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RESEARCH ARTICLE

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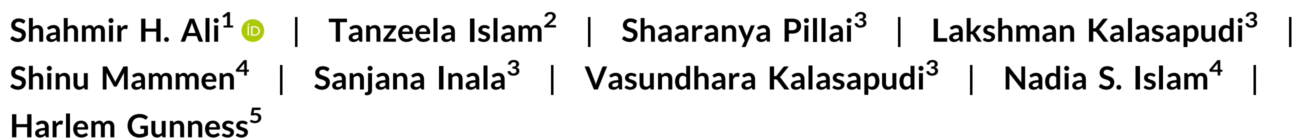
Loneliness and mental health outcomes among South Asian older adult immigrants in the United States: a cross-sectional study



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Abstract

Background: There is growing concern of mental health issues among South Asian immigrant populations, although limited disaggregated data on determinants of these issues exists. The aim of this study was to examine factors associated with mental health outcomes among South Asian older adult immigrants living in New York City (NYC).

Methods: Data were sourced from a needs assessment among self-identified South Asians aged 60+ conducted by an NYC-based frontline agency and nonprofit organization. Variables assessed included the 9-item Patient Health Questionnaire, degree of difficulty experienced due to depression, loneliness, emotional distress, as well as sociodemographic, living situation, acculturation, general health, and financial related indicators.

Results: Among the 682 responses, 9.4% of participants displayed symptoms of mild or moderate depression (16% of Caribbean-origin, 10% of Pakistani, 9% of Bangladeshi, and 8% of Indian participants). About a third of participants (29.9%) reported feeling lonely sometimes and 39.1% experienced any type of emotional distress. When compared to those with excellent or very good self-rated health, having fair, poor, or terrible self-rated health was associated with a greater adjusted odds ratio (AOR) of having mild or moderate depression (AOR: 8.42, 95% confidence interval [CI]: 22.09) and experiencing emotional distress (AOR: 3.03, 95% CI: 1.88–4.94). Those experiencing emotional distress were more likely to be younger (AOR: 0.97, 95% CI: 0.95–1.00) and live alone (AOR: 2.06, 95% CI: 1.21–3.53).

Discussion: Findings support the need for tailored mental health interventions targeting concerns, such as poor self-rated health, among South Asian older adult immigrants, as well as specific subpopulations such as Indo-Caribbeans who may be experiencing a disproportionate burden.

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KEYWORDS
Asian Americans, immigrants, loneliness, mental health, older adults, South Asians

Key points

- Loneliness was reported by almost a third of participants, and 9.4% displayed symptoms of depression
- Indo-Caribbean participants displayed worse mental health outcomes than Indian, Pakistani, and Bangladeshi participants
- Self-rated health had the strongest association with worse mental health outcomes across all analyzed indicators
- Doctors and family members were important points of contact for participants to discuss mental health issues

1 | BACKGROUND

Worldwide, the proportion of older adults, defined by the United Nations as those aged 60 years and older,[1] is increasing and faces growing physical and mental health related challenges.[2] However, although there is a growing body of research on mental health conditions affecting older adults,[3–5] research aimed at low-income or immigrant older adults has been limited. New York City (NYC) has one of the fastest-growing older adult populations, a significant proportion of whom live in poverty.[6] In recent years, the South Asian population (individuals who have ancestry in India, Bangladesh, Pakistan, or other parts of the South Asian region) in the United States (US) has also grown to nearly 5.4 million.[7]

South Asian older adults constitute a larger portion of the NYC Asian older adult population compared to national levels and face socioeconomic burdens that may have serious impact on their health.[6] Moreover, survey data from between 2013 and 2015 show that while 47% of NYC South Asian older adults were enrolled in public or government insurance coverage, 22% did not have health insurance[8] compared to the 11% NYC average.[9] A unique characteristic of the South Asian population is ethnic, religious, and diversity by nationality. For example, NYC is home to a significant Indo-Caribbean population, which includes immigrants from countries including Guyana and Trinidad whose descendants can be traced to indentured laborers from South Asia sent to the Caribbean during the mid-1800s to early-1900s.[10] Thus, in order to more appropriately intervene in the mental health concerns facing the diverse NYC South Asian American community, it is critical to examine the ethnic and socioeconomic disparities of the community to better understand where disparities may be most stark in this growing population.

Even though there is limited literature on mental health and its associated risk factors among South Asian older adults in the US, studies conducted from their native countries have found that rates of depression vary across different South Asian older adult populations, ranging from 21.9% in Indian older adults,[11] 22.9% in Pakistani older adults,[12] and 36.9%–45% in Bangladeshi older adults.[13,14] Moreover, while one study observed a 11.4% prevalence of anxiety disorders among a South Asian Americans,[15] lower than approximate 19.1% U. S. average,[16] research occurred among a sample of highly educated and largely high-income South Asians and may mask mental health issues experienced by socioeconomically disadvantaged South Asians (which comprise a larger portion of the community in cities such as NYC[17]). For example, a recent survey of NYC-based Indo-Caribbean South Asians found that 23% of participants were at risk for depression, and 16% were at risk for anxiety.[8] Moreover, it was found that 45% of respondents have never been screened for depression or other mental health conditions.[8]

In immigrant communities in particular, cultural background plays a role in how mental health terminologies, signs and symptoms are understood. For instance, terms such as "sinking heart" or "heart ache" are often used to describe emotional pain among South Asians.[18,19] Stigma is often attached to depression within the community, which is sometimes perceived as incurable or bringing dishonor to the family.[19] Importantly, research on psychosocial outcomes (such as loneliness and specific emotional distress variables) among South Asian older adults remains limited, which is particularly salient given the isolation experienced by older adult immigrants.[20]

Among South Asian older adult immigrants, higher levels of self-rated health (i.e., rating one's own health, in general, from poor to excellent) have been identified as important indicators of depression, along with sociodemographic determinants such as gender.[19] Likewise, South Asian older adults who had a higher level of agreement with South Asian cultural values were found to be at an increased risk of being depressed,[19] suggesting the salience of acculturation related determinants. Nonetheless, South Asian older adults are less likely to seek resources outside of their social network to combat negative health effects.[21] These challenges may be attributed to the barriers older adult immigrants experience in seeking social ties outside of their families due to limited English proficiency.[22]

Given the growing literature that suggests a mental health burden faced by older South Asian immigrants, as well as the various complex social, cultural, and behavioral determinants of mental health, there is a strong need to identify contributors to mental health concerns among this community. The purpose of this study was to determine factors associated with mental health and loneliness within the South Asian older adult population in NYC.

