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**eTable 1: Sociodemographic characteristics and COVID-19 vaccination status according to GAD-7 and PHQ-8 Latent Class Growth Analysis (LCGA) groups, the CHASING COVID Cohort, between July 2020 and July 2023 (N=4,851)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. **GAD-7 scores** | | | | |
| **Characteristic** | **Persistently low GAD-7, N = 1,219** | **Persistently around and below GAD-7 borderline, N = 2,396** | **Persistently high GAD-7, N = 1,236** | **Unadjusted Risk Ratio of persistently high GAD-7 (95% CI)** |
| **Cohort Prevalence** | **25.1% (95% CI: 23.9-26.4%)** | **49.4% (95% CI: 48.0-50.8%)** | **25.5% (95% CI: 24.3-26.7%)** | **NA** |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 131(11%) | 522(22%) | 414(33%) | **5.07 (4.06, 6.40)** |
| 30-39 | 262(21%) | 709(30%) | 430(35%) | **4.01 (3.22, 5.06)** |
| 40-49 | 213(17%) | 458(19%) | 220(18%) | **3.23 (2.55, 4.13)** |
| 50-64 | 201(16%) | 347(14%) | 108(8.7%) | **2.15 (1.65, 2.82)** |
| 65+ | 412(34%) | 360(15%) | 64(5.2%) | **ref** |
| **Gender, N (%)** |  |  |  |  |
| Male | 667(55%) | 1,044(44%) | 439(36%) | **ref** |
| Female | 544(45%) | 1,293(54%) | 725(59%) | **1.39 (1.25, 1.54)** |
| Non-binary | 8(0.7%) | 59(2.5%) | 72(5.8%) | **2.54 (2.03, 3.13)** |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 160(13%) | 375(16%) | 266(22%) | **1.48 (1.31, 1.68)** |
| NH White | 811(67%) | 1,537(64%) | 677(55%) | **ref** |
| NH Black | 145(12%) | 228(9.5%) | 144(12%) | **1.24 (1.06, 1.45)** |
| NH Asian/PI | 75(6.2%) | 181(7.6%) | 80(6.5%) | 1.06 (0.87, 1.29) |
| NHOther | 28(2.3%) | 75(3.1%) | 69(5.6%) | **1.79 (1.44, 2.21)** |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 5(0.4%) | 28(1.2%) | 34(2.8%) | **2.53 (1.85, 3.36)** |
| High school | 94(7.7%) | 199(8.3%) | 197(16%) | **2.00 (1.74, 2.30)** |
| Some college | 320(26%) | 549(23%) | 397(32%) | **1.56 (1.40, 1.74)** |
| College graduate | 800(66%) | 1,620(68%) | 608(49%) | **ref** |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 943(77%) | 1,718(72%) | 803(65%) | **ref** |
| Yes | 276(23%) | 678(28%) | 433(35%) | **1.35 (1.22, 1.49)** |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 367(30%) | 815(34%) | 662(54%) | **2.18 (1.91, 2.49)** |
| $50,000 - $100,000 | 416(34%) | 796(33%) | 316(26%) | **1.25 (1.08, 1.46)** |
| >$100,000 | 408(33%) | 711(30%) | 221(18%) | **ref** |
| UK | 28(2.3%) | 74(3.1%) | 37(3.0%) | **1.61 (1.18, 2.16)** |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 868(71%) | 1,480(62%) | 556(45%) | **ref** |
| Greater barriers to access | 351(29%) | 916(38%) | 680(55%) | **1.82 (1.66, 2.01)** |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 868(71%) | 1,458(61%) | 479(39%) | **ref** |
| 1 | 249(20%) | 695(29%) | 500(40%) | **2.03 (1.82, 2.26)** |
| 2 | 78(6.4%) | 181(7.6%) | 201(16%) | **2.56 (2.22, 2.95)** |
| ≥3 | 24(2.0%) | 62(2.6%) | 56(4.5%) | **2.31 (1.80, 2.91)** |
| 1. **PHQ-8 scores** | | | | |
| **Characteristic** | **Persistently low PHQ-8, N = 1,472** | **Persistently around and below PHQ-8 borderline, N = 2,136** | **Persistently high PHQ-8, N = 1,243** | **Unadjusted Risk Ratio of persistently high PHQ-8 (95% CI)** |
| **Cohort Prevalence** | **30.3% (95% CI: 29.1-31.6%)** | **44.0% (95% CI: 42.6-45.4%)** | **25.6% (95% CI: 24.4-26.9%)** | **NA** |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 184(13%) | 491(23%) | 392(32%) | **3.79 (3.10, 4.68)** |
| 30-39 | 345(23%) | 635(30%) | 421(34%) | **3.10 (2.54, 3.83)** |
| 40-49 | 254(17%) | 412(19%) | 225(18%) | **2.61 (2.10, 3.26)** |
| 50-64 | 238(16%) | 294(14%) | 124(10.0%) | **1.95 (1.53, 2.49)** |
| 65+ | 451(31%) | 304(14%) | 81(6.5%) | **ref** |
| **Gender, N (%)** |  |  |  |  |
| Male | 739(50%) | 952(45%) | 459(37%) | **ref** |
| Female | 722(49%) | 1,133(53%) | 707(57%) | **1.29 (1.17, 1.43)** |
| Non-binary | 11(0.7%) | 51(2.4%) | 77(6.2%) | **2.59 (2.10, 3.18)** |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 198(13%) | 341(16%) | 262(21%) | **1.42** (**1.26, 1.61)** |
| NH White | 976(66%) | 1,354(63%) | 695(56%) | **ref** |
| NH Black | 168(11%) | 209(9.8%) | 140(11%) | **1.18 (1.00, 1.37)** |
| NH Asian/PI | 96(6.5%) | 164(7.7%) | 76(6.1%) | 0.98 (0.80, 1.20) |
| NHOther | 34(2.3%) | 68(3.2%) | 70(5.6%) | **1.77 (1.42, 2.18)** |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 7(0.5%) | 23(1.1%) | 37(3.0%) | **2.76 (2.05, 3.63)** |
| High school | 107(7.3%) | 183(8.6%) | 200(16%) | **2.04 (1.77, 2.34)** |
| Some college | 347(24%) | 519(24%) | 400(32%) | **1.58 (1.42, 1.76)** |
| College graduate | 1,011(69%) | 1,411(66%) | 606(49%) | **ref** |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 1,116(76%) | 1,518(71%) | 830(67%) | **ref** |
| Yes | 356(24%) | 618(29%) | 413(33%) | **1.24** (**1.12, 1.38)** |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 387(26%) | 786(37%) | 671(54%) | **2.34 (2.05, 2.69)** |
| $50,000 - $100,000 | 505(34%) | 700(33%) | 323(26%) | **1.36 (1.17, 1.58)** |
| >$100,000 | 541(37%) | 591(28%) | 208(17%) | **ref** |
| UK | 39(2.6%) | 59(2.8%) | 41(3.3%) | **1.90 (1.41, 2.51)** |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 1,052(71%) | 1,292(60%) | 560(45%) | **ref** |
| Greater barriers to access | 420(29%) | 844(40%) | 683(55%) | **1.82** (**1.65, 2.00)** |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 1,067(72%) | 1,277(60%) | 461(37%) | **ref** |
| 1 | 302(21%) | 638(30%) | 504(41%) | **2.12 (1.90, 2.37)** |
| 2 | 82(5.6%) | 170(8.0%) | 208(17%) | **2.75 (2.39, 3.16)** |
| ≥3 | 21(1.4%) | 51(2.4%) | 70(5.6%) | **3.00 (2.40, 3.71)** |

