



MSc Thesis

Sweet Talk – Assessing effective provider communication to support self-management of type 1 diabetes mellitus patients

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Abstract

Objective: Health care providers want to provide optimal self-management support for T1DM patients, specifically for the group of young adults. The 5As model was used to assess how and if the health care providers applied all the 5 As during their consultations with the patients.

Furthermore, exploring the communication between the patients and health care providers with the new FSL system was of relevance for the health care providers due to the experience of new communication problems and barriers. The UTAUT model with an addition of attitude was used to explore how and if the patients were satisfied with the new system.

Methods: Three health care providers audio-recorded seventeen consultations. There were a few adjustments made to an existing instrument to assess the quality of the health care providers to determine if the 5As (assess, advise, agree, assist, and arrange), were applied. The 5 As were compared with criteria to provide a thorough assessment.

Secondly, seven explorative telephonic interviews were held with T1DM patients, which the health care provider recruited for the researcher. The UTAUT model was applied which provided for criteria for an explorative assessment.

Results: In every consultation the health care providers arranged a follow-up meeting (Arrange), in all but one consultation the health care provider Assessed the SMBG. Nonetheless, in less than half of the consultations health care providers assisted and agreed with behavioural change about the injection of insulin. However, in more than half of the consultations, health care providers agreed and assisted about the behavioural change of SMBG.

Additionally, the attitude towards the FSL system was positive and accepting about the new FSL system which was received successfully by the patients. The patients who are currently using the system therefore did not had any problems related to their privacy, on the contrary they were pleased that the health care provider was able to help them more accurately.

Conclusion: The health care providers did try to stimulate the self-management of patients but there is room for improvement with the help of the 5As model. The health care providers need to be open to change, through listening to what patients have to say and use the 5As model as a guidance throughout their consultations.

The FSL system was accepted by the patients who were already using the system at this particular moment. Moreover, the patients trust the health care provider with their data and noticed that the graphs help the health care provider to give a more precise advise.

Practice implications: The assessment with the help of the 5As model showed that health care providers can enhance their communication to improve the patients self-management. Specifically

looking at Agree to set goals, and Assist patients with overcoming their barriers. Health care providers have to learn how to cover all aspects of the 5As model but also create a 'we' feeling with the patient. When this is achieved, self-management of the patient can improve tremendously. Secondly, the explorative interviews gave insight into the attitudes of the patients towards the FSL system and the communication with the health care providers about the FSL system. Furthermore, research is required in order to further elaborate about practical recommendations regarding new communication skills in relation to the FSL systems.

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1. Introduction

In the Netherlands around 100.000 people suffer from type 1 diabetes mellitus (T1DM) (Volksgezondheid, 2018). T1DM is a chronic disease, which results from immune-mediated loss of pancreatic beta cells leading to insulin deficiency that is caused by an interplay between environmental and genetic factors (Redondo, Steck & Pugliese, 2018). The body no longer produces insulin, so blood glucose levels can become excessively high. Without insulin-treatment, the short term prognosis of T1DM is poor due to diabetic ketoacidosis (lack of insulin in the bloodstream). This happens when the patient does not have enough insulin in their body to process high levels of glucose in the blood. Long term, chronically elevated glucose levels damage the blood vessels and nerves, resulting in a greatly increased risk of micro-and macrovascular complications such as cardiovascular disease, kidney disease and numbness or pain in the limbs (Adriaanse et al., 2008). Excess mortality among patients with T1DM is mainly due to cardiovascular disease and diabetes-related causes, which is much higher compared to non-diabetic patients (Livingstone et al., 2012; Lind et al., 2014).

Studies show that the average blood glucose levels in patient populations exceed the treatment targets which were set by the health care providers (Miller et al., 2015). Specifically younger adults with T1DM (19-30 years) tend to have elevated HbA1c levels (which is a form of haemoglobin (a blood pigment that carries oxygen) that is bound to glucose). Adolescence is a high-risk period for T1DM management (Miller, 2015). Patterns of poor management that begin during adolescence will extend into young adulthood (Helgeson et al., 2017) and will increase the risk of serious short- and long-term complications (Miller et al., 2015; White, 2015). Poor glycaemic control is the result of the interplay between two factors: poor self-management behaviours of the patients such as low self-monitoring of blood glucose (SMBG) (Vincze, Barner & Lopez, 2004) and suboptimal communication strategies by health care providers (Nam, Chesla, Stotts, Kroon & Janson, 2011).

Moreover, based on health care providers experience within the group of younger adults with T1DM, about 75% of their patients succeed in managing their diabetes. This is confirmed by the patients' HbA1c levels and other clinical outcomes. This leaves about 25% of patients who continuously exceed treatment targets, thus recurrently having damagingly high blood glucose levels, often combined with unpredictable hypoglycaemia (overdosing insulin). This group of young patients, often proves to be very difficult to guide towards effective self-management behaviours. It is noteworthy that international studies also show that this particular patient group has the highest HbA1c levels of all age groups.

To tackle this 25%, three health care providers (internists) from hospital Gelderse Vallei (Doctors Heijligenberg, Van Wijk and Bemelmans) and Bob Mulder from the Strategic

Communication group of Wageningen University have joined forces. The health care providers have years of experience in supporting self-management T1DM patients, and currently the three of them treat approximately 800 T1DM patients. Self-management is inevitable, the health care providers are only present for a fraction of the patient's life, and nearly all outcomes are mediated through patient behaviour e.g. diets, glucose measurements and insulin injections (Glasgow, 2003). In the Netherlands, standard care for adult T1DM patients includes at least two visits to the hospital a year. Consultations at the hospital are being handled by the health care provider and/or a nurse specialised in diabetes.

During the consultation, the patient self-management behaviours and outcomes of the period since their last visit are discussed. These include (but are not limited to) SMBG frequency, blood glucose levels as measured through SMBG and how these relate to insulin use as well as dietary and activity patterns. In addition to these medically oriented topics, psychosocial topics such as the patient's wellbeing, daily functioning, family and work matters are regularly discussed. As psychosocial issues affect and are affected by self-management behaviours and outcomes, these are important points of discussion during consultations.

Background

Treatment of T1DM focuses on metabolic and glycaemic control, which means that patients face a lifelong task of injecting insulin several times a day to maintain blood glucose levels within the normal physiologic range (Chiang, Kirkman, Laffel & Peters, 2014). The essential components of maintaining the blood glucose levels in normal range include self-monitoring of blood glucose (SMBG), as this allows patients to adjust their dosage. SMBG helps to determine insulin requirements, provides data on current glucose concentrations and guides insulin adjustments to avoid harmful blood glucose fluctuations (Rewers et al., 2007). SMBG has shown to have a strong association with normalizing average blood glucose levels and preventing the result of overdosing insulin, i.e. hypoglycaemia (Miller, 2013). Additionally, dietary management and regular physical activity with the aim of maintaining the blood glucose levels in normal range are important factors as well (Knox, Quirk, Glazebrook, Randell & Blake, 2019).

Furthermore, patient health and wellbeing is affected through various pathways when looking at the quality of the health care provider communication. Health care provider communication may improve patient health by providing information and increasing patient self-efficacy and thus support the self-management activities. As a result, the quality of health care provider communication is predictive of treatment adherence (Zolnierik & DiMatteo, 2009). When a health care provider shows understanding, provides comfort and reduces anxiety, patients health and wellbeing can be improved. In contrast, certain communication techniques such as confronting

or persuading appear to have a negative impact on diabetes self-care and HbA1c (Bensing & Verheul, 2010; Street, Makoul, Arora & Epstein, 2009). Evidence-based approaches to improve T1DM self-management and communication strategies for health care providers are needed in order to reduce short and long-term complications (Caccavale, 2019).

Additionally, a new continuous glucose monitoring (CGM) system that measures interstitial glucose is quickly being adopted. This is called Flash Glucose Monitoring (FSL), it monitors the glucose levels via disposable electronics and a subcutaneous sensor. It is a lightweight system that is compact and does not need calibration by the user. Additionally, it has the form of a button and it is placed on the skin (Fokkert et al., 2017; Lemmers, 2018). It automatically measures the glucose every minute up to a maximum of fourteen days (Garg & Akturk, 2017; Landau, Abiri & Gruber, 2018). Studies about the FSL system have reported a decreased glucose variability, increased time in range, good precision and the ease of wearing the subcutaneous sensor (Slattery & Choudhary; 2017; Edge et al., 2017).

Aim

In sum, health care providers want to provide optimal self-management support for T1DM patients, especially to the group of young adults. This due to the relatively high proportion of young adults sub-optimally self-managing their diabetes. Therefore, one aim of this research is to assess current communication strategies and formulate concrete recommendations for improvement. Furthermore, exploring the acceptance and use of the FSL system is of relevance as issues or barriers might arise that have implications for the communication for the health care providers and the patient. These barriers on acceptance and use of the FSL system, perhaps raise issues that have implications for communication which might include privacy-issues, openness towards each other and lack of an adequate guideline. Additionally components of the interview include whether the communication with the health care provider are honest and open. Lastly, at this point in time there is a lack of studies regarding the FSL system thus this is an explorative study which can lead to further research.

2. Theoretical framework

The purpose of the theoretical framework is to provide a guideline for the analysis of the consultations and semi-structured telephonic interviews. Exploring perceived barriers and explaining effective strategies for diabetes self-management with the help of the 5As model will be investigated. The UTAUT model forms the basis of exploring how the new FSL system is received by the patient.

The 5As model

Health care providers (internists) are encouraged to counsel young T1DM patients to help them with their poor self-management during their adolescence. With the aim to avoid progression of the disease and its complications during young adulthood (Helgeson et al., 2017). One of the reasons for poor self-management is that the communication strategies by the health care providers are often not entirely optimal (Nam, Chesla, Stotts, Kroon & Janson, 2011).

There is a need for practical tools to assess implementation for diabetes self-management. One of the tools to investigate this, is the 5As model. The 5As is a patient-centred model of behavioural counselling that has been frequently used to enhance self-management support and linkages to community resources (Glasgow, Whitesides, Nelson & King, 2005). The 5As model is important to indicate the quality improvement and the diabetes self-management research.

The 5As model describes the key steps in chronic illness self-management support; it is a recommended method to train clinicians, and implement or evaluate behaviour change counselling in their secondary care (Mulder, van Belzen, Lokhorst & van Woerkum, 2015). To assess communication strategies of health care providers, the use of the 5As counselling techniques are investigated (Jay, Gillespie, Schlair, Sherman & Kalet, 2010). The definitions and criteria of the 5As model are shown in table 1. Especially the last two As (Assist & Arrange) are key aspects of effective self-management support (Glasgow et al., 2002; Center for the Advancement of Health, 2002; Glasgow, Davis, Funnell & Beck, 2003; Hills-Briggs, 2003; Lorig & Holman, 2003). Unfortunately, these two As seem to be delivered least often in consultations, so evaluations should devote special attention to the compliance of these two components (Glasgow et al., 2005; Glasgow, Emont & Miller, 2006).

Table 1. The 5As model: definitions and criteria (Whitlock, Orleans, Pender & Allan, 2002; Glasgow, Davis, Funnell & Beck, 2003; Hill-Briggs, 2003; Glasgow, Goldstein, Ockene & Pronk, 2004; Goldstein et al., 2004; Glasgow, Emont & Miller, 2006; Jay, Gillespie, Schlair, Sherman & Kalet, 2010; Mulder, van Belzen, Lokhorst & van Woerkum, 2015).

A's	Definition	Criteria
Assessing	Assessment of the patients level of behaviour, beliefs and motivation.	Assessment should be standardized and specific. Assess progress and behaviours that relate to risks/benefits, goal attainment and values.
Advising	Advising the patient based upon personal health risks and behaviour change.	Provide specific, clear and personal information about health risks and benefits of change.
Agreeing	Agreeing with the patient on a realistic set of goals.	Collaboratively set goals based on the patients interest, priorities and confidence in his or her ability to change behaviour. Agreed action planning for specific behaviour changes (what, when, where and how).
Assisting	Assisting to anticipate barriers and develop a specific action plan, to overcome the barriers, including securing social and environmental support.	Identify personal barriers, problem-solving techniques which should generate multiple solutions, linked to the patients personal history, social environment, skills and willingness.
Arranging	Arranging follow-up support and contact.	Follow-up support and contact is aimed to enhance Assist. Ideally, it includes connecting with community resources.

