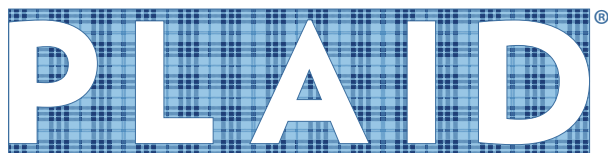


A DESCRIPTIVE EPIDEMIOLOGY OF SEXUAL BEHAVIOR AND INTEREST IN OLDER ADULTS WITH DIABETES

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People Living with And Inspired by Diabetes

ABSTRACT

Objective: In this manuscript we conduct descriptive analysis of epidemiological patterns in older Americans' experiences with diabetes, comorbid chronic conditions, and sexuality. We use data from the National Social, Health, and Life Project (NSHAP) to explore variations in sexual and social experience among Americans with diabetes in later life.

Research Design and Methods: We use descriptive epidemiological methods to explore three research questions. First, how do sexual behavior and interest vary among older adults with and without diabetes? Second, do older adults with diabetes frequently cite health issues as a reason for abstaining from sexual activity? Third, what role might interrelated socio-demographic characteristics play in these patterns?

Results: We illuminate consistent differences between people with and without diabetes with respect to sexual behavior, but not with respect to sexual interest. We find that older adults with and without diabetes think about and desire sex frequently. However, we also find that older adults with diabetes report having sex much less frequently than their peers without diabetes do. This difference is especially striking for older adults who have both diabetes and other chronic conditions.

Conclusions: We assess these findings in the context of prior clinical, social, and behavioral research on sexuality, aging, and chronicity. We conclude with implications of our findings for further research concerning the intersection of diabetes and sexuality in the lives of older Americans.



INTRODUCTION

In recent years, studies exploring the experience of diabetes [1] and later life sexuality [2] have begun to gain prominence in both medical and social science fields. In Europe, for example, researchers have demonstrated significant relationships between diabetes conditions and frequency of sexual activity in middle and later life [3]. Further, researchers have begun to demonstrate patterns of sexual dysfunction in cisgender women [4] and men [5] related to symptoms and experiences with diabetes of varied types. In fact, large scale European samples reveal life-long relationships between diabetes diagnoses and experience and the development of sexual experience, taste, and desire [6]. While these studies have importantly begun to shed light on relationships between aging, diabetes, and sexualities, we know far less about epidemiological patterns in sexual desire among people with diabetes, and the ways such patterns may play out in the American case.

In this study, we begin the process of analyzing epidemiological patterns in older Americans' experiences with diabetes and sexuality. To this end, we utilize data from the National Social, Health, and Life Project (NSHAP), a nationally representative sample of apparently cisgender older Americans [7], to explore variations in sexual and social experience among Americans with diabetes in later life. As such, this research report explores three questions. First, how do sexual behavior and interest vary among older adults with and without diabetes? Second, do older adults with diabetes frequently cite health issues as a reason for abstaining from sexual activity? Third, what role might interrelated socio-demographic characteristics play in these patterns? For the purposes of this report, we define "sexual behavior" as engaging in sexual activity of any type. We define "sexual interest" as feeling that sexual behavior is important and/or thinking about sexual behavior frequently. We define "diabetes" as any type of diagnosed diabetic condition (type I, type II, or cases involving elements of both). In conclusion, we draw out implications of our findings for further research concerning the intersection of diabetes and sexuality in the lives of older Americans.

METHODS

Data and Subject Selection

We explored these questions using data from Wave I of the National Social Life, Health, and Aging Project (NSHAP). Developed between 2005 and 2006, this biosocial dataset provides information on physical, mental, and social health among United States residents aged 57 to 85. Data for the NSHAP is collected via a combination of questionnaires (administered during home visits), in-home interviews, and basic clinical techniques such as using cotton swabs to collect small amounts of saliva (performed during home visits). Samples of bodily fluids are used to measure levels of biomarkers, which are substances present in the body that offer clues about health status. C-reactive protein, an indicator of inflammation, is an example of a biomarker that the NSHAP measures.

NSHAP data documentation describes the study sample as "a nationally representative probability sample of community-dwelling individuals" [8]. Certain groups within the study population (African Americans, Latinos, men, and persons 75 to 85 years of age) are oversampled to boost statistical power (Waite et al. 2007). Several key demographic groups are also not captured explicitly; we comment on this in our discussion of study limitations.

We used NSHAP data capturing diabetes and other diagnosed chronic conditions; sexual behavior and interest; and sex identity, ethnoracial background, and educational attainment. In addition to diabetes, the specific chronic conditions measured by the NSHAP are: arthritis, ulcers, emphysema or chronic obstructive pulmonary disease (COPD), asthma, stroke and its lasting effects, hypertension, Alzheimer's or dementia, cirrhosis, leukemia, lymphoma, skin cancer, any other cancer, poor kidney function, thyroid problems, and enlarged prostate. The NSHAP dataset includes 3,005 individual cases in total. After dropping any cases with missing values on our variables of interest, we retained an analytic sample of 2,552 people, accounting for 84.9% of the total NSHAP population at Wave I. Of these individuals, a total of 530 reported having diagnosed diabetes. Further stratification revealed that 29 of these individuals only had diabetes, whereas 501 had diabetes in combination with one or more other chronic conditions. Over half of our total sample reported being sexually active, with 1,304 participants reporting having sex in the past year and 1,248 reporting the opposite. Our study sample is described fully in Table 1.

