# Perception of Health and Its Association with Community Health Promotors (CHP) Program Participation in Puerto Rico and Impact on Health after Participating in the Program

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## BACKGROUND

Studies show a positive impact of community health worker interventions on health. Community Health Promoters (CHP) act as a connector between the health care teams and the community and plays a significant role in improving outcomes of some health conditions for underserved populations. The objective of this study is to examine perception of health and its association with individuals participating in CHP program in Puerto Rico. Also, to examine the impact on the health of the program participants after participating in the program.

## METHODS

- Two data sources – (1) primary data from six clinics in Puerto Rico (2) clinical encounter data.
- Patient encounter data from six participating clinics (N=2,852) in Puerto Rico and patient survey on self-reported health status (N=1,247) were used to compare clinically diagnosed chronic health conditions among participants and non-participants followed by a comparison of self-reported health with clinically reported health conditions among participants.
- To further examine the impact of the program participation on health outcomes, we took difference-in-difference approach.
- Health measures included hypertension, diabetes, asthma, BMI, HbA1c, blood pressure (BP), and number of visits for HbA1c and BP. The outcome variable of interest was program participation in the CHP program.

## TABLES

**Table 1.** Association of Number of Clinically-reported Health Conditions with Participating in CHP Program (N=2,682)

| | Have at least 1 health condition (N=2,682) | | | Have all 3 health conditions (N=2,682) | | |
|---|---|---|---|---|---|---|
| Participating in CHP | Yes (n=1,127) | No (n=1,555) | Chi-square | Yes (n=1,434) | No (n=1,110) | Chi-square |
| Yes | 1,103 (97.87%) (41.75%) | 24 (2.13%) (60.00%) | 5.38** | 91 (8.20%) (20.92%) | 1,019 (91.80%) (48.32%) | 110.06*** |
| No | 1,539 (98.97%) (58.25%) | 16 (1.03%) (40.00%) | | 344 (23.99%) (79.08%) | 1,090 (76.01%) (51.68%) | |

**Note.** *p<.01, **p<.05, ***p<.001. Each column shows frequency, row percentage, and column percentage.

**Table 2.** Self-reported Health Conditions (N=1,247)

| Self-reported health conditions | N (%) |
|---|---|
| Self-reported diabetes | |
| Yes | 759 (62.52%) |
| No | 455 (37.48%) |
| Missing | 33 (2.65%) |
| Self-reported hypertension | |
| Yes | 995 (81.56%) |
| No | 225 (18.44%) |
| Missing | 27 (2.17%) |
| Self-reported asthma | |
| Yes | 329 (27.12%) |
| No | 884 (72.88%) |
| Missing | 34 (2.73%) |

**Table 3.** Self- and Clinically-reported Health Conditions by Sex

| Self-reported health conditions | Male N (%) | Female N (%) |
|---|---|---|
| Self-reported diabetes | | |
| Yes | 224 (62.40%) | 511 (63.48%) |
| No | 135 (37.60%) | 294 (36.52%) |
| Clinically-reported diabetes | | |
| Yes | 568 (64.47%) | 1,014 (63.89%) |
| No | 313 (35.53%) | 573 (36.11%) |
| Self-reported hypertension | | |
| Yes | 296 (81.77%) | 652 (80.49%) |
| No | 66 (18.23%) | 158 (19.51%) |
| Clinically-reported hypertension | | |
| Yes | 777 (86.91%) | 2,390 (85.75%) |
| No | 117 (13.09%) | 231 (14.25%) |
| Self-reported asthma | | |
| Yes | 72 (20.06%) | 247 (30.57%) |
| No | 287 (79.94%) | 561 (69.43%) |
| Clinically-reported asthma | | |
| Yes | 217 (25.20%) | 438 (28.31%) |
| No | 644 (74.80%) | 1,109 (71.69%) |

**Table 4.** Association of Clinically-reported Health Conditions with Participating in CHP Program (N=2,953)

| | Clinical-reported Diabetes (N=2,852) | | | Clinical-reported hypertension (N=2,852) | | | Clinical-reported Asthma (N=2,852) | | |
|---|---|---|---|---|---|---|---|---|---|
| CHP Participation | Yes (n=1,644) | No (n=970) | P value | Yes (n=2,302) | No (n=359) | P value | Yes (n=665) | No (n=1,889) | P value |
| Yes (n=1,717) | 62.82 | 37.18 | p=.950 | 82.10 | 17.80 | p<.001 | 18.81 | 81.19 | p<.001 |
| No (n=1,135) | 62.94 | 37.06 | | 89.73 | 10.27 | | 31.60 | 68.40 | |

