

TYPE 2.0



PUBLICATION SUMMARY

This internet survey of adults in the United States using insulin to treat type 1 (n=114) or type 2 (n=388) diabetes identified factors associated with patients intentionally skipping insulin injections.

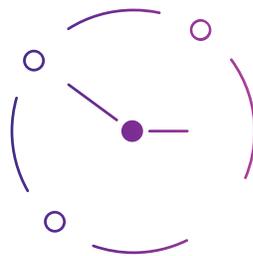
Peyrot M, Rubin RR, Kruger DF, Travis L. Correlates of insulin injection omission. *Diabetes Care*. 2010;33:240-245.

Results

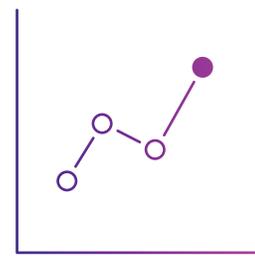
Intentional omission of insulin injections was common



57% of all respondents had skipped insulin injections they knew they should take



~20% of all respondents "sometimes" or "often" skipped insulin injections



Even though concern about hypoglycemia was high in the study population, it did not predict intentional omission of insulin injections

Selected profile results for patients with type 2 diabetes (T2D)	Type 2 diabetes (n=388)
Insulin injection device: Pen	29%
Insulin injection device: Syringe	71%
Changing needle each use	58%
Daily injection frequency	2.5 ± 1.3
Planning daily activities around insulin injections	19%
Interference with eating and exercise*	1.6 ± 0.8
Interference with activity of daily living*	0.5 ± 1.0
Dissatisfaction with time needed for injection†	2.1 ± 0.9
Dissatisfaction with injection ease of use†	2.0 ± 0.9
Dissatisfaction with injection pain‡	2.3 ± 0.9
Dissatisfaction with injection inflammation/bruising‡	2.5 ± 1.0
Dissatisfaction with injection embarrassment‡	2.0 ± 0.9
Negative effect toward injections‡	1.9 ± 0.9
Worrying about hypoglycemia*	2.7 ± 0.9
Skipping insulin injections§	1.8 ± 0.8

Data are % or means ± SD, unless otherwise stated.
* 1 = not at all, 2 = a little, 3 = a moderate amount, 4 = a great deal.
† 1 = very satisfied, 2 = satisfied, 3 = somewhat satisfied, 4 = not at all satisfied.
‡ 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree.
§ 1 = never, 2 = rarely, 3 = sometimes, 4 = often.

- The majority (71%) of patients with T2D use a syringe (*needle*) to inject insulin
- Most T2D patients (58%) changed their needle with each injection
- T2D patients reportedly took an average of 2.5 injections per day

Factors affecting intentional insulin omission

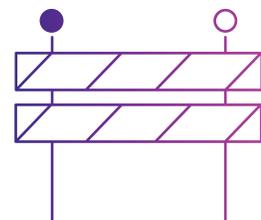
- Risk factors differed between T1D and T2D patients
 - *Diet nonadherence was more prominent in type 1 diabetes*
 - *Age, education, income, pain and embarrassment were more prominent in T2D*
- Respondents significantly less likely to skip injections included older subjects, disabled subjects, those with higher household income, or subjects who followed a healthy diet
- Subjects significantly more likely to skip injections were younger (*students*), had the highest education or had T2D and took more injections
- Four measures of injection burden were associated with higher levels of intentional insulin omission
 - *Two aspects of interference (planning one's activities around insulin injections and injections interfering with activities of daily living)*
 - *Two aspects of the injection process itself (pain and embarrassment)*
- Having T2D was itself associated with higher levels of intentional omission of insulin injections

Interpretation of results

- This study appears to be among the first to identify an association between socioeconomic status and insulin omission
- Respondents with higher household income, but not individuals with more education, were less likely to skip insulin injections they knew they should take
 - *This may reflect easier access to medications and supplies among individuals with higher income, but higher socioeconomic status may also be associated with more access to diabetes education, higher health literacy, greater control over one's daily routines, and better problem-solving skills¹*
- Two aspects of patients' treatment regimens were associated with increased insulin omission—respondents who took more injections each day and those who did not follow a healthy diet
 - *The association between dietary nonadherence and insulin nonadherence is not surprising.*
 - *More frequent injection omission among individuals taking more injections could reflect the frequently reported finding that more complex regimens are associated with lower levels of adherence.² It might also be that the impact of skipping a shot is reduced among individuals who take more shots*
- Insulin omission is affected by the perceived burden of insulin therapy (i.e., *having to plan one's life around insulin injections and feeling that the insulin regimen interferes with activities of daily living such as social activities, work-related activities and family caregiving responsibilities*)
 - *The authors suggested that it is not that the behavior of planning one's day around insulin injections actually increases the level of insulin injection omission, but that feeling that one has to plan around one's injections is associated with higher frequency of skipping insulin injections one should take*
- The independent association of T2D with increased insulin omission
 - *This may reflect the fact that patients with T2D have a residual insulin response, reducing the immediate consequences of omitting an injection. Thus, they may feel less vulnerable to the effects of skipping insulin injections they know they should take*

Reducing intentional insulin omission

- Identify patients at risk and address their concerns
- Reduce the perceived burden of insulin injections
 - *Numerous device-related strategies are available to reduce pain and embarrassment, including insulin pens, finer-gauge needles, injection ports, needleless injectors and other injection assistance devices*
- Addressing pain and embarrassment may reduce insulin omission and the emotional burden of injections, thereby enhancing psychological well-being



Study strengths and limitations

- Strengths

- Large sample size that represents the general national population

- Limitations

- No objective measures of insulin use
- Specific measure of insulin omission (skipping injections that respondents knew they should take), some respondents may include injections that they did not skip intentionally but simply forgot to take. May also include injections appropriately skipped because meal was not eaten or blood glucose levels were very low
- May underestimate the level of insulin nonadherence in this population because it did not capture instances in which patients took an injection, but took less than the amount of insulin they knew was needed for optimal glucose control

References:

1. Link BG, Phelan JC, Miech R, Westin EL. The resources that matter: fundamental social causes of health disparities and the challenge of intelligence. *J Health Soc Behav.* 2008;49:72-91.
2. Rubin RR. Adherence to pharmacologic therapy in patients with type 2 diabetes mellitus. *Am J Med.* 2005;118(Suppl. 3):27S-34S.