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Novel approach to hypoglycemia surveillance in an international online diabetes social network

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Objective

To measure the prevalence of hypoglycemic episodes and associated harms among participants in an international, online diabetes social network.

Introduction

Hypoglycemia is a serious sequel of diabetes treatment that is not tracked by current health surveillance efforts despite substantial related morbidity and mortality (1). We take a novel approach to hypoglycemia surveillance, engaging members of an international online diabetes social network (SN) in reporting about this issue as members of a consented, distributed public health research cohort.

Methods

We collected structured self-reported data about hypoglycemia and related harms using a software application called TuAnalyze that supports SN-mediated health research (2). Odds for harms were estimated controlling for demographics, diabetes type and health insurance.

Results

Of 2538 TuAnalyze users, 608 (24% response rate) completed two complementary surveys on hypoglycemia and diabetes care. Of these, 169 (27.8%) reported ≥ 1 severe low in the past 12 months. Harms were high; one in seven reported an accident or serious injury; over 40% reported high daily worry, and the frequency of reported withdrawal behaviors ranged from 20 to 50%. Experience of ≥ 1 past 12-month severe low was associated with added risk for each of the six harms, and for experiencing multiple harms. (Tables 1 and 2).

Conclusions

Hypoglycemia prevalence is high and exerts a considerable toll in terms of physical and social harms in this sample of predominantly type 1 or insulin-treated patients. Hypoglycemia

Table 1. Sample demographics and disease indicators

Total sample (N = 608)	N (%)	Average (median, range)
Male	243 (40)	–
White	546 (90)	–
U.S location	523 (86)	–
Type 1 and LADA	483 (79.4)	–
Insulin user	541 (89)	–
Health insurance	560 (92.1)	–
Age (yr)	–	44.8 (46, 14–83)
Severe lows/past 12 months	–	4 (0, 0–400)
Diabetes duration (yr)	–	17.9 (15, 0–67)

Table 2. Prevalence of recent and severe hypoglycemia and associated risks for harms

	Total N (%)	N (%) ≥ 1 severe event	N (%) 0 severe events	OR (95% CI) ≥ 1 severe event[†]
Total sample	608 (100)	169 (27.8)	439 (72.2)	
Harms, including withdrawal behaviors (6):				
History of accident or injury	89 (14.7)	47 (28.1)	42 (9.6)	3.6 (2.2, 5.9)***
Worry about hypo affects daily life	254 (41.8)	107 (63.3)	147 (33.5)	3.3 (2.2, 4.9)***
Limit driving	215 (35.4)	91 (53.9)	124 (28.3)	2.6 (1.8, 3.9)***
Stay home more than would like	137 (22.5)	62 (36.7)	75 (17.1)	2.9 (1.9, 4.4)**
Avoid exercise	305 (50.2)	107 (63.3)	198 (45.1)	1.9 (1.3, 2.8)**
Avoid sex	126 (20.7)	47 (27.8)	79 (18)	1.8 (1.1, 2.7)*
Multiple adverse outcomes (≥ 2 of 6)	303 (49.8)	119 (70.4)	184 (41.9)	3 (2, 4.5)***

*$p < .05$ **$p < .01$ ***$p < .0001$.
†Adjusted for age, sex, race, diabetes type, health insurance

surveillance is feasible using a novel approach that affords opportunity for bidirectional communication and tracking—capabilities important to ameliorating this problem.

Keywords

Diabetes; hypoglycemia; surveillance; social networking

References

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