Insulin Perceptions of Adult Type 2 Diabetes Patients at Eastwood Health Center: A Pilot Study

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ABSTRACT

The 3-week cohort study consisted of a self-administered "Insulin Perceptions Questionnaire" adapted from DAWN (Diabetes Attitudes Wishes and Needs). The study was conducted with the adult patient population at El Centro de Corazon's family medicine clinic, Eastwood Health Center. The participants in the study were adults 18 years and older with a diagnosis of Type 2 diabetes without prior exposure to insulin. Seventy-eight percent of the participants were monolingual Spanish speakers. The survey identified different areas concerning insulin perceptions. A negative correlation was found between perceived benefits of insulin and fears/discomforts and others perceptions. There was no link found between acculturation and perceived insulin benefits. In addition, Spanish speakers were found to have higher positive insulin benefits perceptions while English respondents more strongly agreed that the use of insulin could lead to worse health status.

Keywords: adults, type 2 diabetes, insulin, insulin perception, psychological insulin resistance (PIR), Eastwood, El Centro del Corazon

INTRODUCTION

Diabetes is a metabolic disorder consisting of high blood sugar levels due to lack of secretion and/or insulin insensitivity by the human body (Berkowitz, 2014). When food is broken down, it produces glucose for the cells throughout the body to use for energy. The cells use insulin, a hormone produced by the pancreas, to absorb the glucose. Insufficient insulin leads to the inability of glucose to move from the blood stream into the cells, leading to hyperglycemia or high blood sugar.

The Centers for Disease Control and Prevention (2014) estimate that 29.1 million individuals in the US have diabetes. In 2010, 1.8 million adults had a diagnosis of diabetes in Texas (Texas Department of State Health Statistics, 2012). There is specially a high prevalence

in underserved populations like African American and Hispanic communities (CDC, 2014). Between 2010 and 2012 among US adults 20 years and older diagnosed with diabetes, 12.8% were Hispanic and 13.2% were non-Hispanic black in comparison to 7.6% non-Hispanic whites (CDC, 2014). In Texas, 11.0% of the adult Hispanic population has diabetes (Texas Department of State Health Statistics, 2012).

At El Centro de Corazon, a Federally Qualified Health Center in the east end of Houston, Texas, I witnessed the high prevalence of diabetes, counseling for pre-diabetics, and the resistance to using insulin. Ninety-three percent of the clinic's patient population is Hispanic and 9.6% of its adult patient population had diabetes while many others were in the pre-diabetic stage. Dr. Young, El Centro de Corazon's medical director, stated that the resistance to insulin use is a multifactorial problem. Many patients do not want to stick themselves. They are afraid quality of life may be affected. Patients do not want to be tied to the needle and perceive insulin as being too expensive. Some think being started on insulin indicates the end of their life. Dr. Young also reported that how providers present information related to insulin and diabetes is also a factor in how patients respond to the addition of insulin to diabetes management. She stated that providers need to change their attitudes and present information about diabetes management without instilling fear regarding the complications.

The purpose of this project is to understand the perceived barriers for insulin use of adult type 2 diabetes patients specific to Eastwood Health Center and to help providers guide their educational approach towards insulin use around perceived barriers. Based on prior research, it is suspected that Spanish-speaking individuals will be more resistant to insulin usage than English speaking individuals at Eastwood Health Center.

BACKGROUND

Type 2 diabetes accounts for 90 to 95% of all diabetes diagnosis and is growing in prevalence among adult and pediatric populations (CDC, 2014). Type 2 diabetes is usually due to insulin resistance where the cells of the body do not use insulin properly (CDC, 2014). With peripheral tissue resistance, the body responds by increasing the amount of insulin secreted. Eventually, pancreatic beta cells are unable to produce enough insulin, leading to some type 2 diabetes patients necessitating exogenous insulin.

