

The Impact of Memory Issues on Diabetes Treatment in China

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Background

- Memory issues (MIs), such as unintentional forgetting to take an insulin dose and questioning whether or not a dose was taken, due to poor memory can result in poor adherence to insulin regimes as well as the functional and emotional consequences which are linked to poor glycemic control associated with poor adherence.¹
- The impact of patient insulin taking behavior, functioning, well-being and diabetes management is not well understood.
- Known factors for *intentionally* skipping or missing treatments include younger age, lower income and higher education, type 2 diabetes, unhealthy diet, more daily injections, impact of injections with daily activities, injection pain and embarrassment²
- A recent global survey of unintentional dosing irregularities found that within the previous month, 22% of patients missed a basal insulin dose (mean 3 times) and 24% took a basal insulin dose over two hours beyond the scheduled time (mean 4.2 times) - the majority of these were unintentionally missed or mistimed³
- Additionally, 39% of patients worried if they missed their basal insulin dose and 37% felt guilty about missing their dose³
- The purpose of this study was to examine the impacts of MIs in China, the country with the largest diabetes population in the world.

Methods

- A web-based survey examining circumstances leading to the memory issue (MI), corrective actions taken, and impact on health, well-being and diabetes management was conducted
- MIs were defined as:
 - UF - unintentionally forgetting to take insulin,
 - QT - questioning whether or not insulin had been taken,
 - QD - questioning how much insulin was taken
- Survey questions were generated based on qualitative analysis of 3 focus groups in China with persons with diabetes who had at least one MI in the previous 3 months
- Time period for survey questions was "in the last month"

Results

- The major reason for all types of MIs was "being busy"
- Most MIs occurred at work
- For all types of MIs, the majority of respondents tested their blood sugar and took a dose of insulin based on that reading **HOWEVER** at least 1/5 of respondents "did nothing"
- Unintentional forgetting to take a dose had the most long lasting consequences on glucose control, functioning and well-being (between 10 -23 hours) although both QT and QD also impacted respondents for at least 5 hours
- During this time, there is a negative impact on physical and emotional functioning both during performing daily activities as well as at work
- MIs result in increased blood glucose monitoring as well as visits/calls to health care professionals, both of which may contribute to increased cost of care

Diabetes Characteristics

Characteristic		N=354
Age Diagnosed	Mean (SD)	36.9 (10.0)
Diabetes Type	N (%)Type 1	217 (61.3)
	N (%)Type 2	137 (38.7)
Age 1 st took insulin	Mean (SD)	38.7 (11.8)
Insulin method	N (%) Syringe	102 (28.8)
	N (%) Prefilled pen	252 (71.2)
Oral meds	N (%) Yes	198 (55.9)
How often monitor blood sugar on an average day	Mean (SD)	1.8 (1.2)
How well controlled	N (%) Well-Very Well	177 (50.0)
Health Status	N (%) G/V/G/E	193 (54.5)

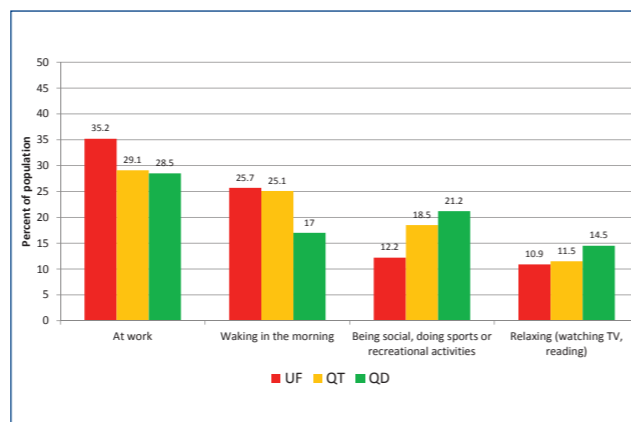
Memory Issues Characteristics

		N (%)
You were sure you missed (did not take) an insulin dose ; you did not question whether or not you missed your dose. This was not deliberate or intentional and may be because you didn't have your insulin or pen/needles/vial with you or they were not available	UF	264 (74.6)
You questioned yourself, or were unsure, about whether or not you took an insulin dose	QT	294 (83.1)
You questioned yourself, or were unsure, about how much insulin you took	QD	233 (65.8)

Memory Issues By Treatment Group

		UF N=264	QT N=294	QD N=233
Basal Only	Count	42	62	41
	Col %	15.9%	21.1%	17.6%
Basal Bolus	Count	182	174	145
	Col %	68.9%	59.2%	62.2%
Premixed	Count	40	58	47
	Col %	15.2%	19.7%	20.2%

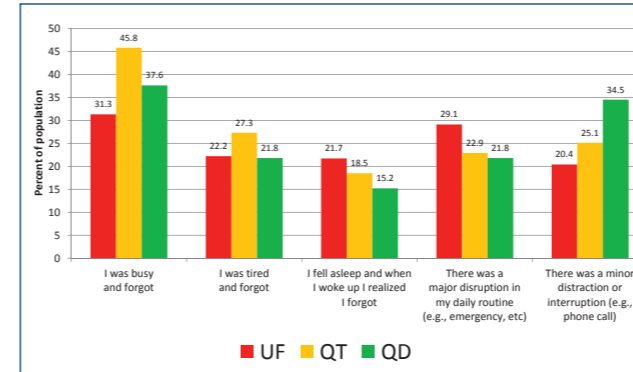
What were you doing when you realized/questioned?