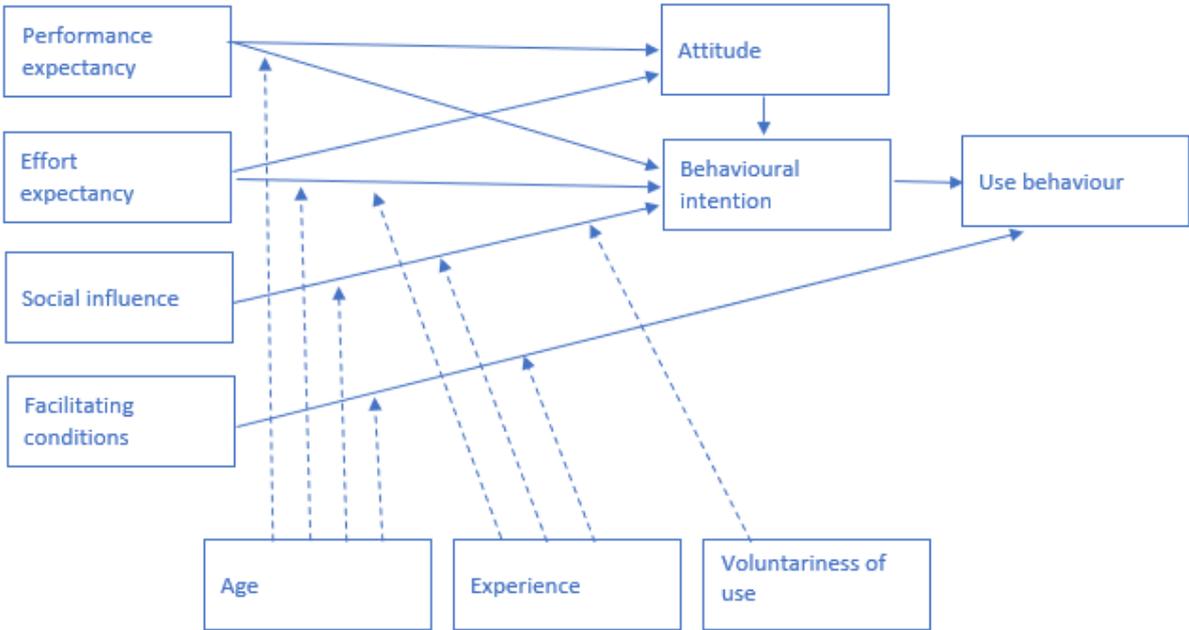
The Unified Technology of Acceptance and Use of Technology Model (UTAUT)

The UTAUT has four core constructs, by examining the presence of each of these constructs in a 'real world' environment. Researchers and practitioners are able to assess the individual's intention to use a specific system. Consequently, given the identification of the key influences on acceptance in the given context, the UTAUT is important in analysing the intention with regards to the new FSL system. This gives in-depth knowledge about the key influences on acceptance for the FSL system (Williams, Rana & Dwivedi, 2015).

The Unified Technology of the Acceptance and Use of Technology Model (UTAUT) has four core constructs (i) social influence, (ii) performance expectancy, (iii) effort expectancy and (iv) facilitating conditions (see figure 1). The four core constructs are direct determinants of behavioural intention and ultimately behaviour. These four core constructs mentioned are moderated by: (i) experience, (ii) age, (iii) gender, (iv) voluntariness of use (see figure 1) (Venkatesh, Morris, Davis & Davis, 2003; Williams, Rana & Dwivedi, 2015). Further elaboration on the core constructs can be found in the methods. During the research the difference between gender was not researched, so gender was excluded in the model (see figure 1).

When critically reviewing the UTAUT model, the path from facilitating conditions to behavioural intention is missing. To be more precise, the individual characteristic attitude should be introduced to the original UTAUT model. Attitude is a mediator of effort expectancy and performance expectancy to the behavioural intention (Aboelmaged, 2010; Kim, Suh, Lee & Choi, 2010; Dwivedi et al., 2019). Additionally, attitude was also used as a mediating variable along the perceived usefulness and perceived ease in different studies that used the UTAUT model. Furthermore, the attitude of the patient influences behavioural intention (see figure 1) (Zhang & Gutierrez, 2007; Šumak, Polancic & Hericko, 2010; Dwivedi et al., 2017; Dwivedi et al., 2019). The addition of analysing attitude gives a more in-depth analysis of the target group. Attitude is of essence to find out why young adults continuously exceed treatment targets and are not carrying out the advice the health care provider gives them.

Figure 1. Adapted theoretical model from UTAUT (Venkatesh, Morris, Davis & Davis, 2003; Williams, Rana & Dwivedi, 2015; Dwivedi et al., 2019)



3. Method

3.1. Design and Setting Consultations

The observational study aimed to identify the communication strategies which were applied to increase the effectiveness of the current applied communication strategies. Therefore, these consultations were recorded in the private consultation rooms of the health care providers and were evaluated by the researcher privately.

Patients were personally recruited by the health care provider during a standard consultation. In preparation of the study, a list was made of all T1DM patients of the polyclinic that were eligible for the study. Next, for all patients the (approximate) date of the next visit was determined, on which occasion the health care provider tried to recruit the patient. Both a quantitative and qualitative was used to assess the data.

Participants Consultations

Three health care providers (all males) provided T1DM care to the patients in the study. All the health care providers (internists) are registered physicians and working at hospital Gelderse Vallei (Doctors: Heijligenberg, Van Wijk and Bemelmans). There were seventeen recorded consultations, lasting on average 13 minutes and 9 seconds (range between 7 minutes and 39 seconds and 20 minutes and 14 seconds).

Inclusion criteria participants Consultations

The inclusion criteria for patients were:

- Age between 18 and 40 years
- Having T1DM for at least 5 years
- Having difficulty in managing their blood glucose levels sufficiently
- HbA1c level > 70 mmol/mol
- Frequency of SMBG < 2 dd

Exclusion criteria:

- Having comorbidities affecting effective communication (e.g. psychiatric disease)

Data collection Consultations

The health care providers got voice recorders with instructions on how to use the recorder. When the health care provider started the voice recorder it marked the start of the interview. The health care providers recorded as many patients as possible within the inclusion criteria of the participants. There were 17 consultations recorded. Transcribed verbatim consultations were evaluated with the help of the 5As model with 31-item instrument (Appendix 1) which is a tool

designed to assess the quality of counselling in terms of self-management support (Glasgow, 2003; Jay et al., 2010).

Analysis Consultations

The consultations were all tape recorded and transcribed verbatim and analysed by assigning codes using ATLAS.ti software. Coding is a suitable manner for qualitative research (Creswell, 2013). During the analysis of the consultations, the 5As were measured with a 31-item instrument which was firstly described by Jay et al. (2010) and later translated into Dutch by Van Dillen et al. (2015). The translated instrument of the 5As were partly covering the aspects that were necessary to analyse the consultations correctly (Mulder, van Belzen, Lokhorst & van Woerkum, 2015). The analysis focused on what components of self-management support, as described by the 5As model were seen (see table 1) (Glasgow et al., 2003). Components include: whether an assessment was made of relevant patient knowledge, beliefs and behaviours, whether behaviour change was advised, or whether problem solving was assisted by the health care provider. In addition, it was assessed how the components were applied, compared to the principle of the model.

The 5As item instrument was adapted due to discussions of other health behaviours relevant for T1DM patients. Specifically for young adult patients, the additions of the 5As item instrument were made based on the literature found (see appendix 1 for more detail on the specific categories). Furthermore, when analysing the consultations, the 5As model was used to evaluate whether the health care provider applied all the necessary As in the consultation. During the evaluation, new codes were continuously developed and the consultations were constantly compared. This inductive coding gave insight into the patterns of the 5As allowing the theory to emerge from the content of the raw data (see appendix 2 for the inductive codes) (Charmaz, 2006; Hennink, Hutter & Bailey, 2020). Additionally, both a quantitative and qualitative assessment was used to assess the data. The analysis allowed the formulation of clear recommendations to improve the effectiveness of the provider communication. These recommendations were translated into clear guidelines as to what specific communication strategies providers may apply, as well as when and how to apply these strategies in clinical practices with the patients.

Investigator triangulation

Both analyses were separately performed by Jacintha Mertz (JM) and Coco Kersten (CK), after which outcomes were compared. For both JM and CK the use of Atlas.ti was new. Furthermore it was a try-out to see if there would be a high interrater concordance. Some pieces of the consultations concerned a high interrater concordance from above 75% but most interrater concordance were much lower than 75%, which were not worth mentioning. The low interrater concordance was due to

when CK analysed the consultations, the focus was also on inter coding instead of only the 31-item model. Going more in depth into the coding's had consequences for the interrater concordance due to that JM mostly focused on the 31-item model and not on inter coding which was understandable due to lack of time. Furthermore it was of great help that JM analysed the consultations, because of the different insights it gave on the consultations. Therefore, discrepancies were resolved through discussion and gave new insights.

Ethical consideration Consultations

All the patients had to sign an informed consent whether they were willing to participate in the research study. The health care provider asked permission to audio record the consultations. Confidentiality and privacy was assured to all the patients and health care providers. Furthermore, the proposal of the study was submitted to the Medical Ethical Committee which resulted in the outcome that the study did not required approval from the Medical Research Involving Human Subjects Act.

3.2 Design and Setting Interviews

Components from the explorative semi-structured interview included whether the communication with the health care provider were honest and open (see appendix 3). Furthermore, the satisfaction with the new FSL system was researched. Additionally, this also enabled the researcher to ask questions which allowed further elaboration on certain topics.

Participants Interviews

Table 2. Overview of Interviews: Date, Duration and Recordings

Anonymised interviews	Date (DD/MM/YYYY)	Duration of the interview	Recording? (yes/no)
Patient 101	03/12/2019	14:07	Yes
Patient 102	09/12/2019	16:12	Yes
Patient 103	03/12/2019	15:09	Yes
Patient 104	22/12/2019	26:45	Yes
Patient 108	03/12/2019	16:23	Yes
Patient 201	04/12/2019	12:35	No (only a summary)
Patient 303	04/12/2019	15:32	Yes

There were six recorded interviews and one summary of an interview, on average lasting 16 minutes and 52 seconds (range between 14 minutes and 7 seconds and 26 minutes and 45 seconds).

Inclusion criteria participants Interviews

More specifically, the inclusion criteria for patients were:

- Has to be a patient of one of the health care providers of the Gelderse Vallei

- Having T1DM at least 5 years

Data collection Interviews

The participants were telephoned by the health care providers whether they were willing to participate in an explorative telephonic semi-structured interview. Via telephone the participants were informed by the health care provider about the purpose of the study aim of the explorative telephonic semi-structured interviews. The participants who agreed to cooperate were approached by telephone by the researcher to make an appointment or to be immediately interviewed. The explorative telephonic semi-structured interviews with the patients who gave consent were audiotaped with a voice recorder controlled by the researcher. There were seven explorative interviews of which six were recorded interviews and one non-recorded interview due to an error (see table 2). Transcribed verbatim interviews were analysed. The analysis focused on components of the UTAUT model which gave in-depth knowledge about the key influences on acceptance for the FSL system (Williams, Rana & Dwivedi, 2015).

Analysis Interviews

Components from the explorative semi-structured interviews include whether the communication with the health care provider was honest and open. Furthermore, as stated above the FSL system was mentioned as was the patients satisfaction with the system. With the remembrance that the interviews were only explorative, this was also how the questions were represented. Additionally it was important for qualitative interviews that patients told their own stories which was the case in these explorative interviews (Davies & Dodd, 2002). The outcome of the analysis of the explorative semi-structured interviews allowed the formulation of the attitudes and satisfaction of the patients about the communication with the health care provider.

The UTAUT model has four core constructs namely: performance expectancy, effort expectancy, social influence and facilitating conditions. These four core constructs mentioned are moderated by: voluntariness of use, experience and age. These were evaluated to create a clear assessment on what influence these concepts had on the attitude and behaviour intention of the patients. These concepts all influenced the final concept 'use of behaviour' which was thoroughly evaluated and assessed. These findings were translated into clear understandings for the health care providers therefore the health care providers gained some knowledge about the satisfaction and attitudes of the patient.

Ethical consideration Interviews

All the patients that were telephoned by the health care provider gave immediate consent to the health care provider to be interviewed. Due to privacy reasons the researcher who interviewed

the patients did not know the patient names and only got the patient's telephone numbers. The patients were also told about the right to decline participation. Confidentiality and privacy was assured to all the patients and health care providers.