Table 1. Characteristics of Study Population at NSHAP Wave I (n = 2,552)

| <i>Attribute</i> | <i>Response</i> | <i>Number Reporting</i> | <i>Proportion Reporting</i> |
|---------------------------|-------------------------------|-------------------------|-----------------------------|
| Chronic conditions | Diabetes only | 29 | 1.1% |
| | Diabetes and other conditions | 501 | 19.6% |
| | Other conditions only | 1,742 | 68.3% |
| | No chronic conditions | 280 | 11.0% |
| Sexual activity | Had sex in last year | 1,304 | 51.1% |
| | Did not have sex in last year | 1,248 | 48.9% |
| Importance of sex | Not at all important | 689 | 27.0% |
| | Somewhat important | 448 | 17.6% |
| | Moderately important | 732 | 28.7% |
| | Very important | 532 | 20.8% |
| | Extremely important | 151 | 5.9% |
| Thinking about sex | Never | 366 | 14.3% |
| | Less than once a month | 551 | 21.6% |
| | One to a few times a month | 637 | 25.0% |
| | One to a few times a week | 585 | 22.9% |
| | Every day | 328 | 12.9% |
| | Several times a day | 85 | 3.3% |
| Sex identity | Male | 1,245 | 48.8% |
| | Female | 1,307 | 51.2% |
| Racial background | Non-Hispanic White | 1,834 | 71.9% |
| | Hispanic White | 152 | 6.0% |
| | Black | 402 | 15.8% |
| | Native American or Alaskan | 17 | 0.7% |
| | Asian or Pacific Islander | 31 | 1.2% |
| | Other | 116 | 4.5% |
| Education level | No degree | 618 | 24.2% |
| | High school diploma or GED | 935 | 36.6% |
| | Associate's degree | 409 | 16.0% |
| | Bachelor's degree | 332 | 13.0% |
| | Master's degree | 187 | 7.3% |
| | Doctoral degree | 71 | 2.8% |

We sought to achieve a high level of detail in our description of diabetes and other chronic condition prevalence estimates across population groups. We thus chose to represent the full range of characteristics assessed by the NSHAP on our measures of interest, instead of collapsing any of the categories for variables with wide ranges of response options.

In the case of ethnoracial background, we used data from two different NSHAP variables to create our own diversified measure of heritage including information about Hispanic ethnicity in the dataset's large White population. In all other cases, we simply recoded real and missing values of single NSHAP variables to facilitate analysis.

Strategies for Analysis

We used descriptive epidemiology techniques to analyze our data. To create our “prevalence” tables, we computed frequencies of each specific response to questions about sexual behavior and interest in each diabetes status category and sociodemographic group. We outlined the following categories for diabetes status: diabetes only, diabetes and other chronic conditions, other chronic conditions only, and no chronic conditions. We also created a master “diagnosed diabetes” category for the intersectional analyses stratified by sociodemographic characteristics, which included all respondents diagnosed with diabetes. We used Stata 12 Special Edition to create and describe our analytic variables as outlined above, and to drop any cases from the full NSHAP sample that lacked real data on one or more measures of interest.

We then continued working in Stata to compute counts of people with each specific response to the three included questions about sexual behavior and interest across any categories we were interested in for each of our three research questions. Using Stata’s “summarize” and “bysort” commands with “if” statements, we obtained frequencies of each response across diabetes status categories and sociodemographic groups. We also used “summarize” and “bysort” commands to compute the group-specific sample sizes (e.g., number of people with diabetes identifying as Black) that we would need for the next phase of analysis.

To compute sexual behavior and interest frequencies in each group of interest, we transferred our raw counts to Microsoft Excel, along with our overall counts of people with specific diabetes status and sociodemographic characteristics from the full analytic sample. Using “product” functions in Excel, we proceeded to compute the percentage of people in each group of interest offering a given response to each of the three questions about sexual behavior and interest. These functions multiplied number of respondents reporting that response by one over the number of people in the possible respondent pool (e.g., people with Bachelor’s degrees who report thinking about sex less than once a month).

These computations in Excel yielded contingency values for Tables 2, 3, 4, 5, and 6a-c. Overall sample sizes for these tables varied by research question. Tables 2, 3, and 4 use the full sample of 2,552 people to capture an overall portrait of differences in sexual behavior and interest frequencies across all diabetes status categories. Table 5 uses data on only those 1,248 respondents reporting no sexual activity

in the past year. Tables 6 a, b, and c use data on only those 530 participants with diagnosed diabetes, including those with and without other chronic conditions. We used a similar process to describe our overall study population in Table 1, using the full sample size of 2,552 people as the denominator for product functions. Outputs from each product function were expressed as percentages for ease of interpretation across disciplines. Even in cases where the variable of interest is considered a health condition, we thus refer to these values as “frequency” rather than “prevalence” estimates, as the latter are usually expressed in cases per 100,000 population [9].

