Diabetic-Mate: your blood glucose follower

Research Report
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Diabetic patients and what they need

Study 1: Semi-Structured Interview

Background

One of Saudi Arabia's 2030 vision goals is to have a population with a high quality of life and livability. Also, the studies show that Diabetic people represent 27% of the society, which is a high percentage. Moreover, most of them cannot find a proper way to manage their blood glucose range. Therefore, the idea for this project is to optimize the adult's type-1 diabetics, who take insulin livability and quality of life by creating a digital product that can help them in their dose calculation. As well as educate them with essential information that diabetic needs to learn to control their blood glucose.

Research Goal

The research objective is to learn about the adult's type-1 diabetic cultures and whether if they know how to control their blood glucose or not. The research findings will help to scope the product direction and whether they really need a product to help them in their daily life to control their blood glucose, and then add the needs to the product.

Research Questions

- [Needs] What is the essential thing to know about how to control your blood glucose range?
- [Behaviors] How do you control your insulin glucose range?
  - (Can you calculate your insulin needs by yourself for daily dose/bulse dose/correction dose?)
- Do you need a product to assist you count your insulin needs?
  - Do you find any other products offer these services? and how do you feel about them?

Method

- 30 min in-person or video semi-structured interview to gather in-depth qualitative data

- The researcher will use the interview script as a guide and ask follow-up questions based on answers from the users.

Recruiting

- 3 participants.
- Adults Type-1 Diabetics who are:
  - Need assistance to control their blood glucose rate.
  - May use different Diabetic products but don't find their needs.

Script

Introduction

My name is Zahra Maher Alnamer. Thank you very much for participating in this study. I am currently working on a project to assist Diabetics in controlling their blood glucose range. I would like to learn more about your experience with Diabetes and your needs. This interview will take about 30 minutes. If you want to leave the session or take a break at any point, please let me know. Off curse the answers will be confidential, and no one will know about them. Do you have any questions before we start?

Do you mind if I record this session for note-taking purposes? The recording won't be shared with anyone outside of our team.

Warm-up Questions

1. Could you tell me about yourself? What kind of insulins do you take?

2. Do you use injections or insulin pump?

3. Which apps do you use to help you in your illness? and did it help you to manage your blood glucose rate? Did you try out other apps before?

4. When do you check your blood glucose? *[before each meal& after each meal / before each meal only/after each meal only/ when I want / when I feel there is something wrong / else "Ask the use to determine it"]*

Questions

5. How many times you were in hypoglycemia last week? *[This question to measure if the user knows the essential information and to know their behavior in controlling their blood glucose in the hypoglycemia state in the correct method]*

   o   What did you do to help yourself?

   o   what happened after you helped yourself after a while (2-3 hours)?

   o   How do you describe this experience?

   o   What was the learning outcome from this experience? Did you reach the correct method to assist yourself in this state?

6. How many times you were in hyperglycemia last week? *[This question to measure if the user knows the essential information and to know their behavior in controlling their blood glucose in the hyperglycemia state in the correct method and measures if they know about the insulin correction dose idea]*.

   o   What did you do to help yourself?

   o   what happened after you helped yourself after a while (2-3 hours)?

   o   How do you describe this experience?

7. Do you know how to calculate your daily dose needed of insulin? *[This question measures if the user knows how to calculate their needs of daily insulin]*.

   ⇒   If the user answers the question with yes:

   o   How do you calculate it? How do you evaluate your experience in counting your daily dose?

   o   How do you divide it for meals(boluse)/ basal?

   o   Do you know an app that helps you in calculating it? What is the app? What do you think the Pros of this? What do you think the Cons of this app?

   ⇒   If user answer the question with No:

   o   Why you haven't try to learn about your need?

   o   Do you know an app that helps you in knowing how to calculate it? What do you think the Pros of this? What do you think the Cons of this app?

8. How do you calculate your bolus (meal) dose of insulin for each meal? (show me how do you do that) *[this question shows if they know how to calculate their bulse dose for each meal]*.

   o   Is it fixed-dose or changed in each meal?

   o   How was your experience with your followed method?

   o   Do you know an app that helps you in calculating it? What do you think the Pros of this? What do you think the Cons of this app?

9. How do you calculate the insulin correction dose? (show me how do you do that) *[this question shows if they know how to calculate their bulse dose for each meal].*
    o   Is it fixed-dose or changed in each meal?
    o   How was your experience with your followed method?
    o   Do you know an app that helps you in calculating it? What is the app? What do you think the Pros of this? What do you think the Cons of this app?

10. Do you know about carb counting? *[this question measures if they know the effect of carbs on their needs of insulin and if they are educated about that].*
    ⇒   if the user answers with yes only:
        o   Do you use an app to teach you about the carbs in each meal?
        o   what motivates you to use this app?

Wrap-up

Thank you so much for sharing your experience and insights. Your answers will help our team build a better product. If you have any additional thoughts and comments, I would love to hear about them at any time. I can be reached at [zahraa.maher@windowslive.com]. Hope you have a wonderful day.

Study 2: Survey

Background

In our previous study, we learned that diabetic friends need to learn how to calculate their doses and are miss diabetic education. Our team decided to take advantage of their interest in learning new things and focus on giving them tips for calculating the doses and controlling their blood glucose.

Research Goal

This study focuses on validating how the needs gathered from user interviews can be generalized to all type-1 diabetics patients who take insulin (either Novorapid and Lantus or Novorapid only with an insulin pump).

Research Questions

- How can digital products best support diabetic patients to control theirs blood glucose by calculating their needed doses?
  - Which features/functions are useful?