2 | METHODS

2.1 | The India Home South Asian seniors needs assessment

Building on principles of community-based participatory research, including community-led research development, implementation, analysis, and application of findings, this study utilizes data from a community needs assessment conducted by India Home, a frontline agency and nonprofit organization dedicated to addressing the needs of the South Asian and Indo-Caribbean older adults in NYC. India Home has served over 2000 older adults through a diverse range of programs and activities, including congregate meals, creative aging programs, case management programs, and educational talks. Noting the paucity of data on South Asian older adults in NYC, India Home developed a community-led needs assessment with the goal of informing the organization's efforts on the health and social needs of South Asian older adults. A survey questionnaire was developed by India Home staff and reviewed and approved by India Home's advisory committee, comprised of community members and content experts on South Asian health.

The questionnaire was developed using existing survey instruments[23] and priority topical domains identified by the advisory board. This advisory board played a strong role in structuring the survey and selecting and refining survey items to ensure the needs assessment was appropriate in capturing the diverse health and social experiences of the South Asian community served by India Home. Demographic questions assessed age, gender, income, country of birth, immigration, living situation, language use, dwelling neighborhood, and zip code. The survey also included questions related to access to and use of services including transportation, recreation, finances, language services, and government benefit programs. Depression was assessed using the Patient Health Questionnaire (PHQ),[23] which has been employed and validated across diverse Asian (and South Asian) immigrant populations.[24,25]

2.2 | Participant recruitment

The survey questionnaire was administered by India Home staff and interns from June 2017 through December 2017. Multilingual (English and other South Asian languages) interns were hired and trained to conduct the surveys in a participant's preferred language across all five of NYC's boroughs at community events, shopping areas, parks, houses of worship, and other areas where there were high volumes of South Asians. India Home clients were intentionally not included in the study to avoid bias. Survey respondents were approached at random by interns and staff. Inclusion criteria included persons who identified as South Asian, 60 years and older, and residing in NYC and surrounding areas (including Westchester, Nassau, and Suffolk counties). For the purpose of this study, "South Asian" individuals are defined as anyone who traced their ancestry from Afghanistan, Bhutan, Bangladesh, India, Maldives, Nepal, Pakistan, Sri Lanka, and descendants from these countries in Guyana, Fiji, and Trinidad.[26] Exclusion criteria included persons who are younger than 60 years old.

2.3 | Variables

Sociodemographic variables assessed included age, gender, educational attainment, country of birth, English speaking proficiency, and religion. Country of birth was assessed as an open-response question; data was cleaned and categorized based on the locations identified. For responses in which country of birth was ambiguous ($n = 19$), for example, a response of "Punjab," which could have been either Punjab, Pakistan or Punjab, India, information from questions on nationality and country in which education was completed was used to corroborate country of birth; responses that could not still be strongly corroborated ($n = 2$) were classified as "Other." Living situation variables included one question asking participants if they lived close to relatives or family, and a single question asking participants about their current living situation. A separated binary variable was created using this data to identify participants living alone.

Acculturation variables included years lived in the US, year of migration, and immigration status. Responses for years lived in the US were further condensed into three categories (5 years or less, 6–20 years, 21+ years). Immigration status data was used to construct a separate variable identifying whether a participant was a US citizen (including dual citizens) or not. Self-rated health was measured through a single categorical variable asking participants how they would characterize their own health (Excellent, Very good, Good, Fair, Poor, Terrible). Participants were also asked if they have a person who is their primary care doctor. Finance related questions included annual household income, source of personal income, and whether respondents rented or owned their houses. Three binary variables were created from information on personal income which indicated whether or not participants used savings, social security, or employment as a source of income.

A diverse set of multiple health indicators were assessed. The validated and widely used 9-item PHQ-9 instrument was used to screen for depression among participants[23]; using the instrument, participants with a total score of between 0 and 4 were categorized as having minimal to no depression, 5–14 categorized as having mild to moderate depression, and 15–27 as having moderately severe to severe depression. The PHQ-9 survey questions were followed up with a question asking participants: "If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?" (Not difficult at all, Somewhat difficult, Very difficult, Extremely difficult, Not applicable). Responses were further categorized into Not difficult (Not difficult at all) and Difficult (other answer choices except Not Applicable).

To assess loneliness, participants were asked if they feel lonely sometimes. To broadly assess experience of emotional distress and

substance abuse, participants were provided a list of emotions and also asked if they had experienced any of them (including anger, anxiety, depression, drug and alcohol abuse, loneliness, panic attacks, posttraumatic stress disorder, sadness, stress, thoughts of hurting other people, other [open response], or none). Participant responses were used to synthesize a binary variable of whether or not participants had experienced any emotional distress or substance abuse issues compared to none. Finally, participants were also asked, if (hypothetically) they had a mental health issue, who they would talk to first: spouse, spiritual leader, doctor, friend, family/relative, sibling, one of their children, mental health counselor, would not talk to anyone, or don't know. Respondents who answered spouse, family/relative, sibling, one of their children were categorized into a singular "family" category. Given the personal and public stigmatization of mental health service utilization in South Asian and South Asian immigrant populations,[27,28] this question was followed up by an additional question asking participants if someone in their community had a mental health issue, who they would talk to first (with same answer choices).

2.4 | Data analysis

Multiple logistic regression analyses were conducted to assess the odds of each included mental health outcome by different sociodemographic, living situation, acculturation, general health (self-rated health and having a primary care doctor) variables. Outcomes analyzed included: (1) Do you feel lonely sometimes? (Yes, Ref = No), (2) PHQ-9 Depression Level (Mild/moderate, Ref = Minimal), (3) Experience of difficulties due to PHQ-9 depression symptoms (Difficult, Ref = Not difficult), (4) Experience of emotional distress or substance abuse (Yes, Ref = No). Analyses were also conducted on determinants of the top five emotional distress concerns expressed by participants (loneliness, depression, anger, sadness, and stress). Models were each adjusted for age, sex, education, country of birth, living alone, living close to family/friends, time in US, citizenship, English proficiency, having a primary healthcare doctor, and self-rated health based on associations identified in preliminary bivariate analyses as well as prior literature. To enhance statistical power in analyses, the following variables were further categorized: country of birth (India, Bangladesh, Pakistan, Caribbean [Guyana, Trinidad], Other), time in US (5 years or less, 6–20 years, 21 years or more), English proficiency (Well/fluent, Poor/fair, Don't speak English), and self-rated health (Excellent/very good, Good, Fair/poor/terrible). Participants who responded, "don't know," "refused," or "nonapplicable" for any of the included variables were excluded from analysis. Differences in point-of-contact to discuss mental health issues were assessed descriptively; differences between point-of-contacts identified for the community and for oneself were assessed using χ^2 tests using a Bonferroni corrected α of $p = 0.025$.