4. Results

4.1. A quantitative assessment of the use of the 5As

The quantitative assessment of each 5As showed a substantial diversity when comparing the As (see table 3). Arrange was applied in all the consultations (100%), furthermore, assess was applied in all consultations except one (94%). Assistance about the injection of insulin was least often given, only in three consultations (18%), compared to thirteen (76%) for Assistance of SMBG.

Table 3. Percentage of consultations in which each A was applied.

The 5As	Injection of insulin (%)	Self-monitoring of blood glucose (SMBG) (%)
Asses	94	94
Advise	76	53
Agree	35	59
Assist	18	76
Arrange	100	100

Even though Assess was applied in every consultation except for one there were different aspects of Assess that were evaluated. Biomedical assessment was mostly done before every consultation, which in this case meant that the HbA1c levels were mentioned or measured in almost all the consultations except two. Furthermore, the average blood glucose levels were measured before every consultation, so the patient and the health care provider had a grip on how the patient had injected their insulin since their last visit.

Additionally, there was an extensive difference regarding Assist between the injection of insulin (18%) and SMBG of blood glucose (76%). The main reason for this might be that first being able to correctly perform glucose monitoring is critical since it will give knowledge about how much insulin the patient must inject. The priority of the health care provider was first to let the patient correctly self-monitor before being able to talk about the right amount of insulin to inject, considering that all patients had difficulty with correctly self-monitoring their blood glucose levels. Agreeing with the patient about the injection of insulin and SMBG was a challenge for the health care provider. Especially Agreeing with injecting the right amount of insulin seemed difficult, considering that the amount of how often the patient SMBG fluctuate all the time, so giving advice about the right amount of insulin intake was difficult for the health care providers. Additionally, the health care provider did try to involve the patient when setting goals to change their behaviour, mostly to stabilize their glucose levels, as can be seen in Assess.

4.2. A qualitative assessment of the use of the 5As

The qualitative assessment of the results is thorough but findings are further elaborated and analysed in the practical implication which can be found in the discussion.

4.2.1. Common findings of the 5As

Some findings came back repeatedly in the 5As: typing too much on the computer during the consultation, the occasional use of humour, eagerly confronting the patient, and initiating interaction with the patient. Each of these occurrences could have a positive or negative effect on communication and on the patient. Although the effect and interpretation by the patient were not directly measured in this study, some conclusions could be drawn from this.

Firstly, the health care providers were typing on the computer constantly; Patient: "Also ehm, many values that I measure eh" Health care provider: "Yes." Patient: "Between 10 and 20." Health care provider: "Okay." Health care provider: "[type on the computer]." Patient: "And if I do forget it once, then I am still at 25, and then ... I bolus and, I will go down reasonably well, after that." Health care provider: "Hmmhmm. [type on the computer] " ; Health care provider: "What is your motive for that, to be sure, what is different about those times that you did measure it?" Patient: "Ehm, eh ... Oh YES moments. Do you understand what I mean?" Health care provider: "[typing on the computer]" Patient: "Oh yes, I also have, oh yes. And then, in between, it just continues." Health care provider: "[typing on the computer]" Patient: "And now I also think it's a bit ..." Health care provider: "Yes, I understand what you mean. You just don't think about it?" Patient: "No, because it's so (...)". Which seemed to indicate that the patient tried to show the health care provider why he/she forgot to measure their glucose levels.

Secondly, occasionally the health care provider used humour to lighten the conversation; Health care provider: "... Ehm, so for you it still means that you have to measure your values, but not just before your ehm, drive that you will lower your blood sugar otherwise you are hanging above the steering wheel with a hypo instead of sitting behind the steering wheel." Patient: "Hahaha." Healthcare provider: "So that's the danger of lowering your blood sugar. The advice for you is not to inject too much insulin because your insulin level is already idiotically high." Patient: "Yes" ; Health care provider: "Uhm, are there any other reasons that you think of for yourself that would allow you to measure your blood sugar levels, except that you have to do it for the doctor and that you will get upset if you haven't measured?" Patient: "Haha. Uhm, well I have had periods in the past that it went really well. And then I also feel a lot fitter at that time so eh ..." Health care provider: "Yes.". The lightness of the approach, due to the humour might help the patient to be more open towards the health care provider.

Third, confronting the patient and initiate interaction which include an answer from the patient. The health care provider was eager to initiate interaction with the patient however possible. Hence, the health care provider gave the patient sporadically compliments which were not always rightfully earned by the patient; Health care provider: "If you make a curve, I would prefer that you make a curve four times in which you also measure before you go to bed, instead of measuring three times for a whole week and do not measure the glucose level before you go to bed. Because the measurement before you go to bed is the one I would like to know so I know if I should raise your insulin or not" Patient: "Yes, yes." The next example highlights that the health care provider does still confront the patient but interacts more; Health care provider: "What you actually have to say is that if it drops that low during the night, then I should just standard start injecting less long-acting insulin." Patient: "Yes, that's right." Health care provider: "Yes, very good of you." Patient: "Yes. Because, you are not going to take a risk if it is already 8." ; Health care provider: "Yes, what would your conclusion be what you should do? Suppose there is a 3 here and a 7 here. So before going to sleep it is 7, and then it is 3 the next morning." Patient: "That's not good." Health care provider: "Yes, but how would you solve the problem?" Patient: "Then ehm, then you do it a little less." Which suggested that the patient only stated what the health care provider was eager to hear, without really knowing him/herself what he/she was saying.

Lastly, this example showed that the health care provider was not waiting for an answer of the patient, but filled in the blanks for the patients themselves. Even though the health care provider was confronting the patient it was not initiating an interaction; Health care provider: "So I'm not going to explain to you why you should do that, but I'm trying to focus a little bit on yes, what what your considerations are about doing it or not. And the consideration, by eh, I really just don't want to know those high values because that confronts me, and that reminds me of the annoying reaction of my parents, of course it is a very strong emotion, and yet you have to try in some way to get rid of it, because you only have to deal with it, isn't it?" Patient: "Yes, yes." Health care provider: "But now ... try to think about those moments, in which you are stimulated to do a little more and then like it, I think it is going in the right direction, hey, and it was an external thing that you were promised right? a dog right?, I had hoped that you said yes listen, I want eh, I want to go exercise and I want to feel fitter, and then it comes from you." Patient: "Yes." Health care provider: "But that is not the case." Patient: "No". ; Health care provider: "What you actually have to say is that if it drops that way during the night, then I should just start standard injecting less long-acting insulin." Patient: "Yes, that's right." Health care provider: "Yes, very good of you".

4.2.2. Asses

Three things were noteworthy in the qualitative analysis of Assess: The lack of questions to create clarity at the beginning of the consultation even though the type of behaviour was discussed constantly, asking through versus asking closed-ended questions which stimulated the patient to endorse the question, and regularly asking multiple questions at once.

First of all, health care providers discussed the behaviour of their patients constantly. The health care providers specifically discussed the behaviour regarding SMBG. When comparing the discussions with the criteria of Assessment the health care provider' behaviour was standardized. However, the consultations were often not sufficient to fully pinpoint the different types of behaviour which could lead to threatening situations. Therefore, it showed that not all the criteria within Asses were met. For this reason behaviour was not only discussed at the beginning of the consultation but also throughout the consultation.

Secondly, close-ended questions were popular. Occasionally the health care providers tried to stimulate the patient to answer the question. Unfortunately, most of the time the health care providers generally stimulated the patient to affirm the question; Health care provider: "What do you think about it if you measure these values?" Patient: "What do I think about it? Yes "Health care provider:" Do you feel Is that nice, is that unpleasant, annoying ... how uh how" ; Health care provider: "Yes, okay and the Novorapid, that went well." Patient: "I just injected it." Health care provider: "Will it continue to go well?" Patient: "Yes". As can be seen, the health care provider asked close-ended questions which resulted in the patient answering only with ' yes '. This affirmation of questions prevented the assessment of specific information and stopped the flow in the conversation. Furthermore, it looked like the patient was somewhat confused by all the different questions so it just states what the health care provider wanted to hear.

Lastly, the health care provider tried to gain as much information about the patient as possible, but the quantity of the questions asked were often too much. This prevented a specific, quantified assessment of the patient due to the bombardment of questions; Health care provider: "Because when did you measure this? Before or after dinner? What time is this measured value?" Patient:" Uhhh that is ehheh, uhhh for dinner".

4.2.3. Advise

Three things were notable in the quality analysis of Advice: the advice from the health care provider was personalized, however it was often unclear for the patient, confronting the patient and initiate interaction if the patient generally only answered with 'yes', 'no' or 'okay' and other As were occasionally involved when giving advice, which seemed confusing for the patient.

First of all, the advice from the health care provider was almost always personalized but it was regularly not entirely clear for the patient what the health care provider meant; Health care provider: "Yes, and for dinner it is sometimes good, but sometimes also very low, quite often low. We have to be a bit careful with that, which means that the 28 that you inject in advance, that is at lunch, it may be just a bit too much." Patient: "Yes, oh, yes". ; Health care provider: "Uhm, uh, what you can do is, if you have sports, at least measure it before you are going to sleep. If you are very low, eh, inject a little less. So I would advise trying to do a bit." Patient: "Hmm". As can be seen the patient answers with "Hmm" which could seem to express that the patient did not fully understand what to do with the advice the health care provider gave.

Secondly, when the health care provider gave advice, generally the answer of the patient was 'yes', 'no' or 'okay'. The health care provider did not check whether the patient really understood the advice which was given; Health care provider: "So what I think is the most profitable, is the Novorapid that you inject" Patient: "Yes?" Health care provider: "Adapt it to the sugar at that time and adapt it to what you are going to eat." Patient: "Yes, hmm, okay". ; Health care provider: "What can happen is that while swimming, your sugar drops, because you just burn sugar, well it is very good what you do beforehand, making sure you start a little higher." Patient: "Yes." Health care provider: "Not 20" Patient: "No." Health care provider: "But hey, 10 or something hey, 8 to 10." Patient: "Exactly." Health care provider: "We often advise you to do endurance sports such as swimming if you have a good workout. That you then spray the Tresiba 20% or 25% less." Patient: "Okay." Health care provider: "So instead of 28, you spray 22 or 20, for example." Patient: "Yes".

Lastly, the advice given by the health care provider was on some occasions mixed and integrated with different As so the content of the message could be confusing for the patient; Health care provider: "But listen, hey, if I'm a blood sugar value of 20, I'll do this or that. And I do not mean inject less so you have a blood sugar value of 1, because that is not the intention. But of course it is the intention that if you have a value of 20, you try to adjust it, and that later that day get it somewhere, say 10 or below 10. And the second thing we want is that, under similar circumstances, next time you make sure that the blood sugar is not 20, but that it also stays a bit reasonably stable, isn't it?" Patient: "Uhu". The advice from the health care provider above can be confusing for the patient due to the different As that were mentioned. This can make it difficult for the patient to focus on the most important message the health care provider meant.

4.2.4. Agree

Three things were evident in the quality analysis of Agree: frequently the health care provider was persuading the patient by giving two options and let them agree with the best option,

confronting the patient about the severity of their disease, setting goals together and try to specify the what, when, where and how.

First of all, the health care provider frequently tried to involve the patient in search for the best agreement. The technique used by the health care provider was to propose two possibilities and persuade the patient to an agreement of the best option proposed. One option was the wrong possibility and one option was the correct possibility in the eyes of the health care provider; Health care provider: "Well, there are two possibilities, hey, there are also people who are confronted with it and then do not measure their blood sugar, because it is very annoying if that value is too high. Eeh, and there are also people who say, I measure it, because then I can do a little more with it. Can you be in one of those two? Patient: "Yes Yes." Health care provider: "I can see you nodding." Patient: "Yes yes." Health care provider: "Okay, do you recognize yourself in the second category? Namely that you say, it does excite me to do better?" Patient: "Yes, yes" Which illustrated that the patient only confirmed the correct option which the health care provider kind of already stated. The health care provider should instead let the patient think about the problem themselves.

