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Experiences of Patients with Type 2 Diabetes Mellitus on Self-Administered Insulin Injection Therapy

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ABSTRACT

Diabetes mellitus is a global public health problem characterized by high mortality and prevalence. One type of pharmacological treatment for diabetes mellitus is insulin injection therapy. Experience in performing self-administered insulin injection therapy still found obstacles that must be considered so as not to affect the effectiveness of insulin injection therapy. This study aims to determine the experience of patients with type 2 diabetes mellitus in carrying out insulin self-injection therapy. The research design used qualitative methods, and data collection was carried out in the UPT Puskesmas Sukorejo and Sananwetan areas of Blitar City, and the data collection time was carried out in March 2024. The data were analyzed by reducing the data, presenting the data in the form of transcripts, and were described descriptively. The research results showed that all participants had fulfilled the cognitive aspects, as evidenced by knowing the definition and type of insulin used. In the affective aspect, it was stated that all participants felt comfortable and felt healthier when carrying out insulin injection therapy, but there were mental problems when diagnosed with diabetes mellitus and when injecting insulin themselves. In the psychomotor aspect, all participants have performed insulin injection skills correctly, but some mistakes must be considered.

Keywords: diabetes mellitus; experience; insulin injection therapy

Background

Diabetes mellitus is a global public health problem characterized by high mortality and prevalence. In 2019, it was estimated that 1.5 million deaths were directly caused by diabetes mellitus, and it ranked ninth in the cause of death in the world (1). The International Organization of Diabetes Federation (IDF) estimates that at least 463 million people aged 20-79 worldwide suffered from diabetes mellitus in 2019, equivalent to 9.3% of the total population at that age (2). Based on Basic Health Research in 2018, the prevalence of the Indonesian community population suffering from diabetes mellitus is 2% at the age of ≥15 (3).

The prevalence of diabetes mellitus globally is expected to continue to triple by 2030. This increase has been predicted by the World Health Organization (WHO), which estimates that reach 21.3 million cases in 2030, and the International Diabetes Federation (IDF), which will reach 16.7 million cases in 2045 (4). These conditions will not be much different from Indonesia. The prevalence of diabetes mellitus is increasing, causing pain and death due to complications of the disease itself, so people with diabetes mellitus must undergo treatment (5). One of the types of pharmacological treatment used is insulin injection therapy (6).

Insulin is an exogenous hormone that plays an important role in metabolism to help transport glucose into cells (1). The goal of insulin therapy is to mimic the exogenous insulin secretion pattern that exists in normal people (7). Based on Basic Health Research in 2018, the proportion of diabetes mellitus treatment types that use insulin injection is 5%, anti-diabetic drugs (OAD) are 75%, the use of OAD and insulin is 11%, and not routinely treated is 9% (3).

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The most effective therapy for people with diabetes mellitus today is insulin injection therapy (8). Insulin injection therapy in patients with diabetes mellitus still found several obstacles felt by patients (8). These obstacles include patients feeling afraid of syringes, afraid of injections, afraid of self-harm, and feelings of anxiety so that some of these obstacles cause patients to refuse to receive insulin injections. Some of these obstacles are part of the affective aspect, which includes the patient's feelings, attitudes, and mentality. Other research also shows that patients with type 2 diabetes mellitus also do not have the correct skills in self-injecting insulin because insulin injection is always assisted by others . Skills in insulin injection itself are a psychomotor aspect that must be mastered by people with type 2 diabetes mellitus. The affective and psychomotor aspects above are part of the formation of the patient experience in which several obstacles are still found (Yanti et al., 2018).

Experience in self-injection insulin can affect the success of insulin injection therapy for the patient himself. Therefore, experiences that are still found to be obstacles need to be considered so as not to affect the effectiveness of the therapy (9). Based on the description above and seeing the importance of success in insulin therapy independently, the author is encouraged to conduct research on "The Experience of Type 2 Diabetes Mellitus Patients in Carrying Out Independent Insulin Injection Therapy".

