

Loneliness and quality of life: Perceived online and offline social support among Sub-Saharan African students in China during the COVID-19 lockdowns

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ABSTRACT

Objective/background: The COVID-19 pandemic disrupted education globally, triggering fear and uncertainties for students. However, there is currently no research evidence to document the loneliness experience of Sub-Saharan African (SSA) students in China and how social support influenced their quality of life (QoL). This study explored the effect of COVID-19-induced loneliness and social support on the QoL of SSA students in China.

Method: The study adopted an institutional-based cross-sectional survey through an online questionnaire on social media platforms to investigate the QoL of SSA students in Chinese universities. Pearson correlation matrix and regression analysis were conducted to validate the association of loneliness, social support (online and offline), and socio-demographic attributes on the student's QoL.

Result: In the population of 358 SSA students appraised in the study, loneliness experience was negatively associated with QoL. Online social support and offline social support were positively associated with QoL. The linear regression shows that loneliness, social support, and socio-demographic attributes explain 25.7% (psychological health), 26.6% (physical health), 24.9% (environmental health), and 30.3% (social relation) of the variance in the QoL domains. By evaluating the EUROHIS subjective QoL, loneliness independently accounts for 24.5% of the variance in the subjective QoL of the SSA students examined in the study (model 1). In comparison, the added effects of social supports and socio-demographic attributes on model 3 explained 32% of the subjective QoL.

Conclusion: It is strongly recommended that loneliness eradication programs be implemented in these universities among SSA students who experience loneliness that negates their QoL. Interventions should focus on how these students can integrate and build social networks (online and offline) to improve social interaction and support for better QoL.

Keywords: COVID-19, loneliness, online social support, offline social support, quality of life, SSA students

INTRODUCTION

International students in Chinese universities have increased in the last ten years, with 489,200 registered students reported in 2018 [1, 2]. Transitioning, adjusting processes, and coping with a new country's environment can be demanding [3-6], bringing significant challenges, especially during a global pandemic. Public health emergencies like the COVID-19 pandemic disrupted education [7], caused fear and uncertainties globally. More particularly, the fear of contracting COVID-19 [8], restrictions, and changes in daily routine were sudden, requiring adaption, self-isolation, daily temperature monitoring, and vaccination to mitigate the spread of the virus among international students [8, 9].

Research evidence shows that COVID-19 exposed the global population to mental health vulnerabilities [10-12].

International students like the Sub-Saharan African (SSA) students in Chinese universities (host country) during COVID-19 are not different from their counterparts in other regions who endured COVID-19 strict measures. COVID-19 emergencies exacerbated the loneliness and quality of life (QoL) of the SSA students based on global intervention and curtailing the infection spread. Those who remained in the host country were affected as provinces/cities adopted strict and different COVID-19 measures. As such, the rationale for appraising the SSA student population's unique experience during the COVID-19 lockdown is premised on shortages of research evidence surrounding their experience during the COVID-19 pandemic,

their willingness to support government regulations, and the possible impact on their overall QoL. Similarly, SSA students at the heart of COVID-19 have unmet personal needs due to being physically away from friends, spouses, and families [13, 14].

Previous study described loneliness as an unwanted feeling associated with the nonexistence of or loss of companionship [15]. Loneliness is, therefore, a subjective feeling, not mere social isolation, as one could be socially isolated yet not feel lonely, while another could have adequate social engagement and still feel lonely [16, 17]. The quality of the social contact or relationship desired by the individual and not the quantity or number of interactions available determines loneliness [18]. Several studies have found loneliness associated with psychological or mental challenges like psychosis [18-21] and an increase in symptoms related to depression [22] and anxiety [23]. It was stated that a growing public health concern that is largely ignored is the experience of loneliness [24], although it has far-reaching damaging effects on physical and mental health indicators [25-27]. Even though loneliness affects all people across the lifespan in the general population, SSA students can be more vulnerable given that their sources of social network in the host country might not be the best, and social support might be lacking, especially during the COVID-19 pandemic and its associated social disengagement. This loneliness problem and how social support is harnessed to reduce the pandemic impact and improve their overall QoL remain unknown in the context of the SSA student population during the COVID-19 pandemic.