Method & Recruiting

- We use the surveys to collect the data from at least 30 diabetic type-1 patients.
- Test survey questions with 5 volunteers recruited from our friends who are diabetic type-1 recruited from our engineering team.
- Send surveys to Diabetics' WhatsApp and Telegram groups whose answers in our screener meet our recruiting criteria.
  - Type-1 Diabetics
  - Uses Novorapid and Lantos insulin or insulin pump.
  - Know how to do the carbs counting

Questions

Screening Questions
1. What type of Diabetic you are? [MCQ] (this question to choose the type1 diabetics only)
   a. Type 1
   b. Type 2 *(screened out)*

2. What Type of insulin do you use? *[MCQ]* (this question to choose patients who take the specified insulin types)
   a. Lantus or Levemir and Novorapid(Aspart)
   b. Novorapid (Aspart)

  c. Other *(screened out)*

3. What do you use to take insulin? [MCQ] (this question to choose the people who takes the insulin by injections or pens, or insulin pump)
  a. Injections or pens
  b. Insulin pump
  c. medicine pills *(screened out)*

4. Do you know how to calculate the carbs in your meals? (they must be able to count their carbs as the app will not give the tutorials for it).
  a. Yes
  d. No *(screened out)*

Survey Questions

5. How many times you were in hypo(low blood glucose) last week? (to see if the key findings from the interview is correct or not)
  a. 1
  b. 2
  c. 3
  d. 4
  e. 5 or more

6. How do you assist yourself in hypo case? (to measure if they can assist them self in the correct method or not in the hypo case)
  a. Eating a hard carbs (ex: Sandwich with Vegetables\ Fruits\Macaroni ..etc)
  b. Drinking a Juice
  c. Drinking a juice and a chocolate or anything

7. What happens after 2-3 hours of assisting yourself in hypo case? (to measure if they can assist them self in the correct method or not in the hypo case)
  a. It turns ok (in the normal range)
  b. I got a hyper case

8. What happens after 5-8 hours of assisting yourself in hypo case? (to measure if they can assist them self in the correct method or not in the hypo case)
  a. It turns ok (in the normal range)
  b. I got a hyper case

9. How many times you were in hyper(high blood glucose) last week? (to measure if they can assist them self in the correct method or not in the hyper case)
  a. 1
  b. 2

    c. 3

    d. 4

    e. 5 or more

10. How do you assist yourself in hyper case? ? (to measure if they can assist them self in the correct method or not in the hyper case)

    a. I take an insulin (correction dose) and drink water if needed

    b. I go to hospital and take IV

    c. I go to do exercise or walk

    d. I don't do anything

11. If you take an insulin in in hyper case, how do you take your correction dose? (this question to measure if they can calculate the correction dose).

    a. It is a fixed dose

    b. I use the insulin pump and it calculate it for me

    c. I use the injections or insulin pens, and I calculate it myself

    d. I use the insulin pump and it calculates it for me, but I know how to calculate if myself if anything wrong

12. How do you take your carb dose? (this question to measure if they can calculate the carb dose).

    a. It is fixed dose and the doctor determine it for me

    b. It is changed and I calculate it myself

13. How do you determine your total insulin doses and needs? (this question to measure if they can calculate the whole insulin doses and needs).

    a. The doctor determines the Lantes, Aspart doses for me and they are fixed in all meals.

    b. I use the insulin pump and the doctor determine the basal, and the pump calculate the bulse doses for me, and I don't know how to divide my body needs of insulin between basal and blouse doses.

    c. I use the insulin pump and the doctor determine the basal, and the pump calculate the bulse doses for me, and I know how to divide my body needs of insulin between basal and blouse doses.

14. Do you know the value for your carb ratio? (this question to measure their level of diabetes education).

    a. Yes

    b. No

    c. I don't know what the carb ratio is.

15. Do you know what is your value for insulin sensitivity? (this question to measure their level of diabetes education).
    a. Yes
    b. No
    c. I don't know what the insulin sensitivity is.

16. If you know your insulin sensitivity, do you know how to calculate it? (this question to measure their level of diabetes education).
    a. Yes
    b. No
    c. I don't know what the insulin sensitivity is.

17. If you know your carb ratio, do you know how to calculate it? (this question to measure their level of diabetes education).
    a. Yes
    b. No
    c. I don't know what the carb ratio is.

18. When do you chick your blood glucose? (This question measures their diabetes education and behaviors if they are correct or not)
    a. Before Meal & After Meal & When I feel Something wrong
    b. Before Meal & When I feel Something Wrong
    c. After Meal & When I feel Something Wrong
    d. When I feel Something wrong only
    e. When I want (I don't have specific time)

19. How do you record your blood glucose levels? (This to see if they uses apps to record their blood glucose levels)
    a. I am recoding it in recoding notebook from hospital (paper)
    b. In application
    c. I use the pump and depend on her records
    d. I use the pump records and app
    e. I use the pump records and paper record book
    f. I don't record my blood glucose rate

20. How was your last HBA1C? (to see how their behaviors effect their health)
    a. Between 4-5
    b. Between 5-6
    c. Between 6-7
    d. Above 7

Demographic Questions

21. How old are you? (to see how their age effect their behaviors)
    e.   Under 18
    f.   18 to 25
    g.   26 to 35
    h.   36 to 55
    i.   Above 55

22. What is you last education level? (to see how their education effect their
    behaviors)
    a.   Less than high school degree
    b.   High school degree or equivalent
    c.   Bachelor's degree
    d.   Graduate degree