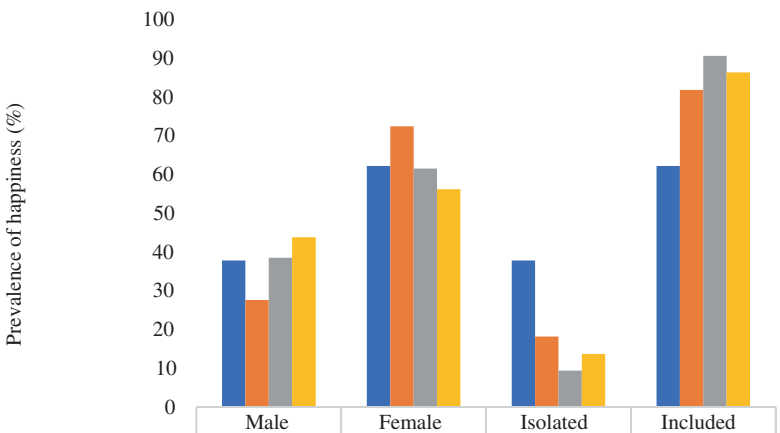
To identify the potential factors explaining the SI-happiness link, we used Hayes PROCESS macro version 4.0 (model 4).[33] This estimated the direct and indirect effects of SI on happiness with depression, generalised anxiety, and sleep problems as the mediators while adjusting for the potential confounders. The approach relied on bootstrapping using 95% confidence intervals (CI) with 5000 samples.[33] If the 95% CI of the mediation effect did not overlap zero (0), the mediation effect was considered statistically significant. All analyses were performed using SPSS 25.0 (IBM, Armonk, NY, USA) software with $P < 0.05$ as the statistically significant level.

RESULTS

A total of 1201 participants (mean age = 66.14, SD = 11.85 years; 63.3% females) were included in the study. Table 1 provides detailed characteristics of the study participants. Overall, the prevalence of SI was 86%. Also, 3.7% reported being happy none of the time, 28.3% little of the time, 43.6% most of the time, and 24.3% were happy all the time. All considered covariates, except age, smoking, and alcohol consumption significantly differed by SI status. For example, the socially included were more likely to be females, live in urban areas, have low education, be unemployed, and have lower mobility limitations (Table 1). For socially included, the prevalence of happiness was 62.2% (none of the time), 81.8% (little of the time), 90.6% (most of the time), and 86.3% (all of the time). Figure 1 shows that females and socially included were more likely to be happy than males and socially isolated. Thus, we found a linear increase in the prevalence of SI and female gender with increasing happiness levels in the overall samples.

Table 2 shows the multivariable ordinal logistic regression results. Controlling for sociodemographic variables, Models 1 and 2 found that SI was significantly associated with higher happiness levels (OR = 1.69). After adjusting for all potential lifestyle and health-related confounders (Model 3), the OR was slightly weakened but remained statistically significant (OR = 1.36; 95% CI = 1.16–2.51). The effect modification of the SI-happiness association by gender did not reach statistical significance. SI domain-specific analyses (Table 3) revealed that having a marital relationship had the strongest effect on happiness (OR = 1.81; 95% CI = 1.39–2.35). Aside from family/friend contact, all other SI domains were significantly associated with increased happiness levels (OR = 1.45–1.59).

The total, direct, and indirect effects of the association of SI with happiness (mediation analysis) are shown in Table 4. The bootstrap-derived 95% CI



	Male	Female	Isolated	Included
None of the time	37.8	62.2	37.8	62.2
Little of the time	27.6	72.4	18.2	81.8
Most of the time	38.5	61.5	9.4	90.6
All of the time	43.8	56.2	13.7	86.3

Figure 1 Prevalence of meeting physical activity guidelines by levels of happiness.

Table 2 Association of SI and covariates with happiness estimated by multivariable logistic regression

	Model 1		Model 2		Model 3	
Variable	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Socially included, Yes vs. No	1.69	(1.23–2.33)***	1.69	(1.19–2.41)***	1.36	(1.16–2.51)***
Age, years	0.99	(0.99–1.01)	1.01	(1.00–1.02)*	1.03	(1.01–1.04)***
Gender, female vs. male	0.67	(0.53–0.83)***	0.77	(0.61–0.99)*	0.95	(0.69–1.31)
Residence type, urban vs. rural			0.83	(0.65–1.05)	0.76	(0.58–1.00)
Education, ref: Never						
Basic-level education			0.85	(0.51–1.41)	0.92	(0.51–1.67)
Secondary or higher			1.25	(0.67–2.35)	1.26	(0.60–2.66)
Employment, employed vs. unemployed			1.62	(1.26–2.09)***	1.02	(0.75–1.38)
Household net income			1.54	(1.15–2.06)**	1.35	(0.96–1.89)
Smoking, yes vs. no					0.97	(0.60–1.55)
Alcohol intake, yes vs. no					0.90	(0.65–1.23)
Self-rated health					0.76	(0.61–.94)*
Number of chronic conditions					0.99	(0.83–1.19)
Mobility, limited vs. not limited					0.99	(0.71–1.40)
Pain interference					1.00	(0.88–1.14)
Depressive symptoms					0.16	(0.12–0.21)***
Anxiety					0.56	(0.45–0.70)***
Sleep problems					0.90	(0.83–0.97)**
Model Information						
-2 Log-likelihood ratio		1472.65	1232.46		813.88	
Nagelkerke R^2		0.04	0.07		0.46	
Hosmer-Lemeshow χ^2		7.65 (0.47)	10.99 (0.17)		12.13 (0.11)	