QoL addresses the subjective evaluation of individuals' interpretation of life outcomes regarding their immediate environment's culture, goals, expectations, standards, and value systems [28]. Several studies have examined the QoL of international students [29, 30], while a few have faintly focused on SSA students as part of a more extensive study [2, 31, 32]. None specifically studied SSA students as a wholesome group. SSA student migrants expect better QoL in host countries to acquire better jobs, income, and education to improve overall life outcomes. With COVID-19 ushering in loneliness and threatening the QoL of the global population, understanding the coping strategies and defense mechanisms adopted by the SSA students in China with the stringent measures can foster support in future pandemics.

Social support is a "human communication process through which individuals express, perceive, receive, and exchange emotional concern, instrumental aid, information or appraisal to reduce uncertainty and improve well-being" [33-38]. While helping individuals deal with life problems, this support (offline or online) offers some relief against psychological stress and tension and contributes to social adaptation skills [39]. In this technological era with internet services and smartphones, online interactions enable people to gain support even without offline support, especially in a pandemic, where social distancing and quarantine are ubiquitous safety measures. It is expected that during the COVID-19 pandemic, students will use more social networking sites, including WhatsApp, Facebook, Twitter, and WeChat, to obtain information and keep in touch with their support network, which may support improving their QoL.

Despite the increasing evidence on the impact of COVID-19 on the global population (students inclusive), no research has been conducted among the SSA student's Asian region, especially in China, to understand their psychosocial

vulnerabilities. Subsequently, this study extends research evidence for the first time in China on

- (i) the association between loneliness and the QoL of SSA students,
- (ii) appraises the added effect of online and offline support on the association between loneliness and QoL, and
- (iii) examines if the socioeconomic status of SSA students influences their QoL.

METHODS

Study Design and Participants

This study adopted an online survey using an institution-based cross-sectional survey design to collect data from 411 SSA students studying in Chinese universities. Inclusion criteria were full-time SSA international students 18 years old and above. Research participants self-completed online questionnaires comprising items about their demographic characteristics, loneliness, perceived online and offline social support, and QoL. Responses from 58 respondents were excluded from the analysis because they completed the questionnaire with a string of consistent responses equal to or greater than half the length of the total scale [40], and 24 were not SSA, leaving 358 valid respondents. Recruitment of respondents occurred between December 2020 and January 2021.

Measures

Quality of life

QoL was appraised using two construct dimensions. First, the short form of the World Health Organization quality of life instrument (WHOQOL-BREF) [41] was used to assess the QoL. The WHOQOL-BREF is a 26-item self-report questionnaire. The four QoL domains were explored independently as outcome variables; mental health, physical health, environment, and social relationships comprise the remaining 24 items of the scale. Responses were elicited on a 5-point Likert scale with domain scores ranging between four and 20. A higher score on each of the dimensions indicates a better QoL in that dimension. The EUROHIS-QOL eight-item index was also used to measure the subjective QoL. This eight-item measure for QoL was derived from the WHOQOL-100 and the WHOQOL-BREF. The EUROHIS-QOL eight-item index is scored by summing up scores of the eight items on the scale. Higher scores indicate better overall QoL of the respondent. Like the WHOQOL-BREF, responses are on a 5-point Likert scale from 1-"not at all" to 5-"completely". Internal consistency across countries is acceptable (between 0.72 and 0.81) [42].

Loneliness

The UCLS-8 by [43] was used to measure loneliness in this study. According to exploratory factor analysis, short-form scale has eight items selected from the original ULS-20 [43]. They demonstrated that the ULS-8 is reliable, valid, and a good substitute for the ULS-20. The internal reliability (Cronbach's α) of the ULS-8 was 0.84 [42]. Items such as "I lack companionship during the COVID-19" and "I feel left out in lockdowns" were used to elicit responses on a 4-point scale ranging from 0-never to 3-Often.

