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Impact of Coronavirus Disease 2019 Lockdown on Quality of Life and Locus of Control in Elderly Subjects with Type 2 Diabetes

ABSTRACT

Objective: The coronavirus disease 2019 (COVID-19) pandemic and its associated restrictions have adversely affected clinical and psychological well-being, especially in elderly subjects with type 2 diabetes (T2D). The aim of the stuy was to evaluate the impact of the restrictions imposed by the COVID-19 pandemic on metabolic parameters, diabetes quality of life (DQoL), and locus of control (LOC) in elderly outpatients with T2D, also taking into account potential gender differences.

Methods: Major clinical parameters, DQoL, and LOC were evaluated in a group of consecutive elderly T2D patients on oral hypoglycemic drugs before and after 12 months of the lockdown period.

Results: The glycemic control of the study subjects (n = 94; age 65-89 years) did not significantly change during the observation period. Overall, QoL slightly improved, mainly due to a reduction in the impact domain, which explores the consequences of diabetes on daily life. Regarding the LOC questionnaire, the internal score increased, and the scores of the external and chance domains decreased, indicating a lower attribution of disease control to chance or other people. These changes were more evident in men than in women.

Conclusion: In this group of elderly T2D outpatients with good glycemic control, the restrictions imposed by the COVID-19 pandemic did not negatively impact health-related QoL and increased the awareness of patients' role, especially in men.

Keywords: Type 2 diabetes, COVID-19 pandemic, lockdown, glycemic control, quality of life, locus of control

Introduction

Type 2 diabetes (T2D) is one of the fastest-growing health challenges of the 21st century, with the number of adults living with diabetes having more than tripled over the past 20 years.[1]

The management of T2D aims to delay chronic complications and optimize patients' quality of life (QoL), requiring personalized strategies that should also consider the patient's age, cognitive abilities, individual needs, and preferences.

Notably, in elderly subjects with T2D, we recently demonstrated that the long-term maintenance of good metabolic control may be influenced by locus of control (LOC) scores.[2] Locus of control reflects whether the patient perceives a causal relationship between his behavior and the outcomes of the disease: subjects who believe that they are in control of the disease's outcomes have a prevalent internal LOC; those who believe that the events related to the disease are determined by other people (for example doctors or nurses) or by the fate have respectively a prevalent external LOC or chance LOC.

The COVID-19 pandemic was an opportunity to reflect on the role of person-related variables in T2D management. Indeed, in many countries, political and social measures, such as social distancing and hard lockdowns, have been adopted to contain the spread of the infection. Elderly people have significantly suffered from these social restrictions because of social isolation and limited access to the healthcare system.[3] Moreover, the disruption of daily routines and health concerns have introduced additional stressors in individuals with chronic diseases.

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As a result, a negative impact of the COVID-19 pandemic on cognitive performances and physical components of health-related quality of life was demonstrated in elderly frail subjects.[4] The restrictive measures affected daily activities and eating patterns.[5] These factors may negatively influence metabolic parameters, especially in elderly subjects.[6]

During the lockdown, many outpatient clinics adopted alternative telemedicine approaches to guarantee health professional advice. In this regard, in a large cohort of T2D outpatients, unstructured telemedicine counseling provided an acceptable quality of diabetes care, with similar glucose control compared to face-to-face consultation patients.[7] However, to date, the influence of telemedicine on person-related variables has yet to be fully investigated. Therefore, this study aimed to evaluate the impact of social restrictions imposed by the COVID-19 pandemic on metabolic parameters, QoL, and LOC in elderly outpatients with T2D on oral hypoglycemic drugs, followed by telemedicine, considering potential gender differences.

Materials and Methods

Study Population

A group of consecutive T2D subjects on oral hypoglycemic agents aged ≥65 years attending the Metabolic Disease Outpatient Clinic of the University Hospital of Messina, Sicily, Italy were included in this single-center observational study in 2019.