**eTable 2: Cross tabulation of GAD-7 and PHQ-8 scores trajectories by latent class growth analysis model and cohort prevalence estimates of persistent mental disorder, the CHASING COVID Cohort (N=4,851) (**Column percentage is presented below**)**

A:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | ***Prevalence estimates of Persistent anxiety*** | | |  |
|  |  | **Never Anxiety** | **Non-Persistent Anxiety** | **Persistent Anxiety** | Total |
| ***Latent class of GAD-7*** | Persistently low | 1,204 (50.7%) | 15 (0.9%) | 0 | 1,219 |
| Persistently around and below borderline | 1,172 (49.3%) | 1,224 (71.9%) | 0 | 2,396 |
| Persistently high | 0 | 463 (27.2%) | 773 (100.0%) | 1,236 |
| Total | 2,376 | 1,702 | 773 | 4851 |

B:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | ***Prevalence estimates of Persistent depression*** | | |  |
|  |  | **Never Depression** | **Non-Persistent Depression** | **Persistent Depression** | Total |
| ***Latent class of PHQ-8*** | Persistently low | 1,435 (62.2%) | 37 (2.3%) | 0 | 1,472 |
| Persistently around and below borderline | 873 (37.8%) | 1,259 (78.3%) | 4 (0.4%) | 2,136 |
| Persistently high | 0 | 312 (19.4%) | 931 (99.6%) | 1,243 |
| Total | 2,308 | 1,608 | 935 | 4,851 |

**eTable 3: Prevalence of moderate to severe anxiety symptoms of by vaccination status by each follow-up assessment, the CHASING COVID Cohort (N=4,851)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Follow-up timing** | **Prevalence of moderate to severe anxiety symptoms** | **Prevalence of moderate to severe anxiety symptoms of vaccinated individuals at each follow-up** | **Prevalence of moderate to severe anxiety symptoms of unvaccinated individuals at each follow-up** | **p-value** |
| 5/25/2021 | 934/4851 (19.3%, 95% CI: 18.1-20.4%) | 678/3902 (17.4%, 95% CI: 16.2-18.6%) | 256/949 (27.0%, 95% CI: 24.2-29.8%) | <0.001 |
| 9/23/2021 | 944/4851 (19.5%, 95% CI: 18.4-20.6%) | 796/4271 (18.6%, 95% CI: 17.5-19.8%) | 148/580 (25.5%, 95% CI: 22.0-29.1%) | <0.001 |
| 12/20/2021 | 986/4851 (20.3%, 95% CI: 19.2-21.5%) | 864/4360 (19.8%, 95% CI: 18.6-21.0%) | 122/491 (24.9%, 95% CI: 21.0-28.7%) | 0.009 |
| 3/3/2022 | 884/4851 (18.2%, 95% CI: 17.1-19.3%) | 772/4384 (17.6%, 95% CI: 16.5-18.7%) | 112/467 (24.0%, 95% CI: 20.1-27.9%) | 0.001 |
| 6/23/2022 | 817/4851 (16.8%, 95% CI: 15.8-17.9%) | 714/4406 (16.2%, 95% CI: 15.1-17.3%) | 103/445 (23.2%, 95% CI: 19.2-27.1%) | <0.001 |
| 10/11/2022 | 825/4851 (17.0%, 95% CI: 16.0-18.1%) | 720/4419 (16.3%, 95% CI: 15.2-17.4%) | 105/432 (24.3%, 95% CI: 20.3-28.4%) | <0.001 |
| 12/7/2022 | 819/4851 (16.9%, 95% CI: 15.8-17.9%) | 725/4426 (16.4%, 95% CI: 15.3-17.5%) | 94/425 (22.1%, 95% CI: 18.2-26.1%) | 0.003 |
| 4/12/2023 | 788/4851 (16.2%, 95% CI: 15.2-17.3%) | 694/4433 (15.7%, 95% CI: 14.6-16.7%) | 94/418 (22.5%, 95% CI: 18.5-26.5%) | <0.001 |
| 6/14/2023 | 786/4851 (16.2%, 95% CI: 15.2-17.2%) | 699/4436 (15.8%, 95% CI: 14.7-16.8%) | 87/415 (21.0%, 95% CI: 17.1-24.9%) | 0.006 |
| **Follow-up timing** | **Prevalence of moderate to severe depression symptoms** | **Prevalence of moderate to severe depression symptoms of vaccinated individuals at each follow-up** | **Prevalence of moderate to severe depression symptoms of unvaccinated individuals at each follow-up** | **p-value** |
| 5/25/2021 | 1118/4851 (23.1%, 95% CI: 21.9-24.2%) | 845/3902 (21.7%, 95% CI: 20.4-23.0%) | 273/949 (28.8%, 95% CI: 25.9-31.7%) | <0.001 |
| 9/23/2021 | 1171/4851 (24.1%, 95% CI: 22.9-25.3%) | 997/4271 (23.3%, 95% CI: 22.1-24.6%) | 174/580 (30.0%, 95% CI: 26.3-33.7%) | <0.001 |
| 12/20/2021 | 1108/4851 (22.8%, 95% CI: 21.7-24.0%) | 967/4360 (22.2%, 95% CI: 21.0-23.4%) | 141/491 (28.7%, 95% CI: 24.7-32.7%) | 0.001 |
| 3/3/2022 | 1064/4851 (21.9%, 95% CI: 20.8-23.1%) | 933/4384 (21.3%, 95% CI: 20.1-22.5%) | 131/467 (28.1%, 95% CI: 24.0-32.1%) | 0.001 |
| 6/23/2022 | 1013/4851 (20.9%, 95% CI: 19.7-22.0%) | 896/4406 (20.3%, 95% CI: 19.2-21.5%) | 117/445 (26.3%, 95% CI: 22.2-30.4%) | 0.003 |
| 10/11/2022 | 995/4851 (20.5%, 95% CI: 19.4-21.7%) | 880/4419 (19.9%, 95% CI: 18.7-21.1%) | 115/432 (26.6%, 95% CI: 22.5-30.8%) | 0.001 |
| 12/7/2022 | 1015/4851 (20.9%, 95% CI: 19.8-22.1%) | 900/4426 (20.3%, 95% CI: 19.2-21.5%) | 115/425 (27.1%, 95% CI: 22.8-31.3%) | 0.001 |
| 4/12/2023 | 950/4851 (19.6%, 95% CI: 18.5-20.7%) | 849/4433 (19.2%, 95% CI: 18.0-20.3%) | 101/418 (24.2%, 95% CI: 20.1-28.3%) | 0.014 |
| 6/14/2023 | 935/4851 (19.3%, 95% CI: 18.2-20.4%) | 831/4436 (18.7%, 95% CI: 17.6-19.9%) | 104/415 (25.1%, 95% CI: 20.9-29.2%) | 0.002 |

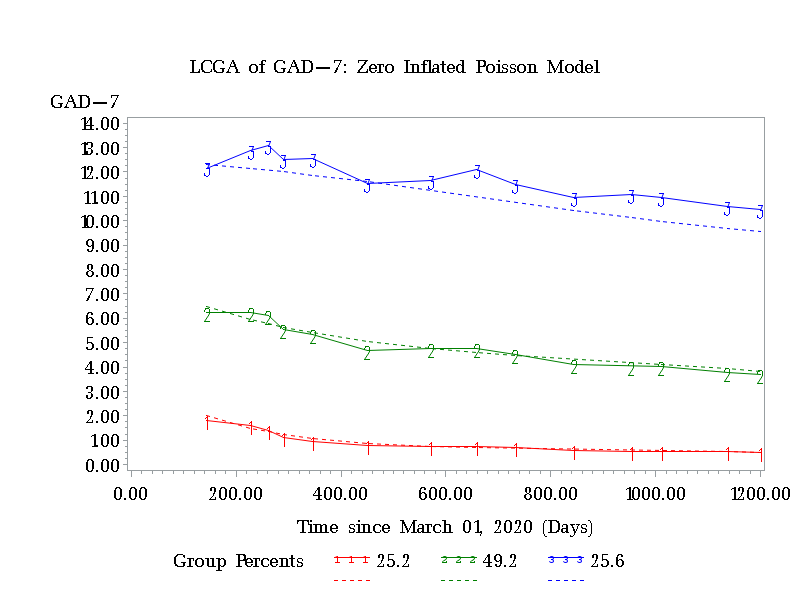
**eFigure 1: Flow chart of eligible cohort participants in the CHASING COVID Cohort**