Online and offline social support

Social support is a dynamic element of human interaction and behavior that can appear as instrumental, emotional, and information support [44]. The current research adopted the modified versions of “the brief form of the perceived social support questionnaire (F-SozU K-6)” [37, 45, 46] developed and validated by [45] were used to measure both online and offline perceived social support of international students. Online social support addressed how people harnessed the internet to accomplish emotional, social companionship, information assistance, and instrumental support [47]. F-SozU K-6 was used to measure students perceived online and offline social support. This measure assesses the general support individuals receive from their social networks. Participants indicated their agreement on 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated a higher level of perceived social support and vice versa. This tool was developed and validated by [45] as a brief version of the social support questionnaire (F-SozU) by [37].

It was reported that psychometric findings across diverse cultural contexts supported the robustness and validity of the F-SozU K-6 for cross-cultural epidemiologic studies [45, 46]. It was confirmed through their study that the 6-item perceived social support questionnaire in general showed good psychometric properties hence a reliable assessment instrument [46]. They also mentioned that because of its brevity, it can be used in large-scale as well as cross-cultural studies for a quick, economical screening of general perceived social support as cross-cultural measurement invariance testing demonstrated partial strong measurement equivalence across cultures [30]. F-SozU K-6 was modified to measure both online and offline perceived social support of international students. Thus, two modified 6-item scales of the F-SozU K-6 were used. The sample items for both online and offline social support included “I experience a lot of understanding and security from others in the online community”, “I experience a lot of understanding and security from others in offline activities”, “There is someone very close to me whose help I can always count on in the online community”, “There is someone very close to me whose help I can always count on in the offline community”, “If I’m very depressed, I know who I can turn to in the online community”, and “If I’m very depressed, I know who I can turn to in the offline community.”

Control variables

Prior research has identified language proficiency, gender, and length of stay in the host country significantly related to QoL or social support of international students [48-50]. The following are the control variables in this study; age, funding support, and length of residence in China. Demographic variables of respondents included age, gender, marital status, number of years lived in China, current location, and program or type of study (bachelors/undergraduate, master’s, and PhD).

Analysis

The sample characteristics were analyzed using frequency and percentage for qualitative variables and mean and standard deviation for continuous variables, while the Pearson correlation matrix was used to test correlation among psychological variables. Multiple linear regression was performed to explore loneliness, online/offline social support, and QoL. Independent analysis was conducted for QoL indicators to evaluate the unique experience among the study

Table 1. Demographic characteristics of participants

Demographics	Characteristics	Frequency (%)
Age	18-24	65 (18.2)
	25-34	240 (67.0)
	35+	53 (14.8)
Gender	Male	241 (67.3)
	Female	117 (32.7)
Marital status	Married	71 (19.8)
	Single/other	287 (80.2)
Length of residency	<1	17 (5.3)
	1-2 years	207 (57.8)
	3+ years	132 (36.9)
Program	Bachelor	55 (15.4)
	Master’s	195 (54.5)
	PhD	83 (23.2)
	Other	25 (7.0)

population. Similarly, a unified approach was explored to determine the overall QoL of the population using the EUROHIS brief scale [51]. This approach was pivotal for quantifying the life outcomes of the SSA student based on the proposed model in the analysis and the added effects of the predictors of QoL among the group. Three models were derived from examining their unique influence on the EUROHIS subjective QoL score. Model 1 examines the independent predicting influence on loneliness; model 2 examines the added effect on model 1, while model 3 shows the aggregate predicting effect of the independent variables on the subjective QoL score. The effect sizes and p-values were presented for the regression model using the overall fit of the models appraised by adjusted R² statistics [52]. R-change and F-test show the significance of changes in model fit. The presentation of coefficients of the regression models (β), the framework by [53] was used, where $\beta=0.1$ as small, $\beta=0.3$ as a medium, and $\beta=0.5$ a large effect. Analysis was completed using the statistical software statistical package for the social science (SPSS version 25 for Windows, IBM Corp., Chicago, IL, USA), accepting a significance level of $p<0.05$.

