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## Background:

- Sexual lifestyles including sexual activity, problems, satisfaction, and the formation and maintenance of relationships, are greatly affected by physical health.
- The energy expended during sexual activity among young subjects may sometimes qualify as a significant exercise, particularly for men, some of whom expend more energy during sexual activity than during 30 minutes of moderate intensity exercise on a treadmill.
- Data are limited regarding the sexual lifestyle of young adults with type 1 diabetes (T1DM).
- Fear from hypoglycemic episodes during sexual intercourse and intimacy issues can impact individuals with T1DM.
- The aim of this study was to assess sexual lifestyles of individuals with T1DM.

## Methods:

Patients diagnosed with T1DM and followed in the Juvenile Diabetes Clinic, Maccabi Health Care Services, Raanana, Israel composed the study cohort. Inclusion criteria were age  $\geq 18$  years, disease duration of at least 1 year. During their clinic visit patients completed a questionnaire assessing demographic and clinical information, including: gender, age of onset of diabetes, disease duration, mode of diabetes treatment and HbA1c level. Participants completed the Hypoglycemia Fear Survey II (HFS II) and the Sex Practices and Concerns Survey questionnaire. The study was approved by the institutional review board of Maccabi Health Care Services.

## Results:

The study population comprised 53 patients, 27 (51%) males. Their mean $\pm$ SD age was 27.8 $\pm$ 8.2 years; age at diabetes onset was 13.8 $\pm$ 8.0 years; Mean HbA1c was 8.1 $\pm$ 1.7%. The majority of patients were single 39(74%), 13(24%) were married and 1(2%) was divorced. The mean age at onset of sexual intercourse was 18.2 $\pm$ 1.9 years (range, 15.5-22.0)

### Sex Practices and Concerns Questionnaire (Table 1)

37(70%) reported that they never or almost never had concerns about having sex because of their diabetes, 21(40%) reported occasional mild hypoglycemic events during sex. Fear of hypoglycemia during sex was reported by 18 (35%) of the patients; 48(92%) reported not avoiding sex because of diabetes; 31 (59%) never or almost never measure their glucose level before, but only 19(37%) do not measure after sex. 43 (84%) never or almost never decrease their insulin dose; 26 (55%) do not prepare any emergency supplies for treating hypoglycemia before sex.

### Characteristics of Patients who Reported Fear of Hypoglycemia During Sex (Table 2).

- Among those who expressed fear from hypoglycemia, more were single than married (94.4% vs. 64.7%,  $p=0.02$ ); more were males (61.1% vs. 44.1%), and more were treated with insulin pumps (76.5% vs. 58.8%).
- Of those who reported fear, a higher proportion experienced mild hypoglycemic episodes during sex than did those who did not report fear.
- Of those who reported fear only 82.3% reported they can differentiate signs of excitement from signs of hypoglycemia during sex, compared with 100% of those who do not fear from hypoglycemia during sex,  $p=0.03$ .
- A higher proportion of those who reported fear of hypoglycemia during sex reported eating before sex, and measure glucose levels after sex.

### Hypoglycemia Fear Survey-II (Table 3)

- Those who expressed fear of hypoglycemia during sex tended to score higher on the total HFS II and on the Worries subscale than did those who did not express fear
- Individuals who reported experiencing hypoglycemic events during sex scored higher on both the Behavior and Worries subscales than did those who reported not experiencing hypoglycemic events.
- In the Behavior subscale, the mean score was higher for females than males; and for those who were single than those who were married.

Table 1. Sex practices and concerns of patients with T1DM

	Never	Mostly not	Sometimes	Very often	Always
	n (%)				
How often do you have concerns regarding sex that are related to your diabetes?	25 (47)	12 (23)	9 (17)	6 (11)	1 (2)
How often do you have severe hypoglycemic episodes during sex?	100 (53)				
How often do you have hypoglycemic episodes during sex?	10 (19)	22 (41)	18 (34)	3 (6)	0 (0)
Can you differentiate signs of hypoglycemia from excitement during sex?	0 (0)	4 (8)	3 (6)	20 (39)	24 (47)
How often are you worried about having hypoglycemia during sex?	18 (34)	16 (31)	13 (25)	2 (4)	3 (6)
Do you avoid sex because of diabetes?	43 (83)	5 (9)	3 (6)	0 (0)	1 (2)
Do you avoid alcohol before sex because of diabetes?	29 (57)	12 (23)	2 (4)	1 (2)	7 (14)
Do you measure your glucose level before sex?	18 (34)	13 (25)	14 (27)	3 (6)	4 (8)
Do you measure your glucose level after sex?	7 (14)	12 (23)	23 (45)	4 (8)	5 (10)
Do you decrease insulin dose before sex?	37 (72)	6 (12)	5 (10)	2 (4)	1 (2)
Do you eat before sex to avoid hypoglycemia?	19 (36)	13 (25)	13 (25)	6 (11)	2 (3)
Do you prepare emergency supplies near the bed?	21 (40)	8 (15)	8 (15)	5 (9)	11 (21)
Do you disconnect the pump before sex?	0 (0)	1 (3)	3 (9)	7 (21)	22 (67)
How often do you forget to connect the pump after sex?	8 (24)	16 (49)	9 (27)	0 (0)	0 (0)
If you are single, do you tell your partner about your diabetes?	1(3)	0(0)	6(15)	3(8)	29(74)
How often do you disconnect the infusion set before sex?	29 (88)	3 (9)	1 (3)	0 (0)	0 (0)