Diabetes can be a huge stressor for individuals, families, and also primary care providers who are trying to avoid short-term and long-term complications. The risk for developing type 2 diabetes is linked to obesity, age, family history, sedentary lifestyle, and race/ethnicity (CDC, 2014). Complications of diabetes include peripheral vascular disease, coronary artery disease, stroke, retinopathy, nephropathy, and/or neuropathy (Berkowitz, 2014). According to the CDC (2014), diabetes was the primary cause of kidney failure in 44% of all new cases in 2011. In addition, from 2005 to 2008, 28.5% of adults 40 years and older with diabetes had diabetic retinopathy. In order to minimize the risk of developing complications, it is important that blood glucose levels and glycosylated hemoglobin A1c levels (which measures the average blood sugar levels in the blood over the previous three months) be well controlled. The target for most individuals with diabetes is an HbA1c of less than 7% (Medline Plus, 2014). Research has demonstrated that lowering HbA1c levels in Type 2 diabetes patients has a significant effect on reducing complications.

Diabetes treatment can be approached using a variety of methods. Lifestyle factor modification is the first step and involves exercise (which helps the body use insulin) and diet (decrease sugar intake). When lifestyle changes are ineffective the next step is oral hypoglycemic

medications. However, in many cases, over time these methods are not effective and insulin is needed to maintain good glucose control. A problem with insulin is that many patients are hesitant to start on it, even though insulin has been established as an effective agent for controlling blood sugar levels. Rubino, McQuay, Gough, Kvasz, and Tennis (2007) reported that 50% of patients whose next step was insulin did not start insulin therapy until 5 years after developing complications.

The phenomenon of "psychological insulin resistance (PIR)" refers to a person's opposition toward the use of insulin (Machinani, Bazargan-Hejazi, & Hsia, 2013). When a person is faced with the decision to start insulin treatment, a complex interaction of psychological factors such as emotional distress, past experiences, misconceptions regarding insulin, and personal knowledge regarding diabetes play a role. PIR impacts both the initiation of insulin therapy and the compliance, so it is important to understand all the influences.

Unwillingness to use insulin among insulin naïve patients even if medically necessary is almost 40% (Machinani, Bazargan-Hejazi, & Hsia, 2013). Machinani, Bazargan-Hejazi, and Hsia examined the psychological resistance to insulin among low-income African American and Latino individuals with no prior insulin use. Of the participants, 48% showed complete unwillingness to begin insulin. When looking at the Latino individuals specifically, they were younger, had lived fewer years in the US, were less educated, and were more unwilling to use insulin, which shows a high prevalence of resistance among low-income US Latino patients. Those individuals who were less acculturated to the US were less likely to be open to using insulin.

A study by Wounderberg, Lucas, Latour, and Scholte op Reimer (2011) explored the factors around psychological insulin resistance in insulin naïve patients with Type 2 diabetes in

primary care. They found that 39% of the sample was unwilling to accept insulin therapy. Those unwilling perceived insulin as a sign of failure to control their diabetes. Multiple linear regression identified a strong association between depression and objection to lifelong insulin therapy with PIR. Having to give up pleasant activities, being unable to fulfill responsibilities, and feeling more dependent on the physician appeared to be the main impediments when objecting to the lifelong use of insulin.

METHODS

This cross-sectional pilot study was conducted among type 2 diabetes adult patients at Eastwood Health Center, the family medicine clinic of El Centro del Corazon, a Federally Qualified Health Center in the East End of Houston, Texas. Patients were randomly invited to complete the "Insulin Perceptions Questionnaire." Participants had to be 18 years of age or older, have a diagnosis of Type 2 diabetes, and not have been previously exposed to insulin. Providers, medical assistants, clerks, and charge nurses were informed of the study and research procedures.

An "Insulin Perceptions Questionnaire" adapted from DAWN (Diabetes Attitudes Wishes and Needs) available in both English and Spanish was used (See Appendix A). The questionnaire is a 20-item self-report instrument to determine attitudes towards insulin therapy. Questions 1-4 (Factor A) assessed perceived benefits of insulin, questions 5-7 (Factor B) assessed perceived effects on health, questions 8-10 (Factor C) assessed perceived difficulties with activities of daily living when taking insulin, questions 12 to 14 (Factor D) assessed perceived perceptions of others, questions 15 to 18 (Factor E) assessed perceived fears and discomfort with insulin use, and questions 19-20 (Factor F) assessed perceived complications and side effects. Answers were given on a 5 point likert-type scale from strongly disagree to

strongly agree. In addition, there were two open-ended questions asking about additional benefits of insulin or any other worries about the use of insulin.

