

EXPLORING RELATIONSHIP SATISFACTION IN OLDER ADULTS WITH DIABETES USING DESCRIPTIVE EPIDEMIOLOGY

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People Living with And Inspired by Diabetes

ABSTRACT

Objective: We descriptively analyzed patterns in relationship satisfaction among partnered older Americans with and without diabetes. We used data from the National Social, Health, and Life Project (NSHAP) to explore overall happiness as well as physical and emotional satisfaction with intimate relationships, and variation in these patterns by sociodemographic characteristics.

Research Design and Methods: We used epidemiological contingency tables to explore three research questions. First, how does overall relationship satisfaction vary among older adults with and without diabetes? Second, how does relationship satisfaction vary across these groups in physical and emotional domains? Third, what role might intersectional socio-demographic characteristics play in these patterns?

Results: We found that older NSHAP participants with diabetes are very similar overall to their peers without diabetes with respect to relationship satisfaction. This pattern was consistent for overall happiness with intimate relationships as well as physical and emotional satisfaction. However, among people with diabetes we observed striking sex differences in overall happiness (that sharply increased) for the physical and emotional satisfaction measures. We also observed modest differences by race and education that may intersect with the strong gender disparities we saw in our data.

Conclusions: We contextualize our findings with prior research on diabetes and partnership to conclude that exploration of the relationships between gender, sexuality, health, and romance in the lives and relationships of people with diabetes may be a necessary and fruitful avenue of future research. To this end, we suggest threads for future inquiry on diabetes and intimate relationships among older adults.



INTRODUCTION

In recent years, researchers have begun to explore the intersection of gender, sexuality, and health in a variety of contexts [1]. As part of this work, researchers have documented variation in sexual satisfaction related to all types of diabetes, and the ways such patterns may be shaped by sex and gender disparities [2]. For example, researchers have demonstrated significant relationships between diabetes conditions and sexual frequency across age populations, specifically in adults in late midlife and beyond. Similar patterns of sexual dysfunction have also been observed among cisgender (people who identify as the same gender they are assigned at birth) women and men related to diabetic symptomology of varied types. Further, these studies note that differences in sexual behavior related to diabetes do not necessarily equate to differences in sexual and romantic interest for partners, which suggests potential variations between physical and emotional satisfaction and experience among people living with and partnering with others living with diabetes in advanced middle and later life. This study uses a very broad definition of “older” adulthood that matches the age groups included in its data source -- the National Social Life, Health, and Aging Project (NSHAP) -- whose youngest participants were 57 years old at first engagement.

Prior inquiry in the above areas and our own previous research on diabetes and sexuality inspired us to explore patterns in intimate relationship satisfaction among older people with diabetes. We outlined three key questions for our study: First, how does overall relationship satisfaction vary among older adults with and without diabetes? Second, how does relationship satisfaction vary across these groups in physical and emotional domains? Third, what role might intersectional socio-demographic characteristics play in these patterns? Using a diverse sample of older Americans, we first compared and contrasted people with and without diabetes with respect to three different measures of relationship satisfaction. We then investigated the potential impact of intersecting forms of socioeconomic disadvantage for participants with diabetes, using extant literature to examine these differences from a biopsychosocial perspective.

METHODS

Data and Subject Selection

We returned [1, 2] to the NSHAP dataset to explore our research questions. The NSHAP provides information on physical, mental, and social health among Chicago area residents aged 57 to 85 at Wave I (the first round of data collection). Participants as young as 57 were engaged so that future panels of the study could show their progression through a long trajectory of continued aging [3]. Data are collected at participants' homes via a combination of questionnaires, interviews, observational assessments, blood spots, and cheek swabs. We used the original Wave I cohort data files, circa 2005-2006, to prevent people from being censored out of the sample by death or loss to follow-up. NSHAP data include people living in the general community as opposed to residential health care settings [3]. People of Black and Hispanic identity, male sex, and age over 75 years are oversampled to mirror the national population distribution and ensure adequate study power; the research team thus describes the data as “nationally representative” [3]. However, we note that as is often the case with such datasets, several potentially relevant demographic characteristics are not captured explicitly [4]. Of particular note for this study is the fact that the NSHAP only captures information about diabetes as a broad construct. It does not distinguish between people with type 1, type 2, or hybrid forms of diabetes. The implications of this are discussed as a limitation in this paper.