During bivariate analyses, annual household income was also observed to be significantly associated across multiple mental health outcomes, however due to its high missingness ($n = 381$, 55.9%), it was unable to be included in analyses. To ensure the potentially salient association of financial variables were not overlooked, multiple imputation analyses were conducted with more specific finance variables (source of personal income, household income), as well as age, sex, education, country of birth, living alone, living close to family/friends, time in US, citizenship, and English proficiency, which were informed by bivariate analyses of the financial variables. Pooled analysis of 10 imputation iterations were conducted based on prior imputation guidelines.[29,30] Multiple logistic regressions using this pooled dataset were then conducted to assess odds ratios for each mental health outcome.

3 | RESULTS

Overall, 682 participants were surveyed during data collection (Table 1). The average age of participants was 69.4 (*SD*: 7.2), with 57.6% of participants being male. Many participants were born in India (42.1%), followed by Bangladesh (17.0%) and Pakistan (15.0%). On average, participants lived 18.1 years in the US (*SD*:13.8) and most participants were US Citizens (54.3%). Likewise, most participants identified living close to family or friends (55.0%), and the majority reported having a primary care doctor (87.8%).

Approximately a third of participants reported feeling lonely sometimes (29.9%) (Table 2). The average PHQ-9 score of the sample was low (mean: 1.55, *SD*: 2.11), although 9.4% of participants displayed symptoms of mild/moderate depression, and 16.7% noted depression symptoms had caused difficulties in their lives. No participants displayed symptoms of moderately severe to severe depression. The most salient dimensions of emotional distress identified by participants included loneliness (18.0%), depression (14.4%), anger (13.6%), sadness (13.6%), and stress (11.7%); only one participant identified experiencing substance abuse issues (0.1%). Factors associated with these salient emotional distress issues are displayed in File S1.

Participants originating from countries in the Caribbean proportionally had the highest prevalence across most of the mental health outcomes examined (Figure 1). The greatest disparities by country of origin were observed among participants feeling lonely sometimes (ranging from 25% among Pakistani to 48% among Caribbean participants) and experiencing emotional distress (ranging from 36% among Indian to 52% among Caribbean participants).

Overall, for individual responses, the top three initial points of contact to discuss mental health issues were family, doctors, or friends. However, when asked who they thought a fellow community member would contact if he/she were experiencing a mental health issue, participants identified doctors as initial points of contact, followed by family. Following χ^2 analyses, compared to participants' perceptions of a community member's initial points of contacts to

TABLE 1 Demographic characteristics in sample of South Asian older adults (n = 682)

Variable	n	%[a]
Age (mean, *SD*), n = 680	69.4	7.2
Sex, n = 679		
Female	281	41.2%
Male	393	57.6%
Country of birth, n = 681		
India	287	42.1%
Bangladesh	116	17.0%
Pakistan	102	15.0%
Guyana	86	12.6%
Tibet	38	5.6%
Nepal	30	4.4%
Trinidad	8	1.2%
Afghanistan	7	1.0%
Myanmar	2	0.3%
Kenya	1	0.1%
Tanzania	1	0.1%
Other	2	0.3%
Education, n = 678		
No formal education	98	14.4%
Primary school	156	22.9%
High school	191	28.0%
Bachelor's/some college	145	21.3%
Master's or above	87	12.8%
English proficiency, n = 679		
Don't speak English	139	20.4%
Poor	94	13.8%
Fair	131	19.2%
Well	98	14.4%
Fluent	215	31.5%
Citizenship, n = 674		
US citizen	370	54.3%
Noncitizen	299	43.8%
Time in United States, n = 678		
5 years or less	160	23.5%
6–10 years	99	14.5%
11-20 years	141	20.7%
21 years or more	269	39.4%
Number of years in United States (mean, *SD*), n = 674	18.1	13.8
Do you live alone, n = 681		
No	596	87.4%
Yes	84	12.3%
Do you live close to family or friends, n = 680		
No	301	44.1%
Yes	375	55.0%
Do you have a primary care doctor, n = 675		
No	72	10.6%
Yes	599	87.8%
Self-rated health, n = 680		
Excellent	60	8.8%
Very good	137	20.1%
Good	312	45.7%
Fair	137	20.1%
Poor/Terrible	30	4.4%
Annual HH income, n = 301		
More than/equal $20,000	146	21.4%
Less than $20,000	155	22.7%
Savings a primary income source, n = 638		
No	548	80.4%
Yes	90	13.2%
Social security a primary income source, n = 638		
No	394	57.8%
Yes	244	35.8%
Employment a primary income source, n = 638		
No	554	81.2%
Yes	84	12.3%
Household ownership, n = 675		
Own/other	250	36.7%
Rent	425	62.3%

[a]Percentage of full 682 participant sample; percentages of missing values not shown.

discuss mental health issues, participants themselves were significantly more likely to discuss mental health issues with either family (p = 0.003) or with no-one ($p < 0.001$) (Figure 2).

