The impact of COVID-19 on the well-being and cognition of older adults living in the United States and Latin America

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Research paper

The impact of COVID-19 on the well-being and cognition of older adults living in the United States and Latin America

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A B S T R A C T

Background: In the COVID-19 pandemic, older adults from vulnerable ethnoracial groups are at high risk of infection, hospitalization, and death. We aimed to explore the pandemic’s impact on the well-being and cognition of older adults living in the United States (US), Argentina, Chile, Mexico, and Peru.

Methods: 1,608 (646 White, 852 Latino, 77 Black, 33 Asian; 72% female) individuals from the US and four Latin American countries aged ≥ 55 years completed an online survey regarding well-being and cognition during the pandemic between May and September 2020. Outcome variables (pandemic impact, discrimination, loneliness, purpose of life, subjective cognitive concerns) were compared across four US ethnoracial groups and older adults living in Argentina, Chile, Mexico, and Peru.

Findings: Mean age for all participants was 66.7 (SD = 7.7) years and mean education was 15.4 (SD = 2.7) years. Compared to Whites, Latinos living in the US reported greater economic impact (p < .001, η2 = .021); while Blacks, reported experiencing discrimination more often (p = .001, η2 = .050).
Evidence before this study

A PubMed search from January 1 to October 21, 2020, using the terms “[COVID-19 OR SARS-CoV2] AND (ethnoracial OR race OR ethnicity) AND (older OR elderly adult) AND (discrimination OR loneliness OR life purpose OR subjective cognitive concerns) AND (LMICs OR low income country OR middle income country OR Latin America)”. Only a handful of studies retrieved appeared relevant and discussed the importance of social distancing, resources in LMICs, and data limitations in addressing inequities in the pandemic. We were unable to find a single study that examined the impact of the pandemic and psychosocial outcomes in ethnoracial groups in Latin America and the US.

Added value of this study

In the US, Latinos indicated more economic challenges, while Black older adults reported more perceived discrimination than other groups in the US. Latinos living in Chile, Mexico, and Peru experienced higher pandemic impact than those in the US. In contrast, those in Argentina, Chile, and Peru experienced lower perceived discrimination than Latinos residing in the US. These findings provide evidence that the pandemic burden is different for non-White individuals and those in low-and-middle-income countries.

Implications of all the available evidence

Discrimination, loneliness, life purpose, and memory concerns deeply influence an individual's health and interact with social determinants of health. Ethnoracial groups and older adults are at a higher risk for health disparities, and COVID-19 exponentially increases mortality and morbidity risks. Future studies should examine between-country differences and also how mediators like income and coping skills modify the pandemic's impact.

1. Introduction

The spread of Coronavirus Disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was declared a pandemic on March 11, 2020, by the World Health Organization [1]. To date, the worldwide impact grosses over 124 million cases, with over 2.74 million deaths [2]. Many countries continue to report higher cases and related deaths. The Centers for Disease Control and Prevention (CDC) reported over 29.9 million cases and over 544,000 deaths in the US, resulting from the pandemic (1/21/20–3/24/2021) [3]. Risk is increased through physical contact, enclosed environments, and longer exposure duration [4]. Sociobiological risk factors, older age, and pulmonary and cardiovascular comorbidities increase the risk of poor outcomes [5,6]. In the United States (US), healthcare disparities are exacerbated for ethnic and racial (ethnoracial) groups [7]. Compared to non-Latino Whites, the CDC reports higher rate ratios of cases (2.8, 2.6), hospitalizations (4.6, 4.7), and deaths (1.1, 2.1) among Latino and Black individuals, respectively [8]. A higher number of Latinos and Blacks have several of the aforementioned risk factors, increasing the risk for a more severe course if infected [9].

Long-term recovery is complicated by comorbidities, psychological sequelae, and lingering symptoms/deconditioning post-treatment [10,11]. For Latinos and Blacks, a greater multifactorial risk of COVID-19 encompasses long-standing systemic structures that restrict access to a complex healthcare system needed to create, sustain, and protect life beyond biological processes [12,13].

Greater perceived loneliness, lower life purpose, higher memory concerns, and greater discrimination are associated with poorer health outcomes and higher mortality among older adults [14-17]. Moreover, loneliness, and depression are related to subjective experiences like social isolation or perceived stress [18]. Ethnicity and culture can influence the development of these symptoms among elderly populations [19]. Preventative measures and national mandates emphasizing shelter-in-place/stay-at-home likely exacerbate stress, isolation, and discrimination for vulnerable populations [20]. The pandemic's impact extends to low- and middle-income countries (LMICs) with differential effects resulting from access to screening/testing, policies mandating work, school, travel, and reporting of COVID-19 cases and deaths. LMIC encounter challenges with more fragile supply chains, collectivist-based households promoting higher transmission, and less developed sanitation systems [21,22].