Methods

The design of this study uses a quantitative descriptive method. The subject of this study is a type 2 diabetes mellitus patient who undergoes self-insulin injection therapy at home as many as 4 people according to the criteria, namely, being able to tell their experiences while carrying out self-insulin injection therapy and willing to be an informant. This research was carried out in the Sukorejo and Sanawetan Health Center areas of Blitar City in March 2024. The focus of this study is to explore the experiences of people with diabetes mellitus which includes the knowledge, feelings and skills of people with type 2 diabetes mellitus when using self-insulin injection therapy. This method of data collection is through in-depth interviews. The data analysis used in this study is data reduction, and display data. …

Results

Participant Characteristics

1. Participant 1

Participant 1 is Mrs. E female, 55 years old, last high school education, self-employed job. Mrs. E's home address is in Pakunden Village, Sukorejo District, Blitar City. Mrs. E was diagnosed with diabetes mellitus 4 years ago. Before using insulin injection therapy, Mrs. E used drug therapy from a pharmacy and switched to using insulin injection therapy since 3 years ago. Mrs. E's control place every month is at Mardi Waluyo Blitar hospital.

2. Participant 2

Participant 2 is Mrs. K female, 61 years old, last elementary school education, Mrs. K is a housewife. Mrs. K's home address is in Turi village, Sukorejo District, Blitar City. The participant was diagnosed with diabetes mellitus 10 months ago. Mrs. K knew about the disease suffered from a doctor and was recommended to use drug therapy every day. However, from 8 months ago Mrs. K switched to using insulin injection therapy because Mrs. K's blood sugar was not controlled until she was admitted to the hospital. Mrs. K's control place at Mardi Waluyo Blitar hospital.

3. Participant 3

Participant 3 is Mr. S male, 64 years old, Mr. S has never attended school, the participant's occupation is self-employed. Mr. S's home address is in Gedog Village, Sananwetan District, Blitar City. Mr. S was diagnosed with diabetes mellitus 2 months ago and has been using insulin injection therapy since 1 month ago. Mr. S said that he did not know much about the

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disease so that his sugar was not controlled and the doctor recommended using insulin injection therapy. Mr. S's control place at Mardi Waluyo Blitar hospital.

4. Participant 4

Participant 4 is Mrs. S, female, 66 years old. The last education of elementary school participants. The work of the housewife participant participant. Mrs. S's home address is in Rembang Village, Sananwetan District, Blitar City. Mrs. S was diagnosed with diabetes mellitus 2 years ago and has been using insulin injection therapy since 1 year. Mrs. S's control place at Suhada Haji Blitar hospital.

Cognitive Aspects

Definition of Insulin

The results of the study of 4 participants found that insulin therapy is a therapy used to lower blood sugar levels The following are the expressions of the participants:

"… As far as I know, insulin injections are a therapy to replace drugs to lower your blood sugar" (Participant 1)

"… Insulin is a kind of medicine to control your blood sugar, but how to use it is by injection" (Participant 2)

"… Insulin injections are used to lower your blood sugar" (Participant 3)

"… Insulin injection is a type of treatment to control your blood sugar, so that your blood sugar does not get higher" (Participant 4)

Type of insulin used

Based on the results of interviews with participants, the types of insulin used based on the length of work are fast-acting insulin, long-acting insulin, and mixed insulin. The following are the expressions of the participants:

" … The insulin given by the doctor is 2 types of mbak, the blue color (apidra) for 3x a day before meals and the grayish-white color (lantus) for the night before going to bed. For the dose before meals, 8 units, if before bedtime, 32 units" (Participant 1)

"… The insulin I used forgot the name, mbak, anyway, the color is orange (Novorapid) for the morning 5 units after meals and green (Lavemir) for the night 6 units before going to bed" (Participant 2)

"… I injected Mbak 4 times a day, in the morning, afternoon and afternoon the color was blue (Apidra) and the color was green (Lavemir). For the apidra 4 units after eating, I drink after 1/2 hour of eating. For the lavemir 6 units, I injected at night around 10 o'clock (Participant 3)

"... There are 2 types of mbak, for the blue morning (apidra) 6 drops before eating and the white (ezelin) 14 drops before eating at 8" (Participant 4)

Affective Aspects

Feelings when diagnosed with diabetes mellitus

The results of the study from 4 participants found various kinds of mental complaints felt by patients when diagnosed with diabetes mellitus, such as feelings of fear, worry, shock, and confusion. The results of the participants' expressions are as follows:

"… I was scared and shocked" (Participant 1)

"… The feeling is afraid of the mother and the increase in the mind is also afraid that the disease is dangerous, worried that eating this is not allowed" (Participant 2)

"… I was confused and surprised because since I was a child, I had never been seriously ill like this until I couldn't get better" (Participant 3