Table 2: Sex practices and concerns of participants who fear hypoglycemia during sex and those who do not fear

Sex practices and concerns	Fear of Hypoglycemia During Sex In Patients with Type 1 diabetes		
	Do fear N=18 n(%)	Do not fear N=34 n(%)	P value
Have concerns regarding sex that are related to diabetes	8 (44.4)	7 (20.6)	0.07
Mild hypoglycemic episodes during sex	11 (61.1)	9 (26.5)	0.01
Ability to differentiate signs of hypoglycemia	14 (82.3)	33 (100)	0.03
Avoid sex because of diabetes	3 (16.7)	1 (3.0)	0.12
Avoid alcohol before sex because of diabetes	5 (29.4)	4 (12.1)	0.13
Measure glucose levels before sex	9 (50.0)	11 (33.3)	0.24
Measure glucose levels after sex	14 (77.8)	17 (53.1)	0.08
Decrease insulin dose before sex	4 (23.5)	3 (9.1)	0.21
Eat extra snack before sex to avoid hypoglycemia	10 (55.6)	10 (29.4)	0.06
Prepare emergency supply near bed	9 (50.0)	14 (41.2)	0.54
Disconnect the pump before sex	12 (92.0)	19 (95.0)	0.99
Forget to connect to pump after sex	5 (41.7)	3 (15.0)	0.12
Telling partner about diabetes (if single)	16(100)	21(95.4)	0.99
Disconnect the infusion set before sex	0	1 (5.0)	0.99

Table 3: Total and subscores on the HFS II, according to demographic and disease characteristics

Characteristics	n	Total score Mean $\pm$ SD	P value	Behavior Subscore Mean $\pm$ SD	P value	Worry Subscore Mean $\pm$ SD	P value
FOH during sex							
No	34	62.3 $\pm$ 15.8	0.06	27.4 $\pm$ 7.0	0.14	34.9 $\pm$ 10.5	0.04
Yes	18	71.9 $\pm$ 16.8		29.3 $\pm$ 5.8		42.8 $\pm$ 12.8	
Gender							
Male	27	62.2 $\pm$ 15.7	0.13	26.2 $\pm$ 5.0	0.04	36.1 $\pm$ 13.3	0.28
Female	26	69.2 $\pm$ 16.8		30.8 $\pm$ 7.5		39.2 $\pm$ 11.2	
Age, years							
18-25	27	66.2 $\pm$ 16.8	0.97	28.3 $\pm$ 6.8	0.85	37.8 $\pm$ 11.8	0.99
$\geq 26$	26	65.2 $\pm$ 16.4		27.8 $\pm$ 6.4		37.5 $\pm$ 11.9	
Family status							
Single	40	68.3 $\pm$ 16.9	0.07	29.2 $\pm$ 6.7	0.02	39.1 $\pm$ 12.0	0.17
Not single	13	57.5 $\pm$ 12.5		24.5 $\pm$ 4.8		33.2 $\pm$ 10.0	
Disease duration, years							
2-9	16	68.9 $\pm$ 17.7	0.62	30.1 $\pm$ 6.7	0.85	38.8 $\pm$ 12.8	0.94
10-19	25	65.6 $\pm$ 17.0		28.0 $\pm$ 6.7		37.6 $\pm$ 12.1	
$\geq 20$	12	61.2 $\pm$ 13.6		25.3 $\pm$ 5.4		36.0 $\pm$ 10.1	
HbA1c, %							
<8.5	33	66.4 $\pm$ 17.2	0.31	28.5 $\pm$ 6.5	0.85	37.9 $\pm$ 12.1	0.32
$\geq 8.5$	14	60.3 $\pm$ 11.0		26.5 $\pm$ 5.7		33.8 $\pm$ 6.5	
Mild hypoglycemia during sex							
No	32	62.3 $\pm$ 17.1	0.03	27.6 $\pm$ 7.2	0.20	34.7 $\pm$ 11.4	0.02
Yes	21	70.9 $\pm$ 14.3		28.9 $\pm$ 5.6		42.1 $\pm$ 11.0	
Pump							
No	18	64.6 $\pm$ 16.4	0.70	29.1 $\pm$ 6.2	0.85	35.5 $\pm$ 12.1	0.28
Yes	34	66.1 $\pm$ 17.0		27.4 $\pm$ 6.8		38.8 $\pm$ 11.7	

## Conclusions :

- Both ends of the spectrum, those who do not fear from hypoglycemia and those who do fear, need special attention.
- Those who do not take measures should be educated about the level of intensity that is exerted during sexual activity, which may be considered as significant exercise; and that measures should be taken to avoid hypoglycemia.
- Those who do fear should be provided practical tools to prevent hypoglycemia and to enhance their quality of life.
- Caregivers should be aware that about one-third of individuals with T1DM fear having hypoglycemia during sex