In adjusted models (Table 3), self-rated health was consistently associated with the analyzed mental health outcomes; when compared to those with excellent/very-good self-rated health, those with fair/poor/terrible self-rated health were more likely to feel lonely sometimes (adjusted odda ratio [AOR]: 2.77, 95% confidence interval [CI]: 1.67–4.65), have mild/moderate depression (AOR: 8.42, 95% CI: 3.65–22.09), experience difficulties in life due to depression symptoms (AOR: 7.27, 95% CI: 3.65–15.42), and experience

TABLE 2 Descriptive overview of mental health outcomes of South Asian older adults ($n = 682$)

Variable	n	%[a]
Do you feel lonely sometimes, $n = 663$		
No	459	67.3%
Yes	204	29.9%
PHQ-9 score, (mean, SD), $n = 675$	1.55	2.11
Depression level (PHQ-9), $n = 675$		
Minimal (score: 1–4)	611	89.6%
Mild/moderate (score: 5–14)	64	9.4%
If you checked off any problems [PHQ-9 symptoms], how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people, $n = 523$		
Not difficult	409	60.0%
Difficult	114	16.7%
Have you ever experienced any of these, $n = 655$		
Loneliness	123	18.0%
Depression	98	14.4%
Anger	93	13.6%
Sadness	93	13.6%
Stress	80	11.7%
Anxiety	45	6.6%
Panic attacks	4	0.6%
Posttraumatic stress disorder (PTSD)	1	0.1%
None	267	39.1%
If someone in your community thought they had a mental health issue, who would they talk to first, $n = 673$		
Doctor	323	47.4%
Family	294	43.1%
Friend	73	10.7%
Mental health counselor	39	5.7%
Spiritual leader	30	4.4%
Would not talk to anyone	1	0.1%
I do not know	120	17.6%
If you thought you had a mental health issue, who would you talk to first, $n = 676$		
Family	351	51.5%
Doctor	303	44.4%
Friend	77	11.3%
Spiritual leader	43	6.3%
Mental health counselor	23	3.4%
Would not talk to anyone	20	2.9%
I do not know	59	8.7%

[a]Percentage of full 682 participant sample; percentages of missing values not shown.

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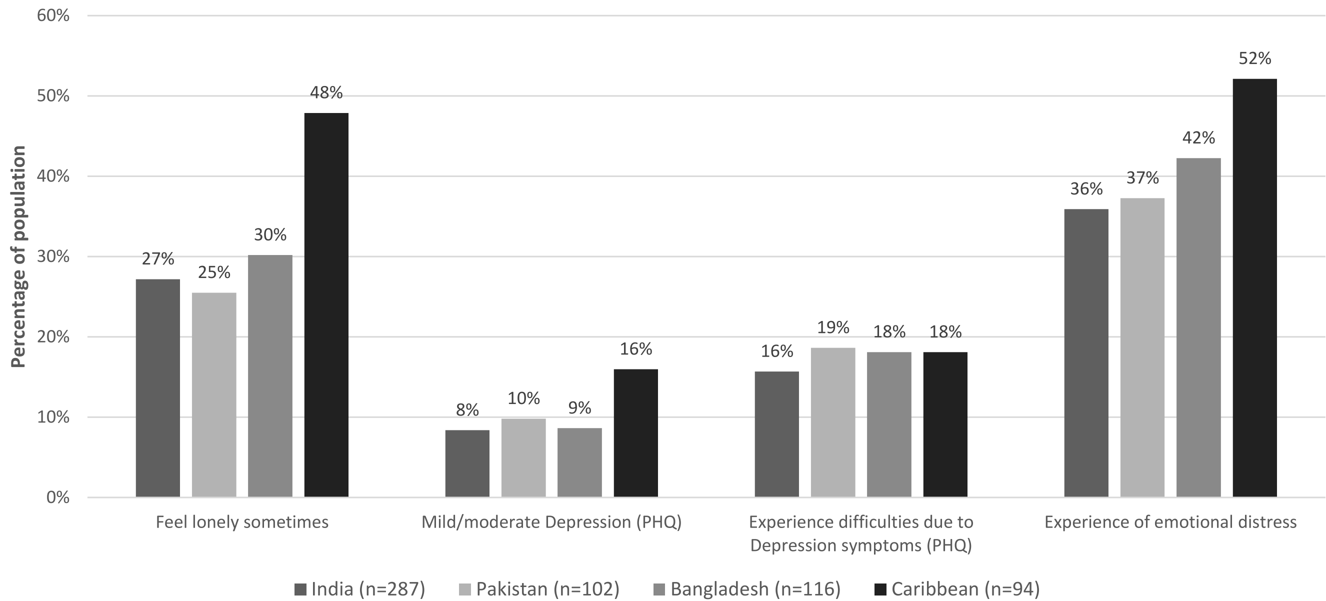

FIGURE 1 Mental health outcomes of South Asian older adults by country of origin (n = 682)