We used NSHAP data capturing diabetes and other diagnosed chronic conditions; intimate relationship status and characteristics; and sex identity, ethnoracial background, and educational attainment. We outlined the following diabetes diagnosis profiles: diabetes only, diabetes and one or more 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 and including all respondents diagnosed with diabetes. We used Stata 12 Special (StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC) 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.

Beginning with the full set of 3,005 Wave I participants, we dropped two groups of participants: those with one or more missing values on variables of interest, and those who did not report being in a sustained relationship. Our criteria for “sustained relationship” included people who were married, cohabitating, or dating at the time of Wave I data collection). This yielded an analytic sample of 1,930 people, or about 64% of the total Wave I population. These individuals are described as a group in Table 1. Of these individuals, a total of 390 reported having diagnosed diabetes. Among participants with diabetes, 19 had only that diagnosis; the remaining 371 also had other diagnosed conditions.

Table 1. Characteristics of Study Population at NSHAP Wave I (n = 1,930)

Attribute	Response	Number Reporting	Proportion Reporting
Chronic conditions	Diabetes only	19	1.0%
	Diabetes and other conditions	371	19.2%
	Other conditions only	1,292	66.9%
	No chronic conditions	248	12.8%
Relationship status	Married	1,724	89.3%
	Cohabitating	57	3.0%
	Dating	149	7.7%
Overall happiness	Very unhappy	45	2.3%
	Mostly unhappy	19	1.0%
	Somewhat unhappy	37	1.9%
	Neither happy nor unhappy	105	5.4%
	Somewhat happy	213	11.0%
	Mostly happy	380	19.7%
	Very happy	1,131	58.6%
Physical satisfaction	Not at all satisfying	51	2.6%
	Slightly satisfying	96	5.0%
	Moderately satisfying	390	20.2%
	Very satisfying	782	40.5%
	Extremely satisfying	611	31.7%

Before beginning our epidemiological analysis in earnest, we also described our sample in greater detail by stratifying data on relationship status by diagnosis information. Table 2 describes the distribution of participants within each diabetes profile with respect to marriage, cohabitation, and dating. The vast majority of people in each diagnosis category reported being married -- about 84% for people who only had diabetes and about 89% for all other groups. Cohabitating was the next most common option for people with only diabetes at around 10%, but was the least common relationship type for the other groups at around 3%. Dating was least common for people with just diabetes

Table 1. Characteristics of Study Population at NSHAP Wave I (n = 1,930)

Emotional satisfaction	Not at all satisfying	40	2.1%
	Slightly satisfying	80	4.1%
	Moderately satisfying	378	19.6%
	Very satisfying	795	41.2%
	Extremely satisfying	637	33.0%
Sex identity	Male	1,148	59.5%
	Female	782	40.5%
Racial background	Non-Hispanic White	1,433	74.2%
	Hispanic White	120	6.2%
	Black	254	13.2%
	Native American or Alaskan	13	0.7%
	Asian or Pacific Islander	26	1.3%
Education level	Other	84	4.4%
	Education level	412	21.3%
	High school diploma or GED	706	36.6%
	Associate's degree	319	16.5%
	Bachelor's degree	271	14.0%
	Master's degree	157	8.1%
Doctoral Degree	65	3.4%	

at roughly 5%, but was somewhat more common among other groups at roughly 7%.

Table 2. Relationship Characteristics by Diabetes Status (n = 1,930)

<i>Diabetes Status</i>	<i>Married</i>		<i>Cohabiting</i>		<i>Dating</i>	
Diabetes only	16	84.2%	2	10.5%	1	5.3%
Diabetes and other conditions	333	89.8%	10	2.7%	28	7.5%
Other conditions only	1,152	89.2%	37	2.9%	103	8.0%
No chronic conditions	223	89.9%	8	3.2%	17	6.9%

Descriptive epidemiology facilitates detailed attention to nuances in population data, even in cases where only a small number of people have a particular characteristic [5]. We thus described our data by the full range of possible responses for our measures of interest, instead of collapsing categories for variables with wide ranges of values. For race and ethnicity, we used two different NSHAP variables to create our own integrated measure of ethnoracial identity. For other measures, we simply re-coded real and missing values of single NSHAP variables.