Participants were asked to complete the self-administered questionnaire, which had no personally identifiable information. Demographic information was limited to gender and age. In addition to the qualitative and quantitative questions regarding perceptions of insulin, the survey also asked for the most recent A1c and blood glucose, length of time living with diabetes, and current diabetes medications. The medical assistants were instructed to give patients the questionnaire as they were placed in an exam room if they had a diagnosis of type 2 diabetes. Type 2 diabetes patients coming in to see the diabetes nurse educator were given the questionnaires by the front desk clerks as they were registered.

RESULTS

The "Insulin Perceptions Questionnaire" was administered to 37 patients over a 3-week period. Twenty-nine were completed in Spanish and eight in English. Data were analyzed using SPSS Statistics 22. Significance was set at $p < 0.05$. The mean age for respondents was 51.73 years (SD 12.885) with a range of 21 to 87 years (See Graph 1). Seventy-seven percent of the participants were female and 23% were male. The average length of time living with diabetes was 8.6 years (SD=6.35744) with a range of 0.25 to 20 years. The mean HbA1c level was 8.4 and the mean blood sugar was 168.7. See Table 1 for descriptive data.

Descriptive statistics for survey questions for all respondents are presented in Table 2 and based on language in Table 3. The only statistically significant difference in mean scores by language group was for questions 1, 8, 14, and 17 when equal variance was assumed, but only question 8 was statistically significant when equal variance was not assumed (Table 4). For questions 1 to 4, all respondents' scores were slightly above the neutral score at 3.56. Question 1

was concerning the perceived benefits of insulin controlling blood sugar levels. Both the Spanish and English respondents agreed with this statement at 3.96 and 3.13 respectively. Question 8 was concerning how respondents think flexibility would be affected. The mean was 2.88, but when comparing Spanish and English speakers the mean was 2.52 vs. 4.00 respectively. Question 14 assessed embarrassment as a perceived barrier for insulin use, and Spanish respondents had an average of 1.93 vs. 2.88 for English speakers. Finally, question 17 assessed perceived time and energy as a barrier for insulin use and Spanish respondents scored an average of 2.21 vs. 3.14 for English respondents.

Participants also believed that insulin initiation was associated with decreased health (questions 5 and 6) (Table 2). When comparing Spanish vs. English speakers (Table 3), overall the Spanish speakers had a higher positive insulin benefits perception and English speakers had a more negative perception of the decreased health effects of insulin. English speaking participants more strongly agreed that the use of insulin would mean that their diabetes got worse and that the use of insulin could lead to worse health status. English speakers agreed that insulin would make their lives less flexible (mean 4.0), while Spanish speakers disagreed with this statement (mean 2.42) (question 8).

Pearson's r (Table 5) found statistically significant negative correlation of -0.508 and -0.463 respectively, between the perceived benefits of insulin (Factor A) and the fears/discomforts (Factor E, $p < 0.004$) and others perceptions (Factor D, $p < 0.007$). A positive correlation of 0.531, 0.530, and 0.435 respectively, was noted between the perceived decreased health effects (Factor B) and difficulty with activities of daily living (Factor C, $p < 0.003$), others perceptions (Factor D, $p < 0.001$), and fears/discomforts (Factor E, $p < 0.010$). Difficulty with activities of daily living (Factor C) and others perceptions (Factor D, $p = 0$), fears/discomforts

(Factor E, $p < 0.003$), and complications/side effects (Factor F, $p < 0.028$) were also positively correlated at 0.743, 0.535, and 0.549 respectively. There was also a positive correlation of 0.644 and 0.535 respectively, between others perceptions (Factor D) to fears/discomforts (Factor E, $p = 0$) and complications/side effects (Factor F, $p < 0.015$).