**A diagram of a flowchart

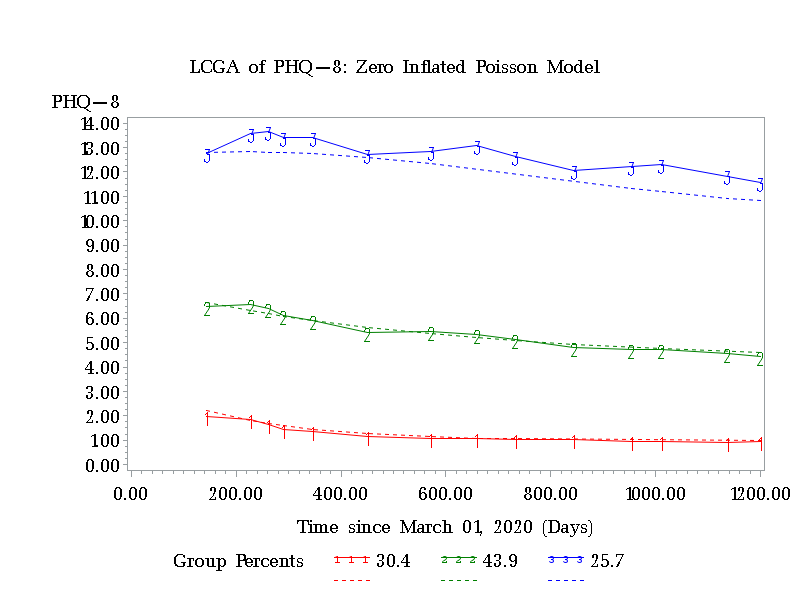
Description automatically generated**

**eFigure 2: latent class growth mixture model analysis: longitudinal GAD-7 and PHQ-8 scores trajectories over 3 years follow up, the CHASING COVID Cohort who have completed at least one follow-up assessments between May 2021 and July 2023 (N=4,851)**

**A:**



**B:**



**Appendix 1: Sociodemographic Characteristics Definitions**

The number of comorbidities were determined using the question “Has a doctor, nurse, or other health professional ever told you that you had any of the following?”, with options: heart attack, angina/coronary heart disease, type 2 diabetes, high blood pressure, cancer, asthma, chronic obstructive pulmonary disease, kidney disease, HIV/AIDS, immunosuppression, and depression.

The healthcare access barrier index and assessment items were adapted from a national survey that explored the experience of adults during the 2009-2010 H1N1 influenza pandemic. The measures of healthcare access included the following components: no primary care doctor, concerns about the costs of healthcare, concerns about seeing a doctor due to immigration status, and no health care coverage/insurance. The index was dichotomized as more versus fewer barriers to healthcare (1 vs. 0) using the median values of the sum of individual dichotomized components as the threshold.

Income loss due to COVID-19 were defined using the question: “In the past month, have you experienced a significant personal loss of income as a result of COVID-19?”. Food insecurity was assessed using questions designed by the United States Department of Agriculture (USDA) Household Food Security Survey (HFSS). Participants were asked to select responses of “often true”, “sometimes true”, and “never true” to the statements: “We couldn’t afford to eat balanced meals”, “We worried whether our food would run out before we got money to buy more”, and “The food that we bought just didn’t last, and we didn’t have money to get more”. Those who responded with “often true” or “sometimes true” to any of these three statements were considered food insecure. We used questions based on the Behavioral Risk Factor Surveillance System survey to assess housing instability. Participants endorsed the options “Always”, “Usually”, “Sometimes”, “Rarely”, and “Never” in response to the question “How often in the past month would you say you were worried or stressed about having enough money to pay your rent/mortgage?”. Participants who answered “Always” or “Usually” were considered housing instable.

**Appendix Table 1: STROBE (Strengthening the Reporting of Observational studies with Epidemiology) Checklist of items that should be included in reports of cohort studies.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Item | | Recommendation | Page |
| **Title and abstract** | 1 | (*a*) Indicate the study’s design with a commonly used term in the title or the abstract | | 1, 2 |
|  | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found |  |
| Introduction | | | | |
| Background/rationale | 2 | | Explain the scientific background and rationale for the investigation being reported | 3 |
| Objectives | 3 | | State specific objectives, including any prespecified hypotheses | 4 |
| Methods | | | | |
| Study design | 4 | | Present key elements of study design early in the paper | 3,4 |
| Setting | 5 | | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 3,4 |
| Participants | 6 | | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up | 4,5 |
| (*b*)For matched studies, give matching criteria and number of exposed and unexposed |  |
| Variables | 7 | | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 5,6, Appendix 1 |
| Data sources/ measurement | 8\* | | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 5,6, Appendix 1 |
| Bias | 9 | | Describe any efforts to address potential sources of bias | 4, 5, 6, Appendix Table 3-11 |
| Study size | 10 | | Explain how the study size was arrived at | 3, eFigure 1 |
| Quantitative variables | 11 | | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 4, Appendix 1 |
| Statistical methods | 12 | | (*a*) Describe all statistical methods, including those used to control for confounding | 7, 9, 10 |
| (*b*) Describe any methods used to examine subgroups and interactions |  |
| (*c*) Explain how missing data were addressed |  |
| (*d*) If applicable, explain how loss to follow-up was addressed |  |
| (*e*) Describe any sensitivity analyses |  |
| Results | | | |  |
| Participants | 13\* | | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed | 10, eFigure 1 |
| (b) Give reasons for non-participation at each stage |  |
| (c) Consider use of a flow diagram |  |
| Descriptive data | 14\* | | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | 10, Table 1 |
| (b) Indicate number of participants with missing data for each variable of interest |  |
| (c) Summarize follow-up time (eg, average and total amount) |  |
| Outcome data | 15\* | | Report numbers of outcome events or summary measures over time | 10, 11 |
| Main results | 16 | | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included  (*b*) Report category boundaries when continuous variables were categorized  (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | 11, 12, Table 1, Table 2 |
| Other analyses | 17 | | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | Appendix Table 3-11 |
| **Discussion** |  | |  |  |
| Key results | 18 | | Summarise key results with reference to study objectives | 12 |
| Limitations | 19 | | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 15 |
| Interpretation | 20 | | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 16 |
| Generalisability | 21 | | Discuss the generalisability (external validity) of the study results | 15 |
| **Other information** |  | |  |  |
| Funding | 22 | | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 17 |

**Appendix Table 2: Bayesian Information Criterion (BIC) used to select group from latent class growth mixture model analysis: longitudinal GAD-7 and PHQ-8 scores**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Number of group** | **BIC (N=67,914)** | **Null model** | **ΔBIC** | **BIC (n=4,851)** | **Null model** | **ΔBIC** | **% of smallest group** |
| GAD-7 | 1 | -153,447.6 |  |  | -153441.4 |  |  |  |
| 2 | -126,298.2 | 1 | 27149.4 | -126286.8 | 1 | 27154.6 | 38.7% |
| 3 | -118,638.5 | 2 | 7659.7 | -118621.8 | 2 | 7665 | 25.2% |
| 4 | -118,327.7 | 3 | 310.8 | -118308.0 | 3 | 313.8 | 17.1% |
| PHQ-8 | 1 | -161,385.8 |  |  | -161379.5 |  |  |  |
| 2 | -128,964.3 | 1 | 32421.5 | -128952.9 | 1 | 32426.6 | 41.2% |
| 3 | -120,659.1 | 2 | 8305.2 | -120,642.5 | 2 | 8310.4 | 25.7% |
| 4 | -120,265.3 | 3 | 393.8 | -120,248.1 | 3 | 394.4 | 17.6% |

