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The Main Barriers to Insulin Treatment in Elderly Diabetic Patients: The Role of Therapeutic Education

Eosefina Gina BOTNARIU¹, Alina Delia POPA²,
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Abstract

The aim of the present study was to assess knowledge of insulin treatment and identify the main barriers to insulin administration in an elderly population with type 2 diabetes. This was a cross sectional study, conducted on 100 insulin treated type 2 diabetic patients, aged 65-89 years, admitted in the Department of Diabetes, Nutrition and Metabolic Diseases in Iasi. We collected data on the demographic characteristics of patients and assessed through two questionnaires patients' compliance with insulin treatment and therapeutic knowledge. Mean duration of diabetes was 6.79 years. Although the majority of patients (54%) declared that they administrated insulin according to the scheduled prescribed, 40% of subjects sometimes delayed the injection and 6% of them frequently retarded the administration of insulin; 22% of patients stated that they seldom forgot to administer insulin and 4% interrupted it for a longer period. Only 16% of patients felt embarrassed to administrate insulin in public. Low adherence of elderly patients to insulin treatment is determined by psychological, social and cognitive factors. Elderly diabetic patients require a greater number of hours for therapeutic education, especially those who have low skills in insulin's injection.

Keywords: diabetes, education, insulin therapy, adherence, psychological factors.

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Introduction

The diagnosis of diabetes and the need of chronic injectable therapy represent a big stress for patients, causing psychosocial consequences (Hancu, Roman, & Veresiu, 2008; Christie & Thompson, 2014). The first few months following the communication of the diagnosis are a period of adaptation to the important changes of lifestyle required. Assal and Lacroix (1998) described five stages of adaptation of the patient with chronic disease to the new condition. During this period, the transition from shock to active phase is achieved. The person with diabetes accepts the illness, becomes responsible and reaches the emotional balance, able to self-control and adjusts the treatment according to the unexpected conditions of daily life. The main purposes are to integrate the diabetic elderly patient into daily familial and social activities. Therapeutic education has an important role in sustaining the theoretical and practical need for active involvement of the diabetic patients into self-management. This may be done by self empowerment, in order to take the correct therapeutic decisions in special situations (Christie & Thompson, 2014).

Some patients manifest an active refusal to recognize that they have diabetes, while others accept the disease, but dissimulate their condition in the social environment, being afraid that the others will change their attitude towards them. The acceptance of a chronic disease depends on the optimal relationship between the shared responsibility of the medical care team and the patient. The diabetic patients will evolve from the passive stage to active self involvement, becoming thus their own doctor. This allows a higher level of autonomy (Tanwani, 2011). Some studies emphasized the main barriers to insulin's treatment initiation, related to the fear of their health's worsening, the risk of hypoglycemia, and dread of needles, the social stigma and the necessity of learning at an older age (Venter, 2006). The lack of adherence to the medical treatment fosters a negative impact on the metabolic control and increases the risk of chronic complications (Christie & Thompson, 2014).

Therapeutic education has a very well documented role in the diabetes nursing plan (Hermanns *et al.*, 2008). At the moment, the interdisciplinary care team receives an increasing role in the patient's management. The working hypothesis of the study was the presence of a relationship between the level of patients' knowledge of insulin therapy and the barriers to its administration.

Aim of the study

The aim of the present study was to assess knowledge of insulin treatment and identify the main barriers to the correct management of insulin treatment in an elderly diabetic population.

Material and methods

We developed a cross-sectional study in 113 elderly diabetic in-hospital patients from the Diabetes, Nutrition and Metabolic Diseases Department in The Clinical Emergency Hospital "Saint Spiridon" Iasi, between 1st of May 2014 to 30th of June 2015. The exclusion criteria were the existence of cognitive impairment due to neurological or psychiatric diseases. Thirteen patients refused to participate in the study or couldn't provide complete answers to the questionnaires, so the final sample included 100 diabetic patients. All patients signed the informed consent for participation in the study. We applied two questionnaires. The first questionnaire was administered by an investigator and targeted data on demographic characteristics (age, area of residence, gender, marital status, duration of formal education), the type and duration of diabetes. The patients were invited to answer questions on their degree of autonomy regarding insulin therapy, compliance, injections' schedule, the presence of an embarrassing feeling when having to inject insulin in public and were asked to pinpoint the barriers to insulin's administration. The answers from the open question related to barriers to insulin's administration and were evaluated through thematic analyses. They were coded in order to identify and to form themes.