Very few of the respondents completed the qualitative questions. Spanish respondents stated that other benefits of insulin included that it does not affect the organs, that it can improve an individual's self-esteem, and that it can help individuals feel better and have better control of their diabetes. None of the English respondents responded to this question. For the question regarding other concerns about insulin, Spanish respondents included secondary health effects, weight gain, fetal deformity, and in the long run having an effect on the kidney leading to the need for dialysis.

DISCUSSION

In the small predominantly Latino, cohort sample from Eastwood Health Center at El Centro de Corazon, there were several factors that could be used in improving psychological resistance to insulin therapy. Of the 37 respondents, only 8 reported their HbA1c levels, which means there is a possibility that they were not given the information or do not understand the significance of this number or what this number means. This lack of knowledge could strongly impact how well they control their blood sugar levels.

Overall, there appeared to be a perceived benefit of insulin in terms of controlling blood sugar levels. English respondents reported more negative attitudes towards insulin than the Spanish respondents. A significant finding was the increased level of concern among English speaking respondents about flexibility with the use of insulin. The data did not indicate greater acculturation, as determined by the ability to read and write in English, predicted less negative

attitudes, in fact it appears that the opposite was true. In the qualitative analysis, English respondents had nothing to say, and while Spanish respondents did report incorrect information about the effects of insulin, they also noted some benefits.

One thing that is evident from the data is that there is a negative correlation between perceived insulin benefits and perceived fears/discomforts or others perceptions. This is important for providers and health facilities, since it shows that if individuals have the correct information and insulin is presented in a positive way, the perceived negative barriers will decrease, which may make a patient more likely to use insulin.

Limitations:

Limitations of this study include the small study sample and the disproportionately greater Spanish-speaking group. Another limitation is the fact that the surveys may have been distributed to patients who were pre-diabetics or who were in to see the nutritionist for other concerns unrelated to diabetes counseling. Other concerns are literacy levels, especially since this is an underserved mainly immigrant monolingual Spanish speaking population. Only 31 respondents reported their gender, so those who did not respond may not have understood the meaning. In addition, there was no one monitoring for completeness of surveys and many surveys had missing data. It would have been helpful to assess for willingness to use insulin as well as income and education to see how those demographic factors impact insulin perception. Missing data was also due to the fact that respondents did not answer questions on the back-side of the survey, so for future studies it will be important to indicate that there's a back side to the survey.

Implications for Future Research:

Although this study did not show that those who are more acculturated to Western culture have more positive insulin perception, it would be important to repeat this study in a larger sample while assessing other demographic variables such as income level and highest education completed. According to prior research, there is a phenomenon where negative cultural beliefs regarding insulin among US Latinos may be mitigated by acculturation (Machinani, Bazargan-Hejazi, & Hsia, 2013). It may also be interesting to look at depression, since the study on PIR by Woudenberg, Lucas, Latour, and Scholte op Reimer (2011) showed a relationship.

RECOMMENDATIONS

Data shows the importance of educating the adult population at Eastwood Health Center regarding diabetes control and the benefits of insulin. While there is emphasis on teaching about HbA1c levels in exam rooms and by providers, this strategy may not be working so it needs to be reevaluated. It is also important that patients understand the benefits of insulin and clarify any misconceptions that they may have about insulin. This can be done through videos while in the waiting room, pamphlets, and/or a diabetes education class available at Eastwood. Introducing insulin early, before the patient actually needs it may also be helpful in terms of explaining the benefits, understanding how it works, and developing a positive perception. It also shows that because the evidence is not as clear, psychological insulin resistance needs to be addressed at an individual level. It is important for providers not to assume what fears/concerns patients may have, but rather to ask and address them.

CONCLUSION

In conclusion, negative insulin perceptions among the adult, mainly Latino population at Eastwood Health Center is not as prevalent as perceived by providers. There is a positive perception of the benefits of insulin, and as that perception increases the fears/discomforts and

concerns with others perceptions decrease. However, there was no relationship found between increased acculturation and increased perception of the benefits of insulin. More research needs to be done with PIR, especially with underserved populations giving the prevalence of diabetes and the serious consequences from uncontrolled blood sugar levels.