BIC = Bayesian information Criterion

ΔBIC: BIC change between a more complex model and null model

**Appendix Table 3: Sociodemographic factors comparing participants who never experienced symptoms, experienced non-persistent symptoms, and persistent symptoms, between July 2020 and July 2023, the CHASING COVID Cohort who completed at least 7 follow-up assessments between this period (N=4,648)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristic** | **Never Anxiety**  **N = 2,283** | **Non-Persistent Anxiety**  **N = 1,637** | **Persistent Anxiety N = 728** | **P value** |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 323(14%) | 428(26%) | 250(34%) | **<0.001** |
| 30-39 | 538(24%) | 557(34%) | 253(35%) |  |
| 40-49 | 425(19%) | 299(18%) | 127(17%) |  |
| 50-64 | 369(16%) | 205(13%) | 62(8.5%) |  |
| 65+ | 628(28%) | 148(9.0%) | 36(4.9%) |  |
| **Gender, N (%)** |  |  |  |  |
| Male | 1,148(50%) | 685(42%) | 236(32%) | **<0.001** |
| Female | 1,108(49%) | 896(55%) | 441(61%) |  |
| Non-binary | 27(1.2%) | 56(3.4%) | 51(7.0%) |  |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 309(14%) | 291(18%) | 156(21%) | **<0.001** |
| NH White | 1,524(67%) | 1,009(62%) | 395(54%) |  |
| NH Black | 232(10%) | 159(9.7%) | 83(11%) |  |
| NH Asian/PI | 152(6.7%) | 125(7.6%) | 49(6.7%) |  |
| NHOther | 66(2.9%) | 53(3.2%) | 45(6.2%) |  |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 16(0.7%) | 21(1.3%) | 27(3.7%) | **<0.001** |
| High school | 173(7.6%) | 155(9.5%) | 123(17%) |  |
| Some college | 536(23%) | 427(26%) | 233(32%) |  |
| College graduate | 1,558(68%) | 1,034(63%) | 345(47%) |  |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 1,740(76%) | 1,121(68%) | 477(66%) | **<0.001** |
| Yes | 543(24%) | 516(32%) | 251(34%) |  |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 699(31%) | 638(39%) | 410(56%) | **<0.001** |
| $50,000 - $100,000 | 755(33%) | 539(33%) | 180(25%) |  |
| >$100,000 | 763(33%) | 414(25%) | 117(16%) |  |
| UK | 66(2.9%) | 46(2.8%) | 21(2.9%) |  |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 1,581(69%) | 899(55%) | 318(44%) | **<0.001** |
| Greater barriers to access | 702(31%) | 738(45%) | 410(56%) |  |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 1,525(67%) | 926(57%) | 243(33%) | **<0.001** |
| 1 | 557(24%) | 512(31%) | 313(43%) |  |
| 2 | 151(6.6%) | 151(9.2%) | 137(19%) |  |
| ≥3 | 50(2.2%) | 48(2.9%) | 35(4.8%) |  |
| **Characteristic** | **Never Depression**  **N = 2,228** | **Non-Persistent Depression**  **N = 1,537** | **Persistent Depression**  **N = 883** |  |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 327(15%) | 388(25%) | 286(32%) | **<0.001** |
| 30-39 | 548(25%) | 500(33%) | 300(34%) |  |
| 40-49 | 406(18%) | 295(19%) | 150(17%) |  |
| 50-64 | 356(16%) | 185(12%) | 95(11%) |  |
| 65+ | 591(27%) | 169(11%) | 52(5.9%) |  |
| **Gender, N (%)** |  |  |  |  |
| Male | 1,104(50%) | 662(43%) | 303(34%) | **<0.001** |
| Female | 1,099(49%) | 827(54%) | 519(59%) |  |
| Non-binary | 25(1.1%) | 48(3.1%) | 61(6.9%) |  |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 300(13%) | 269(18%) | 187(21%) | **<0.001** |
| NH White | 1,494(67%) | 928(60%) | 506(57%) |  |
| NH Black | 223(10%) | 163(11%) | 88(10.0%) |  |
| NH Asian/PI | 151(6.8%) | 124(8.1%) | 51(5.8%) |  |
| NHOther | 60(2.7%) | 53(3.4%) | 51(5.8%) |  |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 15(0.7%) | 18(1.2%) | 31(3.5%) | **<0.001** |
| High school | 148(6.6%) | 157(10%) | 146(17%) |  |
| Some college | 486(22%) | 425(28%) | 285(32%) |  |
| College graduate | 1,579(71%) | 937(61%) | 421(48%) |  |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 1,697(76%) | 1,046(68%) | 595(67%) | **<0.001** |
| Yes | 531(24%) | 491(32%) | 288(33%) |  |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 627(28%) | 640(42%) | 480(54%) | **<0.001** |
| $50,000 - $100,000 | 746(33%) | 499(32%) | 229(26%) |  |
| >$100,000 | 793(36%) | 358(23%) | 143(16%) |  |
| UK | 62(2.8%) | 40(2.6%) | 31(3.5%) |  |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 1,556(70%) | 839(55%) | 403(46%) | **<0.001** |
| Greater barriers to access | 672(30%) | 698(45%) | 480(54%) |  |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 1,551(70%) | 848(55%) | 295(33%) | **<0.001** |
| 1 | 508(23%) | 497(32%) | 377(43%) |  |
| 2 | 132(5.9%) | 147(9.6%) | 160(18%) |  |
| ≥3 | 37(1.7%) | 45(2.9%) | 51(5.8%) |  |