There are limited data on the impact of COVID-19 on ethnoracial groups and whether those in LMICs face greater challenges than those in the US [23]. This study presents baseline data from an ongoing international effort entitled, “The Impact of COVID-19 on Well-being and Cognition in Older Ethnically Diverse Individuals,” launched in May, 2020. This study investigates if differences exist in cognitive concerns, loneliness, life purpose, perceived discrimination, and pandemic impact among older adults across ethnoracial groups living in the US, and in Latin American countries. We hypothesize that 1) Latinos and Blacks living in the US will be more impacted by the pandemic compared to non-Latino Whites and 2) that older individuals living in Argentina, Chile, Mexico, and Peru will encounter more burden compared to their Latino counterparts living in the US.

2. Methods

2.1. Design and sampling

We report cross-sectional findings from an ongoing, longitudinal study of the general noninstitutionalized older adult population (55 years or older). The sample is non-probabilistic and was selected based on convenience in the US and several Latin American Spanish-speaking countries (Argentina, Chile, Mexico, Peru).

2.2. Procedure

A group of researchers from the US and 14 Latin American countries formed in May 2020. The survey was launched simultaneously in the US and Latin America. The first survey was completed on May 15th, 2020, and the last survey data included in this study was completed on September 9th, 2020. Participants were recruited via social media outlets (e.g., Twitter, Facebook), researcher’s contacts (family, friends, ongoing studies), virtual meetings, and word-of-mouth. All participants completed a one-hour survey (online with a computer or smartphone or via phone call with a researcher) in English (n = 844) or Spanish (n = 852). Study data were collected, accessed (VLT & YTQ), and managed in REDCap (Research Electronic Data Capture) [24] hosted at Massachusetts General Hospital. All measures were forward-and-back translated to Spanish following World Health Organization guidelines [25].
2.3. Ethical considerations

The study was approved by the Massachusetts General Brigham Human Research Review Board, and Local Institutional Review Boards from Puerto Rico (Ponce Medical School Foundation, Ponce Research Institute), Perú (Universidad Católica San Pablo, Comité de Ética de la Dirección de Investigación), México (Instituto Nacional de Ciencias y Nutrición Salvador Zubirán, Comité de Ética en Investigación), Chile (Universidad de Chile, Comité de Ética de Investigación en Seres Humanos), Ecuador (Neuromedicenter: Unidad de Trastornos Cognitivos – Centro Diurno), República Dominicana (Universidad Nacional Pedro Henríquez Ureña), and Argentina (Fundación Favaloro Hospital Universitario, Comité de Ética en Investigación). All participants provided online consent.

2.4. Outcome variables/questionnaires

Participants completed a sociodemographic questionnaire, self-report measures, and indicated the country of residence.Ethnoracial group was assessed with two US Census questions about self-identified race (e.g., White, Black, Asian) and ethnicity (Latino versus Non-Latino). Use of White, Black, and Asian entail non-Hispanic origin. For US comparisons, Latinos were grouped irrespective of their race, whereas non-Latino individuals were separated by race.

The Epidemic-Pandemic Impacts Inventory (EPII) [26] was used to measure overall impact. This is a newly developed questionnaire for assessing the coronavirus pandemic’s impact on personal and family life including employment, education, home life, social activities, economic, emotional health and well-being, physical health, physical distancing and quarantine, infection history, and positive change. Greater subscale and total scores suggest more burden, except for the positive change subscale, in which higher scores suggest less burden (See Appendix A).

The Everyday Discrimination Scale [27] (Short Version) [28] asks about experiences of unfair treatment in day-to-day life. Higher scores indicate greater perceived discrimination. The Everyday Cognition (ECog) Scale [29] is a subjective measure of current cognitive daily abilities compared with past abilities (ten years earlier). The 7-Memory questionnaire measures subjective memory concerns (SMC) [30,31]. Higher scores indicate greater memory concerns. The De Jong Gierveld Loneliness Scale [32] measures overall emotional and social loneliness across six items. Higher scores indicate greater loneliness. The Life Purpose Questionnaire [33] is a modified 10-item measure of Psychological Well-Being [34]. Higher scores indicate greater purpose in life.

2.5. Statistical analyses

Descriptive statistics using student’s t-test and Chi-square examined group differences in demographic variables. In the US sample, one-way univariate general linear models (GLM) compared four ethnoracial groups across six outcome measures. Additionally, ten one-way GLM compared the groups in the ten EPII subscales. Age (years, continuous), education (years, continuous), and sex (male/female, dichotomous) were included as covariates in all analyses. The ten models using EPII as the outcome were adjusted for multiple comparisons using Bonferroni correction (α = 0.005 [0.05/10] [35]). Additional one-way GLM analyses were used to compare each Latin American country and the US Latinos in the EPII subscales and the five outcome measures. For each set of analyses, the Bonferroni correction described above was included to correct for multiple comparisons in the EPII subscales.

Pearson correlations examined the relationship between the EPII total and the five outcome measures. Finally, three one-way GLM compared the groups in the EPII total, including the Loneliness scale, Life Purpose Questionnaire, and ECog Total as covariates. Parallel GLM models were repeated comparing each individual country (Argentina, Chile, Mexico, and Peru) to Latinos residing in the US. Mean substitution was used for the corresponding ethnoracial group for eight participants with missing educational data. Analyses were conducted in SPSS version 27 (Chicago, IL, USA).