RESULTS

Research Question 1: How do sexual behavior and interest vary among older adults with and without diabetes?

We first assessed variation in sexual behavior and interest among older adults with different health statuses. Included NSHAP respondents were broken into four groups: diabetes only, diabetes and other conditions, other conditions only, and no chronic conditions. We used these groupings to examine differences in recent sexual activity, importance of sex, and thinking about sex.

Table 1 illustrates key patterns in prevalence of diabetes, engagement in sexual activity, and interest in sex for our study population ($n = 2,552$). Diabetes was relatively common among NSHAP respondents. Most of the participants in our population who had diabetes (20.7% of sample in total) also had at least one other chronic condition (19.6% of sample) versus only diabetes (1.1% of sample). By comparison, many participants without diabetes were also living with one or more chronic conditions (68.3% of sample). The smallest group by far was participants with no diagnosed chronic conditions (11.0% of sample). Sexual activity was even more common among NSHAP respondents. A majority of our study population (51.1% of sample) had engaged in sex at least once during the past year, compared with the remaining participants (48.9% of sample) who had not. A roughly equivalent quantity (55.4% of sample in total) felt sex was at least moderately important to them. Thinking about sex at least once weekly was somewhat less frequent (39.1% of sample in total) but still quite common.

Table 2. Recent Sexual Activity by Diabetes Status (n = 2,552)

| <i>Diabetes Status</i> | <i>Sample Size</i> | <i>Had Sex in Last Year</i> | | <i>Did Not Have Sex in Last Year</i> | |
|-------------------------------|--------------------|-----------------------------|-------|--------------------------------------|-------|
| | | | | | |
| Diabetes only | 29 | 14 | 48.3% | 15 | 51.7% |
| Diabetes and other conditions | 501 | 212 | 42.3% | 289 | 57.7% |
| Other conditions only | 1742 | 891 | 51.1% | 851 | 48.9% |
| No chronic conditions | 280 | 187 | 66.8% | 93 | 33.2% |

Table 2 illustrates the distribution of sexual activity in our study population (n = 2,552) by diabetes status. The majority of our populations with diabetes only (48.3% of group) and diabetes and other conditions (42.3% of group) had not been sexually active in the past year, whereas the majority of our populations with other conditions only (51.1% of group) and no chronic conditions (66.8% of group) had been sexually active. Overall, people with no diagnosed conditions were substantially more likely than any other group to be sexually active. Among people with chronic conditions, diabetes was associated with lower sexual activity than other conditions alone. Among people with diabetes, those with comorbid conditions were less likely than their peers with only a diabetes diagnosis to be sexually active. People with diabetes plus other chronic conditions were substantially less likely (by about 35%) than their peers with no chronic conditions to be sexually active.

Table 3 illustrates the distribution of perceived importance of sex in our study population (n = 2,552) by diabetes status. The majorities of all four groups (62.0% for diabetes only, 52.3% for diabetes with other conditions, 55.6% for other conditions only, and 59.4% for no chronic conditions) were likely to find sex at least moderately important. Overall, people with diabetes (52.8% of aggregate group) were still somewhat less likely than their peers without diabetes (56.1% of aggregate group) to find sex important, but these differences were smaller than the corresponding ones for sexual activity explored in Table 2. Indeed, people with diabetes only were more likely than those with other chronic conditions only and those with no chronic conditions to find sex moderately important.

Table 4 illustrates the distribution of thinking about sex in our study population (n = 2,552) by diabetes status. Large proportions of all four groups (51.6% for diabetes only, 34.0% for diabetes with other conditions, 39.0% for other conditions only, and 47.5% for no chronic conditions) reported thinking about sex at least once a week. Overall, people with diabetes (34.9% of aggregate group) were still somewhat less likely than their peers without diabetes (40.2% of aggregate group) to think about sex frequently, but these differences were again smaller than the corresponding ones for sexual activity explored in Table 2. Indeed, the only group in which a majority of people reported thinking about sex at least weekly was those with diagnosed diabetes not comorbid with other conditions.

Table 3. Importance of Sex by Diabetes Status (n = 2,552)

| <i>Condition</i> | <i>Sample Size</i> | <i>Not at All Important</i> | | <i>Somewhat Important</i> | | <i>Moderately Important</i> | | <i>Very Important</i> | | <i>Extremely Important</i> | |
|-------------------------------|--------------------|-----------------------------|-------|---------------------------|-------|-----------------------------|-------|-----------------------|-------|----------------------------|-------|
| | | | | | | | | | | | |
| Diabetes only | 29 | 6 | 20.7% | 5 | 17.2% | 10 | 34.5% | 5 | 17.2% | 3 | 10.3% |
| Diabetes and other conditions | 501 | 159 | 31.7% | 80 | 16.0% | 131 | 26.1% | 101 | 20.2% | 30 | 6.0% |
| Other conditions only | 1742 | 471 | 27.0% | 302 | 17.3% | 511 | 29.3% | 355 | 20.4% | 103 | 5.9% |
| No chronic conditions | 280 | 53 | 18.9% | 61 | 21.8% | 80 | 28.6% | 71 | 25.4% | 15 | 5.4% |