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Graph 1: Age Distribution

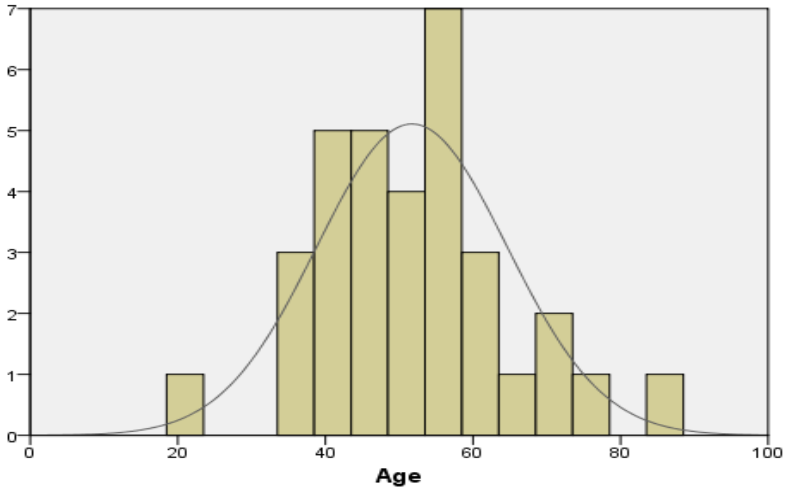

Table 1: Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Age	33	66	21	87	51.73	12.885
Time with diabetes (years)	11	19.75	0.25	20	8.6136	6.35744
Most current HbA1C	8	7.2	5.8	13.0	8.425	2.4870
Most current blood sugar	20	283	92	375	168.70	72.825

Table 2: Descriptive Statistics for Survey Questions 1-20; All Respondents (N=37)

	N	Mean	Std. Deviation
1	34	3.76	.955
2	35	3.66	.725
3	34	3.56	.894
4	35	3.74	.919
5	36	3.42	1.079
6	35	3.60	1.063
7	36	2.64	1.222
8	33	2.88	1.244
9	36	2.44	1.027
10	36	2.19	.889
11	34	3.12	1.320
12	37	2.97	1.301

13	37	2.70	1.222
14	36	2.14	.961
15	36	2.89	1.326
16	35	2.91	1.147
17	35	2.40	1.035
18	36	2.50	1.159
19	29	2.97	1.239
20	20	2.45	.887

Table 3: Descriptive Statistics for Survey Questions 1-20; N=37 Spanish vs. English Speakers

Group Statistics

	Language	N	Mean	Std. Deviation	Std. Error Mean
1	Spanish	26	3.96	.774	.152
	English	8	3.13	1.246	.441
2	Spanish	27	3.67	.734	.141
	English	8	3.63	.744	.263
3	Spanish	26	3.69	.838	.164
	English	8	3.13	.991	.350
4	Spanish	27	3.85	.770	.148
	English	8	3.38	1.302	.460
5	Spanish	28	3.46	.999	.189
	English	8	3.25	1.389	.491
6	Spanish	28	3.54	1.036	.196
	English	7	3.86	1.215	.459
7	Spanish	28	2.54	1.105	.209
	English	8	3.00	1.604	.567
8	Spanish	25	2.52	1.122	.224
	English	8	4.00	.926	.327
9	Spanish	28	2.32	1.020	.193
	English	8	2.88	.991	.350
10	Spanish	28	2.07	.858	.162
	English	8	2.63	.916	.324
11	Spanish	26	3.08	1.324	.260
	English	8	3.25	1.389	.491

12	Spanish	29	2.79	1.264	.235
	English	8	3.63	1.302	.460
13	Spanish	29	2.59	1.150	.214
	English	8	3.13	1.458	.515
14	Spanish	28	1.93	.766	.145
	English	8	2.88	1.246	.441
15	Spanish	28	2.68	1.278	.242
	English	8	3.63	1.302	.460
16	Spanish	27	2.78	1.121	.216
	English	8	3.38	1.188	.420
17	Spanish	28	2.21	.876	.166
	English	7	3.14	1.345	.508
18	Spanish	28	2.36	1.096	.207
	English	8	3.00	1.309	.463
19	Spanish	22	2.77	1.270	.271
	English	7	3.57	.976	.369
20	Spanish	19	2.37	.831	.191
	English	1	4.00	.	.