2.6. Role of the funding source

The funding source(s) had no involvement in the study design, data collection, analysis, or interpretation.

3. Results

3.1. Participants

The initial sample included 1845 participants. The following were excluded: thirteen participants who reported living outside of the United States or Latin America; nine participants who reported being born outside of the United States or Latin America; eight participants who were statistical outliers; thirty-four participants who did not report their ethnicity/cultural background; and 26 participants who reported ‘Other’ ethnicities. Due to low participation among Native American (n = 6) and Native Hawaiian or Pacific Islander (n = 2) participants, these individuals were also removed from the analyses. Similarly, due to a lower number of survey responses (<50), 139 participants were removed across 10 Latin American countries (Fig. 1). The final sample (N = 1608) included: 646 non-Latino White, 717 Latino, 77 Black, and 33 Asian individuals. The sample included 135 (15.8%) Latinos living in the US and 717 living in the four Latin American countries; Argentina (n = 106), Chile (n = 151), Mexico (n = 308), and Peru (n = 152). The mean age of the total sample was 66.74 years (range 55–95), 15.4 mean years of education (range 0–26), and an average of 72.3% females (range 67–87%) across the groups (Tables 1 and 2). In the Black group, there was a slightly higher percentage (84%) of females compared to males. Within the US sample, 64 (7.2%) participants reported having experienced COVID-19 symptoms, six reported having been tested and currently having the disease, and 11 reported having tested positive for the disease but no longer being symptomatic. Within Argentina, Chile, Mexico, and Peru, 10 (1.4%) reported having experienced COVID-19 symptoms, 5 reported having been tested and currently having the disease, and 20 reported having tested positive for the disease (Table 2). The US sample had 59.4% married/in a civil union with similar proportions across ethnoracial groups, but a higher proportion of single individuals in the Black sample, 23% [3, n = 889], p = .028. Self-reported household income (low/middle and high) did not differ between the ethnoracial groups. There were no differences between older individuals residing in Argentina, Chile, Mexico, or Peru, when compared to those living in the US on marital status or household income (Table 2).

3.2. Ethnoracial differences in the US

In the US, the ethnoracial groups differed in age, where the White group was older than the Latino group (p < 0.001). Years of education differed between the groups (p < 0.001), specifically between Whites and Latinos (p = .012), and Asians and Latinos (p = .001). Whites and Asians reported higher education than Latinos. Latinos reported higher economic impact suggesting more financial hardships on the EPII compared to Whites (p < .001) and Blacks (p = .01). The Black and Latino participants reported more positive change on the EPII than White participants (all p < .001), suggesting more positive reframing and coping with the pandemic. On the self-report of everyday perceived discrimination, Blacks experienced everyday discrimination more often than the other
groups, (all $p < .001$). There were no between-group differences on the EPII total or its subscales, the 7-Memory Questionnaire, Loneliness Scale, Life Purpose Questionnaire, or ECog Total (Table 3).

The EPII total significantly correlated (all $p < .001$—low magnitude) with the Loneliness scale ($r = 0.35$), Life Purpose Questionnaire ($r = -0.20$), ECog Total ($r = 0.23$), Discrimination scale ($r = 0.37$), and 7-Memory Questionnaire ($r = 0.29$) [Fig. 2].

The inclusion of the Loneliness scale, Life Purpose Questionnaire, and ECog Total into the models examining the EPII were significant as main effects (all $p < .001$) and improved the models, as indicated by an increased adjusted $R^2$ value from 0.060 in the original model to 0.186, 0.108, and 0.119, respectively. A significant interaction ($p = .014$) between the ethnic racial groups and the ECog suggested that the Black participants who reported more cognitive concerns also reported greater pandemic impacts than the other groups Fig. 3.

3.3. Between country comparisons

A total of 717 individuals reported living in 4 Latin American countries and Latinos living in the US (See Table 4). Argentineans reported greater pandemic effects on the Education and Training subscale ($p = 0.01$), compared to the US Latinos. Chileans also reported greater detrimental effects in Education and Training ($p < .001$) and less discrimination than US Latinos ($p = 0.06$). Mexicans had a higher EPII total score, indicating greater overall pandemic effects ($p < .001$), including the Education and Training ($p < .001$), Home Life ($p = .002$), and Economic effect ($p < .001$) subscales. Conversely, Mexicans reported experiencing greater Positive Change ($p = 0.001$) and more subjective memory concerns ($p = 0.01$) than US Latinos. Peruvians had higher EPII total scores ($p < 0.001$), as well as higher scores in the Economic ($p < 0.001$), Physical Distancing ($p < 0.001$), Infection History ($p < .001$), and positive change ($p = .001$) subscales.

Among Latinos living in the US, 112 (83%) reported having lived in the country for over 20 years, eight reported living 15–20 years, and the rest lived for less than 15 years. There were no differences in age for Latinos living in the US with those residing in Chile, Mexico, or Peru; however, those living in Argentina were slightly older ($p < 0.001$). There were no differences in levels of education.