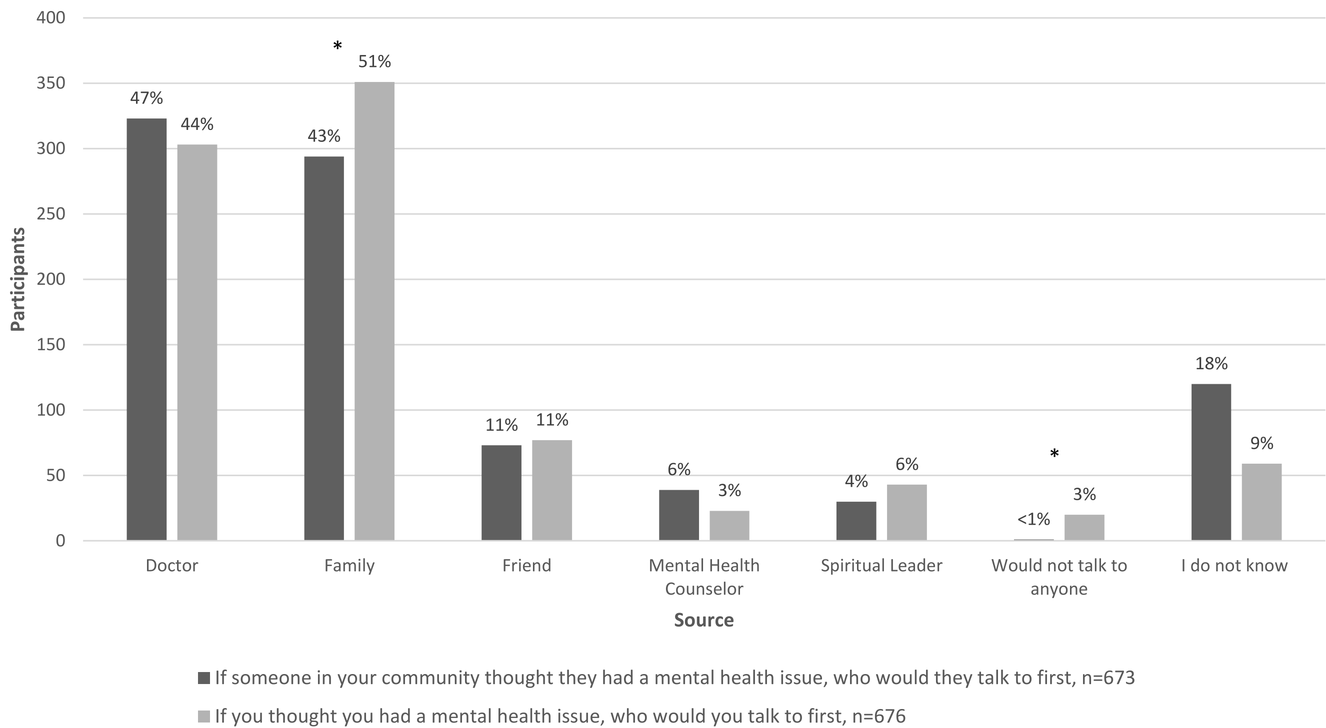

FIGURE 2 Primary point of contact to discuss mental health issues (n = 682)

emotional distress or substance abuse (AOR: 3.03, 95% CI: 1.88–4.94). Those with high school and bachelor's/some-college levels of educational attainment were less likely to experience difficulties due to depression symptoms compared to those without formal education (AOR: 0.37, 95% CI: 0.14–0.94; AOR: 0.32, 95% CI: 0.11–0.91). Those living alone were more likely to experience emotional distress or substance abuse (AOR: 2.06, 95% CI: 1.21–3.53) and feel lonely sometimes (AOR: 2.17, 95% CI: 1.28–3.68). South Asian older adults from Caribbean countries were also more likely to experience emotional distress or substance abuse compared to those from India (AOR: 2.71%, 95% CI: 1.36–5.50).

In the multiple imputation analyses of the financial variables (Table 4), those who had employment as a primary income source had significantly low odds of feeling lonely (AOR: 0.33, 95% CI: 0.15–0.70), while those who rented were more likely to feel lonely (AOR: 1.66, 95% CI: 1.02–2.71).

TABLE 3 Factors associated with mental health outcomes among South Asian older adults (n = 682)

Variables	Adjusted[a] odds ratios of mental health outcome			
	Feel lonely sometimes (n = 204)	**Mild/moderate depression (PHQ) (n = 64)**	**Experience difficulties due to depression symptoms (PHQ) (n = 114)**	**Experience of emotional distress (n = 267)**
Sociodemographic				
Age	1.01 (0.98–1.04)	0.99 (0.95–1.03)	1.02 (0.99–1.06)	**0.97 (0.95–1.00)***
Sex				
Female	Ref	Ref	Ref	Ref
Male	0.86 (0.58–1.27)	1.84 (0.99–3.51)	1.12 (0.68–1.85)	0.99 (0.68–1.43)
Education				
No formal education	Ref	Ref	Ref	Ref
Primary school	1.56 (0.77–3.19)	0.80 (0.29–2.29)	0.83 (0.35–1.96)	0.54 (0.27–1.04)
High school	1.09 (0.51–2.37)	0.59 (0.20–1.85)	**0.37 (0.14–0.94)***	0.54 (0.27–1.10)
Bachelor's/Some college	1.24 (0.54-2.88)	0.39 (0.11-1.41)	**0.32 (0.11-0.91)** *	0.78 (0.36-1.69)
Master's or above	1.17 (0.45–3.01)	**0.17 (0.03–0.82)***	0.40 (0.12–1.30)	1.14 (0.48–2.73)
Country of birth				
India	Ref	Ref	Ref	Ref
Pakistan	0.90 (0.50–1.58)	0.94 (0.38–2.17)	0.81 (0.39–1.61)	1.14 (0.67–1.91)
Bangladesh	1.13 (0.63–2.01)	0.56 (0.21–1.42)	0.75 (0.36–1.53)	1.36 (0.78–2.37)
Caribbean	1.94 (0.97–3.90)	1.41 (0.51–3.91)	0.86 (0.32–2.25)	**2.71 (1.36-5.50)** **
Other	0.92 (0.44–1.89)	0.29 (0.06–1.09)	**0.24 (0.09–0.62)****	1.06 (0.54–2.04)
Living situation				
Living alone				
No	Ref	Ref	Ref	Ref
Yes	**2.17 (1.28–3.68)****	0.57 (0.21–1.33)	0.58 (0.26–1.21)	**2.06 (1.21–3.53)****
Living close to fam/friends				
No	Ref	Ref	Ref	Ref
Yes	1.00 (0.69–1.46)	0.60 (0.33–1.07)	0.95 (0.59–1.53)	1.09 (0.77–1.57)

TABLE 3 (Continued)

Variables	Adjusted[a] odds ratios of mental health outcome			
	Feel lonely sometimes (n = 204)	Mild/moderate depression (PHQ) (n = 64)	Experience difficulties due to depression symptoms (PHQ) (n = 114)	Experience of emotional distress (n = 267)
Accultration				
Time in United States				
5 years or less	Ref	Ref	Ref	Ref
6–20 years	0.79 (0.45–1.36)	0.75 (0.32–1.79)	1.69 (0.86–3.36)	1.21 (0.72–2.05)
21 years or more	0.96 (0.50–1.87)	0.95 (0.34–2.69)	0.74 (0.32–1.71)	1.71 (0.91–3.26)
Citizenship status				
US citizen	Ref	Ref	Ref	Ref
Noncitizen	1.27 (0.77–2.10)	1.29 (0.58–2.86)	1.49 (0.81–2.75)	1.34 (0.84–2.16)
English proficiency				
Well/fluent	Ref	Ref	Ref	Ref
Poor/fair	0.81 (0.48–1.36)	0.61 (0.26–1.41)	0.78 (0.39–1.54)	1.17 (0.72–1.93)
Do not speak English	0.72 (0.35–1.47)	0.50 (0.15–1.55)	0.51 (0.20–1.28)	1.02 (0.51–2.01)
General health				
Have a primary care doctor				
No	Ref	Ref	Ref	Ref
Yes	1.01 (0.53–1.99)	1.52 (0.53–5.53)	0.72 (0.30–1.84)	0.74 (0.39–1.38)
Self-rated health				
Excellent/very good	Ref	Ref	Ref	Ref
Good	1.41 (0.90–2.26)	1.82 (0.76–4.86)	**2.47 (1.26–5.13)***	1.42 (0.93–2.17)
Fair/poor/terrible	**2.77 (1.67–4.65)*****	**8.42 (3.65–22.09)*****	**7.27 (3.65–15.42)*****	**3.03 (1.88–4.94)*****