Strategies for Analysis

We used descriptive epidemiology techniques to analyze our data. To create our contingency tables, we again used Stata to compute frequencies of each specific response to questions about relationship satisfaction for each diabetes profile for the general population, and then for each socio-demographic group within our nested sample of people with diabetes. Specifically, we obtained counts of people who gave each possible response to the three included questions about relationship satisfaction 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 profile categories for the full sample. We also used “summarize” and “bysort” commands to compute the group-specific sample sizes (e.g., number of people with diabetes with a high school education) that we would need for the nested analysis.

After computing frequency data for each research question, we transferred our raw counts to Microsoft Excel, along with our overall counts of people with specific diabetes status from the full sample and our within-group counts of people with diabetes and particular sociodemographic characteristics from the nested 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 relationship status questions. These functions multiplied (A) the number of respondents reporting that response (e.g., being “very satisfied” physically) by (B) one over (greater than?) the number of people in the possible respondent pool (e.g., people with diabetes identifying as Hispanic).

These computations in Excel yielded contingency values for Tables 3-5 for the full sample and Tables 6a-c for the nested sample. Overall sample sizes for these tables varied by research question. Tables 3-5 use the full sample of 1,930 people to show overall patterns in relationship satisfaction across all diagnosis profiles. Tables 6 a-c use data on only the 390 participants with diagnosed diabetes. We used a similar process to describe our overall study population in Tables 1-2, using the full sample size of 1,930 people as the denominator for product functions. Outputs from each product function were expressed as percentages for ease of interpretation across disciplines. Because our outcome variables are measures of subjective well-being rather than specific health conditions; and because we used percentages rather than quantities per 100,000 population, we refer to these outputs as “frequencies” rather than “prevalences” [6].

RESULTS

We first described key characteristics of our sample in Table 1 as noted above. Included NSHAP respondents were broken into four groups: diabetes only, diabetes and other conditions, other conditions only, and no chronic conditions. We also assessed the distribution of people in each of these groups who reported being married, cohabitating, or dating.

Table 1 illustrates key patterns in prevalence of diabetes and relationship satisfaction for our full study population (n = 1,930). Diabetes was relatively common among NSHAP respondents. Most of the participants in our population who had diabetes (20.2% of total sample) also had at least one other chronic condition (19.2% of total sample) versus only diabetes (1.0% of total sample). Many participants

without diabetes were also living with one or more chronic conditions (66.9% of total sample). The smallest group by far was participants with no diagnosed chronic conditions (12.8% of total sample). Marriage was extremely common among our respondents (89.3% of total sample) compared to cohabitating (3.0% of total sample) and dating (7.7% of total sample). High levels of relationship satisfaction across the three outcome measures were also quite common overall. For the overall happiness with relationships measure, 58.6% of participants said their relationship was “very happy” and another 19.7% said “mostly happy.” For the physical satisfaction measure, 31.7% of participants said their relationship was “extremely satisfying” and another 40.5% said “very satisfying.” For the emotional satisfaction measure, 33.0% of participants said their relationship was “extremely satisfying” and another 41.2% said “very satisfying.”

Table 2 illustrates the distribution of relationship types in our study population (n = 1,930) by diabetes profile. The majority of our populations with diabetes only (84.2% of group) and diabetes and other conditions (89.8% of group) were married, as were similar majorities of our populations with other conditions only (89.2% of group) and no chronic conditions (89.9% of group). Cohabiting was more common among people with diabetes only (10.5% of group) compared to people with diabetes and other conditions (2.7% of group) as well as people with other conditions only (2.9% of group) and no diagnosed conditions (3.2% of group). No substantial differences appeared in the likelihood of being married between people with diabetes (89.4% of group) and without diabetes (89.3% of group). Likewise, no substantial differences appeared in the likelihood of cohabitating (3.1% of people with diabetes and 2.9% of people without diabetes) or dating (7.4% of people with diabetes and 7.8% of people without diabetes). Overall, people with and without diabetes who were in any kind of consistent intimate relationship were extremely likely to be married to their partners.

Research Question 1: How does overall relationship satisfaction vary among older adults with and without diabetes?