Within the US Latinos, scores on the EPII total significantly correlated with the Loneliness scale ($r = 0.32$, $p = 0.001$) and Dis-

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**Fig. 1.** Study flowchart of participants.
between participants, scores on the EPII total significantly correlated with the Loneliness scale \((r = 0.21, p = 0.028)\), Discrimination scale \((r = 0.27, p = 0.006)\), and 7-Memory Questionnaire \((r = 0.24, p = 0.015)\). Within the Latinos in Chile, scores on the EPII total significantly correlated \((all \ p < 0.001—low \ magnitude)\) with the Loneliness scale \((r = 0.48)\), ECog Total \((r = 0.21, p = 0.010)\), Discrimination scale \((r = 0.43)\), and 7-Memory Questionnaire \((r = 0.35)\). Within the Mexican participants, scores on the EPII total significantly correlated \((all \ p < 0.001—low \ magnitude)\) with the Loneliness scale \((r = 0.41)\), Life Purpose Questionnaire \((r = -0.15; p = 0.007)\), ECog Total \((r = 0.28)\), Discrimination scale \((r = 0.33)\), and 7-Memory

**Table 3**

Mean differences in outcome measures in the US between ethnoracial groups.

<table>
<thead>
<tr>
<th>Ethnoracial Group</th>
<th>Non-Latino White</th>
<th>Latino</th>
<th>Black</th>
<th>Asian</th>
<th>(p)</th>
<th>(\eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPII Work and Employment</td>
<td>0.84 (0.06)</td>
<td>0.82 (0.11)</td>
<td>0.66 (0.15)</td>
<td>0.79 (0.22)</td>
<td>0.69</td>
<td>0.002</td>
</tr>
<tr>
<td>EPII Education and Training</td>
<td>0.07 (0.01)</td>
<td>0.12 (0.03)</td>
<td>0.12 (0.03)</td>
<td>0.06 (0.05)</td>
<td>0.26</td>
<td>0.005</td>
</tr>
<tr>
<td>EPII Home Life</td>
<td>0.45 (0.04)</td>
<td>0.42 (0.08)</td>
<td>0.74 (0.11)</td>
<td>0.23 (0.16)</td>
<td>0.03</td>
<td>0.010</td>
</tr>
<tr>
<td>EPII Social Activities</td>
<td>5.05 (0.09)</td>
<td>5.18 (0.18)</td>
<td>5.48 (0.24)</td>
<td>4.67 (0.35)</td>
<td>0.18</td>
<td>0.005</td>
</tr>
<tr>
<td>EPII Economic</td>
<td>0.20 (0.03)</td>
<td>0.49 (0.05)</td>
<td>0.24 (0.07)</td>
<td>0.29 (0.10)</td>
<td>0.10</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EPII Emotional Health and Well-Being</td>
<td>1.91 (0.06)</td>
<td>1.99 (0.12)</td>
<td>1.73 (0.16)</td>
<td>1.46 (0.23)</td>
<td>0.14</td>
<td>0.006</td>
</tr>
<tr>
<td>EPII Physical Health Problems</td>
<td>2.54 (0.07)</td>
<td>2.65 (0.14)</td>
<td>2.54 (0.18)</td>
<td>2.37 (0.27)</td>
<td>0.79</td>
<td>0.001</td>
</tr>
<tr>
<td>EPII Physical Distancing and Quarantine</td>
<td>1.47 (0.06)</td>
<td>1.62 (0.12)</td>
<td>1.27 (0.16)</td>
<td>1.37 (0.23)</td>
<td>0.30</td>
<td>0.004</td>
</tr>
<tr>
<td>EPII Infection History</td>
<td>0.16 (0.02)</td>
<td>0.25 (0.04)</td>
<td>0.23 (0.06)</td>
<td>0.12 (0.09)</td>
<td>0.17</td>
<td>0.006</td>
</tr>
<tr>
<td>EPII Positive Change</td>
<td>6.02 (0.15)</td>
<td>7.46 (0.31)</td>
<td>8.07 (0.42)</td>
<td>6.35 (0.61)</td>
<td>0.29</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EPII Total</td>
<td>12.69 (0.24)</td>
<td>13.54 (0.49)</td>
<td>12.99 (0.65)</td>
<td>11.34 (0.95)</td>
<td>0.17</td>
<td>0.006</td>
</tr>
<tr>
<td>7-Memory Questionnaire</td>
<td>1.59 (0.08)</td>
<td>1.66 (0.17)</td>
<td>1.44 (0.22)</td>
<td>1.76 (0.33)</td>
<td>0.82</td>
<td>0.001</td>
</tr>
<tr>
<td>De Jong Gierveld Loneliness Scale</td>
<td>2.87 (0.08)</td>
<td>2.76 (0.17)</td>
<td>2.34 (0.21)</td>
<td>2.81 (0.31)</td>
<td>0.11</td>
<td>0.007</td>
</tr>
<tr>
<td>Life Purpose Questionnaire</td>
<td>37.30 (0.32)</td>
<td>37.93 (0.66)</td>
<td>39.39 (0.87)</td>
<td>37.48 (1.28)</td>
<td>0.12</td>
<td>0.007</td>
</tr>
<tr>
<td>Discrimination Scale</td>
<td>8.41 (0.17)</td>
<td>8.94 (0.35)</td>
<td>11.62 (0.47)</td>
<td>8.10 (0.69)</td>
<td>&lt; 0.001</td>
<td>0.050</td>
</tr>
<tr>
<td>ECog Total</td>
<td>8.92 (0.14)</td>
<td>8.46 (0.28)</td>
<td>8.08 (0.36)</td>
<td>8.19 (0.53)</td>
<td>0.05</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Abbreviations: \(M\) = Mean; \(SE\) = Standard Error; EPII = Epidemic-Pandemic Impacts Inventory; ECog = Everyday Cognition Scale.