Table 4. Thinking About Sex by Diabetes Status (n = 2,552)

| Diabetes Status | Sample Size | Never | | < 1x Monthly | | >1x Monthly | | Weekly | | Daily | | >1x Daily | |
|-------------------------------|-------------|-------|-------|--------------|-------|-------------|-------|--------|-------|-------|-------|-----------|------|
| | | | | | | | | | | | | | |
| Diabetes only | 29 | 5 | 17.2% | 5 | 17.2% | 4 | 13.8% | 9 | 31.0% | 5 | 17.2% | 1 | 3.4% |
| Diabetes and other conditions | 501 | 88 | 17.6% | 122 | 24.4% | 121 | 24.2% | 93 | 18.6% | 60 | 12.0% | 17 | 3.4% |
| Other conditions only | 1742 | 246 | 14.1% | 383 | 22.0% | 433 | 24.9% | 403 | 23.1% | 221 | 12.7% | 56 | 3.2% |
| No chronic conditions | 280 | 27 | 9.6% | 41 | 14.6% | 79 | 28.2% | 80 | 28.6% | 42 | 15.0% | 11 | 3.9% |

Research Question 2: Do older adults with diabetes frequently cite health issues as a reason for abstaining from sex?

Table 5. Health Issues as Reasons for Not Having Sex by Diabetes Status (n = 1,248)

| Diabetes Status | Sample Size | Yes, Health Issues Prevented Sex | | No, Health Issues Did Not Prevent Sex | |
|-------------------------------|-------------|----------------------------------|-------|---------------------------------------|-------|
| | | | | | |
| Diabetes only | 15 | 1 | 6.7% | 14 | 93.3% |
| Diabetes and other conditions | 256 | 82 | 32.0% | 174 | 68.0% |
| Other conditions only | 783 | 166 | 21.2% | 617 | 78.8% |
| No chronic conditions | 84 | 8 | 9.5% | 76 | 90.5% |

Table 5 illustrates the frequency with which people who were sexually inactive in the last year (n = 1,248) cited health issues as reasons for not having sex. In no case did a majority of group members report that health issues prevented them from having sex in the past year. People with diabetes only (6.7% of group) were much less likely than people with diabetes and comorbid conditions (32.0% of group) to report health issues as barriers to sexual activity. Overall, people with diabetes were substantially less likely to report health issues as a barrier to sex (30.6% of aggregate group) than they were to say health issues were a barrier (69.4% of aggregate group). A similar but more dramatic pattern was observed for people who only had other chronic conditions (21.2% and 78.8% of group). Compared to people with no chronic conditions (9.5% of group), people with diagnosed diabetes were three times as likely to cite health issues as a barrier to sex, whereas people with other chronic conditions but no diabetes were only twice as likely to do so.

Research Question 3: What role might intersectional sociodemographic characteristics play in these patterns?

Table 6a. Sexual Behavior and Interest by Sex Among People with Diabetes (n = 530)

| Survey Question | Male (274) | | Female (256) | |
|---|------------|-------|--------------|-------|
| <i>Have you had sex in the last year?</i> | | | | |
| Yes | 160 | 58.4% | 66 | 25.8% |
| No | 114 | 41.6% | 190 | 74.2% |
| <i>How important is sex to you?</i> | | | | |
| Not at all | 50 | 18.2% | 115 | 44.9% |
| Somewhat | 37 | 13.5% | 48 | 18.8% |
| Moderately | 82 | 29.9% | 59 | 23.0% |
| Very | 79 | 28.8% | 27 | 10.5% |
| Extremely | 26 | 9.5% | 7 | 2.7% |
| <i>How often do you think about sex?</i> | | | | |
| Never | 17 | 6.2% | 76 | 29.7% |
| Less than once a month | 38 | 13.9% | 89 | 34.8% |
| One to a few times a month | 69 | 25.2% | 56 | 21.9% |
| One to a few times a week | 78 | 28.5% | 24 | 9.4% |
| Every day | 54 | 19.7% | 11 | 4.3% |
| Several times a day | 18 | 6.6% | 0 | 0.0% |

Table 6a illustrates differences in sexual activity, importance of sex, and thinking about sex among participants with diabetes (n = 530) by sex identity. We observed striking differences between males and females with diabetes

for all three sexuality measures. The majority of males (58.4% of group) had been sexually active in the past year, whereas the majority of females (74.2% of group) had not. Over two thirds of males (68.2% of group) found sex at least moderately important, whereas nearly two thirds of females (63.7% of group) did not. A small majority of males (54.8% of group) reported thinking about sex at least weekly, whereas a large majority of females (86.4% of group) did not.