[a]Adjusted for all socio-demographic, living situation, acculturation, and general health variables in the table.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

TABLE 4 Financial indicators of mental health outcomes among South Asian older adults issuing imputed data analysis ($n = 682$)

Variables	Adjusted[a] odds ratios of mental health outcome			
	Feel lonely sometimes ($n = 204$)	Mild/moderate depression (PHQ) ($n = 64$)	Experience difficulties due to depression symptoms (PHQ) ($n = 114$)	Experience of emotional distress ($n = 267$)
FINANCIAL				
Annual HH income				
More than/equal $20,000	Ref	Ref	Ref	Ref
Less than $20,000	1.30 (0.72–2.34)	2.15 (0.85–5.43)	1.66 (0.54–5.12)	1.21 (0.57–2.57)
Savings a primary income source				
No	Ref	Ref	Ref	Ref
Yes	0.99 (0.55–1.79)	1.33 (0.50–3.55)	1.73 (0.78–3.84)	1.53 (0.89–2.66)
Social security a primary income source				
No	Ref	Ref	Ref	Ref
Yes	1.08 (0.64–1.82)	0.58 (0.25–3.55)	1.47 (0.73–2.95)	1.02 (0.61–1.69)
Employment a primary income source				
No	Ref	Ref	Ref	Ref
Yes	**0.33 (0.15–0.70)****	2.10 (0.78–5.66)	0.73 (0.30–1.80)	0.76 (0.41–1.38)
Household ownership				
Own/other	Ref	Ref	Ref	Ref
Rent	**1.66 (1.02–2.71)****	1.74 (0.77–3.94)	1.28 (0.68–2.41)	1.52 (0.96–2.40)

[a]Adjusted for all other financial variables in the table, along with age, sex, education, country of birth, living alone, living close to fam/friends, time in US, citizenship, English proficiency, having a primary healthcare doctor, and self-rated health.

*$p < 0.05$.

**$p < 0.01$.

***$p < 0.001$.

4 | DISCUSSION

Overall, loneliness and mental health outcomes were associated with a wide variety of indicators among South Asian older adult immigrants. Self-rated health consistently displayed the strongest association with poor mental health outcomes, while living alone, educational attainment, and country of birth were also salient indicators for select outcomes. Past research among NYC South Asian immigrants also corroborates the association between educational attainment and depression observed in the current study.[31] Although comparability of specific loneliness and other emotional distress findings is limited by different ways these constructs have been operationalized in past research, the proportion of the study sample feeling lonely sometimes (29.9%) was notably higher than the 22% of US adults reporting loneliness or social isolation.[32] Likewise, the proportion of South Asian older adults with mild/moderate depression (9.9%) was higher than the 7.7% estimated prevalence of depression observed among US older adults.[33] While participants perceived doctors to be an important point of contact to discuss mental health concerns for individuals in their community experiencing mental health issues, family was the most common point of contact cited if they themselves were experiencing mental health issues. This finding corroborates research showing the strong role of family in the experience and management of mental health, both in South Asian Americans communities[34] and the wider Asian American community as well.[35] Moreover, individuals who noted employment as a primary source of income and owned their own home were less likely to feel lonely.

Our finding that poor self-rated health is related to mental health outcomes is both consistent with the literature on mental health in other Asian immigrant communities[36] and highlights the unique conceptualization and experience of mental health among South Asian immigrant communities. Moreover, South Asian community members may somaticize their experience of mental health and report physical health symptoms.[37,38] However, it is also important to consider that self-rated health (while widely used as an indicator of health-related quality of life) may encompass a variety of different individual health ailments contributing to a participant's response. For example, it is unclear if (or to what extent) some participants may have considered their mental health as part of their general self-

rated health. Based on the findings of this study, further research is needed to disaggregate specific physical health conditions or disabilities to assess their associations with mental health in this population. Second, our results highlight the multi-dimensional role that social support may play in mental health outcomes for South Asian older adults, aligning with other literature on older adults in the general populations of the US[39] and United Kingdom[20] which similarly demonstrated that living alone increased the probability of depressive symptoms. Although recent research among Asian Americans has not observed employment status to be a significant predictor of depression,[31] our study findings suggest that further research is warranted to explore whether socioeconomic conditions may be serving as a source of social support or be involved in other pathways in the prevention or progression of mental health issues.

Importantly, we observed that when a singular construct (notably loneliness) was assessed in two different ways in the survey, this led to different results; for example, 29.9% of participants noting they feel lonely sometimes, while 18.0% noting they have experienced loneliness. This suggests that critical examination must be made in how quantitative observational research focused on mental health in South Asian immigrant settings is conducted; further research is needed to employ survey items measuring loneliness or other mental health constructs that have been comprehensively validated in South Asian immigrant settings, but also qualitative research focused on assessing the experience of loneliness among South Asian older adults to better capture and disaggregate the different experiences in this population.

A statistically higher proportion of older adults noted not talking to anyone if they experienced mental health issues, which may reinforce past findings regarding stigma associated with mental health in South Asian communities.[40–42] Although participant perceptions of mental health help-seeking behaviors among community members was also assessed, their interpretation of "community" may be subjective and thus, likely to differ across the study. Therefore, it is difficult to make conclusive statements regarding the observed disparities between participant self-identified mental health help-seeking behaviors and community perceptions of these behaviors. Further research focused on perceptions of more specific interpersonal or community level relationships in the context of mental health related behaviors is warranted to expand on our findings.

