

Differences in PHQ-9 Scores based on Remote Digital versus In-Person Paper Administration: Findings from the Project Baseline Health Study



Megan K. Carroll MS¹; Kenneth A. Taylor, DPT, PhD²; Hamsa Subramaniam, PhD, MPH¹; Celeste Wong, MPH¹; Benjamin W. Nelson, PhD^{1, 3}; R. Scooter Plowman MD, MBA, MHSA^{1, 4}; Edgar P. Simard PhD, MPH¹, Sarah A. Short MPH¹; Julio C. Nunes, MD⁴
¹Verily Life Sciences, South San Francisco, CA, USA, ²Duke University, Durham, NC, USA, ³Harvard Medical School, Beth Israel Deaconess Medical Center, Boston, MA, USA, ⁴Stanford University, Stanford, CA, USA

Introduction

- The 9-item Patient Health Questionnaire (PHQ-9) is used to evaluate depressive symptoms and their severity
- While validated in in-person settings, there is limited research on its performance when administered remotely
- This study aims to identify meaningful differences in PHQ-9 scores by administration route from a cohort of community-dwelling adults who enrolled in the Project Baseline Health Study (PBHS)

Methods

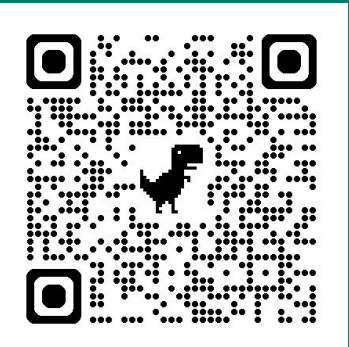
- A cross-sectional analysis included PBHS participants who completed a PHQ-9 survey either in-person or via remote digital application at enrollment
- Inverse probability of treatment weights were employed to condition on study site, identified as the minimally sufficient adjustment set
- Differences in PHQ-9 score distributions were tested using a weighted Mann-Whitney-U test
- History of major depressive disorder (MDD) was considered an effect modifier

Table 1. Demographic characteristics of participants who completed PHQ-9 during their PBHS enrollment visit (N = 2176)

| Demographic Characteristics | Administration Route | |
|---|------------------------------------|------------------------------------|
| | Digital App (N = 748) ¹ | Paper Form (N = 1428) ¹ |
| Age | 55 (39-69) | 47 (33-60) |
| Female | 469 (63%) | 731 (51%) |
| Race | | |
| White | 507 (68%) | 890 (62%) |
| Black or African American | 93 (12%) | 237 (17%) |
| Asian | 67 (9%) | 160 (11%) |
| Native Hawaiian or Other Pacific Islander | 6 (1%) | 19 (1%) |
| American Indian or Alaska Native | 9 (1%) | 16 (1%) |
| Other | 66 (9%) | 105 (7%) |
| Hispanic Ethnicity | 104 (14%) | 138 (10%) |
| Site | | |
| Los Angeles | 67 (9%) | 365 (26%) |
| Durham | 125 (17%) | 303 (21%) |
| Kannapolis | 143 (19%) | 315 (22%) |
| Palo Alto | 413 (55%) | 445 (31%) |
| History of Major Depressive Disorder | 125 (17%) | 224 (16%) |
| PHQ-9 total score, baseline | 3 (1-6) | 2 (0-5) |

¹Median (Q1-Q3); n (%)

There is no clinically meaningful difference in PHQ-9 scores when administered via digital application versus paper form in a hybrid in-person and remote cohort study.



Scan the QR code to access additional information or email megankcarroll@verily.com

MKC, HS, CW, BWN, RSP, EPS, SAS report employment and equity ownership in Verily Life Sciences. The Project Baseline Health Study and this analysis were funded by Verily Life Sciences, South San Francisco, California.