The second questionnaire included 27 questions that focused on insulin therapy and was completed directly by the participants, in order not to influence their answers. There were simple questions, with four alternative answers. The items took into account the specific components of education in insulin therapy (understanding the types of insulin, their duration of action, main storage conditions, insulin injection technique and specific adverse reactions). The analysis of questions consisted in determining the index of difficulty, which indicates the percentage of respondents who correctly answered the same question. Questions with a difficulty index greater than 0.8 or less than 0.2 are not recommended (Venter, 2006). The distribution of the alternatives of responses represents the percentage of people who gave the same answer to the same question. It is recommended to take into account items in which at least 5 % of people had the same answer (Venter, 2006). The ability of each item to discriminate between people with different levels of knowledge was measured correlating the score for each item with the overall test score, eliminating the items with a lower value than 0.2 (Venter, 2006). Results are shown in *Table 1*.

A questionnaire with 17 items resulted so, eliminating those questions which were not noted with a significant correlation compared to the total score. The questionnaire was assessed by determining the internal reliability, using Cronbach alpha coefficient, which had an acceptable value (0.77). Questionnaire score results had an average of 11.5.

Table 1. Items' analysis

| | Correlation with total score | Item difficulty | | The distribution of alternatives | | | |
|-----|------------------------------|-----------------|-------------|----------------------------------|----|----|----|
| | | Corect | Not correct | 1 | 2 | 3 | 4 |
| I1 | .312* | 80 | 10 | 2 | 8 | 90 | 10 |
| I2 | .213 | 38 | 62 | 8 | 14 | 40 | 38 |
| I3 | .495** | 80 | 20 | 4 | 8 | 80 | 8 |
| I4 | .495** | 70 | 10 | 80 | 6 | 30 | 4 |
| I5 | .200 | 88 | 12 | 88 | 4 | 2 | 6 |
| I6 | .358* | 72 | 28 | 90 | 72 | 6 | 2 |
| I7 | .544** | 58 | 42 | 58 | 16 | 12 | 14 |
| I8 | .082 | 22 | 78 | 60 | 22 | 6 | 12 |
| I9 | .343* | 78 | 22 | 78 | 12 | 2 | 8 |
| I10 | .280* | 64 | 36 | 64 | 20 | 4 | 12 |
| I11 | -.026 | 68 | 32 | 68 | 10 | 22 | 0 |
| I12 | .062 | 46 | 54 | 22 | 30 | 46 | 2 |
| I13 | .505** | 68 | 32 | 12 | 6 | 68 | 14 |
| I14 | .205 | 66 | 34 | 66 | 12 | 20 | 0 |
| I15 | .138 | 80 | 20 | 16 | 80 | 2 | 2 |
| I16 | .614** | 76 | 24 | 76 | 6 | 18 | |
| I17 | .507** | 66 | 34 | 8 | 20 | 66 | 6 |
| I18 | .601** | 70 | 30 | 14 | 70 | 10 | 6 |
| I19 | -.202 | 10 | 90 | 10 | 8 | 70 | 12 |
| I20 | .303* | 64 | 36 | 64 | 12 | 22 | 2 |
| I21 | .592** | 62 | 38 | 16 | 10 | 62 | 12 |
| I22 | .361* | 62 | 38 | 38 | 40 | 12 | 10 |
| I23 | .382** | 60 | 40 | 16 | 60 | 10 | 14 |
| I24 | .394** | 48 | 52 | 10 | 48 | 30 | 12 |
| I25 | .344* | 66 | 34 | 26 | 6 | 66 | 2 |
| I26 | -.010 | 14 | 86 | 14 | 70 | 2 | 14 |
| I27 | .071 | 22 | 78 | 78 | 22 | 10 | 10 |

* $p < 0.05$, ** $p < 0.001$

Statistical analysis

The statistical analysis of data was performed with the SPSS Programme (Statistical Package for Social Sciences) version 13.0 for Windows (Chicago, IL, USA). For numerical description of variables we performed measurements of central tendency and determined the data' dispersion indicators.