The exclusion criteria were as follows: T2D diagnosis <2 years, current hypoglycemic injectable therapy, severe sensory deficits, known psychiatric disorders, and severe cognitive impairment (Mini-Mental State Examination, MMSE score <18).

Informed consent was obtained from each participant, and the Ethical Committee of Messina approved the study (approval number: 98/16- 4, date: October 2016).

Clinical and Laboratory Parameters

All clinical and laboratory parameters were evaluated at baseline and 12 months after the onset of the COVID-19 pandemic at the same outpatient clinic.

MAIN POINTS

- Glycemic control and quality of life (QoL) in subjects with type 2 diabetes (T2D) can be influenced by psychological and behavioral variables. The COVID-19 pandemic and the political and social measures adopted to contain the spread of the infection are opportunities to question and reflect on the role of person-related variables.
- We aimed to explore the impact of the social restrictive measures imposed by the COVID-19 pandemic on metabolic parameters, QoL, and diabetes-specific locus of control (LOC) in a group of elderly outpatients with T2D on oral hypoglycemic therapy.
- After 12 months from the onset of the COVID-19 health emergency, in this group of elderly T2D outpatients, glycemic control and body weight were unchanged; the lockdown did not negatively influence the QoL.
- As for LOC, the internal score increased, and the scores of the external and chance domains decreased, indicating a lower attribution of disease control to chance or other people. These changes were more evident in men than in women.

Biochemical parameters were measured after a fasting period of 12-14 hours. Plasma glucose and serum creatinine levels were measured by standard automated methods (Roche Diagnostics, Italy). Automated enzyme assays measured total cholesterol and triglyceride levels. HDL-C was measured with a kit provided by Roche Diagnostics (Indianapolis, IN). HbA1c was measured using the high-performance liquid chromatography method (Diamat, Bio-Rad Laboratories, Italy).

Chronic Diabetes Complications Assessment

The presence of chronic diabetes complications was assessed according to current guidelines,[8] and clinical data were recorded in the computerized clinical chart. As an integral part of the annual screening program, all T2D outpatients were screened for cardiovascular complications with a standard electrocardiogram, and ischemic heart disease was documented by cardiological medical records and/or hospital discharge reports. The presence of diabetic retinopathy was investigated through a fundus examination and/or a fluorangiographic examination.

According to Kidney Disease Improving Global Outcomes Work Group guidelines,[9] glomerular filtration rate estimated by the Modification of Diet in Renal Disease (MDRD) formula (eGFR) and urinary albumin excretion was used to assess kidney function, and diabetic kidney disease (DKD) was defined as an eGFR value <60 mL/min/1.73 m^2 and/or the presence of albuminuria (urinary albumin concentration >30 mg/L).

Assessment of Cognitive Function, Quality of Life, and Locus of Control

Cognitive function, QoL, and LOC were evaluated at baseline and 12 months after the onset of the COVID-19 pandemic.

The MMSE explored cognitive status, a validated screening test exploring orientation, language, attention, immediate and short-term recall, and the ability to perform simple written and verbal commands.[10] The score ranges from 0 to 30 points: a score of 25-30 suggests a normal cognitive status, a score of 18-24 indicates a mild/moderate cognitive impairment, and a score of <18 indicates severe cognitive impairment. Patients with an MMSE score <18 were excluded from this analysis.

To assess the impact of diabetes on QoL, we used the diabetes quality of life (DQoL) questionnaire, a modified version of the questionnaire used in the DCCT study[11] that has been translated into Italian and revalidated.[12] It includes three domains and 39 items, asking patients to rank on a 5-point scale (1 = very satisfied; 5 = very dissatisfied). The satisfaction domain explores the patients' psychological well-being and satisfaction with the treatment, the impact section, the impact of diabetes on everyday life, and the Worry section the diabetes-related anxiety. The total score ranges between 39 (highest level of QoL) and 195 (lowest level of QoL).

