Incidence of Type 2 Diabetes Mellitus over 2-Year Period by Race-Ethnic Group

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ABSTRACT

This study determined the proportion of adults, aged 18 years and older, who self-reported a new diagnosis of type 2 diabetes mellitus (T2DM) over a 2-year period by race-ethnic group. Respondents to the US Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) surveys completed a health questionnaire in 2007 and at least 1 annual follow-up survey through 2009 (response rates ~70%). Respondents with no self-reported diagnosis of diabetes in 2007 were followed to measure the incidence of T2DM over 2 years. Characteristics (e.g., gender, income, health insurance, primary care visits) across Non-Hispanic white, Non-Hispanic black, and Hispanic were compared using chi-square and ANOVA tests.

Among 9,323 respondents without diabetes, 298 (3.2%) reported a new diagnosis of T2DM in 2 years. By race-ethnic group, 3.5% of Non-Hispanic white, 2.6% of Non-Hispanic black, and 3.1% of Hispanic respondents reported a new diagnosis of T2DM. There was no statistically significant difference in incidence rate across race-ethnic groups ($p > 0.05$). Lower annual income (<$30,000; 27% white, 35% black, 29% Hispanic) and fewer primary care visits in the 12 months prior to baseline (3.4 [SD: 5.6] white, 3.1 [4.1] black, 3.0 [6.4] Hispanic) were reported among blacks and Hispanics, compared with whites ($p < 0.01$). Approximately, 15% of blacks and 17% of Hispanics had no primary care visit in the year prior to the baseline survey, compared with 12% of whites ($p = 0.002$). More whites had health insurance (91%), compared with blacks and Hispanics (both 85%; $p < 0.001$).

The finding of similar incidence of T2DM across all population groups was unexpected, as previous studies indicated higher prevalence in minority populations. While it is possible that the incidence of T2DM in minority populations has decreased relative to whites, we are concerned that lower-than-expected rates of self-reporting of T2DM indicate decreased awareness and/or relative lack of access to healthcare in minority groups.

BACKGROUND

- Diabetes mellitus is prevalent in the US, with 8.3% of the population having diabetes and 35% of the adult population with prediabetes[1]
- Individuals with prediabetes (elevated fasting glucose or hemoglobin A1c levels) have an increased risk of developing T2DM, heart disease, and stroke, and had medical expenses of approximately $25 billion in 2007[1]
- Studies have shown that minority populations have a higher prevalence rate of T2DM than non-Hispanic whites; 2007–2009 national data found that 7.1% of non-Hispanic whites, 12.6% of non-Hispanic blacks, and 11.8% of Hispanics had diabetes[2]
- Large-scale, community-based longitudinal studies of health status among minorities have been limited, so current data on the incidence of T2DM within different race-ethnic groups are lacking

OBJECTIVE

- To determine the proportion of adults who self-reported a new diagnosis of T2DM over a 2-year period by race-ethnic group

METHODS

Study Design

- Prospectively followed adults in the SHIELD study population without a diagnosis of diabetes over 2 years to determine the proportion that subsequently reported a diagnosis of T2DM during follow-up
- Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) is a 5-year population-based survey conducted to better understand the risk for the development of diabetes, as well as diabetes disease burden
  - Based upon a screening questionnaire mailed to 200,000 nationally representative households (TNS NFO Household Panel), responses for 211,097 adults from 127,420 households were obtained (64% response rate)
  - A baseline survey was sent to 22,001 selected individuals derived from the screening respondents. Since 2005, annual SHIELD surveys have captured self-reported information on health status, attitudes and behaviors, quality of life, and anthropometry from this representative sample of the US population
  - In 2007, the SHIELD population was supplemented with minority respondents who completed the screening questionnaire but were not included in the baseline survey. A response rate of 69% (n = 18,201) was obtained for the 2007 survey
  - Response rates of 71% (n = 14,921) and 70% (n = 13,822) were obtained for the 2008 and 2009 surveys, respectively

Study Population

- Respondents were 18 years of age or older
- Self-reported diagnosis of T2DM was based on being "told by a doctor, nurse or other healthcare professional that you have type 2 diabetes"
- Respondents who did not report a diagnosis of type 1 diabetes, T2DM, or unspecified diabetes in the 2007 survey were included in the analysis
- Respondents without diabetes in 2007 were included if they had completed the 2007 survey and at least one follow-up survey through 2009

Study Measures

- Incident cases of T2DM were respondents who reported a new diagnosis of T2DM in any of the follow-up surveys
- Characteristics of the study population at baseline (2007 survey) included self-reported gender, income, health insurance coverage, and primary care visits in the past 12 months

Statistical Analysis

- Proportion of respondents reporting a new diagnosis of T2DM was compared across race-ethnic groups using chi-square test
- Characteristics across race-ethnic groups were compared using chi-square and ANOVA tests

RESULTS

- In total, 12,723 respondents reported no diagnosis of diabetes in 2007, and 9,323 (73.3%) completed at least one follow-up survey through 2009
- Of the respondents without diabetes (n = 9,323), 58.3% were non-Hispanic whites, 27.0% non-Hispanic blacks, 8.9% Hispanic, and 5.8% of unknown or other race (e.g., Asian, American Indian) (Figure 1)