Table 3 illustrates the distribution of overall relationship happiness (n = 1,930) by diabetes profile. Most members of all four groups described their relationships as “very happy” (52.6% for diabetes only, 59.8% for diabetes with other conditions, 58.2% for other conditions only, and 59.3% for no chronic conditions) or “mostly happy” (26.3% for diabetes only, 19.1% for diabetes and other conditions, 19.7% for other conditions only, and 19.8% for no chronic conditions). Overall, people with diabetes (59.4% “very happy” and 19.5% “mostly happy” in aggregate group) did not report high levels of happiness substantially more than their peers without diabetes (58.4% “very happy” and 19.7% “mostly happy” in aggregate group). Rates of lower levels of overall happiness with intimate relationships were also quite similar across the different diabetes profiles, and between aggregated groups of people with and without diabetes.

Research Question 2: How does relationship satisfaction vary across these groups in physical and emotional domains?

Table 4 illustrates the distribution of physical satisfaction with intimate relationships in our study population (n = 1,930) by diabetes profile. Large proportions of all four groups described their relationships as “extremely satisfying” (42.1% for diabetes only, 34.2% for diabetes and other conditions, 31.6% for other conditions only, and 27.4% for no chronic conditions) or “very satisfying” (42.1% for diabetes only, 39.4% for diabetes and other conditions, 39.7% for other conditions only, and 46.4% for no chronic conditions) physically. Overall, people with diabetes (34.6% “extremely satisfying” and 39.5% “very satisfying” in aggregate group) did not report high levels of physical satisfaction substantially more than their peers without diabetes (31.0% “extremely satisfying” and 40.8% “very satisfying” in aggregate group).

Table 3. Overall Relationship Happiness by Diabetes Status (n = 1,930)

Condition	Very Unhappy		Moderately Unhappy		Somewhat Unhappy		Neither		Somewhat Happy		Moderately Happy		Extremely Happy	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Diabetes only	1	5.3%	0	0.0%	0	0.0%	1	5.3%	2	10.5%	5	26.3%	10	52.6%
Diabetes and other	14	3.8%	5	1.3%	8	2.2%	11	3.0%	40	10.8%	71	19.1%	222	59.8%
Other conditions only	28	2.2%	14	1.1%	23	1.8%	79	6.1%	141	10.9%	255	19.7%	752	58.2%
No chronic conditions	4	1.6%	0	0.0%	6	2.4%	14	5.6%	30	12.1%	49	19.8%	147	59.3%

Table 4. Physical Satisfaction by Diabetes Status (n = 1,930)

Condition	Very Unhappy		Moderately Unhappy		Somewhat Unhappy		Neither		Somewhat Happy		Moderately Happy		Extremely Happy	
Diabetes only	0	0.0%	0	0.0%	3	15.8%	8	42.1%	8	42.1%	5	26.3%	10	52.6%
Diabetes and other	9	2.4%	18	4.9%	71	19.1%	146	39.4%	127	34.2%	71	19.1%	222	59.8%
Other conditions only	39	3.0%	63	4.9%	269	20.8%	513	39.7%	408	31.6%	255	19.7%	752	58.2%
No chronic conditions	3	1.2%	15	6.0%	47	19.0%	115	46.4%	68	27.4%	49	19.8%	147	59.3%

gate group). Rates of lower levels of physical satisfaction with intimate relationships were also quite similar across the different diabetes profiles, and between aggregated groups of people with and without diabetes.

Table 5 illustrates the distribution of emotional satisfaction with intimate relationships in our study population (n = 1,930) by diabetes profile. Large proportions of all four groups described their relationships as “extremely satisfying” (31.6% for diabetes only, 36.9% for diabetes and other conditions, 33.0% for other conditions only, and 27.4% for no chronic conditions) or “very satisfying” (57.9% for diabetes only, 39.1% for diabetes and other conditions, 40.2% for other conditions only, and 48.4% for no chronic conditions) emotionally. Overall, people with diabetes (36.7% “extremely satisfying” and 40.0% “very satisfying” in aggregate group) did not report high levels of emotional satisfaction substantially more than their peers without diabetes (32.1% “extremely satisfying” and 41.5% “very satisfying” in aggregate group). Rates of lower levels of emotional satisfaction with intimate relationships were also quite similar across the different diabetes profiles, and between aggregated groups of people with and without diabetes.