Secondly, the health care provider every so often determined if it was necessary to bring across a powerful message towards the patient about the severity of T1DM. Specifically when the patient was lacking SMBG and was poorly injecting their insulin; Health care provider: "I can get mad at you, I can tell you to do this, but in the end you have to think for yourself how you can get yourself to actually do it. Uhm but it is already a step forward! Because it is much better than it was, I think, uhm ..." Patient: "Yes." Health care provider: "And I do not think that we should set the goals too high, but that we should try to do this a little bit. to hold on. Especially the tresiba, spray more than 3 times a week. "Patient:" Yes." Health care provider: "Basically every day. But skipping once is also an improvement compared to now. Uhm and then I think we will see that back again at your average, the average of the previous measurement was very high. And if you come back next time we will just measure it again, then you can probably already see that despite having high values, and if you still skip that tresiba once in a while that you have improved a lot. Which is already a huge profit in the long term. "Patient:" Yes." Health care provider: "The only thing uh uh, we still can do is to let you search for what works well for you. Well say having more often a consult and we can see if it helps, uh yes just keep trying yes uh but in the end you have to do it yourself. "Patient:" Yes" ; Additionally, the health care provider can confront the patient with the severity of their disease which can help the patient to set their priorities straight; Health care provider: "Yes. What do we have to do with that? "Patient:" Yes ..." Health care provider: "How on earth can we let you get a little more stable ..." Patient: "Haha. Yes, that is a good [sigh]. I, uh, I'm really thinking about simply ordering that sensor, whether it costs anything or not." Health care provider: "Yes." Which expressed that the

health care provider was eager to unravel all the problems and was also eager to find the appropriate solutions for the problems.

Lastly, the health care provider tried to involve the patient in collaboratively setting goals. Additionally, negotiations between the health care provider and the patient were identified. Furthermore, the goal setting did occasionally specify the what, when, where and how for the patient; Health care provider: "Yes. But what should you do about it?" Patient: "Some more injecting, I think." Health care provider: "Yes! But yes, you only know that if you measure it." Patient: "Yes" Health care provider: "Then you also have to measure it a few times, hey, because you can't inject only after one measurement, you must measure more often" Patient: "Yes, that's right." Health care provider: "Can you adjust it? Uhm, so yes, that's kind of a dilemma. Because on the one hand you do not want to measure because you say yes, I feel like that, but on the other hand, if you do, you have the feeling that you have some control over it." Patient: "Yes. I have to, you are right of course, I have to say, eh, one week in a month." Health care provider: "Would that be feasible for you?" Patient: "That would be feasible, yes." Health care provider: "Okay." Which seemed to indicate that the patient was really heard by the health care provider.

4.2.5. Assist

Three things were noteworthy in the qualitative analysis of Assist: identifying personal barriers, every so often the health care provider needed to be solution-oriented which meant that the health care provider needed to be quick and flexible in thinking of solutions, and the health care provider needed to accept that from time to time, the patient was not willing to cooperate but, it was still important to stimulate the patient to make an effort in keeping their health under control.

First, the personal barriers of the patients were often identified and discussed by the health care provider, but as can be seen the problem solving step was often not developed; Health care provider: "You don't feel annoyed by it, because of those 13 or 12 or 10 or something like that, but why are you worried about it?" Patient: "Yes, if 13 or 14 it is too high, and then I think yes, small things I can actually worry about it, it's my health, I mean ..." Health care provider: "If I understand correctly, you say well I actually worry about my health and the effects diabetes has, but if I then measure my blood sugar level, and if it is no good, then uhh, yes, I feel very unpleasant about that, is it true, is that what you say?" Patient: "Yes, yes, Yes. Look and that is not the intention. I did it years ago, I did it, and I am not supposed to feel bad about measuring." Health care provider: "Yes, no, that is not the intention." ; Health care provider: "Isn't it? And uhm ... you have, you told me last time that you, that it is the pricking act in particular that you have to do and that it is also a bit laziness that you do not ..." Patient: "Yes." Health care provider: "But what you are saying now is that you say yes, but the fact that I measure it if those values are not good, then ehm ... yes" Patient: "It demotivates." Health care

provider: "It demotivates huh." Patient: "Yes." Health care provider: "Yes. It is as if you get a pass, you try to do your test ..." Patient: "Yes, exactly". Which illustrated that the patient was understood by the health care provider but, a problem solving step was not yet developed.

Secondly, when the health care provider confirmed the barriers, the patient could be frustrated as every so often there were no immediate solutions or even no solutions possible at all to solve their personal barrier; Health care provider: "No? You're not going to do that at work? Okay." Patient: "I often sit with the client too, eh, no." Health care provider: "Those clients also don't know that you have diabetes eh?" Patient: "That's just, has no added value to tell it to them. Only my family knows, yes, yes." Health care provider: "Yes, okay. Hey, and how did you succeed in the period before, with the HbA1c of 47 and 55, then apparently did you succeed?" Patient: "Yes, I was doing a good job also in terms of food, but eh, also with eh, I just had time, I didn't work back then" ; Furthermore, there are some problem-solving techniques, but often barriers are unique and therefore, the health care provider needs to be innovative and able to regularly solve the solution on the spot. The example below shows a perfect illustration of the innovative and solution minded thinking of the health care provider, followed by reinforcing the patient; Patient: "If you inject, then the device will wait, beep beep. And that's what you hear, yes, throughout the office." Health care provider: "And if I give you a measurement device that doesn't make a sound? Does that help you?" Patient: "Then maybe I could do it more often, yes." Health care provider: "I'm going to the diabetes nurse now to ask ... You know, those are very practical things." Patient: "Yes ..." Health care provider: "Look if there are no meters that do not make a sound, or we stick chewing gum around the speaker ... but eh ..." Patient: "Hahaha." Health care provider: "I walk to the diabetic nurse right now and take a look at the euhm .." Patient: "Yes, I tried to turn it off, but I don't think you can do anything with it eh ... that's just a standard thing but ... yes then, then I could possibly do it yes." Health care provider: "What a good idea!".

Lastly, the health care provider repeatedly tried to understand the barrier of the patient. Occasionally it was difficult to solve the problem for the patient, for instance when there was a lack of motivation. Whenever this was the case, the health care provider needed to try to stimulate the patient nevertheless; Health care provider: "Do you understand that I'm trying to understand that? Why you measure one time and then inject" Patient: "Uhu." Health care provider: "And the other time you know that you are high, but don't dare to inject, and do not measure ..." Patient: "No that, yes that is, that might be a bit laziness." Health care provider: "It does not sound logical ..." Patient: "Yes, then I am busy, busy and then I think it will come again, it will be fine again and then eh .." Which expressed that the patient was feeling at ease enough to express their real feeling of why he/she found it difficult to SMBG and to inject their insulin.

4.2.6. Arrange

Two things were notable in the quality analysis of Arrange: helping to encourage and motivate the patient to change their behaviour by letting them come more often to a consultation and show the seriousness of their situation and enthusiasm and eagerness to learn about the new technologies (FSL system) and see how it could help the patient in practice.

First of all, the consultations at least happen every six months but, when the health care provider found it necessary to let the patient come back earlier it was with consent and deliberation of the patient; Health care provider: "What time limit we will agree on that you will come back here eh? How long have you been gone? Let's see." Patient: "Yes, eh, half a year, a little more than half a year?" Health care provider: "Yes, I'm just watching, the last time you've been, eh, was in March, huh." Health care provider: "Ehm, personally, I, I, I get the idea that if you do so well, you actually like to tell me how well it goes, or not?" Patient: "Yes, well, I thought so, I actually thought it was pretty good" Healthcare provider: "Yes, I actually think so, and that would be the reason why I just want to see you earlier, is in 4 months okay?" Patient: "Yes, that's okay!." Which seemed to illustrate that the patient was okay with coming back earlier to the hospital for a new appointment. When an earlier consultation was arranged it was most often due to poor outcomes. The health care provider wanted to bring across the seriousness of the situation but also needed to try to let the patient feel at ease; Health care provider: "It is the same compared to last time, which is no good. Shall we agree that, if you have been to the diabetes nurse, that you will come to see me a few weeks later?" Patient: "Yes, that's okay." Health care provider: "Please do that. And then we agree that you will be back in about 3-4 weeks so that we can see how it goes." Patient: "Yes, that's okay." Which seemed to indicate that the patient was okay with coming back earlier to the hospital for a new appointment.

Lastly, the curiosity of the health care provider came to light when the new FreeStyle Libre (FSL) technique was used. Even though the patients answers were short, he or she was willing to arrange a consultation in the near future because of the enthusiasm of the health care provider; Health care provider: "Because I really like it, if you've done that for 2 weeks, eh, to see you again, just to have a look at it with just the 2 of us, but then you have to make a copy" Patient: "Yes." Health care provider: "I can do it too, I can print it, and eh, but I like to have a look with the two of us." Patient: "I want that as well, that's okay." Health care provider: "I'm curious to hear, if the Freestyle Libre has helped you."

4.2.7. Applying the 5As as an integrated sequence

When observing the order of the 5As, Assess was always used first and Arrange was at every consultation used as last. Additionally, the other 3 A's (Advise, Agree & Assist) did not had the same order as was seen in the 5As model. Furthermore, the 5As model must be seen as an integrated

system, when Assess had not delivered enough explicit information, giving correct Advise was a challenge or not even possible. In that way a chain reaction of wrong behavioural changes could take place. This was one of the reasons why Assess was noticeably coming back more often in the consultations. Which did show a correction of earlier hiatus of not asking all the correct questions or not asking through.

Furthermore, typing on the computer affected the interaction and the correspondence with the patient. When looking positively at the computer interaction, outcomes of the previous consultation could help the health care provider to give the right advise. Additionally, the health care provider could integrate the established Agreement from the previous consultation into the new consultation. This could facilitate the follow-up of behaviour change counselling (which only happened in four out of the seventeen consultations); Health care provider: "Ehm, how did it go last year?" Patient: "Yes, well actually ..." Health care provider: "Yes?" Patient: "Yes, just like normal actually ..." Health care provider: "Yes .. [type on the computer] And that we discussed last time, the uhm, is that those sugar values were not really well regulated in you, hey, you felt good about it ... ". On the downside, what happened mostly was that computer interaction lead to an interruption in the consultation as was also seen in the examples of Assess and Assist.

4.2.8. Additional findings of codes

Inductive coding gave insight into the patterns of the 5As allowing the theory to emerge from the content of the raw data (see appendix 2 for the inductive codes). Identifying social processes and cultural norms which were of importance in the process of analysing were made clear due to inductive coding. With the 5As model as guidance and the inductive codes as addition, points of improvement for the consultations were found.

Four things were noteworthy in the additional findings of codes: the general information given about the severity of T1DM by the health care provider could be too extensive, different questions asked during the consultations, positivity towards the patient, the responses of the patients are investigated more closely specifically 'yes', 'no' and 'okay'.

First of all, the health care provider gave general information towards the patient about T1DM during the consultation. Generally when giving information it is important to be accurate and to-the-point, which health care providers sometimes seemed to be lacking. Occasionally though, the health care provider had to convince the patient about the severity of his or her disease at this point in his/her life ; Health care provider: "Suddenly, such a blood vessel can burst and you can become blind, to say it very dramatically. An eye specialist looks deep into your eyes, looking at those blood vessels, that you are not able to see with the naked eye, on the one hand that can be an alarm sign that I see that something is wrong with your sugar because it has consequences for your eyes, so

make sure you have the sugar stable. On the other hand, the eye specialist can also intervene if he/she sees that there are vulnerable blood vessels and things that can cause problems. I would really advise you to have it viewed at in any case. The only thing the eye specialist also does is a test to see how sharp you can see. It drops your eye so that it is wide and it looks back and that's it, it only needs to be done once a year. But it is not impossible that there is some damage. Which you can treat well and can prevent you from ever having problems with it. Heh, because a common cause of blindness is diabetes that has not been treated properly." Patient: "Mhmhm. Then we just have to believe it and go there." Which seemed to indicate that the patient was somewhat sceptical or unconvinced by the message above.

Secondly, questions asked by the health care provider were key in a consultation. What attracted attention was the code 'Questions by the doctor, precise questions, feelings of the patient' (number 96, see appendix 2), ; Health care provider: "What do you think if you measure it that way? What what ... what makes it, what happens to you if you now measure these types of values?" Patient: "Yes, the measurement itself is not a problem. That the values are high I find very annoying, annoying. Ehm ... also comes from home, my parents were always very close, so when something was wrong I immediately heard it from them." Health care provider: "Aha." Furthermore, the regular questions were asked mostly namely: 'Questions by the doctor, precise questions to the patient', 'Questions by the doctor, precise questions, about insulin' and 'Questions by the doctor, precise questions, about insulin' (number 85, 89 & 90, see appendix 2).