In order to assess individual perception of diabetes control, the diabetes-specific LOC questionnaire translated into Italian was used. It consists of 18 items and explores 3 domains: Internal (the subject attributes the responsibility of events to internal factors), Other (the subject attributes the responsibility of events to external factors), and Chance (the patient has the perception that outcomes of diabetes are controlled by destiny or chance). The domain with the highest score indicates the LOC of diabetes-related events, as perceived by the patient.[13,14]

Statistical Analysis

Statistical analysis was performed using Statistical Package for the Social Science (SPSS) version 11.1 for Microsoft Windows (SPSS Inc., Chicago, Ill, USA). Continuous variables were expressed as mean (standard deviation) if normally distributed and as median (25th and 75th percentiles) if non-normally distributed. Categorical variables were expressed as the number of cases and percentages (%).

P-values for comparisons between variables were obtained by testing with matched pair t-testing or Wilcoxon rank testing where appropriate. The analysis of variance (ANOVA) test was used to compare the continuous variables, with a P value < 0.05 considered statistically significant.

Results

Baseline Characteristics of Study Participants

A group of 100 consecutive elderly T2D subjects on oral hypoglycemic agents were included in this study. Among these, 6 patients did not agree to participate in the follow-up evaluation. Therefore, this analysis concerns the 94 subjects who completed the study questionnaires at baseline and follow-up evaluation.

The baseline clinical characteristics of the study participants (54 men and 40 women, mean age 72 years) are shown in Table 1. Overall, the study subjects were overweight (BMI 27.8 kg/m^2) and on adequate glycemic control (HbA1c 6.7%), with 70% of patients presenting HbA1c levels <7.0%.

Also, the lipid profile was adequate, and the mean eGFR value (70.38 mL/min/1.73 m^2) was indicative of early-stage renal impairment. Overall, 42 subjects presented DKD, 11 study subjects were affected by retinopathy, and 8 were affected by coronary heart disease; over half of the study participants had carotid, and 25.5% had lower limb atherosclerosis.

As required by the protocol, all study participants were in treatment with oral hypoglycemic agents.

Cognitive Status, Quality of Life, and Locus of Control Scores at Baseline

Overall, the mean level of education of study participants was 9.2 years. At baseline, the median MMSE score was 27 (interquartile range, IQR 23-28), although 27 patients (29%) presented mild cognitive impairment (Table 2).

Median total DQoL score was 76 (IQR 66-86), indicating a good level of QoL.

Higher LOC scores were recorded in the internal domain compared to the other two.

As for gender differences, the DQoL—total score was higher in female study participants compared with men, although not significantly; the DQoL—satisfaction score, on the other hand, was significantly higher in women, indicating a worse QoL, as compared to men. No significant differences were observed in the impact and worry subscores.

The external LOC score was higher among men (26 vs. 23 $P < .05$), while scores in the internal and chance domain were similar in both genders.

Table 1. Clinical Characteristics at Baseline of the 94 Subjects with Type 2 Diabetes Participating in the Study

Clinical Parameters	
Men, n (%)	54 (57.4)
Age (years)	71.57 ± 6.94
Schooling (years)	9.20 ± 3.65
Years of diabetes (n)	12.45 ± 10.6
Weight (kg)	73.14 ± 13.56
BMI (kg/m^2)	27.76 ± 5.33
Waist circumference (cm)	100.78 ± 11.73
Laboratory Parameters	
HbA1c (%)	6.71 ± 0.67
Subjects with HbA1c ≤7%, n (%)	66 (70.2)
Total cholesterol (mg/dL)	163.48 ± 29.08
HDL cholesterol (mg/dL)	50.02 ± 13.13
LDL cholesterol (mg/dL)	87.86 ± 26.01
Triglycerides (mg/dL)	129.15 ± 60.58
GOT (U/L)	20. 09 ± 5.98
GPT (U/L)	21.93 ± 9.92
GGT (U/L)	27.71 ± 17.98
Creatinine (mg/dL)	0.97 ± 0.26
Chronic Complications of Diabetes	
eGFR (mL/min/1.73 m^2)	70.38 ± 22.62
eGFR< 60 mL/min/1.73 m^2, n (%)	32 (34.04)
Microalbuminuria, n (%)	13 (13.8)
Albuminuria (mg/L)	32.54 ± 101.06
Diabetic retinopathy, n (%)	11 (11.7)
Diabetic kidney disease, n (%)	42 (44.7)
Chronic ischemic heart disease, n (%)	8 (8.51)
Carotid atherosclerosis, n (%)	55 (58.51)
Lower limb atherosclerosis, n (%)	24 (25.53)
Hypoglycemic Therapy	
Acarbose, n (%)	10 (10.6)
Metformin, n (%)	80 (85.1)
Pioglitazone, n (%)	3 (3.2)
Secretagogues, n (%)	27 (28.7)
DPP IV inhibitors, n (%)	22 (23.4)
SGLT2 inhibitors, n (%)	0
Hypoglycemic episodes, n (%)*	6 (6.38)