"… I was shocked" (Participant 4)

Feelings when doing Insulin Therapy

The results of the study showed that 3 participants felt afraid and uncomfortable when injecting insulin themselves, therefore, participants must be helped by family members when injecting insulin daily. The following are the expressions of the participants:

"... every day I inject my child because I am still a bit afraid to inject myself" (Participant 2)

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"... I am usually injected by my wife because it is not comfortable to inject myself" (Participant 3)

"… Until now, I am the one who injected my child because I was afraid that I would inject myself by mistake" (Participant 4)

There was 1 participant who felt normal and not afraid when injecting insulin, the following is the participant's expression:

"... Every day I inject myself... I feel like I'm not too afraid of needles because I often see people injecting me" (Participant 1)

Psychomotor aspects

Insulin injection skills

How to Inject

The results of the study of 4 participants were obtained by the way the participants injected insulin daily, namely adjusting the unit according to the dosage first, cleaning using alcohol swab, then injected perpendicular until the plunger was fully depressed and waited 10 seconds. From the participant's statement, there were insufficient statements, including participants 1 and 4 did not wait for 10 seconds after the injection, and participants 2 and 4 did not inject perpendicularly. The following are the expressions of the participants:

"... The method is usually set first by how many units continue to clean the area of the thigh that you want to inject using alcohol swab and immediately inject it perpendicular and press the tip until it runs out" (Participant 1)

"... Usually my son injects and cleans first using alcohol swab, who rubs me myself and then manages my child's injection and my child is injected with the tip of the syringe until it runs out and counts 10 seconds" (Participant 2)

"... The method is usually cleaned using an alcohol swab and the unit is continuously rotated, then injected upright and pressed until it runs out, then counted for 10 seconds" (Participant 30

"... yes, as far as I know, I was immediately injected into the stomach and massaged at the end until it ran out" (Participant 4)

Injection Rotation

The results of the study of 4 participants were obtained that all participants did not rotate injections. The following are the expressions of the participants:

"… Just slap your hands, alternating right and left. If the left missal feels that he has clenched his fist next to him" (Participant 1)

"… just in my stomach... to be sucked and the buttocks are never because of the desire for a lot of fat" (Participant 2)

"... In the thigh area, change right and left... for in the stomach and buttocks, I have never been sick" (Participant 3)

"... It's just in my stomach, until it's full of injections now... I've never been by my butt." (Participant 4)

Insulin Storage

The results of the study of 4 participants found that insulin was stored in the refrigerator and in an ordinary room. The following are the expressions of the participants:

"… I put the insulin that has not been used in the refrigerator, but I put the used one in the closet" (Participant 1)

"… to store what has not been used in the refrigerator if the one that is used is in the closet" (Participant 2)

"... I keep the dias mbak, those that have not been used and those that have been used I put them in the dias of all the mbak" (Participant 3)

"... I put the insulin in the refrigerator for all of you if you just bought it, if I use it, I put it on a regular table" (Participant 4)

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Frequency of Needle Rotation

The results of the study of 4 participants found that the change of syringe was carried out every 2-3 days, once a week, until the insulin ran out, and until the needle was damaged or broken.

"… if for my insulin needle for 1 month, I usually change it up to 4x" (Participant 1)
"... for the needle to be changed every 2-3 days" (Participant 2)
"... for the needle, I have never changed it because it has never been broken" (Participant 3)
"… for the needle, I change it every time I change the insulin" (Participant 4)

Insulin Needle Waste Disposal

Based on the results of the study, the treatment of used syringes of participants was carried out by being disposed of in the trash, burned, and disposed of in the hospital. The following are the expressions of the participants:

"… the needle is immediately thrown into the trash" (Participant 1)
"… for the needle, I collect it, and then when I control it, I throw it away in the hospital" (Participant 2)
"... I burned the needle" (Participant 4)
Participant 3 had never removed the needle because he said he had never changed the syringe

Efforts of People With Type 2 Diabetes Mellitus While Carrying Out Self-Insulin Injection Therapy

Control Routine

The results of the study of 4 participants obtained the routine of the control participants at the health facility, which is once every 1 month and when the insulin runs out, the following are the expressions of the participants:

"… Yes, I always routinely control every month" (Participant 1)
"… Yes, I always routinely control every month on the 29th" (Participant 2)
"... Yes, every month I control and I only control once" (Participant 3)
"... for the date, of course, if the insulin has not run out, sometimes it has not been controlled" (Participant 4)