Third, positivity towards the patient was a tactic to lighten the conversation especially with a chronic disease as T1DM. Furthermore, positivity could help the patient to improve their motivation to get their T1DM better under control ; Health care provider: "I think it is great that you have measured this, and what I also think is great is that you say you will do this once a month, then it already helps us further." Patient: "Yes, I also try a little ..." Health care provider: "I think it's a cool idea ..." Patient: "I try to think with you a little bit!" ; Health care provider: "And um ... then let's have a look. Ehm, HbA1c 79. It is dropping really fast, it is going a lot better, you go from 100 to 87 to 86 to 79 ... even the little things you do now lead step by step that it goes much better." Patient: "And my blood pressure? Is that good too, measured?" Health care provider: "135 over 88. Great!" Patient: "Yeah, hey. Okay. Now the other one. We're going to do it. Let's agree in 6 weeks" Health care provider: "Yes I am fine with it, if you agree with it."

Lastly, it was remarkable that the patient extremely often answered with the word 'yes' (476 times in 17 consultations). During the consultations with the health care providers 'yes' was the main answer of the patient, in comparison it was three times more said than the answer 'no' (132 times in 17 consultations). Additionally replying with two or three words was popular as well, next to only 'ok' (58 times in 17 consultations) and the 'uhu', 'ohw' or 'mmm' (285 times in 17

consultations). The health care provider lacked checking why the patient said 'yes', 'no', 'okay' or 'uhu', or what the patient exactly meant when using one of these words. This was essential because the health care provider did not know if the patient really agreed or just endorsed to avoid further ado. The health care provider lacked insight of what the patient really understood and felt during a consultation; Health care provider: "I think that in itself, really as a whole ... look there are all sorts of variants to think of, but measuring, once a month a uhhm a curve, because that is the next step, that you say yourself I need more measurements and now I am going to adjust my insulin uhh to the measurement, hey because I see that this is going on, I have to spray a little more in the evening, or maybe a little less" Patient: "Yes ..." Health care provider: "it is of course fine. Look, we would like, what we want is that you get a little grip on it anyway. Well if you do a curve once a month, and take action on it by yourself, then you have more control over it." Patient: "Yes, that's right ..." Health care provider: "But I really think that's an excellent idea eh, and then yes, those other weeks, you just continue as you do now." Patient: "Yes." Health care provider: "By the way, if you want to measure your blood sugar values, then you shouldn't hold back, it's okay." Patient: "Yes." Additionally some health care providers addressed the patient with 'U' (102 times in 3 consultations), which was polite but created distance. Using 'U' is not necessary when the health care provider is acquainted with the patient, which has been the case for all the patients in this research.

4.3. Explorative interviews including health care provider- patient communication and communication of the new FSL system

The overall conclusion was that the patients were quite pleased with their health care providers: The patients were able to ask everything, they felt at ease and comfortable, the health care providers were honest, solution oriented and took their time for the patient during the consultation, lastly, all patients were positive about the new FSL system but were not all enthusiastic to use the new system because their T1DM was quiet stable at the moment.

The patients were pleased to go to the health care provider and found the way of communication sufficient. Furthermore, as could be seen in the following example patients already went for many years to the same health care provider; Patient: "I go to an internist, I think for 19 years, and uh what I say I've had other experiences in the past. But he still keeps seeing positive points and I have sometimes missed that in the past, which makes communication with him nice. And uh yes, it is a positive incentive to continue working on it". Additionally all patients felt that their health care provider was honest and open towards them as a patient, moreover, they felt that their health care provider was able to share everything during their consultation.

Furthermore, all patients were pleased with their consultations, they all stated that going to a consultation was never a waste of their time, even when the consultation had no pleasant

outcomes. Since, the patients always felt that the health care provider supported them with their disease. Moreover, the patient and health care provider always came to a mutual agreement to plan their next consultation. When the patients had to mention a negative point, they often thought about the waiting times, often when patients had an appointment (e.g. at 10.30) they had to wait (e.g. until 10.50) for the health care provider to be available. Even though the patients had to wait, they did not feel rushed during their consultation.

Additionally, most patients were pleased about the conclusion of the health care provider considering they were generally clear. One patient mentioned that sometimes the information given by the health care provider was too much and whenever he/she had a consultation another 'to do' was added to his/her list. Furthermore, waiting for certain results from for instance the eye specialist could take a long time. In addition, the communication between the different specialists could be improved, as was stated by one patient. Due to the lack of mutual communication between the health care provider and other specialists the patient mentioned that he/she often had to tell the same story multiple times which occasionally aggravated him/her. Conclusively, the patients were positive and would not wish for another health care provider.

4.3.1. The FSL system

Generally speaking when looking at table four, the FSL system was received positively by the patients who attended the trial. Applying the UTAUT model to the results of explorative telephonic semi-structured interviews showed that there was a positive relationship when using the FSL system.

When looking at the performance expectancy, a burden has been taken away from the patient. Secondly, the effort expectancy had a positive relationship with the FSL system, meaning that the FSL system was simple and effortless in use. Third, the social influence was mostly done by the health care provider. Fourth, the facilitating conditions were high because compensation had been arranged by the health care insurance therefore, the user friendliness had gone up enormously.

Table 4. Overview of the explorative semi-structured interviews about the FSL system: Use of the FSL system, Why the patient is or is not using the FSL system and How the patient has heard about the FSL system.

Patient	Use?	Why?	How?
101	No	Is eager to use but, is still waiting for the hospital to arrange a new trial group.	The health care provider has been the first one who introduced the FSL system to the patient.
102	Yes	Helps the patient to SMBG.	Found information about the FSL system on forums on the internet.
103	No	The patient wants to think as little as possible about T1DM. The patient is scared he/she will look at the blood sugar level too often.	The health care provider has been the first one who told the patient about the FSL system.
104	Yes	Helps the patient to SMBG.	The health care provider has been the first one to introduce the FSL system to the patient.
108	Yes	Helps the patient to SMBG.	The health care provider has been the one to introduce the FSL system to the patient.
201	No	Is not eligible.	Found information about the FSL system on forums on the internet.
303	No	Is eager to use but, is still waiting for the hospital to arrange a new trial group.	The diabetes specialist nurse has been the first one to introduce the FSL system to the patient.

First of all, the performance expectancy, when looking at the biggest struggle for young adult patients namely SMBG, the new FSL system could take most of this burden away. Even though the FSL system was not as quick in giving the result of the blood glucose level as the SMBG, it did show the correct glucose levels most of the time without the patient having to prick in his/her finger. The FSL system was seen by the patient as user friendly. Furthermore, the glucose levels could be seen on the patients telephone. During the trial patients were offered, they learned how the FSL system worked and what results they could expect from the new device, which resulted in positive reactions of most patients. Even though the patients were overall positive, they must remember that SMBG is still more accurate.

Secondly, the effort expectancy of the FSL system was low which meant it had a positive relationship with attitude due to the easiness of use. The patient needed to apply a disposable

sensor on his/her your upper arm. It is a lightweight system that is a compact (form of a button) on the skin and does not need calibration by the user. With the help of a phone the patient was able to see his/her own blood glucose levels. In this modern age, especially young adults daily spend many hours on their phones. Therefore seeing the results of blood glucose levels on that same telephone were not time-consuming, so little effort was needed and the reward achieved is high (Naaraayan et al., 2018).

The two patients who were not eager to use the FSL system were content with how their T1DM was handled, at this time in their lives. Although they did not manage their T1DM extremely well, these patients had other reasons for not using the new FSL system. One of these reasons being that his/her stress level would go up when using the new FSL system because you could see your glucose levels every minute of every day. Another reason was that changing to another system their daily routine had to be adjusted. Therefore, he/she needed to think more about their disease which at this time in their lives would not be the right decision. On the other side, both patients said that they could imagine the benefits of the FSL system and would later in their lives consider the system. Third, the social influence of the FSL system mostly came from the health care providers. If the patient had brought up the FSL system themselves, the health care provider had taken his/her time to explain the system in detail. After the conversation about the new FSL system with the health care provider or a diabetic specialist nurse, patients were well informed and were positive about the new system. Furthermore, the device on the arm did not bother any of the patients interviewed. The efficiency of the usage in comparison with the finger prick was convincing for all patients.

Lastly, facilitating conditions was the direct determinant of user behaviour. After a long battle between the health insurance and the health care providers, the FSL system will officially be compensated by the health care insurances. The FSL system has been proven to give a clear picture of the trends of fluctuations in glucose levels of the patient as well as snapshots. The Healthcare Institute considered that it had been sufficiently proven that the risk of hypoglycaemia and hyperglycaemia was reduced with the FSL system. Additionally this reduced the chance of long-term complications (Zorginstituut Nederland, n.d.). The greater part of the patients (five out of the seven) were not able to pay for the FSL system by themselves. Now the health insurance compensate the costs which automatically increase the user behaviour.

These four core constructs of the UTAUT model mentioned above were moderated by the following three concepts: voluntariness of use, experience and age. Especially voluntariness of use was essential because these particular patients had substantially problems with SMBG. Therefore, the patients were extra motivated for a system which was easier in use. Due to this reason the patients could be open and positively minded about the new FSL system. These patients were delighted to try the FSL system which had positive effects on the voluntariness of use which

automatically developed a positive behaviour intention. Secondly, age was relevant for the research as the study focused on young adults with T1DM (age between 19-30). Lastly, experience, which influenced individuals' core determinants to adopt the new FSL system. The experience with the FSL system was short for all patients, which meant that some still needed time to adapt to the system. On the positive side, the system was easy in use which lead to easy adaption and experience. Furthermore, for this particular group of patients it was of importance to know their attitudes towards the new FSL system because of their problems with SMBG when using the finger-prick. As stated in the methods, a positive attitude can raise the chance of a behavioural intention to use the FSL system. In both cases the effort expectancy and the performance expectancy were positive. Therefore, the conclusion could be drawn that the attitude of the patients were positive as well. Even though, the entire interaction between the patient and the health care provider changed as a result of the FSL system. Due to the FSL system the patient was now able to send all the data towards the health care provider, so the health care provider was able see a clear picture of the trend of the glucose values. This meant that the health care provider could invade the privacy because he/she was always able to see what happened twenty-four-seven, which on one hand could be beneficial for the patient but might also be seen as a violation of their privacy. The FSL system made it easier for the health care provider to prepare more specific advice. The patients (three patients) who were currently using the FSL system said they had no problems with sharing all their information about their blood glucose levels with their health care provider. Therefore, all the patients gave approval to their health care provider to see all their data, twenty-four-seven. Moreover, the patients trusted the health care provider with their data and noticed that the graphics helped the health care provider to give more precise advise. Additionally, giving more precise advise is needed to improve their self-management.

5. Discussion

The purpose of the first part of this study was aimed to assess the effectivity of the health care provider communication to support self-management of T1DM. The assessment was based on the 5As model, which covers the fundamental elements of self-management (Glasgow, Davis, Funnell & Beck, 2003; Harvey et al., 2008).

Next, the second part of the study focused on exploring if there were new communication problems due to the FSL system. Furthermore, components of the interview included whether the communication between the patient and the health care provider were honest and open.

5.1. Linking of findings to current research

The first part of this study assesses the consultations with the help of the 5As model to try and detect how self-management of the patients with T1DM can be improved due to improving the communication of the consultations. Self-management is an important strategy to reduce the burden of chronic disease and increase health related quality of life (Wagner, Austin, Davis, Hindmarsh, Schaefer & Bonomi, 2001; Bodenheimer, Lorig, Holman, & Grumbach, 2002; Panagioti 2014; Zwerink 2014; Chrvala, Sherr, & Lipman, 2016). Therefore, research on how to help the patient with their self-management is the driving force behind this research. Unfortunately, to date, there has been no systematic review of the literature examining the effectiveness of self-management support interventions for people with T1DM (Griva, 2015). More evidence from high-quality studies is required to support future self-management programs (Zimbudzi et al., 2018). This research could be the starting point of why more research is needed.

The quantitative assessment showed that the health care providers Assess the health behaviours and Arranged all the follow-up consultations. Positively, the health care providers discussed the health behaviours of their patients and gave more often Advise about the injection of insulin, instead of SMBG, but it is still not sufficient enough. Nonetheless, Agree and Assist, were the least used communication methods. These findings are in line with other studies (Carroll, Antognoli & Flocke, 2011).