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

Table 6a illustrates differences in relationship satisfaction among people with diabetes (n = 390) by sex identity. We observed modest differences between males and females for the overall happiness measure, but striking differences between sex groups for both the physical and emotional satisfaction measures. The majority of both males (60.5% “very happy” and 20.9% “mostly happy” for group) and females (57.6% “very happy” and 16.7% “mostly happy” for group) were highly satisfied with their relationships overall. However, the proportions of males (39.1% “extremely satisfying” and 40.7% “very satisfying” for group) reporting high levels of physical satisfaction were substantially higher than the proportions of females (25.8% “extremely satisfying” and 37.1% “very satisfying” for group) within each response category. The proportions of males (41.1% “extremely satisfying” and 41.9% “very satisfying” for group) reporting high levels of emotional satisfaction were also substantially higher than the proportions of females (28.0% “extremely satisfying” and 36.4% “very satisfying” for group) reporting the same within each response category. Overall, somewhat more males with diabetes (81.4% of group) than females with diabetes (74.3% of group) reported high levels of happiness in their relationships. Substantially more males with diabetes (79.8% of group) than females with diabetes (62.9% of group) reported high levels of physical

Table 5. Emotional Satisfaction by Diabetes Status (n = 1,930)

Condition	Very Unhappy		Moderately Unhappy		Somewhat Unhappy		Neither		Somewhat Happy		Moderately Happy		Extremely Happy	
Diabetes only	0	0.0%	0	0.0%	2	10.5%	11	57.9%	6	31.6%	5	26.3%	10	52.6%
Diabetes and other	8	2.2%	16	4.3%	65	17.5%	145	39.1%	137	36.9%	71	19.1%	222	59.8%
Other conditions only	28	2.2%	55	4.3%	264	20.4%	519	40.2%	426	33.0%	255	19.7%	752	58.2%
No chronic conditions	4	1.6%	9	3.6%	47	19.0%	120	48.4%	68	27.4%	49	19.8%	147	59.3%

satisfaction. Likewise, substantially more males with diabetes (83.0% of group) than females with diabetes (64.4% of group) reported high levels of emotional satisfaction.

Table 6a. Relationship Satisfaction by Sex Among People with Diabetes (n = 390)

	Male		Female	
<i>How happy is your relationship?</i>				
Very unhappy	9	3.5%	6	4.5%
Mostly unhappy	3	1.2%	2	1.5%
Somewhat unhappy	5	1.9%	3	2.3%
Neither happy nor unhappy	7	2.7%	5	3.8%
Somewhat happy	24	9.3%	18	13.6%
Mostly happy	54	20.9%	22	16.7%
Very happy	156	60.5%	76	57.6%
<i>How satisfying is it physically?</i>				
Not at all	5	1.9%	4	3.0%
Somewhat	4	1.6%	14	10.6%
Moderately	43	16.7%	31	23.5%
Very	105	40.7%	49	37.1%
Extremely	101	39.1%	34	25.8%
<i>How satisfying is it emotionally?</i>				
Not at all	5	1.9%	3	2.3%
Somewhat	7	2.7%	9	6.8%
Moderately	32	12.4%	35	26.5%
Very	108	41.9%	48	36.4%
Extremely	106	41.1%	37	28.0%

Table 6b illustrates differences in relationship satisfaction sex among people with diabetes (n = 390) by ethnora- cial background. We observed several modest differences between people with diabetes of different races and ethnicities for all three relationship satisfaction measures. Within each racial group the majority of participants with diabetes (76.7% of Non-Hispanic Whites, 78.3% of Hispanic Whites, 73.5% of Blacks, 75.0% of Native Americans and Alaskans, 83.3% of Asians and Pacific Islanders, and 76.9% of other identities) described their relationships as either

“very happy” or “mostly happy” overall. Within each racial group the majority of participants with diabetes (76.7% of Non-Hispanic Whites, 65.2% of Hispanic Whites, 73.5% of Blacks, 75.0% of Native Americans and Alaskans, 66.7% of Asians and Pacific Islanders, and 57.7% of other identities) also described their relationships as either “extremely satisfying” or “very satisfying” physically. Likewise, within each racial group the majority of participants with diabetes (81.2% of Non-Hispanic Whites, 69.5% of Hispanic Whites, 68.6% of Blacks, 75.0% of Native Americans and Alaskans, 83.0% of Asians and Pacific Islanders, and 61.5% of other identities) described their relationships as either “extremely satisfying” or “very satisfying” emotionally. Although always accounting for a majority of their referent groups, these aggregated proportions as well as those for individual response options differed consistently across the included racial categories.