Insulin Injection Routine

The results of the study of 4 participants found that the routine of participants injecting insulin independently at home was carried out every day, but there were participants who sometimes forgot. The following are the expressions of the participants:

"... Yes, I always routinely every day never forget, sometimes if I fall asleep at night, my child will wake me up to inject insulin" (Participant 1)
"... I am routine, but sometimes I forget that I am taking care of my grandchildren" (Participant 2)
"... Yes, I routinely use it 4 times a day" (Participant 3)
"... routinely every day, you never forget" (Participant 4)

Efforts to Handle Hypoglycemia

The results of the study of 4 participants were obtained by efforts to handle participants when experiencing hypoglycemia, namely drinking sugar water, drinking tea, and eating sweets. The following are the expressions of the participants:

"... every time I check my blood sugar drops, I immediately drink sugar water" (Participant 1)
"… If the sugar is high, I have never had it, but I have felt weak, it is a sign of dropping. For the handler, drink sugar water and eat sweet" (Participant 2)
"... When the sugar is low, I feel weak. For his actions, he said he was told to drink only one or two spoons of sugar water." (Participant 3)
"... Now when I drop, it feels like I'm limp as far as I know from drinking sugar water or tea" (Participant 4)

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Discussion

Cognitive Aspects

Based on the results of interviews conducted by the researcher on the participants, all participants knew about the definition of insulin therapy and the type of insulin used. According to the participant's statement, insulin therapy is a therapy used to lower blood sugar levels. Insulin therapy is a therapy that mimics the exogenous insulin secretion pattern that exists in normal people, whose purpose is to treat high blood glucose (10).

Participant statements regarding the type of insulin identified, there are 3 types of insulin used. This is in accordance with the theory, namely the type of insulin based on the way it works is short/fast acting insulin (Insulin Prandial), which is insulin with a working duration of 4-8 hours, which functions to control blood sugar levels after meals, for this insulin is given before meals (4). Medium-acting insulin, namely insulin with a working duration of 8-12 hours, is processed more slowly and is almost the same as the pattern of endogenous insulin secretion (basal insulin). Long-acting insulin, which has a working mechanism of 12-24 hours, is processed more slowly to control blood sugar levels during fasting. Which is used 1 time, usually at night before rest. Then, to meet the needs of certain patients, there is also a mixture of short-acting and medium-acting insulin (human insulin) or fast-acting and medium-acting insulin (analog insulin).

Based on the results of interviews with participants, it was identified that there are 3 types of insulin based on the length of time used, namely fast-acting insulin, long-acting insulin, and mixed insulin (premixed). This showed the importance of understanding the types of insulin and their use in controlling blood sugar levels in diabetic patients.

Affective Aspects

The results of the interviews conducted by the researcher found positive feelings that participants felt when carrying out insulin injection therapy, but there were several mental complaints related to the participants' feelings when diagnosed with diabetes mellitus and when injecting insulin. The participants' feelings when diagnosed with diabetes mellitus were feelings of fear, worry, shock, and confusion. The feelings expressed by the participants are natural because diabetes mellitus itself is a lifelong chronic disease that can be said to be difficult for the healing process. Similar things are also found in the theory that Diabetes mellitus is a disease that can threaten the patient's social, functional, and mental health conditions (11).

The participants' feelings when carrying out insulin therapy were as follows: one participant stated that they felt more comfortable using insulin, while three other participants reported that using insulin made their body feel better or healthier, as it increased their appetite and alleviated complaints they experienced with drug therapy. From the data, it is interpreted that insulin provides benefits and comfort for participants. This is supported by the previous study that most participants feel healthy and comfortable after using insulin. These feelings support their adherence to using insulin (12). In addition, the comfortable feeling felt by people with diabetes mellitus will help avoid feelings of anxiety and stress that can cause the patient's quality of life to decrease (13).

Based on the data results, the participant's feelings when injecting insulin were obtained by 1 participant did not feel afraid when injecting insulin so that the participant could inject insulin himself. This can prove the theory of independence according to Steinberg (2002) on the aspect of emotional independence related to relationships between individuals and others (14). The independence in injecting insulin at home can release the dependence of health workers and participants' families. Different from the other participants, 3 participants said they were afraid and uncomfortable when injecting insulin themselves so they had to ask their families for help to inject. The feeling of fear when injecting insulin oneself causes dependence on others because every day they have to ask for help from others to inject

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insulin (8).