Table 6b illustrates differences in sexual activity, importance of sex, and thinking about sex among participants with diabetes (n = 530) by ethnoracial background. We observed several modest differences between people with diabetes of different races and ethnicities for all three sexuality measures. Being sexually active was either equally common or somewhat less common than being sexually inactive for all ethnoracial groups, but we note that the

rates of sexual activity were especially low by comparison for Black (37.8% of group), Native American or Alaskan (25.0% of group), and Other minority (38.5% of group) respondents. Non-Hispanic Whites (52.0% of group) and Hispanic Whites (65.7% of group) generally found sex at least moderately important, as did most Asians and Pacific Islanders (66.7% of group) and all responding Native Americans and Alaskans (100.0% of group). By contrast, most Blacks (54.1% of group) found sex not at all or only somewhat important. Across all racial groupings of respondents with diabetes, the majority of people reporting finding sex less than moderately important tended to view it as not being important at all. A small majority of males (54.8% of group) reported thinking about sex at least weekly, whereas a large majority of females (86.4% of group) did not. In no case did a majority of members of a given ethnoracial group report thinking about sex one or more times per week.

Table 6b. Sexual Behavior and Interest by Race Among People with Diabetes (n = 530)

| Survey Question | Non-Hispanic White (314) | | Hispanic White (32) | | Black (135) | | Native American or Alaskan (4) | | Asian or Pacific Islander (6) | | Other (49) | |
|------------------------------------|--------------------------|-------|---------------------|-------|-------------|-------|--------------------------------|-------|-------------------------------|-------|------------|-------|
| Have you had sex in the last year? | | | | | | | | | | | | |
| Yes | 140 | 44.6% | 16 | 50.0% | 51 | 37.8% | 1 | 25.0% | 3 | 50.0% | 15 | 38.5% |
| No | 170 | 54.1% | 16 | 50.0% | 84 | 62.2% | 3 | 75.0% | 3 | 50.0% | 24 | 61.5% |
| How important is sex to you? | | | | | | | | | | | | |
| Not at all | 96 | 30.6% | 9 | 28.1% | 48 | 35.6% | 0 | 0.0% | 2 | 33.3% | 10 | 25.6% |
| Somewhat | 55 | 17.5% | 2 | 6.3% | 25 | 18.5% | 0 | 0.0% | 0 | 0.0% | 3 | 7.7% |
| Moderately | 85 | 27.1% | 9 | 28.1% | 26 | 19.3% | 2 | 50.0% | 3 | 50.0% | 16 | 41.0% |
| Very | 58 | 18.5% | 10 | 31.3% | 27 | 20.0% | 2 | 50.0% | 0 | 0.0% | 9 | 23.1% |
| Extremely | 20 | 6.4% | 2 | 6.3% | 9 | 6.7% | 0 | 0.0% | 1 | 16.7% | 1 | 2.6% |
| How often do you think about sex? | | | | | | | | | | | | |
| Never | 51 | 16.2% | 10 | 31.3% | 24 | 17.8% | 0 | 0.0% | 2 | 33.3% | 6 | 15.4% |
| Less than once a month | 74 | 23.6% | 6 | 18.8% | 32 | 23.7% | 1 | 25.0% | 1 | 16.7% | 13 | 33.3% |
| One to a few times a month | 77 | 24.5% | 8 | 25.0% | 30 | 22.2% | 1 | 25.0% | 0 | 0.0% | 9 | 23.1% |
| One to a few times a week | 60 | 19.1% | 5 | 15.6% | 31 | 23.0% | 0 | 0.0% | 0 | 0.0% | 6 | 15.4% |
| Every day | 42 | 13.4% | 2 | 6.3% | 13 | 9.6% | 2 | 50.0% | 2 | 33.3% | 4 | 10.3% |
| Several times a day | 10 | 3.2% | 1 | 3.1% | 5 | 3.7% | 0 | 0.0% | 1 | 16.7% | 1 | 2.6% |

Table 6c illustrates differences in sexual activity, importance of sex, and thinking about sex among participants with diabetes (n = 530) by educational attainment. We observed substantial differences between people with diabetes of different education levels for all three sexuality measures. We note that the patterns we observed for all three measures would be upright or inverse U-shaped if plotted as separate curves for each response level of each measure. Conceptualizing the results in this manner revealed a general pattern of somewhat higher sexual activity and interest among respondents with diabetes with Associate's and Master's Degrees as their highest levels of educational attainment, and substantially higher sexual activity and interest among their peers with only Bachelor's Degrees. We likewise note that overall, both reporting that sexual activity was at least moderately important and thinking about sex at least weekly were quite common across educational groups. Even in

cases where a majority of group members did not give these responses, the prevalence of higher and lower interest in groups was still relatively balanced.