Table 6c illustrates differences in relationship satisfaction among people with diabetes (n = 390) by educational attainment. We observed substantial differences between people with diabetes of different education levels for all three satisfaction measures. Within each educational group the majority of participants with diabetes (80.2% of non-degree holders, 78.5% of high school diploma holders, 75.4% of associate’s degree holders, 88.1% of bachelor’s degree holders, 77.3% of master’s degree holders, and 50.0% of doctoral degree holders) described their relationships as either “very happy” or “mostly happy” overall. Within each educational group the majority of participants with diabetes (71.7% of non-degree holders, 71.1% of high school diploma holders, 75.4% of associate’s degree holders, 90.5% of bachelor’s degree holders, 68.2% of master’s degree holders, and 83.4% of doctoral degree holders) also described their relationships as either “extremely satisfying” or “very satisfying” physically. Likewise, within each racial group the majority of participants with diabetes (74.5% of non-degree holders, 75.2% of high school diploma holders, 73.9% of associate’s degree holders, 92.9% of bachelor’s degree holders, 72.8% of master’s degree holders, and 83.3% of doctoral degree holders) described their relationships as either “extremely satisfying” or “very satisfying” emotionally. Although always accounting for a majority of their referent groups, these aggregated proportions as well as those for individual response options differed consistently across the included educational categories.

Table 6b. Relationship Satisfaction by Race Among People with Diabetes (n = 390)

	<i>Non-Hispanic White</i>		<i>Hispanic White</i>		<i>Black</i>		<i>Native American or Alaskan</i>		<i>Asian or Pacific Islander</i>		<i>Other</i>	
<i>How happy is your relationship?</i>												
Very unhappy	7	2.8%	3	13.0%	5	6.0%	0	0.0%	0	0.0%	0	0.0%
Mostly unhappy	1	0.4%	0	0.0%	2	2.4%	0	0.0%	0	0.0%	2	7.7%
Somewhat unhappy	6	2.4%	0	0.0%	2	2.4%	0	0.0%	0	0.0%	0	0.0%
Neither happy nor unhappy	4	1.6%	1	4.3%	4	4.8%	1	25.0%	0	0.0%	2	7.7%
Somewhat happy	30	12.0%	1	4.3%	8	9.6%	0	0.0%	1	16.7%	2	7.7%
Mostly happy	54	21.7%	2	8.7%	14	16.9%	2	50.0%	2	33.3%	2	7.7%
Very happy	137	55.0%	16	69.6%	47	56.6%	1	25.0%	3	50.0%	18	69.2%
<i>How satisfying is it physically?</i>												
Not at all	4	1.6%	2	8.7%	3	3.6%	0	0.0%	0	0.0%	0	0.0%
Somewhat	14	5.6%	0	0.0%	1	1.2%	0	0.0%	1	16.7%	2	7.7%
Moderately	40	16.1%	6	26.1%	17	20.5%	1	25.0%	1	16.7%	9	34.6%
Very	104	41.8%	8	34.8%	28	33.7%	1	25.0%	4	66.7%	9	34.6%
Extremely	87	34.9%	7	30.4%	33	39.8%	2	50.0%	0	0.0%	6	23.1%
<i>How satisfying is it emotionally?</i>												
Not at all	4	1.6%	2	8.7%	2	2.4%	0	0.0%	0	0.0%	0	0.0%
Somewhat	9	3.6%	0	0.0%	6	7.2%	0	0.0%	0	0.0%	1	3.8%
Moderately	34	13.7%	5	21.7%	17	20.5%	1	25.0%	1	16.7%	9	34.6%
Very	104	41.8%	7	30.4%	28	33.7%	1	25.0%	5	83.3%	11	42.3%
Extremely	98	39.4%	9	39.1%	29	34.9%	2	50.0%	0	0.0%	5	19.2%

DISCUSSION

Key Findings

In our prior work exploring sex and gender differences in relationship satisfaction over time [1], we found that females typically rated their physical and emotional satisfaction at lower levels than males. When focusing next specifically on sexual frequency among people with diabetes [2], we then found that sexual frequency, even when lower than desired, did not necessarily equate to less sexual and romantic interest. Blending insights from each of these prior analyses, here we examined relationship satisfaction among people with diabetes specifically to continue the process of further integrating the experiences of people living with diabetes into growing fields of sexual and gender health research. In so doing, we find some intriguing patterns that could

facilitate more systematic research on the romantic, sexual, and gendered experiences of individuals and couples living – and loving – with diabetes.