**Appendix Table 4: Sociodemographic characteristics comparing GAD-7 and PHQ-8 Latent Class Growth Analysis (LCGA) groups, between July 2020 and July 2023, the CHASING COVID Cohort who completed at least 7 follow-up assessments between this period (N=4,648)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. **GAD-7 scores** | | | | |
| **Characteristic** | **Persistently low GAD-7, N = 1,217** | **Persistently around and below GAD-7 borderline, N = 2,267** | **Persistently high GAD-7, N = 1,164** | **P value** |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 131(11%) | 491(22%) | 379(33%) | **<0.001** |
| 30-39 | 261(21%) | 677(30%) | 410(35%) |  |
| 40-49 | 213(18%) | 428(19%) | 210(18%) |  |
| 50-64 | 201(17%) | 329(15%) | 106(9.1%) |  |
| 65+ | 411(34%) | 342(15%) | 59(5.1%) |  |
| **Gender, N (%)** |  |  |  |  |
| Male | 665(55%) | 989(44%) | 415(36%) | **<0.001** |
| Female | 544(45%) | 1,221(54%) | 680(58%) |  |
| Non-binary | 8(0.7%) | 57(2.5%) | 69(5.9%) |  |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 160(13%) | 352(16%) | 244(21%) | **<0.001** |
| NH White | 810(67%) | 1,471(65%) | 647(56%) |  |
| NH Black | 144(12%) | 199(8.8%) | 131(11%) |  |
| NH Asian/PI | 75(6.2%) | 174(7.7%) | 77(6.6%) |  |
| NHOther | 28(2.3%) | 71(3.1%) | 65(5.6%) |  |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 5(0.4%) | 25(1.1%) | 34(2.9%) | **<0.001** |
| High school | 94(7.7%) | 179(7.9%) | 178(15%) |  |
| Some college | 319(26%) | 507(22%) | 370(32%) |  |
| College graduate | 799(66%) | 1,556(69%) | 582(50%) |  |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 941(77%) | 1,639(72%) | 758(65%) | **<0.001** |
| Yes | 276(23%) | 628(28%) | 406(35%) |  |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 367(30%) | 762(34%) | 618(53%) | **<0.001** |
| $50,000 - $100,000 | 414(34%) | 757(33%) | 303(26%) |  |
| >$100,000 | 408(34%) | 678(30%) | 208(18%) |  |
| UK | 28(2.3%) | 70(3.1%) | 35(3.0%) |  |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 866(71%) | 1,408(62%) | 524(45%) | **<0.001** |
| Greater barriers to access | 351(29%) | 859(38%) | 640(55%) |  |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 866(71%) | 1,376(61%) | 452(39%) | **<0.001** |
| 1 | 249(20%) | 662(29%) | 471(40%) |  |
| 2 | 78(6.4%) | 171(7.5%) | 190(16%) |  |
| ≥3 | 24(2.0%) | 58(2.6%) | 51(4.4%) |  |
| 1. **PHQ-8 scores** | | | | |
| **Characteristic** | **Persistently low PHQ-8, N = 1,472** | **Persistently around and below PHQ-8 borderline, N = 2,001** | **Persistently high PHQ-8, N = 1,175** | **P value** |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 184(13%) | 456(23%) | 361(31%) | **<0.001** |
| 30-39 | 345(23%) | 603(30%) | 400(34%) |  |
| 40-49 | 254(17%) | 380(19%) | 217(18%) |  |
| 50-64 | 238(16%) | 276(14%) | 122(10%) |  |
| 65+ | 451(31%) | 286(14%) | 75(6.4%) |  |
| **Gender, N (%)** |  |  |  |  |
| Male | 739(50%) | 893(45%) | 437(37%) | **<0.001** |
| Female | 722(49%) | 1,059(53%) | 664(57%) |  |
| Non-binary | 11(0.7%) | 49(2.4%) | 74(6.3%) |  |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 198(13%) | 317(16%) | 241(21%) | **<0.001** |
| NH White | 976(66%) | 1,286(64%) | 666(57%) |  |
| NH Black | 168(11%) | 179(8.9%) | 127(11%) |  |
| NH Asian/PI | 96(6.5%) | 156(7.8%) | 74(6.3%) |  |
| NHOther | 34(2.3%) | 63(3.1%) | 67(5.7%) |  |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 7(0.5%) | 20(1.0%) | 37(3.1%) | **<0.001** |
| High school | 107(7.3%) | 161(8.0%) | 183(16%) |  |
| Some college | 347(24%) | 473(24%) | 376(32%) |  |
| College graduate | 1,011(69%) | 1,347(67%) | 579(49%) |  |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 1,116(76%) | 1,437(72%) | 785(67%) | **<0.001** |
| Yes | 356(24%) | 564(28%) | 390(33%) |  |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 387(26%) | 729(36%) | 631(54%) | **<0.001** |
| $50,000 - $100,000 | 505(34%) | 659(33%) | 310(26%) |  |
| >$100,000 | 541(37%) | 558(28%) | 195(17%) |  |
| UK | 39(2.6%) | 55(2.7%) | 39(3.3%) |  |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 1,052(71%) | 1,216(61%) | 530(45%) | **<0.001** |
| Greater barriers to access | 420(29%) | 785(39%) | 645(55%) |  |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 1,067(72%) | 1,190(59%) | 437(37%) | **<0.001** |
| 1 | 302(21%) | 603(30%) | 477(41%) |  |
| 2 | 82(5.6%) | 160(8.0%) | 197(17%) |  |
| ≥3 | 21(1.4%) | 48(2.4%) | 64(5.4%) |  |

**Appendix Table 5: Unadjusted and adjusted incidence rate ratio (95% CI) of ongoing moderate to severe symptoms of anxiety and depression on additional COVID-19 vaccine dose by polled GEE model, between May 2021 and July 2023, the CHASING COVID Cohort who completed at least 7 follow-up assessments between this period (N=4,648)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mental Health Symptom Status** | **Number of COVID-19 vaccine doses as of July 2023** | **Mental Health Symptom Status** | **Univariable regression:  Rate of additional vaccine doses** | **Multivariable regression**\***:**  **Rate of additional vaccine dose** |
| Participants without persistent Moderate to Severe Anxiety Symptoms (N = 3,920), median (IQR) | 4 (3-4) | Participants without ongoing Moderate to Severe Anxiety Symptoms | Ref | Ref |
| Participants with persistent Moderate to Severe Anxiety Symptoms (N = 728), median (IQR) | 3 (3-4) | Participant with Moderate to Severe Anxiety Symptoms | 0.91 (0.90 – 0.91) | 0.97 (0.95-0.98) |
| Participants without persistent Moderate to Severe Depression Symptoms (N = 3,765), median (IQR) | 4 (3-4) | Participants without Moderate to Severe Depression Symptoms | Ref | Ref |
| Participants with persistent Moderate to Severe Depression Symptoms (N = 883), median (IQR) | 3 (2-4) | Participants with Moderate to Severe Depression Symptoms | 0.91 (0.89-0.92) | 0.96 (0.94-0.98) |

\*Adjusted for age, gender, number of comorbidities, and access barriers to healthcare

**Appendix Table 6: Prevalence estimation of cohort participants who never had symptoms, experienced non-persistent symptoms, and had persistent symptoms, by each piece of 10 imputation data, between July 2020 and July 2023, the CHASING COVID Cohort (N=4,851)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Imputation number** | **Prevalence estimation** | | |
|  | **Never Anxiety** | **Non-Persistent Anxiety** | **Persistent Anxiety** |
| 1 | 2,231 (46.0%) | 1,854 (38.2%) | 766 (15.8%) |
| 2 | 2,238 (46.1%) | 1,853 (38.2%) | 760 (15.7%) |
| 3 | 2,228 (45.9%) | 1,855 (38.2%) | 768 (15.8%) |
| 4 | 2,237 (46.1%) | 1,851 (38.2%) | 763 (15.7%) |
| 5 | 2,239 (46.2%) | 1,847 (38.1%) | 765 (15.8%) |
| 6 | 2,236 (46.1%) | 1,845 (38.0%) | 770 (15.9%) |
| 7 | 2,236 (46.1%) | 1,856 (38.3%) | 759 (15.7%) |
| 8 | 2,241 (46.2%) | 1,843 (38.0%) | 767 (15.8%) |
| 9 | 2,231 (46.0%) | 1,857 (38.3%) | 763 (15.7%) |
| 10 | 2,232 (46.0%) | 1,850 (38.1%) | 769 (15.9%) |
| Overall of 1-10 | 22,349 (46.1%) | 18,511 (38.2%) | 7,650 (15.8%) |
|  | **Never Depression** | **Non-Persistent Depression** | **Persistent Depression** |
| 1 | 2,177 (44.9%) | 1,854 (38.2%) | 820 (16.9%) |
| 2 | 2,161 (44.6%) | 1,858 (38.3%) | 832 (17.2%) |
| 3 | 2,156 (44.4%) | 1,867 (38.5%) | 828 (17.1%) |
| 4 | 2,168 (44.7%) | 1,857 (38.3%) | 826 (17.0%) |
| 5 | 2,152 (44.4%) | 1,874 (38.6%) | 825 (17.0%) |
| 6 | 2,171 (44.8%) | 1,856 (38.3%) | 824 (17.0%) |
| 7 | 2,168 (44.7%) | 1,868 (38.5%) | 815 (16.8%) |
| 8 | 2,168 (44.7%) | 1,853 (38.2%) | 830 (17.1%) |
| 9 | 2,172 (44.8%) | 1,856 (38.3%) | 823 (17.0%) |
| 10 | 2,168 (44.7%) | 1,858 (38.3%) | 825 (17.0%) |
| Overall of 1-10 | 21,661 (44.7%) | 18,601 (38.3%) | 8,248 (17.0%) |