First of all, the health care provider is not always asking the correct questions to the patient which can result in an error in judgement later in the consultations (Gravel, Légaré & Graham, 2006; Montori, Gafni & Charles, 2006; Registered Nurses' Association of Ontario, 2009). Assess is the foundation for identifying the potential barriers, and when potential barriers are found the facilitation of self-management will increase (Nagelkerk, Reick & Meengs, 2006; Novak, Costantini, Schneider & Beanlands, 2013). Additionally, the health care providers need to ask through instead of asking closed-ended questions, and specifically need to ask for clarification of the answers the patient give. The consequence of not asking for clarification is that the real behavioural changes and their barriers cannot be identified for this reason Agree and Assist were least used. Secondly, young adults with T1DM value pragmatic knowledge for self-management, during Advise and Agree knowledge is made pragmatic. Unfortunately, Advise was not always specific enough for the patient to understand it entirely. Additionally, when Agree is applied with the given Advise it did not constantly reflect collaboratively setting goals which resulted that the patient did not follow-up the Agreement made. To achieve a collaboration, the health care provider needs to change the relationship with their patient, from a paternalistic model to a partnership which results in patient-centred care (Novak, Costantini, Schneider & Beanlands, 2013; Ramchandani, Way, Melkus & Sullivan-Bolyai, 2019). Positively, due to the long lasting relationship between the health care

provider and the patient, the barrier of a partnership between the patient and the health care provider can be easier changed into a patient-centred relationship. The feeling of 'we're in this together' can help the patient, this feeling is what the health care provider already try to achieve mostly within Agreeing, Assisting and Arranging (Glasgow, Davis, Funnell, Beck 2003; Lugasi, Achille, Stevenson, 2011; Sanders et al., 2018). Third, Assist, due to not always being able to identify the personal barriers, Assist is low which is in line with other studies (Carroll, Antognoli & Flocke, 2011). Lastly, the health care provider always Arranged a follow-up consultation, frequently earlier than within six months which is routine in the Netherlands. Furthermore, the health care provider regularly proposed during the follow-up consultations that the patient should also receive help from other specialists like dieticians, eye specialists or the 'diabetic' nurses (Harvey et al., 2008).

The second study aimed to assess what the patients thought of the FSL system and how the communication between the health care provider and the patient changed. The results show that the FSL system is accepted by the patients who are using the new system at this moment. Moreover, the patients trust the health care provider with their data and notice that the graphics help the health care provider to give more precise advise. It is interesting to indicate that results have shown that the FSL model has significantly reduced the hypoglycaemic exposure in patients with T1DM (Bolinder et al., 2016), future research with the patients from this research might confirm this as well. Due to the easiness of use of the FSL system, the system is already improving the patients way of life as is in line with the results of the interviews. On a critical note, the finger-stick device to prick your finger, is more accurate as is told by the health care providers during the trial of the FSL system (Pearson & Ajjan, 2018). The patients used the finger-stick sporadically, whenever they did not have enough confidence in the results of the FSL system. Nevertheless, as patients stated, this only happened when they wanted to be entirely sure about their glucose levels. During reflection of the interviews, all patients who had used the FSL system had a high level of confidence in the FSL system (Olafsdottir et al., 2017; Al Hayek & Al Dawish, 2019). Even though SMBG is more accurate, it interferes more in the daily life of the patients in comparison with the FSL system. In addition, the finger-stick has its limitations, since they are only snapshots of times and, as a result, patients have less insight into the fluctuations and patterns of the glucose values, which is confirmed by the patients during the interviews (Raaijmakers et al., 2013; Nederlandse Diabetes Federatie, 2017). Due to the inconvenience of the finger-stick, the patients often skip testing their glucose level. As was seen in the consultations, fifteen out of seventeen patients gave this as one of their reasons not to measure their glucose levels, which is confirmed by other studies (Šoupal et al., 2016; Dunn et al., 2018). The observed high rate of the glucose tests within the FSL system is explained by the ease of testing the patients' blood glucose levels (Bolinder et al., 2016; Dover, Stimson, Zammit & Gibb, 2017; Pearson & Ajjan, 2018). The three patients who already used the FSL system could confirm that the ease of

use helped them enormously when measuring their glucose levels, so the findings are in line with the literature found. Furthermore, this helped them improving their self-management (Hunt, 2015).

5.2. Linking of theoretical model

Firstly, the assessment is based on the 5As model, which is the conceptual framework which provide for fundamental elements of self-management (Glasgow, Davis, Funnell & Beck, 2003). When looking closely, it is possible to link different theories to self-management. The different As of the 5As model can also be linked to different models. The Theory of Planned Behaviour is the main theory to predict behaviour which can be linked to self-management (Ajzen, 1991). Additionally, the Self-Determination Theory helps the patient in gaining motivation and commitment to goals (Ryan, & Deci, 2000). The 5As model is a guide for health care providers to use a patient-centred approach to reduce the risks of the patients through behavioural change as can also be seen in this research (Storer, 2019). Furthermore, the 5As model represents the framework that covers the crucial elements of self-management (Glasgow, Davis, Funnell, & Beck, 2003; Fisher et al., 2005). Additionally, the reason why the 5As model suits best with the self-management theory is because it covers almost all aspects that are useful in giving the health care providers the right advise in communicating towards the patient to enhance their self-management.

The UTAUT model is considered a more enhanced model when considering new technology acceptance in health care compared with the TAM model, which this research confirmed. However, the TAM is a relatively older model which is implemented more often in studies on the acceptance and use of Health IT (Holden & Karsh, 2010). Even though, the UTAUT model is being applied less, earlier studies have shown that the UTAUT explained 50% in actual use of new systems and a remarkable 70% of the variance in behavioural intention (Holden & Karsh, 2010). Therefore, the decision for the UTAUT model has been the correct one because, the behavioural intention is of great relevance. It is of essence for this research to see if the patients are open and willing to use the FSL system. Moreover, the UTAUT has factors including experience, free will, and demographics which are suitable for an explorative research of the new FSL system (Holden & Karsh, 2010). The context of this study concerns the FSL system as a technology which, together with the attitude of T1DM patients, is of relevance for an explorative research, therefore, attitude was added to the UTAUT model (Dwivedi et al., 2017). This research supports that attitude is a favourable addition to the model of the UTAUT to establish a better understanding, in this case with T1DM patients and the new FSL system.

5.3. Practical implications

To start with the first A, Assess. One of the main issues in Assess is the lack of clarity of the questions the health care provider asks the patient, which in turn leads to inconclusive answers from the patient. This has consequences on the whole consultation, as the questions were often not sufficiently answered. A sufficient answer includes no additional questions later in the consultation, and an answer which gives the health care provider enough insights to make an Assessment. On the other hand, the perception is that the health care provider tries to gain as much information as possible from the patient. The health care provider constantly continues to ask too many questions at once which is confusing for the patient. Additionally, the health care provider often asks closed-ended questions which stimulate the patient to endorse the question. Due to these mistakes, asking the right, open-ended questions and having an interactive conversation is crucial to learn for the health care provider. Questions from the health care provider are to assess, so the other A's can be sufficiently answered later in the consult by the health care provider. When Assess is not sufficient it will lead to inefficient healthcare and loss of time which automatically lead to loss of providing the correct healthcare. When performing the step of Assess correctly it creates opportunity to enhance self-management. Additionally it is crucial that the health care provider makes sure the patient is sufficiently informed about the risks and benefits of their possible actions involving diabetes. Over more, the health care provider must understand the patients values regarding their diabetes. Conclusively, the health care provider did try to assess the situation of the patient as good as possible, but as can be seen, there is room for improvements.

Continuing with Advise. In order to lessen the consequences of the shortcomings of the Assessment part, specific suggestions can be made concerning giving Advice. The health care provider may not always know if the patient tells the truth during their Assessment which makes it challenging to give the proper Advice. Even though, a health care provider adheres to a strict policy of confidentiality, and which is only in the best interest of the patient to be completely forthcoming. Furthermore, giving answers that are viewed as socially acceptable is unfortunately still common practice in a consultation. The question that has been raised is whether the patient has understood all the personalized Advice given. It is crucial for the health care provider to know if the information has reached the patient correctly. Therefore, repeating a question and checking if a patient is truthful or whether he/she completely understands is a powerful mechanism to improve health care and patient communication. Furthermore, improvements in communication regarding the confrontation with the patient can be made. It is of great relevance to show the patient exactly why this particular Advice is given and how their health can be improved by following the particular Advice. The health care provider must again be careful that the patient will not only reply with 'yes', 'no' or 'okay'. In practice, this means that the intervention should aim at increasing people's self-management. In the

end there must be an interaction between the health care provider and the patient, to come to a coherent Advice. Another obstacle for the patient is that the health care provider at first glance gives contradicting Advice which might be confusing for the patient. Additionally, the T1DM patients need stay alert to various aspects of their health so, multiple advises are and have to be given. This can be the reason why not all the Advice can be followed up by the patient, because it is simply too much to remember all at once. Using repetition at the end of the consultation helps the health care provider to determine if all the Advice given has also been received properly.

Moving on to the third A: Agree. The health care provider tries to communicate more systematically by discussing two possibilities for the patient to Agree with. Through this way, the health care provider tries to initiate an interaction with the patient because it implies that the patient has to think about the best solution in his/her personal case. To start an Agreement in this particular systematic way can give the patient a sense of control and influence on the treatment, but this has to be done correctly. During the consultations, the health care provider often tried this systematic way to initiate an interaction, unfortunately the patient does not always respond to this in the way the health care provider anticipated it. Additionally, the intention of Agreement between the health care provider and the patient is necessary but can be improved. Examples show that on many occasions, there is no more interaction between the health care provider and the patient than a single word. As stated before, this may show that the patient is not involved in the consultation which as a result may mean that he/she is not going to fully or even partially follow the Agreement made. Improvements can be made regarding this one-sided way of communication by asking the patient the same question again, when a given answer is not satisfactory. Additionally, health care providers have a crucial role as they are the gatekeepers of the patients health. It is the job of the health care provider to confront the patient with the severity of their disease and help them to live as healthily as possible. Furthermore, collaborative thinking between the health care provider and the patient is crucial in helping the patient with their health step-by-step. Setting goals together is of relevance, it can give conclusive outcomes especially when the patient feels involved in making the decision which can result in specific behavioural changes.

Then onto Assist, in order to increase self-management, identifying personal barriers is of essence, during consultations, the health care provider is often searching for the patient' personal barriers. Moreover, barriers must be confirmed and made clear so both the health care provider and the patient can understand them. Whenever, the health care provider confirmed the barrier of the patient as being problematic, strategies to deal with the barriers were not developed. Furthermore, at any given time, the patient is not cooperating and is clear about what he or she is willing or is not willing to give up for their disease, the health care provider must remain calm and come to a compromise to try to solve the barrier, if possible. This can be difficult but is a necessary

process for solving bad self-management behaviour. Additionally, it can occasionally be difficult to solve the self-management problems at all, for instance if there is lack of motivation. Even when this might be the case, the health care provider must still try to stimulate the patient. Stimulation is of essence for patients, since even stimulation without coming to a solution can improve self-management in the end.

Lastly Arrange, firstly the health care provider persuades the patient to come to the consultations more often, in order to encourage and motivate the patient for his or her behavioural change. Next, it is critical for the health care provider to motivate the patient to take better care of themselves. This is also a stimulation for the patients to improve their own self-management. As can be seen above every A is of importance, next applying the 5As as an integrated sequence is fundamental for giving Advice to the health care provider on how to communicate with the patient. Additionally, questions by the health care provider are key in a consultation. When looking at self-management, Assess is the foundation of encouraging self-management (Glasgow et al., 2004). Questions are the way to Assess the patient and therefore it is the cornerstone for the health care provider. Questions at the beginning are of importance for giving Advice, Agreeing with the patient, Assisting the patient and Arranging help.

First of all, the quantitative assessment showed that the health care providers Assess almost all health behaviours. Moreover, the health care providers Arranged a personal follow-up consultation for all their patients. However, in less than half of the consultations, Agree was not mentioned, specifically when injecting insulin, this was the same for Assist. This is not entirely in line with the literature findings that Assist and Arrange seem to be least delivered in consultations (Glasgow et al., 2005; Glasgow, Emont & Miller, 2006). This shows that the health care providers positively differ in Arrange but unfortunately the Agreement part of the model must increase. Furthermore, in both cases, the health care provider more actively set goals, priorities and gave the patient more confidence in his or her ability to change behaviour for SMBG compared to the injection of insulin. The main reason why the percentage of Assisting SMBG is higher is because knowing the glucose levels of the patient is needed to know how much insulin must be injected. To conclude: Assessment is important at the beginning of the consultation and is of essence for the rest of the 5As. Health care providers mainly discussed the SMBG in comparison with the use of insulin of the patient.