Figure 1. Race-ethnic distribution of study population

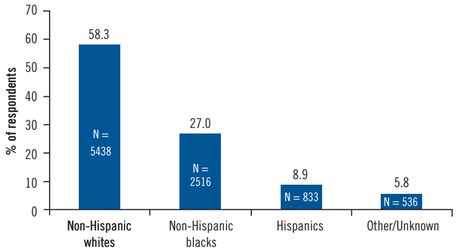
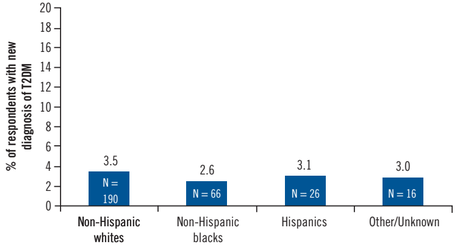


Figure 2. Proportion of respondents with new diagnosis of T2DM (incident cases) by race-ethnic group



- Over the 2-year follow-up, 3.5% of non-Hispanic whites, 2.6% of non-Hispanic blacks, and 3.1% of Hispanics reported a new diagnosis of T2DM (Figure 2)
- There was no statistically significant difference in incidence rate across the race-ethnic groups ($p > 0.05$)
- Overall, 3.2% of respondents reported a new diagnosis of T2DM in 2 years

Table 1. Characteristics of respondents without diabetes across race-ethnic groups

Characteristics	Non-Hispanic whites N = 5438	Non-Hispanic blacks N = 2516	Hispanics N = 833	Other/Unknown N = 536
Age, years, mean (SD)	58.1 (15.4)*	52.9 (15.0)	49.4 (15.5)	52.4 (15.3)
Women, %	59.5*	63.4	61.0	58.2
Overweight (BMI = 25.0–29.9 kg/m^2), %	31.1*	32.4	38.1	32.9
Obese (BMI ≥30 kg/m^2), %	45.9*	42.0	35.4	39.2
Household annual income <$30,000, %	27.4*	35.3	28.6	30.8
Health insurance coverage, %	91.2*	85.3	85.3	84.8
Primary care physician visits in the past 12 months, %				
0	12.2*	15.1	16.7	15.4
1	21.8	21.1	25.3	23.0
2	21.2	20.7	20.3	17.7
3 or more	44.8	43.1	37.7	43.9
Mean (SD)	3.4 (5.6)†	3.1 (4.1)	3.0 (6.4)	3.2 (3.7)

*$p < 0.001$; †$p < 0.05$; BMI = body mass index

- Non-Hispanic whites were older ($p < 0.0001$) and fewer were women ($p = 0.008$) than in the minority groups (Table 1)
- More non-Hispanic whites were obese and fewer were overweight than non-Hispanic blacks and Hispanics ($p = 0.001$)
- More non-Hispanic blacks and Hispanics reported lower annual household income, compared with non-Hispanic whites ($p < 0.0001$)
- More non-Hispanic whites had health insurance (91%), compared with non-Hispanic blacks (85%) and Hispanics (85%) ($p < 0.0001$)
- Fewer primary care visits in the 12 months prior to baseline were reported among non-Hispanic blacks (mean = 3.1 visits) and Hispanics (3.0 visits), compared with non-Hispanic whites (3.4 visits) ($p < 0.05$)
  - Approximately 15% of non-Hispanic blacks and 17% of Hispanics had no primary care visit in the year prior to the baseline survey, compared with 12% of non-Hispanic whites ($p = 0.002$)

LIMITATIONS

- Diagnosis of diabetes was self-reported and could not be validated with medical record review or administrative claims data
- The surveys were provided in English only, thus potentially reducing the participation of individuals whose native language was not English, especially among Hispanic households
- Household panels, like the SHIELD study, tend to under-represent the very wealthy and very poor segments of the population and do not include military or institutionalized individuals

CONCLUSIONS

- Similar incidence of T2DM across all race-ethnic groups was unexpected, as previous studies indicated higher prevalence in minority populations
- It is possible that the incidence of T2DM in minority populations has decreased relative to non-Hispanic whites, but further research is needed to confirm this association
- The lower-than-expected rates of self-reporting of incident T2DM may indicate a decreased awareness of T2DM and its symptoms by minorities compared with non-Hispanic whites
- Also, the similar incidence rates across race-ethnic groups may indicate a relative lack of access to or utilization of healthcare (e.g., lower income and fewer physician visits) in minorities compared with non-Hispanic whites

References

1. American Diabetes Association. Diabetes Statistics 2011. www.diabetes.org/diabetes-basics/diabetes-statistics
2. Centers for Disease Control and Prevention. National diabetes fact sheet 2011

LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
BMI	Body mass index
SHIELD	Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes
T2DM	Type 2 diabetes mellitus
TNS NFO	Taylor Nelson Sofres National Family Opinion

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