Of particular note, as demonstrated above, is that people with diabetes generally rate their relationships very highly overall. This is similar to other findings among people who are in relationships in later life, and suggests that, as has been the case with others, the relationships of people with diabetes, or people with romantic partners living with diabetes, may be a fruitful area of study beyond questions about sexual frequency or function. In fact, people with diabetes mirror the broader older population by rating overall relationship status generally high, regardless of level or frequency of sexual activity, but varying along gendered lines in terms of specific emotional and physical satisfaction within relationships [1]. Specifically, females tend to express

Table 6c. Relationship Satisfaction by Education Among People with Diabetes (n = 390)

	No Degree		HS Diploma or GED		Associate's Degree		Bachelor's Degree		Master's Degree		Doctoral Degree	
<i>How happy is your relationship?</i>												
Very unhappy	5	4.7%	6	4.0%	3	4.6%	1	2.4%	0	0.0%	0	0.0%
Mostly unhappy	1	0.9%	1	0.7%	3	4.6%	0	0.0%	0	0.0%	0	0.0%
Somewhat unhappy	0	0.0%	5	3.4%	3	4.6%	0	0.0%	0	0.0%	0	0.0%
Neither happy nor unhappy	6	5.7%	4	2.7%	1	1.5%	0	0.0%	0	0.0%	1	16.7%
Somewhat happy	9	8.5%	16	10.7%	6	9.2%	4	9.5%	5	22.7%	2	33.3%
Mostly happy	13	12.3%	30	20.1%	15	23.1%	12	28.6%	6	27.3%	0	0.0%
Very happy	72	67.9%	87	58.4%	34	52.3%	25	59.5%	11	50.0%	3	50.0%
<i>How satisfying is it physically?</i>												
Not at all	2	1.9%	4	2.7%	1	1.5%	1	2.4%	1	4.5%	0	0.0%
Somewhat	7	6.6%	6	4.0%	3	4.6%	0	0.0%	1	4.5%	1	16.7%
Moderately	21	19.8%	33	22.1%	12	18.5%	3	7.1%	5	22.7%	0	0.0%
Very	42	39.6%	54	36.2%	25	38.5%	20	47.6%	9	40.9%	4	66.7%
Extremely	34	32.1%	52	34.9%	24	36.9%	18	42.9%	6	27.3%	1	16.7%
<i>How satisfying is it emotionally?</i>												
Not at all	2	1.9%	4	2.7%	0	0.0%	1	2.4%	1	4.5%	0	0.0%
Somewhat	3	2.8%	6	4.0%	5	7.7%	0	0.0%	1	4.5%	1	16.7%
Moderately	22	20.8%	27	18.1%	12	18.5%	2	4.8%	4	18.2%	0	0.0%
Very	32	30.2%	56	37.6%	28	43.1%	17	40.5%	10	45.5%	3	50.0%
Extremely	47	44.3%	56	37.6%	20	30.8%	22	52.4%	6	27.3%	2	33.3%

significantly lower emotional and physical satisfaction than males, and as a result, they mirror the responses of women with and without chronic health conditions in later life and stable, long term relationships. These observations direct attention to the importance of systematically exploring and cataloguing the relational, romantic, gendered, and sexual experiences of people with diabetes as well as the ways such people and their partners – with or without diabetes – manage and make sense of these dynamics.

Our analyses also suggest smaller variations related to race, educational attainment, and types of relationships that might be teased out with more in-depth data collection on people in relationships who manage diabetes and other chronic health conditions. Although such a study could take a wide variety of forms, one avenue might include interviewing couples about the ways diabetes, gender, and sexual desires and practice influence their relationships over

time, as well as the ways they make sense of aging, gendered, sexual, and health-related concerns within the relationship. These observations also suggest that more robust survey efforts be developed. Future research focused on the lives of people living and loving with diabetes might yield significant insights and revelations concerning the intersection of sexual frequency, sexual desire, relationship satisfaction, physical satisfaction, and emotional satisfaction -- if each of these variables could be collected and explored together in a comparative manner. Finally, considering the sex and gender pattern found here and mirroring broader studies of gender, relationships and health, it may be useful to integrate studies and findings related to diabetes, gender, and sexualities into broader gender literatures seeking to understand the life course of cisgender and transgender women over time. Each of these threads could begin to further solidify a tapestry of understanding related to health,

gender, and sexuality that could benefit both people living with diabetes and research efforts in these fields.