**Table 5.** Unadjusted Difference-in-difference Results

| Outcome Variable | Measure | Std. Error. | $P-value^{unadj.}$ |
|---|---|---|---|
| Diff-in-diff *BMI* | 0.237 | 0.420 | 0.572 |
| Diff-in-diff *HbA1c* | -0.473 | 0.143 | 0.001** |
| Diff-in-diff *Systolic* | 1.110 | 1.078 | 0.303 |
| Diff-in-diff *Diastolic* | 0.286 | 0.593 | 0.629 |
| Diff-in-diff *Visit_BP* | 1.218 | 0.071 | 0.000*** |
| Diff-in-diff *Visit_HbA1c* | 0.791 | 0.069 | 0.000*** |

***Note.*** **p<.01, **p<.05, ***p<.001.* $P-value^{unadj.}$ refers to unadjusted DID p-value. N for BMI: 3,961. N for HbA1c: 2,793. N for Systolic: 5,922. N for Diastolic: 5,921. N for visit for blood pressure: 5,921. N for visit for HbA1c: 2,793.

**Table 6.** Adjusted Difference-in-difference Results

| Outcome Variable | Measure | Std. Error. | $P-value^{adj.}$ |
|---|---|---|---|
| Diff-in-diff *BMI* | 0.168 | 0.416 | 0.687 |
| Diff-in-diff *HbA1c* | -0.471 | 0.145 | **0.001**** |
| Diff-in-diff *Systolic* | 3.001 | 1.096 | **0.006**** |
| Diff-in-diff *Diastolic* | 0.356 | 0.600 | 0.553 |
| Diff-in-diff *Visit_BP* | 1.199 | 0.039 | **0.000***** |
| Diff-in-diff *Visit_HbA1c* | 0.821 | 0.059 | **0.000***** |

***Note.*** **p<.01, **p<.05, ***p<.001.* $P-value^{unadj.}$ refers to unadjusted DID p-value. $P-value^{adj.}$ refers to adjusted DID p-value where covariates (age and sex) included in the model. N for BMI: 3,961. N for HbA1c: 2,793. N for Systolic: 5,922. N for Diastolic: 5,921. N for visit for blood pressure: 5,921. N for visit for HbA1c: 2,793.

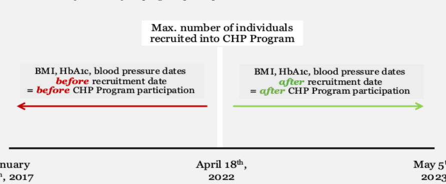


**Figure 1.** Timeline for *before* and *after* program participation

## CONCLUSION

Our preliminary results suggest that diagnosed health condition measures, such as hypertension and asthma, are associated with the program participation. Compared to non-participants, a lower proportion of participants show having diabetes, hypertension, and asthma. Further, findings show that the CHP program in Puerto Rico has met the target (e.g., those with at least 1 chronic disease participating in the program). The CHP program in Puerto Rico demonstrates a positive impact on participants' health, as evidenced by a significant reduction in HbA1c levels and increased utilization of health services.

## RESULTS

- Nearly all program participants (98%) had at least one chronic health condition.
- Among the program participants, self-reported prevalence of diabetes and asthma (62.52% and 27.12%, respectively) were higher compared to clinically reported diabetes and asthma (62.82% and 18.81%, respectively).
- Our findings show that there is a *statistically significant difference* between having 1 and all 3 chronic health conditions and the program participation (*p*<.05 and *p*<.001, respectively).
- Compared to non-program participants, a *lower* percentage of participants reported having 1 and 3 chronic conditions (41.75% and 20.92%, respectively). The percentage of clinically reported diabetes, hypertension and asthma is also *lower* among participants than non-participants.
- Regardless of sex, more than half and majority of the program participants have diabetes and hypertension, respectively (Table 3).
- Unadjusted DID results for patients' BMI and blood pressure measures *did not show* significant difference before and after participating in the CHP program.
- Yet, mean value of HbA1c decreased by 0.473 for intervention group after participating in the program and *it is significant* (p<.05).
- Compared to before joining the program, number of visits for blood pressure and HbA1c of patients who joined the program *increased* by 1.21 and 0.79 points, respectively (p<.001).
- Furthermore, adjusted DID model (age and sex as covariates) shows similar result.