RESULTS

Of the 358 SSA students surveyed, 67% were aged between 25 and 34, and 67.3% were male (**Table 1**).

Reliability and validity tests for the instruments were estimated along with their psychometric properties (mean and standard deviations) in **Table 2**.

Aggregates QoL (EUROHIS) score was calculated as $M=30.77$ and $SD=4.98$ with a Cronbach’s alpha, $\alpha=0.86$, while there was no significant difference in the QoL score of male and female SSA students. Indicators of QoL show a strong reliability value greater than 70% for all domains, with their score value ranging from 23-29.5. The total loneliness score for both genders was $M=18.31$ and $SD=4.68$, with a Cronbach’s alpha, $\alpha=0.78$. The online social support score ($M=18.31$; $SD=5.13$) was lower than the offline social support score ($M=21.31$; $SD=4.7$) for the SSA students. There was no gender difference in the score value of the independent variables.

Table 2. Reliability/validity, mean, and standard deviation (SD) of SSA students' attributes

Attributes	α	Total		Male		Female	
		Mean	SD	Mean	SD	Mean	SD
QoL (EUROHIS)	0.86	30.77	4.98	30.95	4.70	30.39	5.28
Psychological health	0.77	23.05	3.68	23.31	3.44	22.52	4.08
Physical health	0.80	26.43	4.41	26.54	4.46	26.21	4.31
Environmental health	0.83	29.35	4.66	29.48	4.48	29.10	5.02
Social relationship	0.71	10.87	2.43	10.69	2.39	11.23	2.49
Loneliness	0.78	18.52	4.68	18.25	4.73	19.09	4.54
Online social support	0.88	18.31	5.13	18.13	5.09	18.70	5.21
Offline social support	0.90	21.32	4.7	21.29	4.52	21.37	5.08

Table 3. Pearson correlation matrix: QoL (independent indicators), loneliness, social support, and control variables (N=358)

	5	6	7	8	9	10
QoL-Psychological health	-.455**	.101	.366**	-.105*	.001	-.005
QoL-Physical health	-.476**	.169**	.347**	-.095	.088	-.012
QoL-Environmental health	-.411**	.190**	.394**	-.099	.096	.003
QoL-Social relationship	-.477**	.244**	.398**	-.140**	.020	-.077
Loneliness	1	-.186**	-.309**	.123*	-.055	.062
Online social support		1	.257**	-.015	-.068	.036
Offline social support			1	-.047	.076	-.016
Age				1	-.018	.426**
Length of residency					1	-.194**
Funding support						1

Note. **p<0.01 & *p<0.05

Table 4. Pearson correlation matrix: QoL (EUROHIS), loneliness, social support, and control variables (N=358)

	1	2	3	4	5	6	7
QoL (EUROHIS)	1	-.497**	.224**	.398**	-.116*	.060	.029
Loneliness		1	-.186**	-.309**	.123*	-.055	.062
Online social support			1	.257**	-.015	-.068	.036
Offline social support				1	-.047	.076	-.016
Age					1	-.018	.426**
Length of residency						1	-.194**
Funding support							1