The coefficients of correlation were determined in order to assess the association between variables. Nonparametric tests were used to test the differencies between the mean values of two sets of scores, knowing that the data did not have a Gaussian distribution. The chi-square test (χ^2) was used to compare nominal, dichotomous variables or proportions (Howitt, & Cramer, 2010).

Results

The study included a total of 100 elderly type 2 diabetic patients, with age limits between 65 to 85 years (mean age 72.68 years). The group included a total of 62 patients from urban areas and 38 patients from rural areas; 56% patients were male and 44% female. A few patients had higher education (5%). Most patients had high school education (55%) or gymnasium (40%). The mean duration of diabetes was 6.79 years. Although most patients said that they administered the insulin with a constant schedule (54%), there were 40 patients who declared that sometimes they delayed injecting the insulin, whereas 6% had often delayed to administer the insulin. In our study, 22% patients said that it happened to them to forget to inject the insulin and 4% interrupted insulin's administration for a longer period. In our study 16% of patients felt embarrassed when they had to inject insulin in public.

Patients who declared that they always injected the insulin at the same time had a lower average of knowledge (as revealed by the questionnaire) compared with those who said that sometimes or often they delayed to inject the insulin with a constant schedule, but the differences were not significant ($p=0.234$). Patients who said they happened to forget to manage their treatment had a lower average of knowledge in managing insulin treatment ($p=0.369$). Patients who said they felt embarrassed to inject insulin in public had a lower level of knowledge ($p=0.04$) (*Table 2*).

Table 2. Adherence to insulin therapy plan and the score on knowledge questionnaire

| | Score | N | Mean | Std. Deviation | 95% Confidence Interval for Mean | |
|---|------------|----|-------|----------------|----------------------------------|-------|
| Respecting insulin schedule | always | 54 | 10.70 | 3.01 | 9.51 | 11.89 |
| | frequently | 40 | 12.40 | 4.27 | 10.40 | 14.39 |
| | sometime | 6 | 12.66 | 1.52 | 8.87 | 16.46 |
| Temporary voluntary interruption of insulin therapy | No | 78 | 11.25 | 3.63 | 10.07 | 12.43 |
| | Yes | 22 | 12.36 | 3.32 | 10.13 | 14.59 |
| Embarrassment in insulin administration in public | Yes | 84 | 11.95 | 3.59 | 10.66 | 12.90 |
| | No | 16 | 10.00 | 3.25 | 7.28 | 12.71 |

The most important barriers to insulin treatment were: frequent blood glucose tests, the need to respect the schedule or diet, associated fear of needles or bites. Although most patients did not report complaints related to treatment, 16% of them declared they feared the bite related to insulin injection or related to blood glucose test (32%) or to schedule a very strict diet. Results are presented in *Table 3*.

Table 3. Complaints related to insulin treatment

| The most important complaint related to actual treatment | % |
|--|------|
| No complaint related to actual treatment | 40.0 |
| Complaints related to frequent blood tests | 14.0 |
| Very strict insulin schedule or diet | 14.0 |
| Fear of needles or bites | 16.0 |
| Medical system | 16.0 |

There were significant differences in scores achieved by respondents and complaints related to current treatment (*Table 4*). Patients who did not report complaints related to treatment and those who had as main complaint the need to respect the schedule of insulin had a lower level of knowledge ($p=0.01$). Patients who had as main complaint the need of frequent blood sugar testing had a higher level of knowledge than those who had problems with the injections' schedule ($p=0.02$).

