The Importance of Patient Satisfaction with Insulin Device Administration: Does a Positive Patient Experience Drive Improved Diabetes Self-Management and Adherence?

Background
- Among patients with diabetes mellitus type 1 and 2 (T1DM, T2DM), insulin therapy is a necessary treatment regimen to maintain optimal glycemic control.
- Recent technological advances in insulin administration devices have increased the impact of patient preference, satisfaction, and comfort with usability in medication adherence and therefore glycemic control.

Objective
- To compare the patient experience with self-injecting pens and insulin pumps and explore how satisfaction with these devices affects insulin adherence, diabetes self-management, and patient health outcomes.

Methods
- A standardized review protocol was used to define the eligibility criteria for the search and screening of references (Table 1).
- Medicine (Ph.Abbott), Embase (OVID), and CENTRAL (Wiley) were searched during May 2017 for English language references published between 2000 and 2017 on studies in humans.
- Bibliographies of relevant systematic reviews and meta-analyses were also checked for additional studies.
- Data extraction was conducted using DoctorEvidence proprietary universal electronic extraction form and standardized data configuration protocol. Each data point was configured by two analysts.
- The primary outcome of interest was patient satisfaction. Secondary outcomes included medication adherence, treatment acceptance, and medication persistence.

Patient satisfaction outcomes were reviewed qualitatively as meta-analysis was not feasible due to heterogeneity of study design and lack of evidence. Common reasons for device dissatisfaction, satisfaction, adherence, and discontinuation were reviewed for each intervention and compared.

Relevant References
- American Association of Diabetes Educators
- National Kidney Foundation

Results
- The search in MEDLINE, Embase and the Cochrane Library resulted in 4,475 potentially relevant references after duplicates were removed.
- Four thousand five hundred ninety-eight references were rejected during the title/abstract screening and 110 after reviewing the full-text (see Figure 1 for the flow of studies through the review).
- Two studies reported on satisfaction for subgroups of age and gender. Rubin (2012) reported similar results in treatment satisfaction for adults versus pediatric T1DM insulin pump users. Al Hayek (2015) also reported similar treatment satisfaction in adults compared to children and young adults but did not report females being more satisfied than males with pump use, based on the Diabetes Treatment Satisfaction Questionnaire (DTSQ) system.
- Seven different survey types were used to assess patient satisfaction, making overall assessment of satisfaction across studies difficult. Most studies used a study-specific non-validated questionnaire. The DTSQ was the most commonly used validated assessment (Figure 2).
- Forty-four studies met eligibility criteria. Eighteen addressed patient satisfaction, therefore the definition and measurement scales differed substantially between studies. Thirteen studies focused on insulin pens and 6 studies focused on insulin pumps reported on satisfaction.
- The majority of studies measuring satisfaction with insulin pumps focused on T1DM patients, while most insulin pen studies included both T1DM and T2DM patients. Two studies that reviewed insulin pump satisfaction included T2DM patients. 5 studies of insulin pen satisfaction due to heterogeneity of study design and lack of evidence.
- Only 6 studies reported glycemic control and patient satisfaction outcomes for the same study population. Review of the individual studies showed a possible trend toward greater satisfaction leading to lower HbA1c levels. In some studies, high patient satisfaction did not result in reaching HbA1c targets. The heterogeneity of satisfaction instruments and lack of common measures prevented cross-study quantitative comparative analysis (Table 2).
- No additional records identified through other sources.

Future Use (yes/no for each patient, median)

Table 2: Study Eligibility: Reasons for Exclusion

Patient Satisfaction
- Most studies reported that patients using pens would continue to use a pen following the study and recommend the method for others.
- When comparing reasons for patient satisfaction based on device, pen users found that pens were easy to use, convenient and they had confidence in the use of these insulin. Pump users also felt confident in dosing, but generally did not find pumps convenient or easy to use. However, patients did believe that diabetes management was easier, less worry about hypoglycemia when using the device (Figure 3).

Conclusion
- This is the first review investigating the direct role patient satisfaction plays in diabetes treatment and delivery device preferences that patient preferences play a role in adherence to therapy and glycemic control could lead to more individualized treatment plans and consequently better outcomes.
- There is evidence that patient satisfaction impacts glycemic control; however a lack of standard outcome methodology limited further analysis of this relationship. While there appears to be a trend towards higher satisfaction and lower HbA1c, high satisfaction with device does not always result in better glycemic control.
- There may be differences in satisfaction between T1DM and T2DM patients for both devices, however there is a lack of literature focusing on satisfaction with insulin pump use.
- Further research is needed in this area as there may be implications for better adherence in T2DM patients who are given the option of using the device. Also, adult patients with T1DM may have been living with the disease longer than adult patients with T2DM. This could result in systematic differences in device satisfaction between these two patients.
- Dosing confidence was a common reason for satisfaction for both devices. While insulin pen users first convenience and ease of use to be high variables for satisfaction, pump users felt there was easier diabetes management associated with the continuous insulin administration. This information may yield further insight into patient characteristics associated with higher satisfaction of certain devices and additional research is needed on this topic.
- While this review provides valuable insight into the role satisfaction has on the patient experience with insulin devices, perhaps even more notably, the review highlights the lack of standard methodology used in the published literature to measure patient satisfaction. Additional research is needed to fully explore the relationships satisfaction on patient outcomes and if any differences exist in different population segments.

Applications for Healthcare Practitioners
- PATIENT SATISFACTION IS A CRITICAL OUTCOME MEASURE IN PATIENT SEGMENTATION
- There is a gap in the literature for assessment of satisfaction and preferences of patients. Use of standardized method of assessing satisfaction and preferences can help improve patient compliance and care. In addition, evaluation of satisfaction and preferences can help healthcare providers inform patients on the different treatment options available and choose the best care plan for each patient.
- Further research could help ICPS impact patient care delivery system requirements, align patient expectations, and evaluate and optimize care delivery system requirements.

References
- American Association of Diabetes Educators
- National Kidney Foundation

This study was funded by Sanofi. American Association of Diabetes Educators. August 17-20, 2018 (Baltimore, Maryland).