The mental health burden experienced by Indo-Caribbean participants was another notable finding, supporting past research showing that this subpopulation of South Asians faces a disproportionate mental health burden.[31] Anthropologic research among populations in Trinidad and Tobago have observed marginalization, ethnic disadvantage, and transgenerational conflicts to be among the reasons why the country faces a high suicide rate.[43,44] Among Indo-Caribbean immigrants, recipients of mental health care identified issues of identity, acculturation, and racism influencing their experience of mental health issues,[45] while perceived discrimination, deskilling and survival employment, and sense of belonging have also been seen as important social determinants of health.[46] We also suspect that unique sociocultural and linguistic traits of the Indo-Caribbean community (such as higher English proficiency) may be driving observed differences due to differences in subjective understanding of mental health. For example, while the survey was provided in-language to participants from non-English backgrounds, the specific translations of various mental health terms may have distinct or unique connotations in different languages, thus influencing how non-English speaking participants may have responded. Indeed, although English proficiency was adjusted for in analyses, specific emotional distress variables or PHQ-9 survey items involved English-language terminology which may have been interpreted more consistently and with a different nuance among English-proficient populations.

Our study findings point to several recommendations to improve programmatic and policy efforts regarding the mental health of South Asian older adult immigrants. First, health promotion which integrates mental health with more general well-being may be particularly important and may also have an impact on mitigating stigma associated with discussing and seeking help for mental health issues. Second, there is a need to work closely with and educate primary care providers serving South Asian older adult populations, suggesting that screening for mental health risk factors in this community may need to also consider manifestations of other health-related quality of life indicators; further research examining specific physical health ailments and mental health outcomes is also warranted. Finally, there is a continued need for programs to foster social support and independence among South Asian seniors. Senior centers and social services agencies that provide job training, financial literacy training, English classes, and other opportunities for socialization may play a particularly important role in improving mental health outcomes in the community.

There were a number of limitations that must be acknowledged. First, South Asian older adult immigrants were recruited using convenience sampling and thus findings may not be generalizable to the wider South Asian older adult immigrant population in the US. For example, while gender and age distributions of past study samples of South Asian older adult immigrants have differed,[47,48] the mean age of this study sample was below 70 and men comprised approximately half of participants (57.6%). The specific characteristics of this sample was likely influenced by the overall demographic profile of the community served by India Home. Moreover, surveys were conducted in-person, and given stigmatization of mental health issues, this could have led to an underestimation of findings. Likewise, the high missingness in the financial outcome data and resultant need to rely on multiple imputation analysis was a limitation of the study, and further in-depth analysis on these financial factors is warranted. Finally, due to the relatively small sample size of participants from specific Caribbean countries such as Guyana and Trinidad, these participants were aggregated during analysis of disparities by country-of-origin.

Finally, it is important to consider how the COVID-19 pandemic has likely impacted mental health concerns in this population, given preliminary evidence highlighting the pandemic's role in catalyzing a vast array of population mental health issues, exacerbated through

isolation and pandemic-related grief.[49] In particular, there are growing concerns of disproportionate COVID-19 related racial trauma experienced by Asian immigrant communities, including South Asian older adult immigrants, and the need to acknowledge and intervene on many of the social and economic disparities faced by these populations that may be adding to the mental health burden faced by the community.[50] As the face of the US older adult population continues to change, community-engaged efforts to better understand and guide efforts to improve the health of this population will be critical.

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CONFLICT OF INTEREST

The study authors declare no conflicts of interest.

ETHICS STATEMENT

All study materials and data collection procedures were developed and approved by the India Home advisory committee responsible for this community-led needs assessment.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

1. Indicator definitions—older adults, *Center for Disease Control and Prevention (CDC)*; 2015. https://www.cdc.gov/cdi/definitions/older-adults.html. Accessed September 11, 2020.
2. Ageing and Health, *World Health Organization*; 2018. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health. Accessed August 20, 2020.
3. Moore THM, Kesten JM, López-López JA, et al. The effects of changes to the built environment on the mental health and well-being of adults: systematic review. *Health Place*. 2018;53:237-257.
4. Gonçalves DC, Byrne GJ. Interventions for generalized anxiety disorder in older adults: systematic review and meta-analysis. *J Anxiety Disord*. 2012;26(1):1-11.
5. World Health Organization. *Mental Health of Older Adults*; 2017. https://www.who.int/news-room/fact-sheets/detail/mental-health-of-older-adults. Accessed January 15, 2021.
6. Asian American Seniors in New York City: An Updated Snapshot, *Asian American Federation*; 2016. http://www.aafederation.org/doc/Final_Senior_Report_3.pdf. Accessed August 20, 2020.
7. South Asian Americans Leading Together (SAALT). *Demographic snapshot of South Asians in the United States April 2019*; 2019. https://saalt.org/wp-content/uploads/2019/04/SAALT-Demographic-Snapshot-2019.pdf. Accessed August 20, 2020.
8. Indo-Caribbean CHRNA (Community Health Resources and Needs assessment). *NYU Center for the study of Asian American Health*; 2016. https://med.nyu.edu/asian-health/sites/default/files/asian-health2/Indo%20Caribbean%20CHRNA.pdf. Accessed August 20, 2020.
9. New York City Comptroller Scott M Stringer. *More than 962,000 New York City residents lack Health insurance*. 2014. https://comptroller.nyc.gov/wp-content/uploads/2015/11/Poverty-and-Uninsured-Rate-by-Community-District-ACS-2014.pdf. Accessed January 15, 2021.
10. Ramsawak J. *Twice Migration and Indo-Caribbean American Identity Politics*; 2020.
11. Barua A, Ghosh MK, Kar N, Basilio MA. Prevalence of depressive disorders in the elderly. *Ann Saudi Med*. 2011;31(6):620-624.
12. Ganatra HA, Zafar SN, Qidwai W, Rozi S. Prevalence and predictors of depression among an elderly population of Pakistan. *Aging Ment Health*. 2008;12(3):349-356.
13. Wahlin Å, Palmer K, Sternäng O, Hamadani JD, Kabir ZN. Prevalence of depressive symptoms and suicidal thoughts among elderly persons in rural Bangladesh. *Int Psychogeriatrics*. 2015;27(12):1999-2008.
14. Disu TR, Anne NJ, Griffiths MD, Mamun MA. Risk factors of geriatric depression among elderly Bangladeshi people: a pilot interview study. *Asian J Psychiatry*. 2019;44:163-169.
15. Lee SY, Martins SS, Lee HB. Mental disorders and mental health service use across Asian American subethnic groups in the United States. *Community Ment Health J*. 2015;51(2):153-160.
16. Kessler RC, Berglund P, Chiu WT, et al. The US National Comorbidity Survey Replication (NCS-R): design and field procedures. *Int J Methods Psychiatr Res*. 2004;13(2):69-92.
17. NYU School of Medicine. *Community Health Needs & Resource Assessment: An Exploratory Study of South Asians in NYC*; 2007. https://med.nyu.edu/sites/default/files/asian-health2/chnra_southasian_0.pdf. Accessed January 15, 2021.
18. Rait G, Burns A. Appreciating background and culture: the South Asian elderly and mental health. *Int J Geriatr Psychiatry*. 1997;12(10):973-977.
19. Lai DWL, Surood S. Predictors of depression in aging South Asian Canadians. *J Cross Cult Gerontol*. 2008;23(1):57-75.
20. Wilson K, Mottram P, Sixsmith A. Depressive symptoms in the very old living alone: prevalence, incidence and risk factors. *Int J Geriatr Psychiatry*. 2007;22(4):361-366.
21. Chen X, Talwar D, Talwar D, Ji Q. Social Network and social support among elderly Asian immigrants in the United States. *Glob J Anthropol Res*. 2015;2:15-21.
22. Diwan S. Limited English proficiency, social network characteristics, and depressive symptoms among older immigrants. *J Gerontol B Psychol Sci Soc Sci*. 2008;63(3):S184-S191.
23. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9. *J Gen Intern Med*. 2001;16(9):606-613.
24. Kim HJ, Park E, Storr CL, Tran K, Juon HS. Depression among Asian-American adults in the community: systematic review and meta-analysis. *PLoS One*. 2015;10(6):e0127760.

