Evaluating the Distribution of Diabetes and Prediabetes in Arizona's Maricopa County

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Introduction

- The prevalence of type 2 diabetes mellitus (T2DM) is well documented at the national, state, and county level. Results are captured in the Behavior Risk Factor Surveillance System (BRFSS), a US self-reported survey that collects data on disease rates and health-related risk behavior.
- The latest BRFSS audit revealed Arizona has an overall T2DM prevalence of 10.1% in adults (1).
  - In Maricopa County, the region which includes the greater Phoenix area (Figure 1), the T2DM prevalence is 9.5% (2).
- Conversely, there is limited and outdated data available on prediabetes rates in Maricopa County.
  - The BFRSS prediabetes modules and questions have not been administered during an annual survey in Arizona since 2014.
  - The Arizona State Health Assessment, another surveying tool the state health department uses to develop strategies to address health priorities identified by all 15 counties was also last updated in 2014.

Objective

- Current diabetes and prediabetes distribution rates are necessary for primary, secondary and tertiary chronic disease management. Therefore, as part of an educational "A1C initiative" we examined the rate of diabetes and prediabetes during community-partnered health fairs and events throughout Maricopa County.

Methods

- We provided free HbA1C screening at 15 community health fairs and cultural events in the county of Maricopa from April 2016 until September 2017.
- All subjects participating in the screening provided basic demographic data and signed an institutional review board approved waiver.
- HbA1C results from 792 participants were collected using the A1CNow® handheld monitor (PTS Diagnostics, Indianapolis, IN) with fingerstick blood sampling.
- ADA guidelines were used to categorize the HbA1c results (3).

Normal	<5.7%
Prediabetes	5.7% to 6.4%
Diabetes	≥6.5%

- Results are presented as mean ± SD, and were analyzed by Excel (Microsoft Corporation, Redmond, WA) and Prism (GraphPad, San Diego, CA). Results were analyzed by Student's T-test or one-way ANOVA followed by Tukey's post-hoc test as appropriate.

Figure 1. Map of Arizona. Maricopa County (shown in red) is the largest county in the state of Arizona with a population of 4,009,412. It is located in the south-central part of the state. Maricopa County includes the state capitol of Phoenix and accounts for 60.4% of the state's population (4).

Image source: wikipedia.org/wiki/Maricopa_County,_Arizona

Results

Table 1. Participant Characteristics. The majority of the participants screened were females and of Hispanic descent. Overall, average HbA1c was similar between males and females and among ethnicity/race groups.

Parameter	Male	Female	African American (AA)	Asian	Hispanic	Native American	White Non-Hispanic (WNH)
Number of Participants Screened	270	522	201	8	427	14	114
Percent Screened (%)	34	66	26	1	54	1	14
Average age (yrs.)	48 ± 14	49±14	49±14**	50±12	46±13*****	43±15*	55±15
Average HbA1c (%)	6.0 ±1.3	5.9±1.1	6.0±1.0	5.8±0.5	6.0±1.3	5.8±0.5	5.8±0.9

* p<0.05, **p<0.01, ***p<0.001 vs WNS and **p<0.01 vs AA

Figure 2. Gender Prevalence of Diabetes and Prediabetes. The prevalence of diabetes was similar among males and females; however there was a slightly higher rate of prediabetes among women.

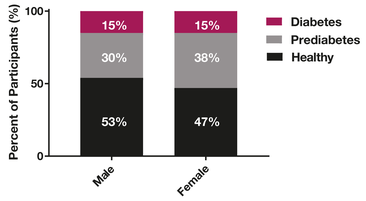


Figure 3. Ethnic/Race Prevalence of Diabetes and Prediabetes. Prediabetes was highest among Native Americans, followed by AA, NHW, then Hispanics.

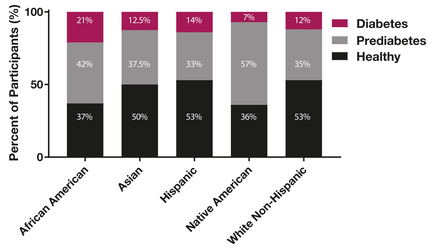
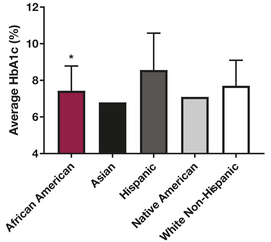


Figure 4. Average HbA1C values in Diabetes groups. Despite AA having a higher diabetes rate at 21%, HbA1c was significantly higher in Hispanics with diabetes vs AA with diabetes, suggesting worse glycemic control for the Hispanic group.



*Number of participants by ethnicity/race; AA = 42, Asian = 1, Hispanic = 58, NA = 1, WNH = 14. *p<0.05 vs Hispanic.*

Discussion

- In the present study, we observed the prediabetes and diabetes prevalence to be 36% and 15% respectively. Moreover, the rate of prediabetes is much higher than previously published in 2014; the Arizona State Health Assessment reported that the rate for adults who were told they had prediabetes was 5.76% (5). In the present study, the observed diabetes rate was nearly double than that of the BRFSS report.
- Our community efforts reached a small portion of the population and were focused in lower income areas where access to health care may be limited therefore could have overestimated the prediabetes and diabetes rates.
- We found that our Hispanic diabetes population demonstrated worsened HbA1c control over the other groups. This is in contrast to a recent study on racial disparities observed in hospitalized patients with diabetes and hyperglycemia; AA exhibited a higher diabetes rate as well as greater rate for poor glycemic control over WNH (6).
- Furthermore, a community outreach health survey among individuals with self-reported physician-diagnosed T2DM found that AA and Latinos had a similar degree of glycemic control, yet poor compared to WNH (7).
- The known disparity among racialized groups related to poor glycemic control highlights the need for greater diabetes awareness, education, and support.

Conclusions

Our countywide initiative provided vital prediabetes and diabetes education and awareness to Maricopa County residents; as screening is key for early detection of T2DM. These overall findings were shared with our community partners, to aid in developing strategies for T2DM prevention and control.

Acknowledgements

We would like to thank our dedicated staff as well as our Arizona community partners, participants, and organizations.

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