Data are n, % mean (SD).
eGFR, glomerular filtration rate estimated using the MDRD formula.
*Subjects who reported at least 1 episode of hypoglycemia in the previous 6 months.

Type 2 Diabetes Control at Follow-Up Evaluation

During the lockdown period, study participants received a mean of 2 telephone and/or email contacts with the diabetes-care team, with 41% of them receiving more than one remote consultation.

As shown in Table 3, body weight and HbA1c levels did not show any significant change. Moreover, the proportion of patients with HbA1c levels ≤7.0% did not change over time, without the need for a pharmacological intensification. Thus, there was a 17% increase in patients treated with DPP-4i, but also a 21% reduction insubjects on metformin and a 3% reduction in subjects treated with secretagogues. Only 12 subjects started injectable therapy.

Table 2. Assessment of Cognitive Function, Quality of Life, and Locus of Control at Baseline

Cognitive Function	
n (%)	n = 94
MMSE (Mini-Mental State Examination)	27 (23-28)
MMSE <24, n (%)	27 (28.7)
Diabetes Quality of Life (DQoL)* (n = 94)	
Total DQoL score	76 (66-86)
Satisfaction score	30 (26-37)
Diabetes impact score	35 (32-41)
Diabetes-related worry	8 (6-10)
Locus of Control (LOC)# (n = 94)	
Internal	32 (30-36)
External	22 (19-25)
Chance	13 (9-20)

Data are median (interquartile range), n (%).
*The DQoL questionnaire contains 39 items and explores three areas: diabetes impact on daily life (20 items, range: 20-100), satisfaction (14 items, range: 14-70), and diabetes-related worry (5 items, range: 5-25). The total DQoL score ranges between 39 (highest level of QoL) and 195 (lowest level of QoL).
#LOC-scores: each domain score ranges from 6 to 36, and the domain with the highest score indicates the main locus to which the patient attributes the responsibility for diabetes-related events.

Quality of Life and Locus of Control Scores at Follow-up Evaluation

As shown in Figure 1, both DQoL and LOC scores showed some changes at the follow-up evaluation. In particular, the total QoL score significantly decreased compared with the baseline, mainly due to the reduction of the median DQoL—impact dimension; instead, the median DQoL—worry and DQoL—satisfaction subscores slightly increased compared with the baseline.

Regarding the LOC questionnaire, a significant decrease in LOC—chance and LOC—external scores was observed compared to baseline; a parallel modest increase in the LOC—internal value was observed ($P > .05$).

When comparing men and women participating in the study (Supplementary Table 1) at the end of the follow-up, the DQoL—Satisfaction subscore was still higher in women than in men, with no significant differences were observed in the other 2 domains. A reduction in the total DQoL score was only observed in men, mostly due to the reduction in Impact subscore. The women's Impact subscore decreased, as did the men's, however, the Worry subscore increased, so the total score remained almost unchanged.

