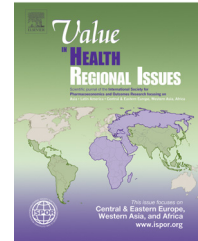




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## An Audit of Diabetes-Dependent Quality of Life (ADDQOL) in Older Patients with Diabetes Mellitus Type 2 in Slovenia

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### ABSTRACT

**Objective:** This article reports a study to measure diabetes-dependent quality of life (QOL) in older Slovenian patients with diabetes mellitus type 2 (DMT2). **Methods:** A cross-sectional study of older (age  $\geq 65$  years) patients with DMT2 at outpatient diabetic centers was conducted in all regions in Slovenia. The Audit of Diabetes-Dependent Quality of Life questionnaire was carried out between January and May 2012. Statistical analysis was performed by using IBM SPSS Statistics software, version 18.0. **Results:** After exclusion of noneligible respondents, a total of 285 respondents were included in the analysis, which represented a 57% response rate. Lower QOL was significantly connected to a heart attack episode (odds ratio 2.42; 95% confidence interval 1.06–5.20) and to the perception of not having diabetes under control (odds ratio 0.36; 95% confidence interval 0.18–0.69). Eleven (3.9%) patients reported no impact of DMT2 on their QOL

at all, while in the remaining respondents, particular reference was put to the effects on freedom to eat, dependency on others, and family life. There was no significant difference between the older people living in urban and rural areas. **Conclusions:** The findings of the present study highlight the impact of DMT2 on QOL. DMT2 imposes a personal burden on individuals. Information on the QOL of older patients with diabetes is important to Slovenian policymakers and family physicians to identify and implement appropriate interventions for achieving better management of diabetes and ultimately improving the QOL of patients with diabetes.

**Keywords:** ADDQOL, DMT2, elderly, patient-reported outcomes, quality of life.

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### Introduction

Diabetes is a chronic metabolic disease that can have a profound impact on the health status and quality of life (QOL) of patients in terms of physical, social, and psychological well-being [1–3]. Diabetes is now a global health concern: affecting both industrialized and transitioning countries. The number of people with diabetes is increasing because of population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity. Diabetes mellitus (DM) currently affects about 285 million adults worldwide, and it is projected to rise to 366 million in 2030 [4,5]. The most important demographic change to diabetes prevalence across the world appears to be the increase in the proportion of people aged 65 years or older [4]. In Europe alone, more than 50 million individuals are affected by diabetes, 90% of whom have diabetes mellitus type 2 (DMT2) [6].

Slovenia does not differ significantly from other European Union countries with regard to the prevalence of diabetes. The estimates of the National Institute of Public Health [7] amount to approximately 125,000 patients with diabetes in Slovenia, which is 6.3% of the population. Of these, 22.2% are aged 75 years or older, and 16% are aged between 65 and 74 years, with the mean age of patients with DMT2 being 65 years. Similarly, as in the rest

of Europe, the population in Slovenia is ageing and population health improvement is an increasingly important component of coordination and collaboration among patients and health care providers [8,9].

Internationally, there has been a marked shift in thinking about what health is and how it is measured [10]. Traditional clinical ways of measuring health and the effects of treatment are either accompanied by or even replaced by patient-reported outcome measures (PROMs), which present an entirely subjective report of the status of a patient's health condition. Research has shown that patients with diabetes are more concerned about physical and social function, emotional and mental health, as well as the burden of illness and treatments on daily life than with clinical biomarkers such as hemoglobin A<sub>1c</sub>, blood pressure, or lipid levels [11,12]. PROMs are thus meaningful and relevant outcomes. Furthermore, there is evidence that when the health-related quality of life (HRQOL) of individuals with diabetes is properly measured and the results are incorporated into health care management, improvements in patient outcomes occur [13,14]. Improvements in glycemic control and QOL, as well as reduction in short-term complications including the incidence of severe hypoglycemia, can be observed in combination of treatment and education of patients [15–17].

Conflict of interest: The authors have indicated that they have no conflicts of interest with regard to the content of this article.

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Many valid instruments to measure PROMs in diabetes have been developed and are already used in industrialized countries [18–20]. Among diabetes-dependent QOL measures, the Audit of Diabetes-Dependent Quality of Life (ADDQOL) is a widely used instrument [21–24]. In Slovenia, however, despite the high prevalence of diabetes, so far no studies evaluating patient-reported outcomes, such as HRQOL, have been conducted. According to the literature, less research was conducted on how various risk factors influence the QOL of patients with diabetes [25–27]. In this manner, the objective of the current study was to measure diabetes-dependent QOL in the older Slovenian patients with DMT2 and to assess its relationships with sociodemographic and health factors.

## Methods

### Instrument

The ADDQOL consists of two overview items; one measures generic overall QOL and a further 19 items are concerned with the impact of diabetes on specific aspects of life. The 19 life domains are as follows: leisure activities, working life, local or long-distance journeys, holidays, physical health, family life, friendships and social life, close personal relationships, sex life, physical appearance, self-confidence, motivation to achieve things, people's reactions, feelings about the future, financial situation, living conditions, dependence on others, freedom to eat, and freedom to drink. These 19 domains ask the respondents to evaluate how their life would be if they did not have diabetes.