\(^1\) \(p < .005\) (Adjusted for Bonferroni correction).

\(^2\) \(p < .05\).
### Table 1
Demographic Characteristics of the US Participants.

<table>
<thead>
<tr>
<th></th>
<th>Non-Latino White</th>
<th>Latino</th>
<th>Black</th>
<th>Asian</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Age</td>
<td>67.72</td>
<td>7.67</td>
<td>645</td>
<td>64.53</td>
<td>7.30</td>
</tr>
<tr>
<td>Education</td>
<td>15.93</td>
<td>2.06</td>
<td>645</td>
<td>15.28</td>
<td>2.99</td>
</tr>
<tr>
<td>Sex Male</td>
<td>171</td>
<td>10</td>
<td>27</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Female</td>
<td>474</td>
<td>107</td>
<td>65</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>Marital Status</td>
<td>250</td>
<td>(38.8%)</td>
<td>37</td>
<td>(42.2%)</td>
<td>43</td>
</tr>
<tr>
<td>Single</td>
<td>394</td>
<td>(61.2%)</td>
<td>78</td>
<td>(57.8%)</td>
<td>34</td>
</tr>
<tr>
<td>Income/Level</td>
<td>525</td>
<td>(82.9%)</td>
<td>118</td>
<td>(89.4%)</td>
<td>67</td>
</tr>
<tr>
<td>High</td>
<td>108</td>
<td>(17.1%)</td>
<td>14</td>
<td>(10.6%)</td>
<td>10</td>
</tr>
<tr>
<td>COVID-19 Symptoms</td>
<td>48</td>
<td>(5.5%)</td>
<td>9</td>
<td>(1.0%)</td>
<td>6</td>
</tr>
<tr>
<td>Positive test and current symptoms</td>
<td>2 (0.2%)</td>
<td>4 (0.4%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>Positive test no current symptoms</td>
<td>7 (0.8%)</td>
<td>4 (0.4%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: M = Mean; SD = Standard Deviation.

### Table 2
Demographic Characteristics of the Latino Participants by Country.

<table>
<thead>
<tr>
<th></th>
<th>Argentina</th>
<th>Chile</th>
<th>Mexico</th>
<th>Peru</th>
<th>USA</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n (%)</td>
<td>M</td>
<td>SD</td>
<td>n (%)</td>
</tr>
<tr>
<td>Age</td>
<td>69.36</td>
<td>6.69</td>
<td>106</td>
<td>66.10</td>
<td>7.35</td>
<td>151</td>
</tr>
<tr>
<td>Education</td>
<td>14.97</td>
<td>2.27</td>
<td>16.33</td>
<td>1.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex Male</td>
<td>34</td>
<td>(32.08%)</td>
<td>59</td>
<td>(39.07%)</td>
<td>75</td>
<td>(24.35%)</td>
</tr>
<tr>
<td>Female</td>
<td>72</td>
<td>(67.92%)</td>
<td>92</td>
<td>(60.93%)</td>
<td>233</td>
<td>(75.65%)</td>
</tr>
<tr>
<td>Marital Status</td>
<td>60</td>
<td>(39.74%)</td>
<td>158</td>
<td>(51.30%)</td>
<td>49</td>
<td>(32.24%)</td>
</tr>
<tr>
<td>Single</td>
<td>91</td>
<td>(60.26%)</td>
<td>150</td>
<td>(48.70%)</td>
<td>103</td>
<td>(67.76%)</td>
</tr>
<tr>
<td>Income/Level</td>
<td>121</td>
<td>(80.13%)</td>
<td>300</td>
<td>(97.40%)</td>
<td>145</td>
<td>(95.39%)</td>
</tr>
<tr>
<td>High</td>
<td>30</td>
<td>(19.87%)</td>
<td>4</td>
<td>(1.30%)</td>
<td>7</td>
<td>(4.61%)</td>
</tr>
<tr>
<td>COVID-19</td>
<td>106</td>
<td>(100%)</td>
<td>148</td>
<td>(98.01%)</td>
<td>304</td>
<td>(98.70%)</td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>(1.99%)</td>
<td>4</td>
<td>(1.30%)</td>
<td>3</td>
<td>(1.97%)</td>
</tr>
<tr>
<td>Symptoms</td>
<td>106</td>
<td>(100%)</td>
<td>149</td>
<td>(98.68%)</td>
<td>306</td>
<td>(99.35%)</td>
</tr>
<tr>
<td>Positive test</td>
<td>0</td>
<td></td>
<td>2</td>
<td>(1.32%)</td>
<td>2</td>
<td>(0.63%)</td>
</tr>
<tr>
<td>Positive test no</td>
<td>0</td>
<td></td>
<td>148</td>
<td>(98.01%)</td>
<td>300</td>
<td>(97.40%)</td>
</tr>
<tr>
<td>symptoms</td>
<td>0</td>
<td></td>
<td>3</td>
<td>(1.99%)</td>
<td>8</td>
<td>(2.60%)</td>
</tr>
</tbody>
</table>