DISCUSSION

Key Findings

Our analyses present some key findings for further developing research into relationships between diabetes and sexuality in later life. Our population, for example, was rather sexually active – over 50% having engaged in sexual behaviors in the past year – so our findings automatically contradict the notions that (1) older adults do not experience sexual desire and/or engage in sexual activity, and that

| Survey Question | <i>No Degree</i> (170) | | <i>HS Diploma or GED</i> (189) | | <i>Associate's Degree</i> (86) | | <i>Bachelor's Degree</i> (49) | | <i>Master's Degree</i> (27) | | <i>Doctoral Degree</i> (9) | |
|------------------------------------|---------------------------|-------|-----------------------------------|-------|-----------------------------------|-------|----------------------------------|-------|--------------------------------|-------|-------------------------------|-------|
| Have you had sex in the last year? | | | | | | | | | | | | |
| Yes | 52 | 30.6% | 80 | 42.3% | 45 | 52.3% | 31 | 63.3% | 14 | 51.9% | 4 | 44.4% |
| No | 118 | 69.4% | 109 | 57.7% | 41 | 47.7% | 18 | 36.7% | 13 | 48.1% | 5 | 55.6% |
| How important is sex to you? | | | | | | | | | | | | |
| Not at all | 70 | 41.2% | 61 | 32.3% | 18 | 20.9% | 8 | 16.3% | 5 | 18.5% | 3 | 33.3% |
| Somewhat | 24 | 14.1% | 32 | 16.9% | 13 | 15.1% | 9 | 18.4% | 6 | 22.2% | 1 | 11.1% |
| Moderately | 34 | 20.0% | 50 | 26.5% | 35 | 40.7% | 12 | 24.5% | 7 | 25.9% | 3 | 33.3% |
| Very | 34 | 20.0% | 37 | 19.6% | 15 | 17.4% | 14 | 28.6% | 6 | 22.2% | 0 | 0.0% |
| Extremely | 8 | 4.7% | 9 | 4.8% | 5 | 5.8% | 6 | 12.2% | 3 | 11.1% | 2 | 22.2% |
| How often do you think about sex? | | | | | | | | | | | | |
| Never | 46 | 27.1% | 29 | 15.3% | 12 | 14.0% | 4 | 8.2% | 1 | 3.7% | 1 | 11.1% |
| Less than once a month | 42 | 24.7% | 59 | 31.2% | 16 | 18.6% | 5 | 10.2% | 3 | 11.1% | 2 | 22.2% |
| One to a few times a month | 32 | 18.8% | 41 | 21.7% | 25 | 29.1% | 16 | 32.7% | 9 | 33.3% | 2 | 22.2% |
| One to a few times a week | 24 | 14.1% | 31 | 16.4% | 22 | 25.6% | 16 | 32.7% | 7 | 25.9% | 2 | 22.2% |
| Every day | 22 | 12.9% | 23 | 12.2% | 7 | 8.1% | 6 | 12.2% | 6 | 22.2% | 1 | 11.1% |
| Several times a day | 4 | 2.4% | 6 | 3.2% | 4 | 4.7% | 2 | 4.1% | 1 | 3.7% | 1 | 11.1% |

(2) living with chronic conditions necessarily decreases older adults' desire for and engagement in sex. In fact, it appeared that people were engaging in higher rates of sexual behavior than they were even thinking about if they did not have diabetes. People with diabetes, however, did not match this pattern. In fact, as studies of European samples have noted [1,3,6], people with diabetes – whether isolated or comorbid – were having substantially less sexual activity than their peers with both other conditions and no conditions.

At the same time, sexual behavior was about equally important on the whole to people with and without diabetes. The only group that demonstrated slight differences were the people with no conditions, but people with different clusters of chronic conditions looked rather similar on most measures. The patterns for thinking about sexual behavior paralleled those for the perceived importance of sexual behavior, which suggests that the lower rates of sexual activity among people with diabetes do not owe to a lack of sexual desire [see also 4, 5 for reviews of studies finding similar patterns with other populations]. Rather than a lack of desire, it appears that diabetes itself significantly impacts sexual opportunity and/or functioning among older adults in ways that should be assessed and evaluated on a broader scale.

Although many respondents with diabetes cite health issues as a sexual barrier and many who do so also experience comorbidity with other conditions, diabetes by itself, other conditions without diabetes, and no conditions were associated with substantially lower interference with sexual behavior related to health. Even among people with comorbid diabetes, fewer than 30% cited health as the barrier to their sexual behavior. This presents an interesting question for clinicians and researchers. What is happening to make rates of activity so much lower among older adults with diabetes if health concerns do not even account for half of the problem? Could it be the way people's partners view them because of their diabetes (i.e., see them as less able or desirable even when the condition does not actually change their desire)? Similarly, could it be that, even when health issues are at play, people utilize existing cultural scripts about gender and sexualities (i.e., "I have a headache" or "I'm tired" or "I'm not in the mood") to explain the absence of sexual engagement without explicitly referencing health in general or specific conditions [10, 13]? Understanding this puzzle may create intervention strategies capable of enhancing the sexual options and experiences of many people managing diabetes – comorbid or otherwise – in later life.