**Appendix Table 7: GAD-7 and PHQ-8 Latent Class Growth Analysis (LCGA) groups by each piece of 10 imputation data, between July 2020 and July 2023, the CHASING COVID Cohort (N=4,851)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Imputation number** | **Group assignment estimation** | | |
|  | **Persistently low GAD-7** | **Persistently around and below GAD-7 borderline** | **Persistently high GAD-7** |
| 1 | 1,258 (25.9%) | 2,372 (48.9%) | 1,221 (25.2%) |
| 2 | 1,225 (25.3%) | 2,374 (48.9%) | 1,252 (25.8%) |
| 3 | 1,215 (25.1%) | 2,409 (49.7%) | 1,227 (25.3%) |
| 4 | 1,245 (25.7%) | 2,378 (49.0%) | 1,228 (25.3%) |
| 5 | 1,199 (24.7%) | 2,403 (49.5%) | 1,249 (25.8%) |
| 6 | 1,265 (26.1%) | 2,365 (48.8%) | 1,221 (25.2%) |
| 7 | Not converge | Not converge | Not converge |
| 8 | Not converge | Not converge | Not converge |
| 9 | Not converge | Not converge | Not converge |
| 10 | Not converge | Not converge | Not converge |
| Overall of 1-6 | 7,407 (25.5%) | 14,301 (49.1%) | 7,398 (25.4%) |
|  | **Persistently low PHQ-8** | **Persistently around and below PHQ-8 borderline** | **Persistently high PHQ-8** |
| 1 | 1,467 (30.2%) | 2,125 (43.8%) | 1,259 (26.0%) |
| 2 | 1,458 (30.1%) | 2,116 (43.6%) | 1,277 (26.3%) |
| 3 | 1,470 (30.3%) | 2,112 (43.5%) | 1,269 (26.2%) |
| 4 | 1,447 (29.8%) | 2,142 (44.2%) | 1,262 (26.0%) |
| 5 | 1,455 (30.0%) | 2,103 (43.4%) | 1,293 (26.7%) |
| 6 | 1,472 (30.3%) | 2,125 (43.8%) | 1,254 (25.9%) |
| 7 | 1,382 (28.5%) | 2,075 (42.8%) | 1,394 (28.7%) |
| 8 | 1,479 (30.5%) | 2,135 (44.0%) | 1,237 (25.5%) |
| 9 | 1,452 (29.9%) | 2,122 (43.7%) | 1,277 (26.3%) |
| 10 | 1,457 (30.0%) | 2,110 (43.5%) | 1,284 (26.5%) |
| Overall of 1-10 | 14,539 (30.0%) | 21,165 (43.6%) | 12,806 (26.4%) |

**Appendix Table 8:** **Co-Occurrence Patterns of** **Ever/Never and Non-Persistent/Persistent Anxiety and Depression Symptoms between July 2020 and July 2023, the CHASING COVID Cohort (N=4,851)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Never Depression** | **Non-persistent Depression** | **Persistent Depression** | **Total** |
| **Never anxiety** | **2005** | **341** | **30** | **2376** |
| **Non-persistent anxiety** | **296** | **1156** | **250** | **1702** |
| **Persistent anxiety** | **7** | **111** | **655** | **773** |
| **Total** | **2308** | **1608** | **935** | **4851** |

|  |  |
| --- | --- |
|  |  |

**Appendix Table 9: Sociodemographic factors comparing participants by the comorbidity of ever or persistent anxiety and ever or persistent depression status between July 2020 and July 2023, the CHASING COVID Cohort (N=4,851)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Characteristic/** | **Never Anxiety and Never Depression**  **N = 2,005** | **Never/Non-Persistent Combinations N = 1,793\*** | **Persistent/Non-Persistent Combinations N = 398§** | **Persistent Anxiety and Persistent Depression**  **N = 655** | **Unadjusted Risk ratio of** **experiencing either persistent anxiety or persistent depression (95% CI)** | **Unadjusted Risk Ratio of experiencing both persistent anxiety and persistent depression (95% CI)** |
| **Cohort Prevalence** |  |  |  |  | **Ever experienced any persistent symptom: 1053/4851,** **21.7% (95% CI: 20.6 – 22.9%)** | **Experienced both persistent symptom:**  **655/4851,** **13.5% (95% CI: 12.5-14.5%)** |
| **Age category, N (%)** |  |  |  |  |  |  |
| 18-29 | 278(14%) | 432(24%) | 128(32%) | 229(35%) | 4.37 (3.47, 5.57) | 5.79 (4.14, 8.34) |
| 30-39 | 458(23%) | 590(33%) | 127(32%) | 226(35%) | 3.29 (2.62, 4.19) | 4.35 (3.11, 6.27) |
| 40-49 | 368(18%) | 349(19%) | 60(15%) | 114(17%) | 2.55 (1.99, 3.31) | 3.45 (2.41, 5.06) |
| 50-64 | 333(17%) | 218(12%) | 50(13%) | 55(8.4%) | 2.09 (1.59, 2.76) | 2.26 (1.51, 3.44) |
| 65+ | 568(28%) | 204(11%) | 33(8.3%) | 31(4.7%) | ref | ref |
| **Gender, N (%)** |  |  |  |  |  |  |
| Male | 1,019(51%) | 774(43%) | 146(37%) | 211(32%) | ref | ref |
| Female | 964(48%) | 973(54%) | 227(57%) | 398(61%) | 1.47 (1.31, 1.65) | 1.58 (1.36, 1.85) |
| Non-binary | 22(1.1%) | 46(2.6%) | 25(6.3%) | 46(7.0%) | 3.08 (2.44, 3.83) | 3.37 (2.48, 4.50) |
| **Race/Ethnicity, N (%)** |  |  |  |  |  |  |
| Hispanic | 267(13%) | 314(18%) | 66(17%) | 154(24%) | 1.39 (1.21, 1.59) | 1.70 (1.42, 2.03) |
| NH White | 1,330(66%) | 1,097(61%) | 256(64%) | 342(52%) | ref | ref |
| NH Black | 220(11%) | 185(10%) | 34(8.5%) | 78(12%) | 1.10 (0.91, 1.31) | 1.33 (1.06, 1.67) |
| NH Asian/PI | 134(6.7%) | 139(7.8%) | 23(5.8%) | 40(6.1%) | 0.95 (0.75, 1.19) | 1.05 (0.77, 1.41) |
| NHOther | 54(2.7%) | 58(3.2%) | 19(4.8%) | 41(6.3%) | 1.76 (1.38, 2.22) | 2.11 (1.54, 2.82) |
| **Education, N (%)** |  |  |  |  |  |  |
| Less than high school | 12(0.6%) | 21(1.2%) | 10(2.5%) | 24(3.7%) | 3.00 (2.18, 4.03) | 3.77 (2.50, 5.44) |
| High school | 142(7.1%) | 172(9.6%) | 56(14%) | 120(18%) | 2.12 (1.82, 2.47) | 2.57 (2.11, 3.13) |
| Some college | 464(23%) | 471(26%) | 108(27%) | 223(34%) | 1.55 (1.37, 1.75) | 1.85 (1.57, 2.18) |
| College graduate | 1,387(69%) | 1,129(63%) | 224(56%) | 288(44%) | ref | ref |
| **Any children <18 y in household, N (%)** |  |  |  |  |  |  |
| No | 1,528(76%) | 1,218(68%) | 297(75%) | 421(64%) | ref | ref |
| Yes | 477(24%) | 575(32%) | 101(25%) | 234(36%) | 1.17 (1.04, 1.31) | 1.39 (1.20, 1.61) |
| **Household annual income, N (%)** |  |  |  |  |  |  |
| <$50,000 | 577(29%) | 686(38%) | 212(53%) | 369(56%) | 2.48 (2.14, 2.90) | 2.53 (2.08, 3.10) |
| $50,000 - $100,000 | 670(33%) | 590(33%) | 108(27%) | 160(24%) | 1.38 (1.17, 1.64) | 1.32 (1.06, 1.67) |
| >$100,000 | 699(35%) | 471(26%) | 64(16%) | 106(16%) | ref | ref |
| UK | 59(2.9%) | 46(2.6%) | 14(3.5%) | 20(3.1%) | 1.93 (1.37, 2.64) | 1.82 (1.14, 2.78) |
| **Healthcare access barriers, N (%)** |  |  |  |  |  |  |
| Fewer barriers to access | 1,410(70%) | 1,005(56%) | 214(54%) | 275(42%) | ref | ref |
| Greater barriers to access | 595(30%) | 788(44%) | 184(46%) | 380(58%) | 1.72 (1.55, 1.92) | 2.06 (1.78, 2.38) |
| **Number of Comorbidities, N (%)** |  |  |  |  |  |  |
| 0 | 1,390(69%) | 1,061(59%) | 143(36%) | 211(32%) | ref | ref |
| 1 | 462(23%) | 522(29%) | 184(46%) | 276(42%) | 2.52 (2.23, 2.85) | 2.54 (2.15, 3.00) |
| 2 | 118(5.9%) | 161(9.0%) | 48(12%) | 133(20%) | 3.12 (2.66, 3.65) | 3.84 (3.14, 4.70) |
| ≥3 | 35(1.7%) | 49(2.7%) | 23(5.8%) | 35(5.3%) | 3.24 (2.51, 4.11) | 3.28 (2.32, 4.51) |