Lastly looking at the additional findings of codes, four things were noteworthy: the general information given by the health care provider about the severity of T1DM could be too extensive,

different questions asked during the consultations, positivity towards the patient, the responses of the patients are closer investigated specifically 'yes', 'no' and 'okay'.

First of all, general information given to the patient about T1DM during a consultation is of essence. During a consultation a great deal can be discussed at the beginning of the consultation therefore, there can be less misunderstandings later in the consultation. Hereafter, the patient can ask questions more related to him/her-self. On the contrary, the patient can get lost in all the different sorts of information given by the health care provider because T1DM is a complex disease which influences multiple body functions. The patient must feel at ease with the health care provider so he/she can ask all the questions that he/she wants. Most patients have had the same health care provider for many years, which may insinuate they will feel close enough with their health care provider to ask anything and to ask if the health care provider can elaborate on a subject if they are not able to understand it.

Furthermore, occasionally the health care provider got really enthusiastic about explaining a concept, most often this happened when the health care provider wanted to show the seriousness of the problem. Yet, the patient generally did not listen carefully enough because of the information overload. The health care provider got regularly carried away which resulted in the patient generally answering with one word, which is indicative of a loss of attention. Moreover, the health care provider must ask the opinion of the patient more often, as well as asking whether the patient still understands all the information given. As said before the bond between the health care provider and the patient can be close which can also be a pitfall. The health care provider might assume that the patient will understand their message and know what to do, but even then it will be sensible for the health care provider to ask if the patients still understands the information. Occasionally, the health care provider did convince the patient of the severity of their disease. This can result in better self-management because patients understand the essence of why they need to take good care of themselves.

Next, positivity towards the patient is a tactic to lighten the conversation which can be helpful, especially when talking about a chronic disease. The health care provider shows empathy and interest in the patients problems. Moreover, positivity towards the patient gave the patient more confidence and a boost in excitement to get their disease under control, as was stated by the patients themselves. Frequently, the health care provider was positive towards the patient although in reality the outcomes periodically were worse than the outcomes of the previous consultation. Whenever the health care provider is too positive, the patient might think he or she is doing a great job but in reality it is quite the opposite. Every so often, the health care provider can show that they are disappointed in the patient without hurting their relationship, when this happens it is still

important that the health care provider gives the patient a positive perspective (when self-management is improved) in order to motivate.

Additionally, the responses of the patients were investigated more closely, specifically the responses 'yes', 'no' and 'okay'. As mentioned before, it is important that during a consultation the health care provider as well as the patient are heard and feel that they are heard. The health care provider has a leading role in helping the patient to get out of his or her shell, so he/she dares to say and ask everything that they find necessary. The health care provider must be vigilant of moments when the patient says 'yes' a couple of times in a row as this can be indicative of loss of attention or lack of understanding. The health care provider must ensure that all the information is well understood and manageable for the patient. This can stimulate the patient to improve their self-management because they exactly know why they must improve their self-care and what results it will give them.

5.3.1. Explorative interviews including health care provider- patient communication and communication of the new FSL system

Overall, the patients are pleased with the communication with the health care provider. Additionally, the attitudes towards the health care provider were all positive.

Furthermore, a tip as was said by one patient; "Perhaps the tip might be that he might ask more to the patient, that he would place the ball of the conversation more with the other person". This result has come back repetitively during the assessment of the communication of the health care provider as well. Moreover, the information given by the health care provider is often okay but it can be too much for the patient which can result in disregarding the promise of the patient too change their behaviour. Additionally, when the conversation is in the hands of the patient, the health care provider can gain valuable information which can lead to new insights and new understanding about the patient. Therefore, the health care provider can help the patient even more effectively when listening more careful. When the health care provider realizes too listen more careful to their patients the patients will be even more content with their health care providers.

5.3.2. The FSL system

This study has tried to fill in the knowledge gap between the communication of the health care provider and their patients in addition with the new FSL system. New questions during the explorative interviews arose, specifically about the privacy of the patient and the attitudes of the patients towards the system.

When analysing the explorative interviews with the UTAUT model, the attitudes, performance expectancy, effort expectancy, social influence and the facilitating conditions were all positive.

Therefore, the attitudes towards the new FSL system can be interpreted as positive. When studying the young adult patients for whom it is difficult to sufficiently manage the blood glucose levels the FSL system has been of tremendous assistance. The patients who are using the FSL system are more often measuring their blood glucose levels which allows for an earlier detection and timely treatment of the targeted glucose levels, thus preventing intense fluctuations. Therefore, the health care provider can see that the patients are able to enhance their own care and their self-management (Bianchi et al., 2019).

5.4. Strengths & Limitations

This study attempts to fill the knowledge gap concerning the effectivity of the health provider communication to support self-management of T1DM patients. It strives to shed light on the process of support that the patient need and what communication the health care provider can give.

Firstly, a shortcoming of this study is the limited number of participants who were recruited by the health care providers from the Gelderse Vallei. This small sample size of homogeneous participants and health care providers from one hospital who were willing to participate limits the generalisability. Of which, most consultations were performed by one health care provider. This sample size is too little to make communication recommendations for all the hospitals in the Netherlands. Although not representative, the findings are likely to reflect experiences of the broader population of young adults with T1DM. Even though, the aim was not to generalize beyond the immediate study participants. On the contrary, the health care provider that contributed most has been working in this field and with these patients for many years, and thus has a vast amount of experience. Moreover, this health care provider, but the others as well are very enthusiastic and care about their patients deeply. So even though the sample size is small, these health care providers can be deemed to be adequate representatives.

Secondly, the semi-structured interviews which were carried out about the FSL system were entirely new. The interviews were only meant for exploratory purposes because the interviews would evolve into more questions which could be researched. Furthermore, the interviews may have some limitations. To start off, there were individual differences regarding the questions asked, which resulted in some themes being discussed more in depth than others which depended on the questions of patients and their answers. This is something that cannot be controlled for but does differentiate between interviews. On the other hand, it added a wide range of insights into patient experiences. The telephonic interviews were only explorative, so more in-depth research would be needed. Additionally, participants who were telephoned were not known by the researcher due to consideration with the participants privacy which suggest it resulted in open and honest answers.

Thirdly, Guest et al., (2006) stated that twelve interviews are sufficient for a qualitative research investigation and, a small sample size is preferred for qualitative research if the sample is representative for the population (Miles & Huberman, 1994; Teddlie & Tashakkori, 2000). Even though this study only has seven interviews, it is explorative so it is sufficient for an explorative research. In addition, the seven interviews gave further in-depth information which gave the research confidence that a broad range of views and experiences were captured.

Lastly, a strength of this research is the investigator triangulation, the checking of the interpretations of the interviews with another researcher. Even though the investigators had overlapping as well as contradicting findings which can devalue the conclusions, it also raised questions and opened a discussion which gave new insights and showed critical thinking.

In conclusion, even though the study sample was small, important themes emerged that warrant further exploration.

5.5. Suggestions for future research

Future studies directly related to this thesis can be carried out. One suggestion is expanding, so creating a larger sample size. Furthermore, in order to validate the communication recommendations, it is suggested to carry out future research regarding whether the recommendations made in this research did influence the self-management of the patients as a follow up investigation. Note that the Gelderse Vallei is interested in participating in future follow-up studies. An approach for follow-up study can be using the recommendations and translating these into guidelines which can be applied in practice. These guidelines can also be incorporated in trainings for health care providers using, for example, role play with an actor who plays a patient. This allows for guided practice with feedback. After sufficient training, the health care providers can start applying these guidelines for a more effective communication in their clinical practice. Additionally, the impact of the new communication strategies on patient outcomes can be examined. This can be done by comparing patient outcomes pre-test with patient outcomes post-test, i.e. through a quasi-experiment with a one-group pre- post -test design (Harris et al., 2006). Based on the results, the new research team can decide whether the pilot-test was effective and feasible to use in clinical practice. If so, a formal protocol can be formulated, including a handbook and training guidelines. Assuming that there is inconclusive evidence to provide for effective guidelines, the eligible patients can be re-interviewed by the researcher to support or try to confirm the data that has already been found and to add missing information.

In addition, further studies can explore the fairly new questions which were raised by the health care providers themselves, namely how to find a new balance of communication with the patient regarding the new FSL system. Specifically finding the balance between privacy and all the

information given in the FSL system, in order to develop more concrete communication recommendations. When a protocol has been formulated as is recommended above, adjustments can be made for the new communication skills with the FSL system. Even the study above can be repeated but then concerning only patients who use the FSL system but this is debatable since the study will take a long time.

Furthermore, because little knowledge is present about the communication between patient and health care provider of T1DM patients, this explorative thesis raises more questions and at the same time fills in a small knowledge gap. However, further research is required in order to further elaborate about the practical recommendations regarding new communication skills for the FSL systems.

In the end the research, has shed light on issues about the communication between the health care providers and the patients. Different aspects are highlighted which if adjusted can help the self-management of the patients and can help to make their lives easier, which is the goal of every health care provider.

6. Conclusion

This study shows the importance of assessing the provider communication to support self-management with the 5As method with T1DM patients. Truly seeking to understand how to support self-management for young adult patients with T1DM. The consultations between patients and health care providers contribute to important insights into the aspects of stimulating self-management. Ultimately the health care providers need to be open to change, through listening to what patients have to say and use the 5As model as a guidance throughout their consultations.

The 5As (assess, advise, agree, assist, and arrange), can be adapted for T1DM young adult patients consultations. Assess the type of behaviour discussed, asking through instead of asking closed-ended questions and ask for clarification of the answers of the patients. Advise, which is personalized and mostly specific however it remains regularly unclear for the patient what the health care provider exactly meant. Furthermore, confronting the patient is essential. Agree, with the patient about the same goals which are set together and to specify the what, when, where and how is crucial. Assist, in identifying the personal barriers and be quick and flexible in thinking of solution. Additionally the health care provider needs to stimulate the patient to carry out their agreement. Lastly, arranging new consultations and arrange regular follow-ups (see table 5). Breaking down the barriers of the patient, keep asking questions and keeping all the 5As in mind can play a role in encouraging dialogue with the patient and later towards self-reflection of the patient. The goal is to flourish the self-management of the patient, without the help of the health care provider this is not possible (Watermeyer, Hume, Seabi, & Pauly, 2020). Additionally, the problems lay with Advise,

Agree and Assist. Even though, the research is based on a small sample the results of this study can have significance for T1DM care. The study also confirms there is a need for health care providers to further understand young adult patients with T1DM and to learn how to encourage the patients even further in their battle with their chronic disease. There is an appreciation for the demands which T1DM has on both the health care providers and the patients (Watermeyer, Hume, Seabi, & Pauly, 2020).

Secondly, exploring the communication problems with the new FSL system. Which is relevant for the health care provider to get a comprehensive impression about the thoughts and feelings of the patients about the new system. While the explorative research was based on a small sample the study did give an impression about the new barriers of the FSL system namely; privacy issues, openness towards each other and lack of an adequate guidelines of communication for the health care providers. Even though, the patients are excited about the FSL system, the study confirms that new insights of communication are needed. Additionally, a clear image was made between the relationship of the patient and the health care provider. Overall, the patient felt comfortable with their health care provider. Furthermore, the patients felt at ease and dared to say anything to the health care provider. Conclusively, the patient are pleased with their relationship with the health care provider. Nevertheless there is always room for improvement.