Abbreviations: M = Mean; SD = Standard Deviation.
Table 4
Mean differences in outcome measures in US Latinos and Latinos in Argentina, Chile, Peru, and Mexico.

|                           | US (M | SE) | Argentina (M | SE) | p     | US (M | SE) | Chile (M | SE) | p     | US (M | SE) | Mexico (M | SE) | p     | US (M | SE) | Peru (M | SE) | p     |
|---------------------------|-------|------|--------------|------|-------|-------|------|----------|------|-------|-------|------|----------|------|-------|-------|------|-------|-------|
| EPII Work and Employment  | 0.93  | 0.14 | 1.20         | 0.14 | 0.15  | 0.009 | 1.01 | 0.14     | 1.40 | 0.12  | 0.03  | 0.017 | 1.07 | 0.13 | 1.38  | 0.09 | 0.03  | 0.010 | 1.04 | 0.11 | 0.02  |
| EPII Education and Training| 0.09  | 0.04 | 0.30         | 0.05 | 0.001 | 0.047 | 0.14 | 0.04     | 0.34 | 0.04  | <0.001| 0.043 | 0.11 | 0.05 | 0.45 | 0.03 | <0.001| 0.079 | 0.16 | 0.03 | 0.09  |
| EPII Home Life            | 0.46  | 0.09 | 0.52         | 0.10 | 0.001 | 0.001 | 0.45 | 0.10     | 0.62 | 0.09  | 0.20  | 0.006 | 0.51 | 0.12 | 0.92  | 0.08 | 0.002| 0.022 | 0.50 | 0.10 | 0.61  |
| EPII Social Activities    | 5.29  | 1.19 | 4.84         | 2.00 | 0.09  | 0.013 | 5.37 | 0.20     | 5.10 | 0.17  | 0.29  | 0.004 | 5.26 | 0.20 | 5.14  | 0.13 | 0.56  | 0.001 | 5.30 | 0.18 | 0.16  |
| EPII Economic             | 0.55  | 0.11 | 0.91         | 0.12 | 0.02  | 0.023 | 0.50 | 0.09     | 0.63 | 0.08  | 0.29  | 0.004 | 0.51 | 0.12 | 1.40  | 0.08 | <0.001| 0.092 | 0.50 | 0.10 | 1.17  |
| EPII Emotional Health and Well-Being | 1.97 | 0.14 | 2.23         | 0.15 | 0.19  | 0.007 | 1.27 | 0.15     | 2.97 | 0.12 | 0.17  | 0.047 | 2.17 | 0.15 | 2.93  | 0.10 | 0.29  | 0.004 | 2.62 | 0.15 | 2.43  |
| EPII Physical Health Problems | 2.71 | 0.14 | 3.02         | 0.15 | 0.11  | 0.011 | 2.75 | 0.15     | 3.17 | 0.13 | 0.03  | 0.018 | 2.71 | 0.15 | 2.93  | 0.09 | 0.20  | 0.004 | 2.62 | 0.15 | 2.43  |
| EPII Physical Distancing and Quarantine | 1.72 | 0.14 | 2.01         | 0.15 | 0.19  | 0.007 | 1.65 | 0.14     | 2.09 | 0.12 | 0.02  | 0.020 | 1.70 | 0.14 | 2.00  | 0.10 | 0.06  | 0.008 | 1.55 | 0.15 | 2.30  |
| EPII Infection History    | 0.28  | 0.05 | 0.70         | 0.05 | 0.002 | 0.042 | 0.31 | 0.05     | 0.28 | 0.05  | 0.64  | 0.001 | 0.29 | 0.06 | 0.40  | 0.04 | 0.08  | 0.007 | 0.29 | 0.07 | 0.93  |
| EPII Positive Change      | 7.70  | 0.34 | 7.53         | 0.36 | 0.73  | 0.001 | 7.92 | 0.34     | 8.53 | 0.30  | 0.17  | 0.007 | 7.90 | 0.30 | 9.06  | 0.21 | 0.001| 0.272 | 7.78 | 0.30 | 9.10  |
| EPII Total                | 14.02 | 0.54 | 15.09        | 0.57 | 0.16  | 0.009 | 14.26 | 0.57     | 15.88 | 0.51  | 0.03  | 0.017 | 14.22 | 0.58 | 17.04 | 0.40 | <0.001| 0.042 | 14.08 | 0.54 | 16.66 |
| 7-Memory Questionnaire    | 1.65  | 0.17 | 1.05         | 0.18 | 0.001 | 0.028 | 1.67 | 0.17     | 1.59 | 0.15  | 0.72  | 0.000 | 1.74 | 0.19 | 2.28  | 0.13 | 0.01  | 0.015 | 1.70 | 0.17 | 2.00  |
| De Jong Gierveld Loneliness Scale | 2.67 | 0.18 | 2.18         | 0.18 | 0.05  | 0.019 | 2.79 | 0.18     | 2.71 | 0.17 | 0.73  | 0.001 | 2.71 | 0.19 | 2.66 | 0.13 | 0.81  | <0.001| 2.88 | 0.18 | 2.77 | 0.14 |
| Life Purpose Questionnaire| 38.01 | 0.74 | 37.22        | 0.79 | 0.44  | 0.003 | 37.83 | 0.66     | 38.44 | 0.58 | 0.48  | 0.002 | 37.74 | 0.69 | 37.56 | 0.48 | 0.82  | <0.001| 37.95 | 0.70 | 39.25 | 0.61 |
| Discrimination Scale      | 9.06  | 0.41 | 7.29         | 0.43 | 0.002 | 0.040 | 9.43 | 0.41     | 7.96 | 0.36 | 0.09  | 0.010 | 8.92 | 0.40 | 7.28  | 0.30 | 0.30  | 0.002 | 9.11 | 0.34 | 6.93  |
| ECog Total                | 8.61  | 0.29 | 8.03         | 0.30 | 0.15  | 0.009 | 8.64 | 0.27     | 8.06 | 0.23 | 0.09  | 0.010 | 8.58 | 0.29 | 8.94  | 0.20 | 0.26  | 0.003 | 8.62 | 0.27 | 9.58  |