25. Roberts LR, Mann SK, Montgomery SB. Depression, a hidden mental health disparity in an Asian Indian immigrant community. *Int J Environ Res Public Health*. 2015;13(1):27.
26. India Home. *South Asian Seniors in New York City: Needs Assessment*. New York, NY: India Home; 2019.
27. Shidhaye R, Kermode M. Stigma and discrimination as a barrier to mental health service utilization in India. *Int Health*. 2013;5(1):6-8.
28. Han M, Pong H. Mental health help-seeking behaviors among Asian American community college students: the effect of stigma, cultural barriers, and acculturation. *J Coll Stud Dev*. 2015;56(1):1-14.
29. Raghunathan TE, Solenberger PW, Van Hoewyk J. *IVEware: Imputation and Variance Estimation software*. Ann Arbor, MI: Survey Methodology Program, Survey Research Center, Institute for Social Research, University of Michigan; 2002.
30. Stuart EA, Azur M, Frangakis C, Leaf P. Multiple imputation with large data sets: a case study of the Children's Mental Health Initiative. *Am J Epidemiol*. 2009;169(9):1133-1139.
31. Misra S, Wyatt LC, Wong JA, et al. Determinants of depression risk among three Asian American subgroups in New York City. *Ethn Dis*. 2020;30(4):553-562.
32. DiJulio B, Hamel L, Muñana C, Brodie M. *Loneliness and Social Isolation in the United States, the United Kingdom, and Japan: An International Survey*; 2018. https://www.kff.org/report-section/loneliness-and-social-isolation-in-the-united-states-the-united-kingdom-and-japan-an-international-survey-section-1/. Accessed January 15, 2021.
33. Centers for Disease Control and Prevention. *The State of Mental Health and Aging in America*; 2008. https://www.cdc.gov/aging/pdf/mental_health.pdf. Accessed January 15, 2021.
34. Masood N, Okazaki S, Takeuchi DT. Gender, family, and community correlates of mental health in South Asian Americans. *Cult Divers Ethn Minority Psychol*. 2009;15(3):265-274.
35. Kramer EJ, Kwong K, Lee E, Chung H. Cultural factors influencing the mental health of Asian Americans. *West J Med*. 2002;176(4):227-231.
36. Silveira ERT, Ebrahim S. Social determinants of psychiatric morbidity and well-being in immigrant elders and whites in east London. *Int J Geriatr Psychiatry*. 1998;13(11):801-812.
37. Bhugra D, Gupta KR, Wright B. Depression in North India comparison of symptoms and life events with ocher patient groups. *Int J Psychiatry Clin Pract*. 1997;1(2):83-87.
38. Bhugra D, Mastrogianni A. Globalisation and mental disorders. *Br J Psychiatry*. 2004;184:10-20.
39. Stahl ST, Beach SR, Musa D, Schulz R. Living alone and depression: the modifying role of the perceived neighborhood environment. *Aging Ment Health*. 2017;21(10):1065-1071.
40. Jung H, Cho YJ, Rhee M-K, Jang Y. Stigmatizing beliefs about depression in diverse ethnic groups of Asian Americans. *Community Ment Health J*. 2020;56(1):79-87.
41. Chaudhry T, Chen SH. Mental illness stigmas in South Asian Americans: a cross-cultural investigation. *Asian Am J Psychol*. 2019;10:154-165.
42. Pishori AZ. *The impact of stigmatized identities and culture on the mental health of East and South Asian Americans*; 2015.
43. Parasram R, Maharajh H. Suicide and attempted suicide in Trinidad and Tobago. *Caribbean Med J*. 1993;54(1):17-19.
44. Maharajh HD. Transgenerational cultural conflicts and suicide among Hindu girls. *Caribb Med J*. 1998;60(1):16-18.
45. Upadhya A. *Indo-Caribbean Canadian Mental Health Service Recipients: Processes of Power and Constructions of Identity*; 2011.
46. Changoor TMR. *Indo-Caribbean Immigrants' Well-Being: An Intersectional Exploration of the Social Determinants of Health on an Understudied Population*; 2018.
47. Ng CF, Northcott HC, Abu-Laban SM. Housing and living arrangements of South Asian immigrant seniors in Edmonton, Alberta. *Can J Aging*. 2007;26(3):185-194.
48. Mahmood A, Chaudhury H, Kobayashi K, Valente M. The housing and community characteristics of South Asian immigrant older adults in Greater Vancouver, British Columbia: a comparison between older adults in ethno-specific seniors' housing and community-dwelling older adults. *J Archit Plan Res*. 2008;25:54-75.
49. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. *Asian J Psychiatry*. 2020;52:102066.
50. Liu SR, Modir S. The outbreak that was always here: racial trauma in the context of COVID-19 and implications for mental health providers. *Psychol Trauma*. 2020;12(5):439-442.

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