\* **Non-Persistent Anxiety and/or Non-Persistent Depression includes:**

**Never Anxiety and Non-Persistent Depression: N = 341; Non-persistent Anxiety and Never Depression: N = 296; Non-persistent Anxiety and Non-persistent Depression: N = 1156**

§ **Persistent Anxiety and Non-Persistent Depression or Non-Persistent Anxiety and Persistent Depression: Non-Persistent Anxiety and Persistent Depression: N = 250; Never Anxiety and Persistent Depression: N = 30; Persistent Anxiety and Non-Persistent Depression: N = 111; Persistent Anxiety and Never Depression: N = 7**

**Appendix Table 10: Unadjusted and adjusted incidence rate ratio (95% CI) of ongoing comorbidity of moderate to severe symptoms of anxiety and depression on additional COVID-19 vaccine dose by polled GEE model, between May 2021 and July 2023, the CHASING COVID Cohort (N=4,851)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mental Health Symptom Status** | **Number of COVID-19 vaccine doses as of July 2023** | **Mental Health Symptom Status** | **Univariable regression:  Rate of additional vaccine doses** | **Multivariable regression**\***:**  **Rate of additional vaccine dose** |
| Participants without either persistent Anxiety or persistent Depression (N = 4,196), median (IQR) | 4 (3-4) | Participants without either ongoing Anxiety or ongoing Depression | Ref | Ref |
| Participants with both persistent Anxiety and persistent Depression (N = 655), median (IQR) | 3 (2-4) | Participant with Both ongoing Anxiety and ongoing Depression | 0.91 (0.90, 0.93) | 0.98 (0.97, 0.99) |
| Participants without both persistent Anxiety and persistent Depression (N = 3,798), median (IQR) | 4 (3-4) | Participants without both ongoing Anxiety and ongoing Depression | Ref | Ref |
| Participants with either persistent Anxiety or persistent Depression (N = 1,053), median (IQR) | 3 (2-4) | Participants with either ongoing Anxiety or ongoing Depression | 0.88 (0.86, 0.89) | 0.93 (0.92, 0.94) |

\*Adjusted for age, gender, number of comorbidities, and access barriers to healthcare

**Appendix Table 11: Number of follow-up assessments by anxiety and depression symptoms groups**

|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristic** | **Never Anxiety**  **N = 2,376** | **Non-Persistent Anxiety**  **N = 1,702** | **Persistent Anxiety N = 773** |
| **Number of follow-up assessments, N (%)** |  |  |  |
| 1 | 15(0.6%) | 6(0.4%) | 4(0.5%) |
| 2 | 10(0.4%) | 3(0.2%) | 3(0.4%) |
| 3 | 15(0.6%) | 9(0.5%) | 6(0.8%) |
| 4 | 17(0.7%) | 15(0.9%) | 13(1.7%) |
| 5 | 14(0.6%) | 15(0.9%) | 8(1.0%) |
| 6 | 22(0.9%) | 17(1.0%) | 11(1.4%) |
| 7 | 23(1.0%) | 20(1.2%) | 15(1.9%) |
| 8 | 22(0.9%) | 26(1.5%) | 13(1.7%) |
| 9 | 28(1.2%) | 26(1.5%) | 19(2.5%) |
| 10 | 48(2.0%) | 44(2.6%) | 13(1.7%) |
| 11 | 57(2.4%) | 45(2.6%) | 24(3.1%) |
| 12 | 98(4.1%) | 89(5.2%) | 49(6.3%) |
| 13 | 258(11%) | 188(11%) | 107(14%) |
| 14 | 1,749(74%) | 1,199(70%) | 488(63%) |
| **Characteristic** | **Never Depression**  **N = 2,308** | **Non-Persistent Depression**  **N = 1,608** | **Persistent Depression**  **N = 935** |
| **Number of follow-up assessments, N (%)** |  |  |  |
| 1 | 10(0.4%) | 8(0.5%) | 7(0.7%) |
| 2 | 6(0.3%) | 8(0.5%) | 2(0.2%) |
| 3 | 12(0.5%) | 11(0.7%) | 7(0.7%) |
| 4 | 16(0.7%) | 16(1.0%) | 13(1.4%) |
| 5 | 14(0.6%) | 12(0.7%) | 11(1.2%) |
| 6 | 22(1.0%) | 16(1.0%) | 12(1.3%) |
| 7 | 16(0.7%) | 24(1.5%) | 18(1.9%) |
| 8 | 20(0.9%) | 25(1.6%) | 16(1.7%) |
| 9 | 25(1.1%) | 28(1.7%) | 20(2.1%) |
| 10 | 46(2.0%) | 38(2.4%) | 21(2.2%) |
| 11 | 49(2.1%) | 49(3.0%) | 28(3.0%) |
| 12 | 90(3.9%) | 92(5.7%) | 54(5.8%) |
| 13 | 245(11%) | 186(12%) | 122(13%) |
| 14 | 1,737(75%) | 1,095(68%) | 604(65%) |