Table 4:

Independent Samples Test (Spanish vs. English Speakers)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
1	Equal variances assumed	2.382	.133	2.303	32	.028	.837	.363	.097	1.577
	Equal variances not assumed			1.795	8.723	.107	.837	.466	-.223	1.896
2	Equal variances assumed	.003	.959	.141	33	.889	.042	.296	-.561	.644

	Equal variances not assumed			.140	11.362	.891	.042	.299	-.613	.696
3	Equal variances assumed	.020	.887	1.606	32	.118	.567	.353	-.152	1.287
	Equal variances not assumed			1.466	10.276	.173	.567	.387	-.292	1.426
4	Equal variances assumed	2.886	.099	1.303	33	.202	.477	.366	-.268	1.222
	Equal variances not assumed			.986	8.499	.351	.477	.484	-.627	1.581
5	Equal variances assumed	1.110	.300	.490	34	.627	.214	.437	-.675	1.103
	Equal variances not assumed			.407	9.173	.693	.214	.526	-.972	1.401
6	Equal variances assumed	.523	.475	-.711	33	.482	-.321	.452	-1.242	.599
	Equal variances not assumed			-.644	8.317	.537	-.321	.499	-1.465	.822
7	Equal variances assumed	1.516	.227	-.946	34	.351	-.464	.491	-1.462	.533
	Equal variances not assumed			-.768	8.985	.462	-.464	.604	-1.831	.903
8	Equal variances assumed	.712	.405	-3.370	31	.002	-1.480	.439	-2.376	-.584
	Equal variances not assumed			-3.729	14.217	.002	-1.480	.397	-2.330	-.630

9	Equal variances assumed	.294	.591	-1.361	34	.182	-.554	.407	-1.380	.273
	Equal variances not assumed			-1.384	11.606	.192	-.554	.400	-1.428	.321
10	Equal variances assumed	.059	.809	-1.587	34	.122	-.554	.349	-1.262	.155
	Equal variances not assumed			-1.528	10.769	.155	-.554	.362	-1.353	.246
11	Equal variances assumed	.012	.914	-.320	32	.751	-.173	.541	-1.276	.929
	Equal variances not assumed			-.312	11.220	.761	-.173	.555	-1.393	1.047
12	Equal variances assumed	.099	.755	-1.638	35	.110	-.832	.508	-1.863	.199
	Equal variances not assumed			-1.609	10.928	.136	-.832	.517	-1.970	.307
13	Equal variances assumed	.468	.498	-1.108	35	.275	-.539	.486	-1.526	.449
	Equal variances not assumed			-.966	9.540	.358	-.539	.558	-1.790	.712
14	Equal variances assumed	2.431	.128	-2.662	34	.012	-.946	.355	-1.669	-.224
	Equal variances not assumed			-2.040	8.568	.073	-.946	.464	-2.004	.111
15	Equal variances assumed	.027	.870	-1.840	34	.075	-.946	.514	-1.992	.099

	Equal variances not assumed			-1.820	11.163	.096	-.946	.520	-2.089	.196
16	Equal variances assumed	.050	.825	-1.307	33	.200	-.597	.457	-1.527	.333
	Equal variances not assumed			-1.265	10.976	.232	-.597	.472	-1.637	.442
17	Equal variances assumed	1.970	.170	-2.247	33	.031	-.929	.413	-1.769	-.088
	Equal variances not assumed			-1.737	7.321	.124	-.929	.535	-2.182	.325
18	Equal variances assumed	.186	.669	-1.403	34	.170	-.643	.458	-1.574	.288
	Equal variances not assumed			-1.268	9.979	.234	-.643	.507	-1.773	.487
19	Equal variances assumed	.659	.424	-1.520	27	.140	-.799	.525	-1.877	.279
	Equal variances not assumed			-1.746	13.118	.104	-.799	.458	-1.786	.189
20	Equal variances assumed	.	.	-1.914	18	.072	-1.632	.852	-3.422	.159
	Equal variances not assumed			.	.	.	-1.632	.	.	.