Note: *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. OR, odds ratio; CI, confidence interval; SI, social inclusion.

estimation procedure with 5000 bootstrap samples did not cross zero for any outcome. Thus, there is a significant indirect effect of SI on happiness through depressive symptoms, anxiety, and sleep problems as mediators. The most important proportion of the SI-happiness association was explained by depressive symptoms (65.16%). Generalised anxiety and sleep problems explained 30.14% and 9.50%, respectively, of the association.

DISCUSSION

Principal findings

In line with our hypothesis, being socially included was associated with a higher likelihood of happiness than being socially isolated (OR = 1.36; 95% CI = 1.155–2.512) among community-dwelling older adults from the SSA context after adjusting for a range of potential confounding variables. This association was consistent regardless of measurement level of happiness (i.e., as binary or continuous/ordinal variable), but gender was not a significant effect modifier. Findings further showed that the fundamental mechanisms through which SI relates to happiness were depressive symptoms (65.16%), generalised anxiety (30.14%), and sleep problems (9.50%). This is the first study to investigate SI's direct and indirect associations with happiness utilising a large representative sample from the LMICs. These data are essential as they may aid in developing targeted interventions to improve subjective well-being in old age.

Table 3 Association of SI and covariates with happiness estimated by multivariable logistic regression

Model	OR	(95% CI)	*P*-value
Marital status	1.807***	(1.391–2.346)	<0.001
Contact with family/friends	1.096	(0.767–1.567)	0.613
Social participation	1.583***	(1.235–2.029)	<0.001
Having someone to assist to hospital	1.594***	(1.224–2.077)	<0.001
Having to share secrets and fears	1.452**	(1.084–1.944)	0.012
Emotional bond with others	1.576**	(1.187–2.092)	0.002

Note: Each model was adjusted for age, gender, residence type, educational levels, employment status, income level, smoking status, alcohol consumption status, self-rated health, number of chronic physical conditions, mobility limitation, pain interference, depressive symptoms, anxiety, and sleep problems. OR, odds ratio; CI, confidence interval; SI, social inclusion.

Table 4 Mediating variables in the association between SI and happiness in older adults based on bootstrapping estimates

	Total effect		Direct effect		Indirect effect		
Mediators	β	(Boots 95% CI)	β	(Boots 95% CI)	β	(Boots 95% CI)	% mediated
Depressive symptoms	0.295	0.109–0.491	0.103	−0.016–0.222	0.192	0.126–0.270	65.16
Generalised anxiety symptoms	0.281	0.134–0.438	0.196	0.088–0.305	0.085	0.046–0.133	30.14
Sleep problems	0.241	0.125–0.362	0.218	0.118–0.318	0.023	0.006–0.045	9.50

Note: $^{*}P < 0.05$; $^{**}P < 0.01$; $^{***}P < 0.001$. Models were adjusted for age, gender, residence type, educational levels, employment status, income level, smoking status, alcohol consumption status, self-rated health, number of chronic physical conditions, mobility limitation, and pain interference. β, unstandardised regression coefficients; CI, confidence interval; SI, social inclusion.

Results in the context of what is known

The finding that SI was associated with more happiness aligns with a few previous high-income country studies.[34] For example, in a sample of 22 019 retirees aged 50–99 years in China, social participation, including more frequent participation in social activities, more active roles in social activities, and more frequent participation in activities of former employing units, was associated with higher odds of subjective well-being.[35] A recent systematic review including 21 studies reported that social support significantly predicted happiness and life satisfaction among older adults.[36] Furthermore, Sjåstad *et al*.[37] found among 709 American adults from Amazon's Mechanical Turk that those who felt a strong sense of general belonging reported higher happiness levels. Our findings corroborate these results and add to the field by showing that a positive and robust association between SI and happiness exists in LMICs, using representative data. Indeed, these findings not only support the scant but growing literature linking SI with subjective well-being but also extends the discourse to older SSA populations, among whom data on this topic are lacking. The study further contributes to knowledge of the role of the psychosocial mechanisms underlying the association between SI and happiness.