Note. **p<0.01 & *p<0.05

Pearson correlation analysis (**Table 3**) identified the association between the variables relating to QoL indicators (environmental health, physical health, psychological health, and social relationship) and the predictors (loneliness, social support, and sociodemographic attributes). Loneliness among the SSA students was negatively correlated with QoL-psychological health, ($r=-0.455$; $p\leq 0.01$), QoL-physical health ($r=-0.476$; $p\leq 0.01$), QoL-environmental health ($r=-0.411$; $p\leq 0.01$), and QoL-social relationship ($r=-0.477$; $p\leq 0.01$). While online social support was positively associated with QoL-physical health ($r=0.169$; $p\leq 0.01$), QoL-environmental health ($r=0.190$; $p\leq 0.01$), and QoL social relationship ($r=-0.244$; $p\leq 0.01$), there was no correlation with QoL-psychological health. Loneliness and online social support were negatively correlated ($r=-0.186$; $p\leq 0.01$). Online social support among the SSA students was negatively associated with loneliness ($r=-0.306$; $p\leq 0.01$), but positively associated with QoL-psychological health ($r=0.366$; $p\leq 0.01$), QoL-physical health ($r=0.347$; $p\leq 0.01$), QoL-environmental health ($r=0.394$; $p\leq 0.01$), and QoL social relationship ($r=0.398$; $p\leq 0.01$). Among the sociodemographic variables, only age was positively associated with loneliness ($r=0.123$; $p\leq 0.01$), but negatively associated with QoL-psychological health ($r=-0.105$; $p\leq 0.01$) and QoL-social relationship ($r=-0.140$; $p\leq 0.01$).

The Pearson correlation matrix in **Table 4** examined the aggregation of QoL using EUROHIS construct. QoL was negatively associated with loneliness ($r=-0.497$; $p\leq 0.01$) and

age ($r=-0.116$; $p\leq 0.05$). Meanwhile, online social support ($r=0.224$; $p\leq 0.01$) and offline social support ($r=0.398$; $p\leq 0.01$) were positively associated with QoL. Loneliness was negatively associated with online social support ($r=-0.186$; $p\leq 0.01$) and offline social support ($r=-0.309$; $p\leq 0.01$) but positively correlated with age ($r=0.123$; $p\leq 0.01$).

Effects of loneliness, social support, and sociodemographic attributes on the SSA students' psychological health, physical health, environmental health, and social relations was evaluated in **Table 5**.

The result shows a negative predicting effect of loneliness ($\beta=-0.38$; $p<0.001$) on psychological health, while offline social support ($\beta=0.26$; $p<0.001$) has a positive effect in the regression analysis. Variance in the psychological health regression model was 25.7%. Similar results were derived for physical and environmental health, with a variance of 26.6% and 24.9%, respectively. Social relationship among the SSA student population was supported by online ($\beta=0.11$; $p<0.05$) and offline social support ($\beta=0.25$; $p<0.001$) but negated by loneliness ($\beta=-0.37$; $p<0.001$). The total variance estimation for social relations was 30.3%.

Three models were derived in **Table 6**. Model 1 examined the predicting effect of loneliness on QoL scores among the SSA students. Model 1 establishes loneliness as a negating determinant of QoL among the study population ($\beta=-0.497$; $p<0.001$) and independently predicts 24.5% of the variance in the QoL score. Model 2 examined the inclusive effect of social

Table 5. Linear regression analysis of SSA students' quality of life indicators, loneliness, and social support

Quality of life indicators	Unstandardized coefficients		β	Adjusted R ²
	B	Standard error		
Psychological health (constant)	25.47	1.57		25.7***
Loneliness	-.30	.04	-.38***	
Online social support	-.03	.03	-.04	
Offline social support	.20	.04	.26***	
Age	-.43	.32	-.07	
Length of residency	-.16	.21	-.04	
Funding support	.22	.21	.05	
Physical health (constant)	27.84	1.87		26.6***
Loneliness	-.37	.05	-.40***	
Online social support	.04	.04	.04	
Offline social support	.19	.05	.21***	
Age	-.43	.38	-.06	
Length of residency	.34	.25	.06	
Funding support	.29	.30	.05	
Environmental health (constant)	27.22	2.00		24.9***
Loneliness	-.30	.05	-.31***	
Online social support	.06	.04	.07	
Offline social support	.27	.05	.28***	
Age	-.62	.41	-.08	
Length of residency	.43	.27	.08	
Funding support	.43	.32	.07	
Social relationship (constant)	11.61	1.01		30.3***
Loneliness	-.19	.03	-.37***	
Online social support	.05	.02	.11*	
Offline social support	.13	.03	.25***	
Age	-.29	.21	-.07	
Length of residency	-.06	.14	-.02	
Funding support	-.09	.16	.03	