Although most research concerning relationships between diabetes and sexuality focuses almost entirely on medical and/or clinical dynamics [1], the variables available in the NSHAP also allowed us to look into some of the socio-demographic patterns in our respondents' experiences. People who identify as female appear to be lacking sexual engagement despite continuing sexual desire, which may be the result of gendered double standards concerning bodies and sexual desirability noted in other studies of gender and chronic health conditions [10]. Given that living with diabetes often goes hand in hand with heavier body development and that heavier women – cisgender and transgender – face significant stigma in contemporary American society, there may be much to learn by exploring the ways sexual partners of women managing diabetes – as well as the women themselves – sexually evaluate the bodies and self-presentations of females with diabetes [1, 6, 10].

We also see consistent patterns suggesting Black adults with diabetes have compounded disadvantages noted in other populations managing both racial minority status and health-related experiences [11]. When we factor in literatures concerning Black female bodies, sexuality, and health [12, 13], for example, these patterns appear quite striking, and suggest there may be much to learn from systematic examinations of the experiences of Black people – and especially Black cis and trans women – managing diabetes, sexualities, and bodily appearance. What might we learn by asking Black people how they interpret and make sense of the sexual potential of people with diabetes – whether Black or otherwise – as well as the ways Black people with diabetes manage their sexual desires, options, and experiences?

Finally, our analyses point to not unexpected but still potentially interesting findings concerning education [see also 14 for similar findings related to education and chronic health conditions]. In fact, some of the variability, as noted in other studies [14], related to education may be tied to race or gender dynamics overall. That said, we did note that people with middle levels of education tended to be more sexually active, more interested in sexual activity, and more inclined to think about sexual activity more frequently. While this parallels other trends we have seen in relationships between education and health [14], such patterns are almost never explored in relation to specific relationships between diabetes and sexuality. Our findings thus suggest work in education and health should expand to explicitly consider factors and nuances related to managing both diabetes and sexuality in later life.

Strengths

We began our study with substantial samples of people with (530) and without (2,022) diabetes. These sample sizes are often regarded as adequate even for basic inferential analysis [9]. However, we remind our readers that good epidemiological practice requires thorough description of a population prior to attempting inference [9]. We were also able to achieve a high level of detail in our descriptive analysis by deconstructing our four health status groups into smaller contingency groups by sociodemographic characteristics long associated with inequality in health outcomes. This allowed us to illuminate potential social inequalities with implications for academic medical sociology research and applied public health practice alike.

Because we only used data from Wave I of the NSHAP to assess condition frequencies, we avoided potential issues with cohort inversion. This can happen when certain groups in an analytic sample appear to become gradually healthier over time relative to their peers because members with profound health challenges die prior to subsequent waves of data collection [15]. Combining a specific focus on late life with a cross-sectional view of our population's characteristics largely prevented the possibility of cohort inversion skewing our results. However, we do note that we might find different patterns were we to replicate this cross-sectional approach with a midlife or early adulthood population. Such differences would suggest that perhaps diabetes can impact sexuality differently as people move through the life course [6].

Limitations

Our study is notably limited by the fact that we could not distinguish between populations with type 1 diabetes, type 2 diabetes, and complex cases involving elements of both type 1 and type 2. Our framework here suggests, as do substantial bodies of prior research [16] that certain social health impacts of living with diabetes may be at least somewhat shared among people with diabetes as an aggregate group. But we cannot suggest that we would see consistent patterns for each group affected by diabetes were we to replicate this study using data incorporating information about the unique characteristics of each person's condition.

Additional uncertainty was introduced by our small sample of people with diabetes without comorbid chronic conditions. Whereas we had 501 people with diabetes and comorbid conditions in our population, we only had 29

reporting diabetes without other conditions. This limited our ability to observe variation among people whose main health issue was diabetes. We further note that we could not say with total confidence that people identifying as only having diabetes had no other chronic conditions, as this measure was collected using diagnosis information and also was only relevant to the 16 conditions formally assessed by NSHAP.

In the same spirit, we strongly caution against overinterpretation of our findings for the “none of the above conditions” measure. People in this category did not necessarily have no chronic conditions at all, only none of those captured by the 16 commonly diagnosed condition variables in NSHAP. Overall, we felt reasonably confident in our general understanding of people's health status, but much less confident in our ability to articulate the nuances and complexities of these health states. We thus join other scholars in calling for diverse and prolific research engaging multiple sources of information about different types of chronic conditions and what it means to live well with them [17]. Developing more sources that do not exclusively hinge on diagnosis, and consequently its many limitations [18], is crucial to this effort.

We also note that as with any “nationally representative” datasets, several key demographic groups are also not captured explicitly [7]. For example, transsex, intersex, gender nonbinary, same sex attracted, bisexual, asexual, and nonsexual people are often not given the opportunity to document these attributes. Although people with these characteristics may be included in the total participant pool, we cannot comment meaningfully on their experiences using this dataset. Indeed, our findings for male and female study participants might appear much more nuanced if we had access to more detailed information about their sex, gender, and sexuality. We thus join other scholars in calling for increased attention to the diversity of sex, gender, and sexuality in research on physical health [19] and extend this recommendation to scholarship on diabetes specifically.

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CONFLICT OF INTEREST DISCLOSURES

The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. The authors report no potential conflicts of interest relevant to this article.