Abbreviations: M = Mean; SE = Standard Error; EPII = Epidemic-Pandemic Impacts Inventory; ECog = Everyday Cognition Scale.

1 p < 0.005 (Adjusted for Bonferroni correction)
2 p < 0.05

Discussion
The prospective, cross-sectional study found no differences in the pandemic’s self-reported overall impact among older adults living in Latin America and the US compared to those reporting higher pandemic impact, especially within Education and Training compared to those in the US. These differences were found in any of the older adult subgroups.

Activities and Trajectories between those reporting in the Latin American and the US compared to those reporting higher pandemic impact, especially within Education and Training compared to those in the US. These differences were found in any of the older adult subgroups.

4 Discussion
The prospective, cross-sectional study found no differences in the pandemic’s self-reported overall impact among older adults living in Latin America and the US compared to those reporting higher pandemic impact, especially within Education and Training compared to those in the US. These differences were found in any of the older adult subgroups.

The pandemic’s self-reported overall impact among older adults living in Latin America and the US compared to those reporting higher pandemic impact, especially within Education and Training compared to those in the US. These differences were found in any of the older adult subgroups.
Data on the pandemic’s social impact within and outside of the US are limited beyond proximal clinical outcomes, incidence, and mortality statistics [36]. The current findings provide evidence and confirmation of initial anecdotal commentaries [7,9,13] that the pandemic’s burden is different for non-White groups and those in LMICs. Discrimination is also a driver in the backdrop of the pandemic and ongoing discussions about equality, race, and ethnicity. Black older adults self-reported more perceived discrimination than the other groups and US Latinos similarly reported more discrimination than those residing in Argentina, Chile, and Peru. While it is unclear if perceived discrimination was greater or reduced for Black participants pre-pandemic, these results support prior findings of greater discrimination in Black older adults than their White counterparts [37]. Discrimination influences if and when healthcare services are accessed, how information about the pandemic is interpreted, and trust in the healthcare system [38,39]. Latinos also reported more economic difficulties in this study. Nationally-representative data show that compared to Whites, Latino adults aged 18–64 were more likely to have difficulty accessing and using health care due to language and economic barriers [40]. A prior history of limited healthcare access and utilization predicts future underutilization of care to manage chronic conditions. Latinos residing in Chile, Mexico, and Peru reported a higher impact of the pandemic, including greater difficulty with work and employment (Chile, Mexico, Peru), education and training (Argentina, Chile, Mexico), economics (Argentina, Mexico, and Peru), and physical distancing and quarantine (Chile, Mexico, Peru [e.g., limited physical closeness with a loved one and household quarantine]). Therefore, despite a higher number of cases and deaths in the US, particularly among vulnerable populations, the country’s economic infrastructure and reserves may help reduce the pandemic’s impact than those of LMICs.

The unremarkable findings on memory concerns (with the exception of Mexicans), loneliness, and life purpose in the ethnoracial groups within and outside the US are also interesting. Participants indicated being healthy with only a small number of reported COVID-19 cases. Older age is associated with more loneliness, leading to anxiety and depression [41]. However, potential mediators for higher loneliness in older adults include poor health, higher stress, prior mental health problems, and COVID-19 recovery [20]. One longitudinal study of loneliness among US older adults found little change between January to April 2020 and less loneliness than younger adults [42]. Our findings extend these results by assessing race and ethnicity in the US. Greater life purpose suggests a directional relationship with lower loneliness and, indirectly, a reduced impact of the pandemic among participants in this sample. However, this may change with recurring surges of infection and a prolonged period of no effective treatments or vaccines.