Note. *p<0.05; **p<0.01; & ***p<0.001

Table 6. Hierarchical multiple regression analysis of SSA students' quality of life indicators, loneliness, and social support (N=358)

Total sample	Model 1		Model 2		Model 3	
	β	SE	β	SE	β	SE
Constant (QOL)						
Loneliness	-.497***	.048	-.497***	-.049	-.397***	.049
Online social support			.084	.044	.084	.044
Offline social support			.252***	.049	.248***	.049
Age					-.097*	.410
Length of residency					.043	.269
Funding support					.104*	.315
R² change	0.247***		0.073***		0.012^{ns}	
Adjusted R²	0.245		0.314		0.320	

Note. Constant: QoL (EUROHIS); Model 1: Constant, loneliness; Model 2: Constant, loneliness, online social support, & offline social support; Model 3: Constant, loneliness, online social support, offline social support, age, length of residency, & funding support; *p<0.05; **p<0.01; ***p<0.001; & ns: Not significant

support (online and offline) on the association between loneliness and QoL. Only offline social support shows an added effect in the existing model 1 with a positive predicting effect ($\beta=0.252$; $p<0.001$). Meanwhile, model 2 predicted 31.4% of the variance in the QoL of the study population. Aggregation in model 3 with the inclusion of sociodemographic attributes shows that age has a negative predicting effect ($\beta=-0.097$; $p<0.05$) while funding support shows a positive predicting effect ($\beta=0.104$; $p<0.05$).

DISCUSSION

Globally, the COVID-19 crisis caused significant public health problems that burdened special groups like migrant students [54]. Psychosocial vulnerabilities were witnessed, affecting people's life outcomes [55]. This study examined the

influences of loneliness, social support, and socio-demographic attributes on the QoL of SSA students in China to document their unique experiences during the COVID-19 emergencies. This current study is essential for addressing social, environmental, and mental vulnerabilities that may negatively affect QoL and also provide information that can enhance intervention among migrant students globally. Firstly, the study determined the correlations among the psychosocial attributes of the SSA students, appraised the measures of QoL independently, and aggregated the QoL score to better understand the study population's experience.

Evidently, the COVID-19 experience of the SSA students in China highlighted loneliness negatively influenced their psychological, physical, environmental, and social relations, similar to other studies [56]. One measure affirmed in the literature is the magnitude of COVID-19 impact, which required lockdowns, reduced close contact, and self-isolation, among

other pandemic measures [57]. These measures, consistent with the literature [58], magnified the experience of loneliness [59] among the global population that equally affected the SSA students in China.

The negative association between loneliness and the four QoL indicators presents an unsavory scenario for the SSA students like having mental imbalance, struggling to adjust to the COVID-19 environment, or battling with physical health that is required to navigate their education, conduct research, and scale through series of examinations. This assertion resonates with Swami et al. on a negative association between loneliness and life satisfaction [60]. These outcomes mean the adverse effect of loneliness on the QoL indicators may propel other academic vulnerabilities to manifest in the short and long term. These social, environmental, and mental health vulnerabilities exposed the inadequacies of structures to promote healthy students and cope with the COVID-19 pandemic.

Social support stands out as a coping mechanism during the COVID-19 pandemic. Seeking human interaction to facilitate instrumental, emotional, and information support among the SSA was explored through access to online and offline social support, which was expected to abate their psychosocial vulnerabilities. Undoubtedly, receiving social support in any host country will depend on the institutional structure and interpersonal network available to migrant students. As such, the SSA student's online and offline support depends on the preexisting institutional system and interpersonal relationships they have built pre-COVID-19 outbreak.