**Appendix Table 12: Sociodemographic characteristics comparing GAD-7 and PHQ-8 Latent Class Growth Analysis (LCGA) groups, among participants who completed all 14 assessments between May 2021 and July 2023, the CHASING COVID Cohort (N=3,436)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. **Moderate to Severe Anxiety Symptoms** | | | | |
| **Characteristic** | **Never Anxiety,  N = 1,749** | **Non-Persistent Anxiety, N = 1,199** | **Persistent Anxiety, N = 488** | **P value** |
| **Cohort Prevalence** |  | **Ever experienced symptom: 1687/3436, 49.1% (95% CI: 47.4-50.8%)** | **Persistent Symptom:**  **488/3436, 14.2% (95% CI: 13.0-15.4%)** |  |  |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 232(13%) | 289(24%) | 162(33%) | **<0.001** |
| 30-39 | 409(23%) | 409(34%) | 171(35%) |  |
| 40-49 | 330(19%) | 218(18%) | 91(19%) |  |
| 50-64 | 280(16%) | 166(14%) | 41(8.4%) |  |
| 65+ | 498(28%) | 117(9.8%) | 23(4.7%) |  |
| **Gender, N (%)** |  |  |  |  |
| Male | 865(49%) | 478(40%) | 160(33%) | **<0.001** |
| Female | 863(49%) | 683(57%) | 295(60%) |  |
| Non-binary | 21(1.2%) | 38(3.2%) | 33(6.8%) |  |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 218(12%) | 202(17%) | 92(19%) | **<0.001** |
| NH White | 1,203(69%) | 768(64%) | 275(56%) |  |
| NH Black | 161(9.2%) | 95(7.9%) | 51(10%) |  |
| NH Asian/PI | 116(6.6%) | 97(8.1%) | 37(7.6%) |  |
| NHOther | 51(2.9%) | 37(3.1%) | 33(6.8%) |  |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 11(0.6%) | 16(1.3%) | 18(3.7%) | **<0.001** |
| High school | 119(6.8%) | 96(8.0%) | 73(15%) |  |
| Some college | 393(22%) | 282(24%) | 141(29%) |  |
| College graduate | 1,226(70%) | 805(67%) | 256(52%) |  |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 1,359(78%) | 836(70%) | 331(68%) | **<0.001** |
| Yes | 390(22%) | 363(30%) | 157(32%) |  |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 522(30%) | 458(38%) | 267(55%) | **<0.001** |
| $50,000 - $100,000 | 595(34%) | 388(32%) | 125(26%) |  |
| >$100,000 | 583(33%) | 318(27%) | 81(17%) |  |
| UK | 49(2.8%) | 35(2.9%) | 15(3.1%) |  |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 1,247(71%) | 692(58%) | 221(45%) | **<0.001** |
| Greater barriers to access | 502(29%) | 507(42%) | 267(55%) |  |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 1,163(66%) | 678(57%) | 169(35%) | **<0.001** |
| 1 | 429(25%) | 366(31%) | 210(43%) |  |
| 2 | 117(6.7%) | 118(9.8%) | 87(18%) |  |
| ≥3 | 40(2.3%) | 37(3.1%) | 22(4.5%) |  |
| 1. **Moderate to Severe Depression Symptoms** | | | | |
| **Characteristic** | **Never Depression, N = 1,737** | **Non-Persistent Depression, N = 1,095** | **Persistent Depression, N = 604** | **P value** |
| **Cohort Prevalence** |  | **Ever experienced symptom: 1699/3436, 49.5% (95% CI: 47.8-51.1%)** | **Persistent Symptom:**  **604/3436, 17.6% (95% CI: 16.3-18.9%)** |  |
| **Age category, N (%)** |  |  |  |  |
| 18-29 | 243(14%) | 252(23%) | 188(31%) | **<0.001** |
| 30-39 | 431(25%) | 357(33%) | 201(33%) |  |
| 40-49 | 321(18%) | 208(19%) | 110(18%) |  |
| 50-64 | 275(16%) | 142(13%) | 70(12%) |  |
| 65+ | 467(27%) | 136(12%) | 35(5.8%) |  |
| **Gender, N (%)** |  |  |  |  |
| Male | 843(49%) | 446(41%) | 214(35%) | **<0.001** |
| Female | 874(50%) | 618(56%) | 349(58%) |  |
| Non-binary | 20(1.2%) | 31(2.8%) | 41(6.8%) |  |
| **Race/Ethnicity, N (%)** |  |  |  |  |
| Hispanic | 216(12%) | 179(16%) | 117(19%) | **<0.001** |
| NH White | 1,204(69%) | 679(62%) | 363(60%) |  |
| NH Black | 153(8.8%) | 103(9.4%) | 51(8.4%) |  |
| NH Asian/PI | 117(6.7%) | 95(8.7%) | 38(6.3%) |  |
| NHOther | 47(2.7%) | 39(3.6%) | 35(5.8%) |  |
| **Education, N (%)** |  |  |  |  |
| Less than high school | 11(0.6%) | 13(1.2%) | 21(3.5%) | **<0.001** |
| High school | 106(6.1%) | 98(8.9%) | 84(14%) |  |
| Some college | 363(21%) | 276(25%) | 177(29%) |  |
| College graduate | 1,257(72%) | 708(65%) | 322(53%) |  |
| **Any children <18 y in household, N (%)** |  |  |  |  |
| No | 1,342(77%) | 755(69%) | 429(71%) | **<0.001** |
| Yes | 395(23%) | 340(31%) | 175(29%) |  |
| **Household annual income, N (%)** |  |  |  |  |
| <$50,000 | 477(27%) | 450(41%) | 320(53%) | **<0.001** |
| $50,000 - $100,000 | 593(34%) | 353(32%) | 162(27%) |  |
| >$100,000 | 618(36%) | 263(24%) | 101(17%) |  |
| UK | 49(2.8%) | 29(2.6%) | 21(3.5%) |  |
| **Healthcare access barriers, N (%)** |  |  |  |  |
| Fewer barriers to access | 1,235(71%) | 630(58%) | 295(49%) | **<0.001** |
| Greater barriers to access | 502(29%) | 465(42%) | 309(51%) |  |
| **Number of Comorbidities, N (%)** |  |  |  |  |
| 0 | 1,204(69%) | 596(54%) | 210(35%) | **<0.001** |
| 1 | 397(23%) | 347(32%) | 261(43%) |  |
| 2 | 105(6.0%) | 118(11%) | 99(16%) |  |
| ≥3 | 31(1.8%) | 34(3.1%) | 34(5.6%) |  |

**Appendix Table 13: Unadjusted and adjusted incidence rate ratio (95% CI) of ongoing moderate to severe symptoms of anxiety and depression on additional COVID-19 vaccine dose by polled GEE model, among participants who completed all 14 assessments between May 2021 and July 2023, the CHASING COVID Cohort (N=3,436)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mental Health Symptom Status** | **Number of COVID-19 vaccine doses as of July 2023** | **Mental Health Symptom Status** | **Univariable regression:  Rate of additional vaccine doses** | **Multivariable regression**\***:**  **Rate of additional vaccine dose** |
| Participants without persistent Moderate to Severe Anxiety Symptoms (N = 2,948), median (IQR) | 4 (3-4) | Participants without ongoing Moderate to Severe Anxiety Symptoms | Ref | Ref |
| Participants with persistent Moderate to Severe Anxiety Symptoms (N = 488), median (IQR) | 4 (3-4) | Participant with Moderate to Severe Anxiety Symptoms | 0.99 (0.98 – 1.00) | 1.00 (0.99-1.01) |
| Participants without persistent Moderate to Severe Depression Symptoms (N = 2,832), median (IQR) | 4 (3-4) | Participants without Moderate to Severe Depression Symptoms | Ref | Ref |
| Participants with persistent Moderate to Severe Depression Symptoms (N = 604), median (IQR) | 4 (3-4) | Participants with Moderate to Severe Depression Symptoms | 0.99 (0.98-1.00) | 1.00 (0.99-1.01) |

\*Adjusted for age, gender, number of comorbidities, and access barriers to healthcare

**Appendix Figure 1: Cohort Prevalence of (A) Both Anxiety Symptoms and Depression Symptoms (B) Either Anxiety Symptoms or Depression Symptoms by COVID-19 Vaccination Status as of each follow-up, May 2021 to July 2023, the CHASING COVID Cohort (N=4,851)**

A graph of a graph

Description automatically generated with medium confidence