Table 5: The 5As model, what does work and what does not work (Glasgow, Davis, Funnell & Beck, A. (2003);

What Works	What Does Not Work
Common findings	
<ul style="list-style-type: none"> • Initiate interaction with the patient • Confronting the patient about the severity of their disease when necessary 	<ul style="list-style-type: none"> • Typing on the computer during the consultation
Assess	
<ul style="list-style-type: none"> • Assess the patient with the help of the feedback of the previous appointment • Assessment of own patients view • Ask open-ended questions 	<ul style="list-style-type: none"> • Lack of asking questions to create clarity at the beginning of the consultation • Asking closed-ended questions • Asking multiple questions at once • Assuming the patient has the same understanding as the health care provider
Advise	
<ul style="list-style-type: none"> • Give personalized advise • Ask if the patient understands the advice and accepts the advise • Confront the patient and create interaction • Listen to the patient 	<ul style="list-style-type: none"> • Giving non-personalized, unspecific and unclear advise • No confrontation with the patient about the advise • Being okay, with only the answer 'yes', 'no' or 'okay' and not ask further if the patient really understands the advise given
Agree	
<ul style="list-style-type: none"> • Let the patient themselves think about the best option • Confront the patient about the severity of their disease when necessary • Setting goals together and specify the what, when, where and how • Personalized agreements made together 	<ul style="list-style-type: none"> • Taking on too many goals at once • No vague recommendations
Assist	
<ul style="list-style-type: none"> • Identifying personal barriers • Be solution oriented, so also be quick and flexible in thinking of solutions • Keep stimulating the patient 	<ul style="list-style-type: none"> • Not identifying the personal barriers and not asking further • Accepting when the patient does not want to change their behaviour • Not being flexible and thinking of solutions
Arrange	
<ul style="list-style-type: none"> • Encourage and motivate the patient to change their behaviour • Put the mind of the patient at ease • Let the patient see the seriousness of the situation • Personally arrange the next meeting 	<ul style="list-style-type: none"> • To not arrange a next meeting personally

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Appendix

1. Observatielijst Kwaliteit: 5As Model

In hoeverre komen de verschillende componenten uit het 5As Model tijdens het consult aan de orde?

	ASSESS	Wel besproken
G00	Gewicht bespreken*	
G01	Vragen naar het <u>huidige</u> inspuiten van insuline en dit bespreken.	
G02	Vragen naar het <u>huidige</u> zelfmonitoring en dit bespreken.	
G03	Vragen naar het <u>huidige</u> voedingspatroon en dit bespreken.	
G04	Vragen naar het <u>huidige</u> beweegpatroon en dit bespreken.	
G05.	Vragen of de patiënt <u>pogingen</u> onderneemt om de bloedsuiker zo constant mogelijk te houden.	
G06	Vragen of de patiënt <u>pogingen</u> onderneemt om de zelfmonitoring te verhogen.	
G07	Vragen hoe <u>belangrijk</u> de patiënt het vindt om zelfmonitoring te doen.	
G08.	Vragen hoe <u>belangrijk</u> de patiënt het vindt om te proberen om de bloedsuiker stabiel te houden.	
G09.	Vragen hoe <u>zeker</u> de patiënt is dat hij/zij voldoende insuline spuit.	
G10.	Vragen om een lijst te maken met alles wat de patiënt de afgelopen 24 uur gegeten heeft of op een typische dag.	

	ADVISE	Wel besproken
G11.	Adviseren om <u>vaker</u> zelf te monitoren.	
G12	Adviseren om <u>anders</u> te monitoren.	
G13	Adviseren om <u>vaker</u> insuline te spuiten.	
G14	Adviseren om <u>anders</u> insuline te spuiten.	
G15.	Bespreken van specifieke <u>veranderingen</u> in voedingspatroon.	
G16.	Bespreken van specifieke <u>veranderingen</u> in beweegpatroon.	

	AGREE	Wel besproken
G17.	Bereiken van overeenstemming over specifieke plannen om het voedings- of beweegpatroon te verbeteren.	
G18.	Bereiken van overeenstemming over specifieke plannen om de zelfmonitoring te verbeteren.	
G19.	Bereiken van overeenstemming over specifieke plannen om het spuiten van insuline te verbeteren.	
G20.	Betrekken van de patiënt bij het vaststellen van veranderdoelen.	
G21.	Zorgdragen dat veranderdoelen realistisch zijn.	
G22.	Rapporteren in een systeem/document (zodat tijdens het volgende consult hierop terug gekomen kan worden).	

	ASSIST	Wel besproken
G23.	Bespreken hoe om te gaan met allerlei belemmerende factoren bij zelfmonitoring.	
G24.	Bespreken hoe om te gaan met allerlei belemmerende factoren bij het insuline spuiten.	
G25.	Mogelijke oplossingen bespreken voor veranderdoelen.	

	ARRANGE	Wel besproken
G26.	Inplannen van persoonlijke vervolgspraak.	
G27.	Afspreken dat tijdens de vervolgspraak doelen besproken worden.	
G28.	Doorverwijzen naar lokale initiatieven ter ondersteuning.	
G29.	Doorverwijzen naar de diabetesverpleegkundige indien nodig.	
G30.	Doorverwijzen naar de oogarts indien nodig.	
G31.	Doorverwijzen naar diëtist indien nodig.	

*Jay et al. (2010) hebben deze vraag weggelaten "(...) since we wanted to focus on quality of counseling." Sonja van Dillen heeft dit item (dus?) ook niet opgenomen in haar vertaling van het instrument. Het is bij dit onderzoek wel van toepassing om dit te bespreken.

2. Inductive codes

1	Code doctor 'Eh' 'Uhm' 'Ohw'
2	Adress the patient with 'U' (in dutch)
3	Code doctor, cannot finish sentence
4	Code patient, ok
5	Code patient, 'Uhu' 'Ohw' or 'Mmm'
6	Codes patient, 2 or 3 word answer
7	Codes patient, cannot finish the sentence
8	Codes patient, no
9	Codes patient, yes
10	Conclusion made by doctor, agreeing with the patient
11	Conclusion made by doctor, changing medication
12	Conclusion made by doctor, graphics of the FreeStyle Libre
13	Conclusion made by doctor, repetition of what the patient just said, seeing if it is correct
14	Conclusion made by doctor, seeing positivity in patients actions
15	Conclusion made by doctor, seeing the dilemma of the patient
16	Conclusion made by doctor, too little information of the patient
17	Conclusion made by doctor, what patient must do
18	Conclusion made by the doctor, through numbers of analysis and measurements
19	Conclusion made by the doctor, what patient must not do
20	Confronting the patient, asking the patient what to do, advise
21	Confronting the patient, asking the patient what to do, assist
22	Confronting the patient, be explicit in what he/she must do advise
23	Confronting the patient, be explicit in what he/she must do, agree
24	Confronting the patient, be explicit in what he/she must do, assist
25	Confronting the patient, be explicit in what he/she must not do, advise
26	Confronting the patient, be explicit in what he/she must not do, assist
27	Confronting the patient, carefull, advise
28	Confronting the patient, carefull, agree
29	Confronting the patient, carefull, assess
30	Confronting the patient, carefull, assist
31	Confronting the patient, going back to the topic of diabetes
32	Confronting the patient, not carefull, advise
33	Confronting the patient, not carefull, agree

34	Confronting the patient, not carefull, assess
35	Confronting the patient, not carefull, assist
36	Confronting the patient, with humor
37	Discussing doctor and patient, next appointment
38	Discussing patient complication, possible, careful not to speculate
39	Discussing patient complication, possible, warning
40	Doctor cannot help
41	Doctor cannot provide what the patient wants
42	Effort of doctor to help
43	General factual, medication, adjustments
44	General factual, medication, giving advise
45	General factual, medication, providing information
46	General factual, medication, treatment
47	General factual, short term, solutions
48	General giving adivse, blood sugar stability
49	General giving advise, eye
50	General giving advise, giving options of solutions
51	General giving advise, insuline
52	General giving advise, measuring
53	General giving advise, medication
54	General giving advise, say to others you have Diabetes type 1
55	General giving advise, treatment
56	General information for the doctor, how the patient feels, low/high bloodsugar
57	General information for the doctor, how the patient feels, measuring bloodsugar
58	General information, blood pressure
59	General information, blood sugar
60	General information, eye
61	General information, FreeStyle Libre
62	General information, HbA1c
63	General information, insuline
64	General information, kidneys
65	General information, long term complications
66	General information, long term complications, blood pressure

67	General information, long term complications, blood sugar stability
68	General information, long term complications, eye
69	General information, long term complications, HbA1c
70	General information, short term complications, blood pressure
71	General information, short term complications, eye
72	General information, short term complications, HbA1c
73	General information, vitamine B12 and/or vitamine D
74	General information, worries, long term
75	General information, worries, short term
76	Humor of doctor
77	Humor of patient
78	Humor, doctor laughing
79	Humor, laughing together
80	Humour, patient laughing
81	If there are any other questions (at the end of the appointment)
82	Positivity towards the patient
83	Put the patient at ease, he/she is not the only one with diabetes
84	Questions by the doctor, about the previous appointments
85	Questions by the doctor, precise questions to the patient
86	Questions by the doctor, precise questions to the patient, psychology
87	Questions by the doctor, precise questions, about FreeStyle Libre
88	Questions by the doctor, precise questions, about FreeStyle Libre, feelings
89	Questions by the doctor, precise questions, about insulin
90	Questions by the doctor, precise questions, about measurement
91	Questions by the doctor, precise questions, about medication
92	Questions by the doctor, precise questions, blood sugar
93	Questions by the doctor, precise questions, diabetic nurse
94	Questions by the doctor, precise questions, dietician
95	Questions by the doctor, precise questions, eye specialist
96	Questions by the doctor, precise questions, feelings of patient
97	Repetition of what the patient said (by the doctor)
98	Talking about the FreeStyle Libre
99	Typing on the computer (by the doctor)

3. Interviewschema

Naam interviewer: Coco Kersten
Patiënt: nummer
Datum:
Plaats:

Inleiding:

- Mijn naam is Coco Kersten
- Uw internist heeft contact met u opgenomen om te vragen of ik u mocht interviewen en u hebt ermee ingestemd, alvast erg bedankt daarvoor
- Het interview duurt ongeveer 15-20 minuten
- De gegevens zullen uitsluitend voor het onderzoek gebruikt worden en uw naam zal nergens worden vermeld in verband met privacy

Doel

Ervaring met diabeteszorg; uiteindelijke doel om deze zorg te verbeteren

Hoofdthema: Communicatie

Hoe vindt u het om naar uw internist te gaan?

- Wat vindt u [term van patiënt] van uw bezoek?

Hoe open zijn uw gesprekken met de internist? → Dus in hoeverre deelt u alles met uw internist tijdens uw gesprek?

In hoeverre durft u alles te vertellen tegen uw internist?

- Wat vindt u positief aan de manier van communiceren van uw internist?
 - Kunt u hier een voorbeeld van geven?
- Wat vindt u negatief aan de manier van communiceren van uw internist?
 - Kunt u hier een voorbeeld van geven?

Hoe open is uw internist naar u toe voor uw gevoel?

- In hoeverre denkt u dat uw internist alles met u deelt in jullie gesprek?
- In hoeverre denkt u dat uw internist alles tegen u durft te zeggen?

In hoeverre helpt de communicatie van uw internist u bij het omgaan met diabetes?

- Zo ja waarmee helpt hij u?

- Kunt u hier een voorbeeld van geven?
- Zo nee, wat zal u dan wel helpen?
- Kunt u hier een voorbeeld van geven?

In hoeverre begrijpt u wat uw internist tegen u zegt?

Zou u de communicatie met uw internist graag anders zien?

- Zo ja, wat zou u graag anders willen zien?
- Zo nee, wat is er al goed?

Kan de internist iets verbeteren aan de communicatie zodat u eventueel beter en/of anders met uw diabetes omgaat?

Hoe/Met welk gevoel gaat u na afloop naar huis?

Zo ja/nee hoe komt dat?

→ Doorvragen is altijd mogelijk!

Deelthema FSL

Maakt u gebruik van de FSL?

- Zo ja hoe kwam u hiermee in aanraking?
- Zo nee, in hoeverre is/was dit een bewuste keuze?
 - In hoeverre heeft uw internist het er wel of niet met u over gehad?
 - Waarom heeft u hier bewust/onbewust voor gekozen?
 - Wat vindt u de nadelen?

JA:

Wat vindt u van de FSL?

Wat zijn in uw ogen de voordelen van de FSL?

→ doorvragen als mogelijk

Wat zijn in uw ogen de nadelen van de FSL?

→ doorvragen als mogelijk

Wie zou u de FSL aanraden en wat zou u dan zeggen?

In hoeverre helpt de communicatie van uw internist u bij het omgaan met de FSL?

Wat vindt u ervan dat de internist nu alles kan zien door de FSL?

- Waarom vindt u dat wel of niet prettig?
- Kunt u hier een voorbeeld van geven?