Consistent with findings in [61], this study confirms that online social support provided zero predicting effects on physical health [62], psychological health [61], environmental health, and social relations. However, the offline social support available to the student population ameliorated the students' experiences, supporting the findings from the study, which reported that offline social support was a good predictor of psychological well-being [62]. This evidence pointed to increased physical relationships and eased emotional and instrumental support accessible to SSA students during the COVID-19 emergencies.

The socio-demographic characteristics of the SSA students in China were salient in independent QoL measures explored. While evaluating the subjective QoL, the analysis revealed the magnitude of the effect of loneliness, social support, and age on the QoL of the SSA students. Age is identified as an element that explains the direction of loneliness and QoL of the study population. Higher age translates to decreased social relations and overall subjective QoL. Similarly, the older the SSA student, the lonelier they become. Contrary to our findings, it was reported that loneliness decreases with age [63], while some studies reported no significant difference [64, 65]. However, a U-shaped curve was found in another study, where the middle age reported lower loneliness compared to young adults and older people who had higher loneliness [66].

Further evidence in the analysis shows that the 24.5% variance in the QoL of the SSA students investigated in China was explained by loneliness. The additional emotional, instrumental, and information support received by the students remained influential in strengthening their QoL during the COVID-19 crisis, similar to other research findings that higher perceived social support was associated with lower anxiety and stress [67].

The consideration of the social support received shows a 7.3% added effect on the overall QoL of the students to model 1. Socioeconomic attributes such as age and funding support significantly impacted the SSA students' QoL. While the increase in age puts the students at a disadvantage, the ability to receive funding support has the potential to improve their QoL. These outcomes support the premise that younger SSA may have better QoL than those that are older. Similarly, the availability of scholarship support (funding) can enhance their QoL, particularly during a global pandemic.

Sudden emergency of the COVID-19 crisis brought significant tradeoffs for the global population, whereby compulsory isolation and adherence to government measures were nonnegotiable [68]. The toll on minority groups such as the SSA students is evident in the study analysis where they have experienced loneliness which impacted their QoL. It is strongly recommended that loneliness eradication programs should be implemented in universities targeting migrant students. Other interventions should focus on how students can integrate among natives and build social networks online and offline to improve social interaction and support. Ultimately, the COVID-19 measures that promote loneliness and reduced interaction should also provide alternatives to avoid or mitigate human vulnerabilities.

This empirical study has some limitations to be considered. The online survey approach was necessitated due to the COVID-19 measures and restricted human interaction, which may have reduced the reach of the target population and sample size. Online data collection was monitored to ensure that only SSA students completed the questionnaire by indicating their country of origin. Our target population was primarily found in clusters of social media groups in the host country. Therefore, we project that the sample size and the study's cross-sectional nature may limit the representation and the generalization of the study evidence. However, this study presents significant evidence that addresses the vulnerability of the SSA student population during the COVID-19 emergencies in China.

CONCLUSION

The current research presents the unique experience of the SSA student population in China by exploring their experiences of loneliness and social support both online and offline in association with QoL during the COVID-19 public health crisis. Expectedly, loneliness was found to dampen the QoL of the student group. We established that among the SSA students, online social support had no significant predicting effect. Meanwhile, offline social support enhanced their QoL. Age was also confirmed to be a crucial factor, where an increase in age means exposure to loneliness and reduced QoL. Improving social interaction among the SSA students and providing alternative pandemic measures to reduce loneliness may be a viable approach to improving their QoL. Future research can explore other social capital like social integration, trust, and solidarity as a coping mechanism during the COVID-19 pandemic and how it may improve their QoL.

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August 2020 as part of the first author's master's degree dissertation. Informed consents were received from participants through the web-form. All study participants were anonymous, and their data kept in private. They further stated that all procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Declaration of interest: No conflict of interest is declared by authors.

Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

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