According to researchers, although many positive feelings are obtained when undergoing insulin therapy, it is undeniable that every individual has mental complaints when diagnosed with diabetes mellitus and when injecting insulin. Therefore, it is important for health workers to understand the concerns of each individual in carrying out insulin therapy and the support of the family, especially so that the patient's fears and anxieties can be overcome.

Psychomotor Aspects

Insulin Injection Skills

Based on the results of interviews conducted by researchers on participants, the insulin injection skills carried out by the participants were partly in accordance with the theory, but some errors were still found. The skills in the injection method get almost the same answer, namely adjusting the unit according to the dosage first, cleaning using an alcohol swab, then injecting perpendicular until the plunger is fully depressed and waiting 10 seconds. Participant statements about the method of injection showed that the recommended injection includes adjusting the unit according to the dosage and cleaning the injected area if using an alcohol swab and waiting for it to dry, then inject insulin at a perpendicular angle slowly to the surface of the skin folds, once the plunger is fully depressed, leave the needle on the skin with a count of 10 and pull the needle away from the skin. From the results of the study, there was also a shortcoming in the method of insulin injection, namely, participants who did not inject perpendicularly and did not count for 10 counts after injection. Insulin injections should be done at an angle of 900 or perpendicular to the surface of the skin. In addition, to ensure insulin is fully absorbed it is necessary to count 10 seconds after the plunger is depressed. The reason is that too little, too much, or at the wrong time can result in temporary and serious hyperglycemia, extensive glycemic changes, and severe hypoglycemia.

In rotating insulin injections, there were variations in the injection area that the participants did, and all participants had done the injection rotation correctly. Two participants injected into the abdominal area alone without trying to inject in other areas, such as the thighs and buttocks. Two other participants said they injected insulin into the thigh alone without rotating consistently, only doing one arm until the fist, and then the other arm. Injection rotation is important because insulin injected in different places will enter the bloodstream at different speeds. It is most quickly injected into the abdomen (15). If it is injected into the upper arm, insulin enters the bloodstream a little more slowly, and even more slowly if insulin is injected into the thighs and buttocks. To get optimal results, insulin should be given in the same area on the same schedule. The way to do insulin injection rotation is that each injection site must be divided into one quadrant (or two if using the thighs or buttocks) then use one quadrant every week and always move clockwise (4). Quadrant or half injections should be given at least 1-2 cm apart to prevent recurrent tissue trauma.

The participants' skills in storing insulin were assessed, including being stored in the refrigerator and ordinary places. Some participants store unused insulin in the fridge. unused insulin is stored in the refrigerator at a temperature of 2-80, but don't freeze or put it in the freezer. The purpose of storage in the refrigerator is to maintain the stability of insulin and allow the product to last longer until the expiration date. If you don't have a fridge, you can store it in the most humid place at home. For the storage of insulin that has been used, namely at room temperature (15-20 ^{o}C), a maximum of one month after the first use and has not expired. From the results of the study, it was found that insulin storage in some participants was still not appropriate, namely, storing unused insulin in a regular place and storing used insulin in the refrigerator. Storing unused insulin in a regular place can cause the loss of insulin effectiveness. It is not recommended to store it in the refrigerator again when it has been used, because insulin is stored in the refrigerator in a stable condition (16). Then the insulin released for use will undergo a change in stability, so it is useless if it is stored again in

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ice.

Skills in changing insulin needles were also answered differently in each participant. The participant's statement included changing the syringe every 2-3 days, once a week, until the insulin ran out, and until the needle was damaged. Participant's statement about changing the needle 2-3 times, insulin injections with needles should be replaced once after use, but can be used 2 to 3 times provided that storage sterility is maintained. From the results of the study, it was also found that 3 participants used syringes repeatedly, which were changed once a week, until the insulin changed, and waited for the syringe to break. This is certainly dangerous for the participants themselves because the reuse of needles that have been used repeatedly can cause trauma to the tissues, which increases the likelihood of lipohypertrophy.