Several plausible psychopathological mechanisms may explain the association between SI and happiness. Our analysis found that depressive symptoms and generalised anxiety independently explained approximately 65% and 30% of the SI-happiness association, respectively. Social integration and interactions have been found to reduce the risk of mental disorders such as depression and anxiety through stress-buffering effects.[38,39] Thus, the corticotropin-releasing factor activates the stress response by regulating the hypothalamic–pituitary–adrenal axis.[40] Indeed, social relationships directly induce psychosocial resources such as a sense of control, belonging, and general self-esteem, which may offset mental problems.[41] For example, a systematic review of 51 studies found protective effects of perceived emotional support, instrumental support, and diverse social networks against mental disorders.[42] Egeljić-Mihailović *et al*.[43] noted that social participation negatively contributes to depressive symptoms. Thus, mental well-being, in turn, may lead to higher levels of happiness and general well-being,[46] particularly in an advancing age.[44]

Furthermore, social relationships such as marriage, participating in outdoor social events, and having strong emotional connections/bonds with relevant others may boost social control and role obligations to maintain healthy behaviours such as physical activity. [41] These healthy lifestyle behaviours have been shown to increase positive affect, good mood, and a range of emotion regulations which may, in turn, protect individuals against mental problems and improve happiness. For example, substantial evidence from various psychologic studies indicates a strong link between emotion regulation and happiness in later life through mechanisms to cushion worry and emotional strain, which reduce common mental disorders, including anxiety and depression.[45]

Our findings identified sleep quality as an important factor which explained about 10% of the SI-happiness association. Previous studies have shown that sleep problems strongly undermine happiness and well-being in later life.[46] However, social integration may positively improve sleep health. Although sleep problems are a serious health concern in older adults, those embedded in a robust and larger constellation of social networks at least, in part, report fewer sleep problems than their counterparts with

weak network systems.[47] This could be achieved through a greater sense of security, generalised social trust, emotional well-being, and communal support, which are instrumental in solving challenges at the individual and societal levels.[48] Reduced sleep problems may, in turn, lead to higher levels of happiness among older adults.

Finally, our analysis did not consider other potential mediators in the SI and happiness link, including resilience and personality traits. For example, genetic-related mechanisms have been highlighted to account for 30–40% of the differences in happiness between people living in similar conditions.[49] In addition, we observed that the SI and happiness association remained statistically significant in each model after adjusting for various potentially confounding variables. This may indicate that SI can influence happiness directly through other biologic-related conditions, such as increases in monoamines, cortisol, and cytokines, which is less understood.[31,50]

Public health and policy implications

This study suggests that strategies to promote SI among the socially isolated through improved psychological well-being may promote happiness in older adults from the LMIC context, mainly when prospective analyses confirm the findings. Efforts to ensure cordial interpersonal relationships and participation in the community may stimulate cognitive-induced behaviours to enhance happiness.[51] Like many national policy frameworks, the Sustainable Development Goals aim to improve well-being and happiness by creating a better world and stability for everyone in the remit of 'leaving no one behind'.[52] Policy and public health interventions aimed to improve happiness in old age should conspicuously and effectively target psychosocial mechanisms with particular emphasis on reducing social isolation and common mental disorders such as anxiety, depressive symptoms, and sleep disturbances. Body–mind and cognitive therapies through social cohesion may also work together to enhance subjective well-being and happiness among adolescents,[53] which may well be the case for many middle-aged and older adults in the LMICs context.

Strengths and limitations

This study included a large and representative random sample of community-based older adults with a broad age cohort. In addition, our variables were assessed with well-validated and reliable tools. However, the study has its limitations. First, given that cross-sectional data were used, causal inferences and directionality cannot be established. Indeed, more studies need to evaluate the longitudinal relationships between SI and happiness in older adults in LMICs. Therefore, we call for more longitudinal evidence to better understand the SI-happiness relationship and the specific role of mediating factors. Second, we measured the core variables, including happiness and SI, through self-reports. This may present social desirability bias and undermine the veracity of findings. Moreover, happiness is a complex construct with several domains. Therefore, the use of more sophisticated measures of happiness would be useful.

CONCLUSIONS

Representative data on community-dwelling older adults from an SSA setting were analyzed to examine the association between SI and odds of happiness. SI structure (e.g., relationship status, interaction frequency with friends/family, and social participation) and SI quality (e.g., emotional connection and attachment) may be associated with greater happiness levels. This association may be explained by reduced depression, generalised anxiety, and sleep problems. Our data suggest the importance of an improved constellation of social connections in happy ageing. Moreover, addressing mental and psychological disorders may be critical for SI-related interventions to promote happiness in old age. However, without inferring a causal relationship of SI with happiness, there is a need for prospective data to confirm these findings of the current study.

AUTHOR CONTRIBUTIONS

RMG contributed to conceptualisation, formal analysis, methodology, supervision, data curation, writing the original draft, and review and editing of the draft. AH contributed to data curation, writing the original draft, and reviewing and editing the draft. FA contributed to data curation, formal analysis, writing the original draft, and review and editing of the draft. BTA contributed to data curation, formal analysis, writing the original draft, and review and editing of the draft.

SO-T contributed to data curation, formal analysis, writing the original draft, and review and editing of the draft. MR contributed to data curation, formal analysis, writing the original draft, and review and editing of the draft. VMH contributed to the writing of the original draft, data curation, review, and editing of the draft. KA contributed to data curation, formal analysis, writing the original draft, and review and editing of the draft. DRP contributed to supervision, data curation, writing the original draft, and review and editing of the draft.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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