This descriptive, cross-sectional study had several limitations, which limit the generalizability of the results. It is likely that group differences in the outcomes explored in this study design were present pre-pandemic and may have been amplified by the stress of the pandemic. For example, it is very likely that group differences in perceived discrimination existed pre-pandemic (via historical and social norms) and persist as reinforced (via institutional and social determinants of health) by these results. Data were cross-sectional and therefore causality cannot be inferred since data on the outcome measures pre-pandemic were not available nor would recall be helpful in providing an appropriate comparison. Given the crucial restrictions resulting from regional, national, and international mandates for social distancing, traditional in-person recruitment strategies, and testing could not be deployed and sampling was not random, which limits external validity. Selection bias may have influenced the results since most respondents completed the survey on a computer or smartphone/tablet and may differ from individuals who may not have access to such technology. Evidence of this bias is that the sample was relatively well-educated (15 years of education on average), indicating post-secondary education (college, trade, vocational schools). This is not representative of the average/mean years of education statistic in the United States or in Argentina, Chile, Mexico, and Peru. Particularly, given the high level of education of our respondents from Latin American countries, our results should be interpreted with caution and should not be taken as representative of the majority of Latin American population. This sample did not include US Native Americans, who have also been impacted by COVID-19 [43]. Data were self-reported. Further, we did not collect information on race in Latin America, which prevents us from learning about within-Latino ethnoracial differences. Similar to the US, ethnoracial minorities in Latin America might experience a higher burden of COVID-19 compared to the non-ethnoracial minority population. Furthermore, there is considerable heterogeneity (sociocultural, resources, COVID-19 pandemic management, among others) across the Latin American countries included. Future studies should examine potential differences across these countries. Some data, such as COVID-19 positivity, cognition, or physical health, could have been collected more reliably via performance, clinical, or laboratory assessments. Measures were forward-and-back translated but have not all been validated in Spanish, which may impact results’ validity and reliability. Finally, most of our participants were female, which matches the patterning distribution observed in other clinical studies [44], but does not represent the entire population.

As many countries struggle with the evolving surge and ebb of the COVID-19 pandemic, research and public policy shift to upstream social determinants of health that increase the community-wide risk for vulnerable populations like older adults and ethnoracial groups. This international study had a number of strengths including, prospectively surveying over 1600 older adults across the US and in 4 Latin American countries, over 700 participants residing in Argentina, Chile, Mexico, and Peru, employing a battery of valid, psychosocial measures and a comprehensive pandemic inventory. Discrimination, loneliness, life purpose, and memory concerns deeply influence an individual’s health and interact with social determinants of health. Ethnoracial groups and older adults are at a higher risk for health disparities, and COVID-19 exponentially increases mortality and morbidity risks. Future studies should examine how mediators like income and coping skills modify the pandemic’s impact. The pandemic likely has a differential impact across countries; between-country differences should be examined. The percentage of reported positive COVID-19 cases was low in this sample; yet, these results highlight salient themes that physicians and other healthcare workers need to be cognizant of when working with high-risk populations.

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Data sharing statement
Data will be shared after approval by study investigators. Data requests should be sent to Dr. Quiroz at yquiroz@mgh.harvard.edu
Author contributions
GMB, VT, and YTQ designed the study, VT and BH conducted data analyses with oversight by GMB and YTQ, EGV and VT created the figures. GMB and VT wrote the drafts and integrated contributions from all co-authors. YTQ provided supervisory oversight. All authors searched the literature, participated in data collection, discussed the contents of the manuscript, contributed to editing, and approved the final version of the article. VT and YTQ had full access to all data in the study. All authors had final responsibility for the decision to submit for publication.

Declaration of Competing Interest
Dr. Thumala reports personal fees from National Agency for Research and Development, during the conduct of the study. Dr. Miranda-Castillo reports grants and personal fees from National Agency for Research and Development, during the conduct of the study. Dr. Gatchel reports grants from NIH/NIA, grants from Alzheimer’s Association, and served as a one-time consultant with Huron Consulting, outside the submitted work. Dr. Sperling reports personal fees from Roche, Takeda Pharmaceuticals, Eisai, Biogen, AC Immune, Neurocetria, Janssen, Neuraly, Ailylam Pharmaceuticals, Renew, JOMDD, Acumen, Prothena, Cytox, Oligomerix, Inc., and Genentech; grants from Eisai, Eli Lilly, Janssen, NIA, and Alzheimer’s Association; personal fees and honorarium (consulting) for Dr. Sperling’s spouse (Dr. Keith Johnson) from Novartis, AC Immune, Janssen, and Cerveau, outside the submitted work. Dr. Rentz reports consulting from Digital Cognition Technologies, Neu rotor, and Biogen Idec, outside the submitted work. All other authors have nothing to declare.

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Supplementary materials

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References