The participant's skill in disposing of insulin needle waste in the participant was obtained correctly, but there was 1 answer that was still incorrect. Based on the results of research on waste disposal by burning. The disposal of insulin needle waste before being disposed of must first be bent and stored in a closed container or can and then burned (16). This statement is also supported by a previous study, namely that used syringes are collected in a safe container, when they are 3/4 full, they are tightly closed and destroyed or disposed of in the hospital during control every month. In addition, there was 1 participant who threw carelessly in the trash without a safe container, This is certainly dangerous because needles are sharp objects that can have an impact that results in injury, environmental pollution, and causes nosocomial diseases (17).

The skills carried out by the participants in using insulin injections also prove the theory of independence according to Steinberg (2002), especially in the aspect of independence to act. In terms of independence to act, insulin users can make decisions to act independently at home, such as when determining how to inject daily, determining rotation, determining the frequency of needle changes, storing insulin, and performing waste disposal. From the results of the study, the actions taken by insulin users are still wrong, so according to the researcher, periodically reviewing and re-educating participants about the skills in injecting insulin needs to be considered to reduce the occurrence of side effects obtained from improper insulin use.

Efforts of Type 2 Diabetes Mellitus Patients While Carrying Out Self-Insulin Injection Therapy

Based on the results of interviews conducted by the researcher on the participants, the efforts made by the participants when carrying out insulin injection therapy have been well done by the participants in accordance with the theory, but there are some participants who do not comply in making these efforts. Efforts that must be made by participants include when carrying out control routines. Based on the results of the interviews conducted, the control routine carried out by the participants was once a month and when the insulin ran out. The control routine is carried out once a month by 3 participants and is in accordance with what is recommended.

People with diabetes mellitus must do routine control with a doctor at least once every 3 months and do regular blood sugar checks at home. Through routine control by the doctor, patients will be monitored for their body condition, asked about the symptoms they experienced, and informed about the possibility of changing drugs or therapy. In addition, there was 1 participant who said they controlled when insulin ran out. The non-compliance that the participants do must be stopped. The non-compliance will increase the risk of complications and increase the cost of treatment for people with diabetes mellitus, it is because people with diabetes mellitus who do not carry out routine control in the hospital will find it difficult to know the progress of their health.

Another effort that must be made when carrying out insulin injection therapy is to do an insulin injection routine every day. Based on the data results, the answer was obtained that 3 participants routinely injected insulin every day, but 1 participant said that sometimes they

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forgot to inject insulin because they were busy. Administration of too little, too much, or at the wrong time can result in temporary and serious hyperglycemia, extensive glycemic changes, and severe hypoglycemia. Therefore, the compliance of insulin users in injecting insulin must be really considered because non-compliance with the use of insulin for people with diabetes mellitus causes therapy failure (18).

Efforts to handle hypoglycemia carried out by participants were obtained by all participants, knowing that efforts to handle hypoglycemia include drinking sugar water, drinking tea, and eating sweets. In this handling, participants know and can determine the right and wrong actions. This can prove the theory according to Steinberg (2022) on the aspect of value independence (19). Diet high in glucose or simple carbohydrates is needed, namely for adults, 15-20 g of carbohydrates or (2-3 tablespoons of granulated sugar) dissolved in water. The participant's statement is also supported by the previous study that hypoglycemia handlers can be given 3-4 glucose tablets, 4 ounces of juice or non-diet soda, 1 tablespoon of sugar, 6-8 hard candies (20). After 15 minutes, the blood glucose concentration should be retested and 15 g63 carbohydrates repeated, until the blood glucose concentration is >70 mg/dL (3.9 mmol/L). If up to 45 minutes the blood glucose has not reached >70 mg/dL, then glucose fluid is needed, namely 10% dextrose infusion of 150-200 ml within 15 minutes, and if the liquid is not available at home, it is recommended to go to the nearest hospital..

According to the researchers, participants should pay attention to and increase adherence to the efforts that must be made when carrying out insulin injection therapy. In addition, health workers also need to increase education about the risk of non-compliance carried out with the aim of increasing the effectiveness of therapy in patients with diabetes mellitus.

Conclusions and Recommendations

Knowledge about insulin injection therapy in people with type 2 diabetes mellitus showed that all participants knew the definition and type of insulin according to theory. The feelings experienced by type 2 diabetes mellitus patients when carrying out self-insulin injection therapy are positive feelings such as feeling healthier, However, mental complaints were also felt by participants when injecting insulin and being diagnosed with diabetes mellitus. The ability of people with type 2 diabetes mellitus in performing independent insulin injection therapy based on theory is still lacking and wrong in all participants.

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