Strengths

We began our study with substantial samples of people with ($n = 390$) and without ($n = 1,540$) diabetes. These sample sizes are often regarded as adequate even for basic inferential analysis, but any such effort should always begin with a thorough descriptive epidemiology [6]. Taking this detailed descriptive approach using fully inclusive ranges of sociodemographic categories and response options allowed us to illuminate potential intersectional inequalities relevant for disease management and quality of life maintenance in populations with diabetes.

Because we only used data from Wave I of the NSHAP to assess condition frequencies, we avoided potential issues with cohort inversion -- the phenomenon of people appearing healthier than their peers midway at later points in a longitudinal study because their cohort peers died after earlier waves of data collection [7]. Our cross-sectional approach using data for the full initial NSHAP cohort largely prevented the possibility of cohort inversion and associated bias. That said, we stress that our study focused on older adults only. Our observations should not be generalized to earlier portions of the life course, although they can certainly inspire further inquiry using data on youth through early midlife. Indeed, diabetes may only develop for some people in later portions of the life course [8]. For others, congenital and earlier-onset diabetes may impact relationship satisfaction and overall quality of life differently as they age [9].

Limitations

The NSHAP's lack of discrimination between populations with type 1 diabetes, type 2 diabetes, and complex cases involving elements of both type 1 and type 2 diabetes introduced substantial limitations into our analysis. Extant research and our own prior work suggest that many social health impacts of living with diabetes may be at least somewhat shared among people with diabetes as an aggregate group [10]. However, we cannot say with any level of confidence that we would see consistent patterns for each group affected by diabetes were we to replicate this

study using detailed information about each participant's endocrine history.

We also had a very small sample of people with diabetes absent other chronic conditions ($n = 19$) compared to a much larger sample of people with diabetes and comorbidities ($n = 371$). This placed further limitations on our ability to capture variation among people with diabetes as an overall group. We also could not comment with any certainty on whether these 19 people actually did not have other chronic conditions, or if they simply had not been diagnosed with conditions that were already present. Rates of comorbidity among chronic conditions are high in the general population and even more so among people with diabetes [11]. Even if we had been able to say with absolute certainty that our "diabetes only" group had no other chronic conditions, that certainty would only extend to the 16 other chronic conditions assessed by the NSHAP.

We thus also stress the importance of interpreting our findings for the "no chronic conditions" group conservatively. People in this category did not necessarily have no chronic conditions at all, only none of the specific diseases captured by the 16 other chronicity variables in NSHAP. Because of this, our reasonably solid general understanding of NSHAP participants' health status was tempered by our limited ability to articulate the nuances and complexities of these health states. We once again reiterate our advocacy 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 [12]. Diagnosis data introduce a variety of limitations on research that aims to capture the experience of chronic conditions [13] and this may be especially true for conditions like diabetes that are disproportionately prevalent in the very populations least likely to have consistent access to health care [14].

As noted previously, "nationally representative" datasets may only capture a portion of the sociodemographic variation within a given population [4]. In general, people of non-dominant identities are often excluded from response options and even complete questions that describe important elements of their lives [4]. In the NSHAP specifically, sexuality is not captured as an explicit measure, although the dataset does include some information about the sex of previous intimate partners. Intersex identity is not captured by the measure of sex groupings, and gender identity is not captured as a distinct construct from assigned sex. Although people with these characteristics may well be included in the total participant pool, we cannot compare and contrast their

experiences with those of their peers from more dominant social groups using this particular dataset. With respect to analysis of relationship satisfaction across sex groups among our participants with diabetes, we might well have seen more nuanced patterns had we been able to describe their gender identities and sexualities, and to capture their sex identities more inclusively. We thus sustain our call for increased attention to the diversity of sex, gender, and sexuality in research on physical health [15] and extend this recommendation to scholarship on diabetes specifically.

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. No outside funding was used in support of this research.

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