The scales range from  $-3$  to  $+1$  for 19 life domains (impact rating) and from  $0$  to  $+3$  in attributed importance (importance rating). A weighted score for each domain is calculated as a multiplier of impact rating and importance rating (ranging from  $-9$  to  $+3$ ). Lower scores reflect poorer QOL. Finally, a mean weighted impact score (ADDQOL score) is calculated for the entire scale across all applicable domains [21,23,28]. Apart from the perceived QOL, data on patients' demographic characteristics, duration of diabetes, and existing diabetic complications were measured. The linguistic validation and cultural adaptation of the original English ADDQOL into Slovenian version is described elsewhere (E. Turk, V. Prevolnik-Rupel, A. Tapajner, et al., unpublished data, 2013).

### Study Design and Participants

A cross-sectional study was conducted between January and May 2012 by using a structured questionnaire.

Patients from the 12 participating outpatient diabetic centers were recruited by using the convenience sampling method. The regions selected were defined by the Statistical office of the Republic of Slovenia (E. Turk, V. Prevolnik-Rupel, A. Tapajner, et al., unpublished data, 2013). For recruitment, we used the largest outpatient center in each region in consideration that patients were approximately half from urban and rural areas. Each outpatient center recruited from 20 to 80 patients according to region size and diabetes prevalence [29]. All the study patients had an established relationship with the outpatient centers. Patients who met our inclusion criteria were asked to participate in this study. The inclusion criteria were as follows: physician-diagnosed DMT2, noninsulin treatment, and age 65 years or older. Patients who were diagnosed as suffering from type 1 diabetes, secondary diabetes, or gestational diabetes were excluded. All patients were diagnosed by physicians in light of diagnostic criteria recommended by the World Health Organization in 1999 [31].

A total of 500 patients with DMT2 were invited to participate in the research. Of them, 391 agreed and after exclusion of incomplete questionnaires, our sample included 285 patients with DMT2. The response rate was 57%.

After informed consent was obtained, all prospective participants were given the questionnaire. Where assistance was needed in completing the questionnaire, this was given by medical students, who were trained in the use of the ADDQOL questionnaire prior to the launch of this study.

### Ethical Considerations

The study was approved by the National Medical Ethics Committee of the Republic of Slovenia. The data obtained through the questionnaires were anonymous and based on participant consent.

### Statistical Analysis

The sample data were expressed as frequencies and percentages for categorical variables or by mean values and SDs for continuous variables. Binary logistic regression analysis was used to assess the influence of sociodemographic and health characteristics of patients with DMT2 on their QOL by using the ADDQOL. The calculation included Wald chi-square, odds ratio (OR), 95% confidence interval (95% CI), and P value. Nagelkerke's  $R^2$  was used to indicate goodness of fit. Patients were divided into two groups by using the ADDQOL score by using quartiles; the first group in the lower quartile was considered as having lower QOL. Such a cutoff strategy was previously applied in the literature [26,31]. Statistical analysis was performed with the SPSS 18.0 software (SPSS, Inc., Chicago, IL). A P value of less than 0.05 was considered statistically significant.

## Results

Sociodemographic characteristics of the studied population are presented in Table 1. The age ranged from 65 to 84 years, with a mean of  $70.0 \pm 4.9$  years. Among the 285 respondents, less than half were female (135, 47.4%). The majority of the respondents were married (191; 67.0%), owned their own house (171; 60.0%), and lived in an urban area (243; 85.3%).

The body mass index ( $\text{kg/m}^2$ ) ranged from 16.9 to 53.0, with a mean value of  $29.6 \pm 5.0$ . A majority of the respondents have been living with DMT2 for 11 years or more (56.5%), and many had problems with hypertension (78.9%) and high cholesterol (59.6%). More details about respondents' health characteristics are shown in Table 2. A vast majority of the respondents (230, 80.7%) reported to be satisfied with professional health support provision, and 114 (40.0%) were of the opinion that their diabetes was under control.

The ADDQOL score of 285 patients with DMT2 was calculated in a range of  $-8.3$  to  $0.0$  on a defined range from  $-9$  to  $+3$ . The median ADDQOL score was calculated at  $-1.6$ , lower quartile cutoff was calculated at  $-3.0$ , 213 (74.7%) patients with DMT2 reported an ADDQOL score of  $-3.0$  or more, and 72 (25.3%) patients had an ADDQOL score of less than  $-3.0$  (lower QOL). Eleven patients (3.9%) reported an ADDQOL score of  $0$ , which means that their QOL was not affected by diabetes at all.

Table 3 shows the logistic regression model results of the predictors of QOL according to the ADDQOL score. Lower QOL was significantly connected to a heart attack episode (OR 2.42; 95% CI 1.06–5.20). From a patient perspective, being of the opinion that their diabetes was under control decreased the likelihood of a lower QOL (OR 0.36; 95% CI 0.18–0.69). Living in a rural environment was not significantly connected to a lower QOL. Results in Figure 1 show that only 13.6% of the patients without heart attack

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