Table 5:

Correlations (Factors A-F, Language, and Gender)

	A	B	C	D	E	F	Language	Gender

A	Pearson Correlation	1	-.022	-.181	-.463**	-.508**	-.176	-.281	-.220
	Sig. (2-tailed)		.906	.348	.007	.004	.486	.113	.270
	N	33	32	29	33	31	18	33	27
B	Pearson Correlation	-.022	1	.531**	.530**	.435*	.118	.146	.038
	Sig. (2-tailed)	.906		.003	.001	.010	.619	.402	.845
	N	32	35	30	35	34	20	35	29
C	Pearson Correlation	-.181	.531**	1	.743**	.535**	.549*	.306	-.259
	Sig. (2-tailed)	.348	.003		.000	.003	.028	.095	.212
	N	29	30	31	31	29	16	31	25
D	Pearson Correlation	-.463**	.530**	.743**	1	.644**	.535*	.348*	.037
	Sig. (2-tailed)	.007	.001	.000		.000	.015	.038	.846
	N	33	35	31	36	34	20	36	30
E	Pearson Correlation	-.508**	.435*	.535**	.644**	1	.257	.406*	.073
	Sig. (2-tailed)	.004	.010	.003	.000		.274	.017	.707
	N	31	34	29	34	34	20	34	29
F	Pearson Correlation	-.176	.118	.549*	.535*	.257	1	.371	.256
	Sig. (2-tailed)	.486	.619	.028	.015	.274		.107	.305
	N	18	20	16	20	20	20	20	18
Language	Pearson Correlation	-.281	.146	.306	.348*	.406*	.371	1	-.027
	Sig. (2-tailed)	.113	.402	.095	.038	.017	.107		.885
	N	33	35	31	36	34	20	37	31
Gender	Pearson Correlation	-.220	.038	-.259	.037	.073	.256	-.027	1
	Sig. (2-tailed)	.270	.845	.212	.846	.707	.305	.885	
	N	27	29	25	30	29	18	31	31

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix A

Insulin Perceptions Questionnaire

Date: Age: Gender:
Length of time with diabetes:
Most recent A1C: Most recent blood sugar:
Current medications:

Please mark the appropriate box to indicate how you feel about each of the statements below.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1) Taking insulin can help me better control my blood sugar.					
2) Taking insulin will help me to improve my energy levels.					
3) Taking insulin can prevent future health problems.					
4) Taking insulin can make me feel better.					
5) Taking insulin would mean I have failed to manage my diabetes with lifestyle changes and tablets.					
6) Taking insulin would mean my diabetes has become much worse.					
7) Taking insulin would mean my health could get worse.					
8) Taking insulin would make life less flexible.					
9) Taking insulin would mean I have to give up activities I enjoy.					
10) Taking insulin would make it more difficult to do my job and the things that I have to do at home.					
11) Taking insulin would make me more dependent on my doctor.					
12) Being on insulin would cause family and friends to be more worried about me.					
13) Taking insulin would mean other people might see me as a sicker person.					
14) Injecting insulin would be embarrassing.					
15) I'm afraid of injecting myself with a needle.					
16) Injecting insulin would be painful.					
17) Managing insulin injections would take a lot of time and energy.					
18) It would be difficult to correctly inject the right amount of insulin at the right time every day.					
19) Taking insulin would increase the risk of low blood sugar.					
20) Insulin can cause weight gain.					

What else do you think will be good about taking insulin?
Does anything else worry you about taking insulin?

Adapted from DAWN (Diabetes Attitudes Wishes & Needs)/novo nordisk