Table 4. Complaints related to treatment and questionnaire score

| Score | N | Mean | Std. Deviation | Std. Error | 95% Mean Confidence Interval | |
|------------------------------------|----|-------|----------------|------------|------------------------------|-------|
| No complaints related to treatment | 40 | 11.15 | 3.28 | .73 | 9.61 | 12.68 |
| Frequent blood glucose testing | 14 | 13.85 | 4.45 | 1.68 | 9.74 | 17.97 |
| The need of very strict diet | 14 | 10.14 | 3.57 | 1.35 | 6.83 | 13.45 |
| Fear of bites or needles | 16 | 11.62 | 3.02 | 1.06 | 9.09 | 14.15 |
| Medical system | 16 | 11.37 | 3.88 | 1.37 | 8.12 | 14.62 |

Discussions

The social position of elderly depends on the ethnic and cultural context. Elderly people are considered a socially disadvantaged group in the modern industrial society. The eight stages of human life are marked by one major objective, whose achievement ensures the integrity of ego. Failure to achieve this goal generates despair. Integrity of ego is linked to self-acceptance, lifestyle and belief that previous decisions were the best for the specific conditions of that time. Despair is a mental attitude and condition, opposed to dissatisfaction and disappointment, due to belief that decisions were not optimal (Erickson, 1968). Havighurst (1972) defines the human behavior through the stages of personal development objectives. Their achievement builds the satisfaction feeling.

The personal goals of the third age are: accepting and adapting to decreased physical force and impaired health, retirement and reduced income, to the death of close people and achieving satisfactory arrangements for the physical life. The following concepts are desirable personal goals for the elderly: maintaining a

sense of self esteem, solving old personal conflicts, adapting to the death of close people and environmental changes (Parmenter & Wardle, 1999).

One of the major goals of treatment of type 2 diabetes is to prevent chronic complications. Low adherence to treatment in elderly patients is determined by a lot of psychological, cognitive or emotional factors and the ability to adapt to new life conditions (Palos, Sava, & Ungureanu 2007). In our study, the adherence to treatment was assessed from two view points: the congruence with the indication of the number of daily doses of insulin and the schedule of insulin. In our study, most patients declared that they administered the insulin with the same daily schedule (54%) and 22 % of patients said that they sometimes forgot to inject their insulin.

Taking into account that the average duration of a diabetic patient's examination in the office is about 5-7 minutes, it is useful to assess the therapeutic knowledge and insulin-related barriers to a correct treatment (Ionescu-Targoviste, 1997). Main complaints regarding insulin treatment in elderly diabetic patients are: frequent blood glucose testing, the strictness of the treatment, the need to follow the schedule or diet, fear of injections and barriers linked to the medical system (Abaterusso *et al.*, 2008).

Peyrot *et al* (2010) emphasize that some patients tend to omit one to two injections a day, sometimes intentionally, skipping to inform their physician or hindering that fact. Therefore, the medical team needs to identify these patients and imagine strategies to ensure both: good diabetes control and minimal changes of the daily schedule (Tong, Vethakkan, & Ng, 2015). A big challenge is to perform continuous glucose monitoring (using Continuous Glucose Monitoring System). The emotional factors related to patients' perception may adversely affect the results, being related to the displeasure of wearing the device for 3-5 days, the painful sensations and the high cost of sensors (Ong, Chua, & Ng 2014). The optimal timing of initiation of the insulin therapy appears to depend more on the level of patients' perception than on the assessment of therapeutic knowledge, injection skills or insulin's structure (Christie & Thompson 2014; Abu Hassan *et al.*, 2014; Lee *et al.*, 2014).

Conclusions

Low adherence in elderly diabetic patients to insulin therapy is determined by psychological or cognitive capacity to adapt to new life conditions. Better adherence requires the need for a more intensive therapeutic education in this population, especially in elderly with low skills in insulin's injections. Cognitive factors' improvement could help them surpass the emotional barrier entailed by the fear of daily injections, lifestyle and attitude changes towards diabetic chronic complications.

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