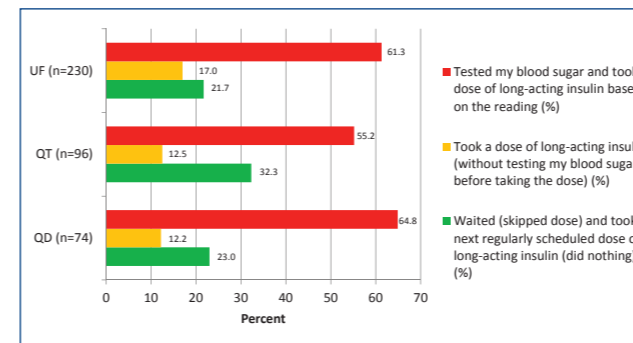
Sample Description

Subject Characteristic		N=354
Age	Mean (SD)	43.2 (13.4)
	Range	25-70
Gender	N (%) Male	209 (59.0)
Marital Status	N (%) Married/ Partnered	308 (87.0)
	N (%) Single	35 (9.9)
Education	N (%) High School	35 (9.9)
	N (%) College/ Grad School	319 (90.1)
Work for Pay	N (%) Yes	313 (88.4)
Hours worked, n=313	Mean (SD)	39.6 (6.2)
Trouble remembering	N (%) Mod-Severe	44 (12.4)

Top Reasons for Memory Issues



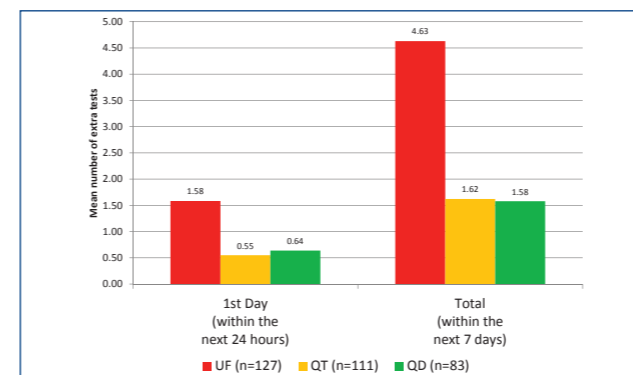
Corrective Actions Taken



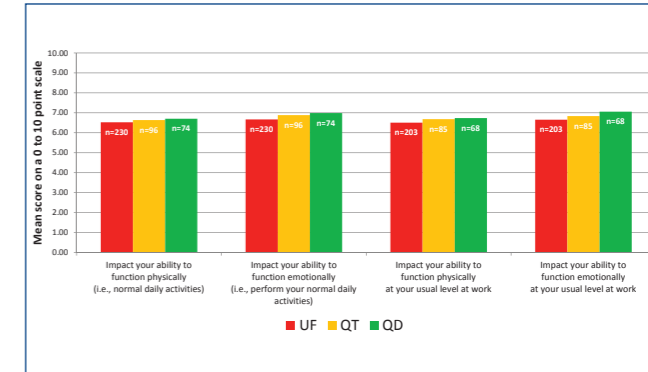
Impact of High Blood Sugar as Result of Memory Issue

	UF (n=230)	QT (n=227)	QD (n=165)
This last time, how long did it take for you to get your high blood sugar levels back into a normal range? Mean hours (SD)	10.1 (20.6)	5.5 (17.1)	4.9 (18.9)
How long did it take for all of your high blood sugar symptoms to go away? Mean hours (SD)	14.2 (30.0)	7.2 (20.2)	6.2 (19.8)
How long did it take until you felt you were physically functioning again at your usual normal level? Mean hours (SD)	20.2 (49.4)	8.7 (25.3)	7.3 (23.7)
How long did it take until you felt you were emotionally functioning again at your usual normal level? Mean hours (SD)	23.0 (45.4)	10.4 (30.9)	9.3 (30.1)

Corrective Actions Taken : Additional BG testing



Ability to Function



Impact of Memory Issues on Lost Work Productivity, and Healthcare Contact

	UF	QT	QD
This last time, did you go to see your physician, or other health care professional, because of missing, or because of how you felt due to missing, this long-acting dose? Yes, n (%)	52 (40.9)	18 (16.2)	14 (16.9)
Did you miss a full day of work? Yes, n (%)	23 (11.5)	9 (10.7)	9 (13.4)

Conclusions

- In China, the prevalence of memory issues is high and in at least half the population occur at least monthly
- Consequences of memory issues, especially missing a dose, is non-trivial
- Missing a dose (UF) or questioning if took dose (QT) is more of an issue than questioning how much insulin taken (QD)
- Memory issues may represent:
 - an important obstacle for optimal glycemic control as at least a third of patients either took an additional or skipped their insulin dose **WITHOUT** testing their blood sugar
 - a contributor to increased cost of care
 - an important contributor to burden of illness
- A subset of patients may benefit from insulin delivery systems which include an easily read and understood memory device

References

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