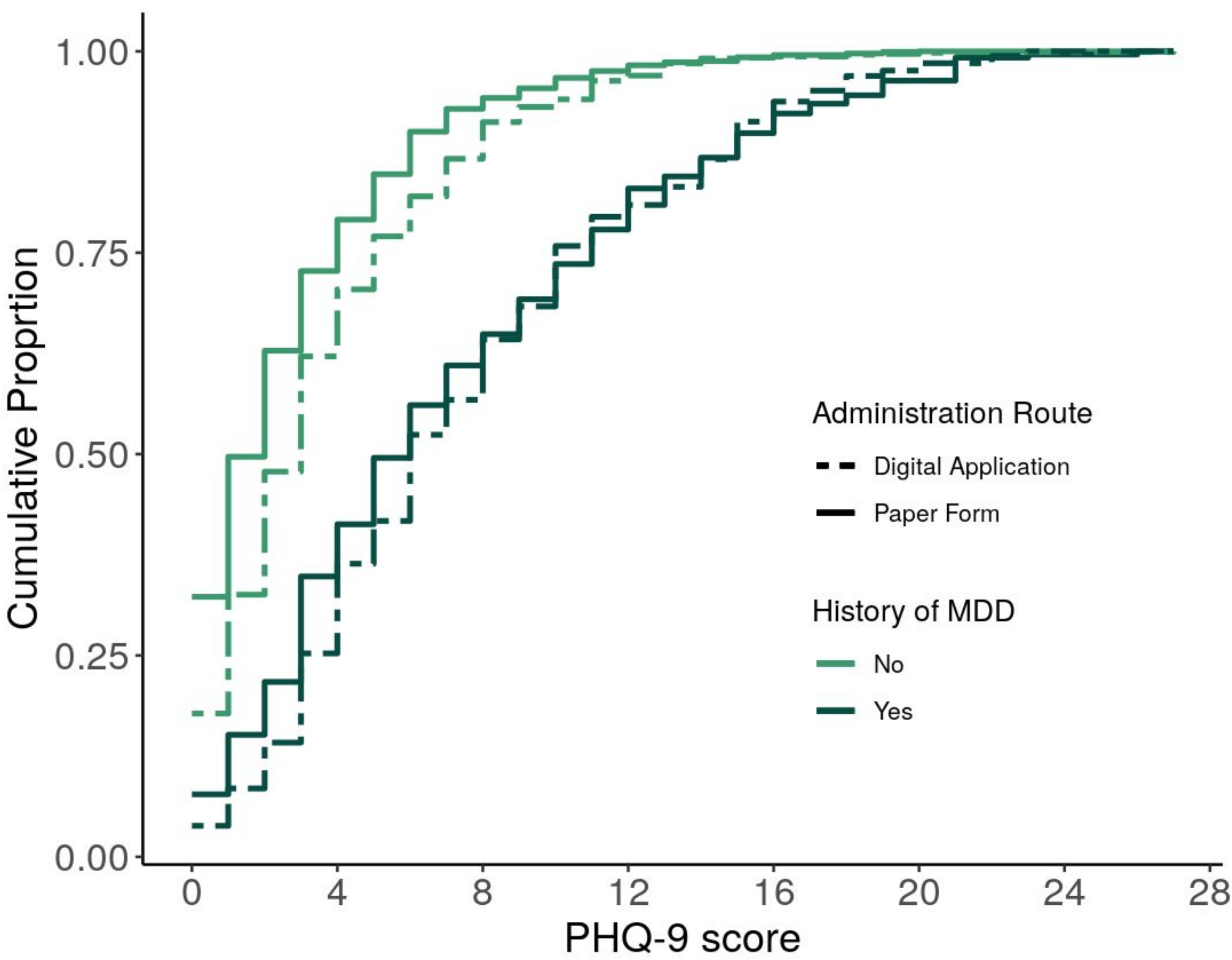


Figure 1. Cumulative weighted proportion of PHQ-9 score by route of administration, stratified by history of major depressive disorder

Results

- Median (IQR) scores among paper completers (n=1428) and digital application users (n=748) were 2 (0-5) and 3 (1-6), respectively (U=-6.15, p<0.001) (Table 1)
- Among 1813 participants without history of MDD, weighted median [IQR] PHQ-9 score among digital application users was greater than paper completers (paper: 2 [0-4]; app: 3 [1-5]; p<0.001) (Fig. 1)
- There was no difference in weighted median scores among the 349 participants with history of MDD (paper: 6 [3-11]; app: 6 [4-10]; p=0.748) (Fig. 1)

Conclusion

- Small statistically significant differences in PHQ-9 scores by route of administration were not clinically meaningful
- As the prominence of app-based clinical data collection increases, these results suggest remote screening for depression via PHQ-9 in a community-dwelling population is a pragmatic and viable approach