REFERENCES

- Enzlin P, Rosen R, Wiegel M, Brown J, Wessells H, Gattcomb P, et al. Sexual dysfunction in women with type 1 diabetes: Long-term findings from the DCCT/EDIC study cohort. *Diabetes Care*. 2009;32(5):780–5. DOI: <http://dx.doi.org/10.2337/dc08-1164>. PubMed PMID: 19407075; PubMed Central PMCID: PMC2671088.
- Wilmoth MC. Sexuality: A critical component of quality of life in chronic disease. *Nurs Clin North Am*. 2007;42(4):507–14. DOI: <http://dx.doi.org/10.1016/j.cnur.2007.08.008>. PubMed PMID: 17996752.
- Bjerggaard M, Charles M, Kristensen E, Lauritzen T, Sandbæk A, Giraldi A. Prevalence of sexual concerns and sexual dysfunction among sexually active and inactive men and women with screen-detected type 2 diabetes. *Sex Med*. 2015;3(4):302–10. DOI: <http://dx.doi.org/10.1002/sm2.91>. PubMed PMID: 26797065; PubMed Central PMCID: PMC4721034.
- Phillips A, Phillips S. Recognising female sexual dysfunction as an essential aspect of effective diabetes care. *Appl Nurs Res*. 2015;28(3):235–8. DOI: <http://dx.doi.org/10.1016/j.apnr.2015.04.007>. PubMed PMID: 26074296.
- Yildiz H, Bölüktaş RP. Evaluation of sexual dysfunction in males with diabetes. *Sex Disabil*. 2015;33(2):187–205. DOI: <http://dx.doi.org/10.1007/s11195-015-9397-5>.
- Mellerio H, Guilmin-Crépon S, Jacquin P, Labéguerie M, Lévy-Marchal C, Alberti C. Long-term impact of childhood-onset type 1 diabetes on social life, quality of life and sexuality. *Diabetes Metab*. 2015;41(6):489–97. DOI: <http://dx.doi.org/10.1016/j.diabet.2014.12.006>. PubMed PMID: 25869639.
- Nowakowski ACH, Sumerau JE, Mathers LAB. None of the above: Strategies for inclusive teaching with “representative” data. *Teaching Sociology*. 2016;44(2):96–105. DOI: <http://dx.doi.org/10.1177/0092055X15622669>.
- Waite LJ, Laumann EO, Levinson W, Lindau ST, McClintock MK, O’Muircheartaigh CA, et al. National Social Life, Health, and Aging pProject (NSHAP). National Archive of Computerized Data on Aging 2007, <http://www.icpsr.umich.edu/icpsrweb/NACDA/studies/20541>.
- Gordis L. *Epidemiology*. 3rd ed. Philadelphia: WB Saunders; 2004.
- Nowakowski ACH, Sumerau JE. 2015. Swell foundations: Fundamental social causes and chronic inflammation. *Sociological Spectrum*. 2015;35:161–78. DOI: <http://dx.doi.org/10.1080/02732173.2014.1000554>.
- Grollman EA. Multiple forms of perceived discrimination and health among adolescents and young adults. *J Health Soc Behav*. 2012;53(2):199–214. DOI: <http://dx.doi.org/10.1177/0022146512444289>. PubMed PMID: 22588219.
- Nowakowski ACH, Graves KY, Sumerau JE. Mediation analysis of relationships between chronic inflammation and quality of life in older adults. *Health Qual Life Outcomes*. 2016;14:46. DOI: <http://dx.doi.org/10.1186/s12955-016-0452-4>. PubMed PMID: 27001461; PubMed Central PMCID: PMC4802844.
- Collins PH. *Black feminist thought: Knowledge, Consciousness, and the Politics of Empowerment*. New York: Routledge; 2000.
- Mirowsky J, Ross CE. *Education, Social Status, and Health*. New York: De Gruyter; 2003.
- Noymer A, Beckett MK, Elliott MN. Mortality selection and sample selection: A comment on Beckett / Reply. *J Health Soc Behav* 2001;42(3):328–31.
- Jacobson AM. Impact of improved glycemic control on quality of life in patients with diabetes. *Endocr Pract*. 2004;10(6):502–8. DOI: <http://dx.doi.org/10.4158/EP.10.6.502>. PubMed PMID: 16033724.
- Clark NM, Gong M, Kaciroti N. A model of self-regulation for control of chronic disease. *Health Educ Behav*. 2014;41(5):499–508. DOI: <http://dx.doi.org/10.1177/1090198114547701>. PubMed PMID: 25270175.
- Jutel A, Nettleton S. Towards a sociology of diagnosis: Reflections and opportunities. *Soc Sci Med*. 2011;73(6):793–800. DOI: <http://dx.doi.org/10.1016/j.socscimed.2011.07.014>. PubMed PMID: 21868144.
- Gorman BK, Denney JT, Dowdy H, Medeiros RA. A new piece of the puzzle: Sexual orientation, gender, and physical health status. *Demography* 2015;52(4):1357–82. DOI: <http://dx.doi.org/10.1007/s13524-015-0406-1>. PubMed PMID: 26126883.