In terms of LOC, at the end of the follow-up, both men and women continued to show a predominantly internal LOC. However, a large reduction in the median LOC—chance subscore was observed in men but not in women (Supplementary Table 1).

The external score slightly decreased in both genders and the difference between men and women in the external score, which was statistically significant at baseline, decreased over time.

Discussion

In this study, we explored the impact of the social restrictive measures imposed by the COVID-19 pandemic on metabolic parameters, QoL, and diabetes-specific LOC in a group of elderly outpatients with T2D on oral hypoglycemic therapy, followed by telemedicine in a single center in Italy. After 12 months from the onset of the COVID-19 health emergency, an unstructured telemedicine approach allowed T2D elderly patients to keep their glycemic control and body weight unchanged. Also, the lockdown had no negative impact on QoL and LOC scores in the elderly patients participating in the study.

In particular, the slight reduction in the total QoL score, mainly driven by the reduction in the Impact subscale, suggests that the COVID-19 lockdown has not worsened the QoL in these elderly T2D patients. Our results are at variance with other studies showing a worsening of the QoL in subjects during the pandemic due to various psychosocial factors, including stress, anxiety, and isolation.[15-17] Social distancing and isolation profoundly influenced the mental well-being of subjects with chronic diseases; many patients encountered barriers in sourcing fresh food and performing physical activity.[18,19] Furthermore, the burden of fear and anxiety further worsened psychological fragility,

Table 3. Change from Baseline in Metabolic Parameters and Hypoglycemic Therapy in Elderly T2D Study Participants

	At Baseline	At Follow-up	Change from Baseline
Weight (kg)	73.14 ± 13.56	71.66 ± 14.16	−1.48 ± 4.08
BMI (kg/m^2)	27.76 ± 5.33	27.24 ± 5.66	−0.53 ± 1.58
HbA1c (%)	6.71 ± 0.67	6.65 ± 0.63	−0.06 ± 0.71
Subjects with HbA1c ≤7.0%, n (%)	66 (70.2)	58 (61.7)	−8 (8.5)
Hypoglycemic therapy			
Metformin, n (%)	80 (85.1)	60 (63.8)	−20 (21.3)*
Sulfonylureas/repaglinide, n (%)	27 (28.7)	24 (25.5)	−3 (3.2)
Acarbose, n (%)	10 (10.6)	10 (10.6)	–
DPP IV-i, n (%)	22 (23.4)	38 (40.4)	+16 (17.02)
Pioglitazone, n (%)	3 (3.19)	2 (2.12)	−1 (1.07)
Patients on injectable therapy, n (%)	0	12 (12.8)	+12 (12.8)
GLP-1RA, n (%)	0	6 (6.4)	+6 (6.4)
Insulin, n (%)	0	6 (6.4)	+6 (6.4)

All variables were evaluated at baseline and 12 months after the onset of the COVID-19 pandemic.
Data are mean (SD); n, %.
*P values <.05 for comparison between baseline and follow-up.

stress, and mood disorders. This aspect can be particularly important in elderly subjects, in which diabetes may negatively affect emotional well-being, cognitive status, and QoL, already compromised because of aging.[20]

In this stressful period, elderly T2D patients included in our study, followed by an unstructured telemedicine approach, did not experience a worsening of QoL and, on the contrary, experienced a reduction of the impact of diabetes on everyday life activities. Confinement at home and more time for T2D management probably simplified some diabetes-related activities, including diet, self-blood glucose monitoring, and adherence to diabetes therapy.

Current guidelines on T2D management place QoL at the center of the therapeutic objectives, together with the achievement of glycemic control.[8] In elderly patients, psychological health, social status, and cognitive decline may also influence adherence to therapy.

On the other hand, the acquisition of specific knowledge and aware behavior can lead to an improvement in the QoL and to more favorable clinical outcomes.[12]

As for LOC, a reduction of the external and chance scores was observed in our T2D patients, indicating a lower fatalism and a good patients' awareness of their active role in diabetes management.

Some authors suggested a role for the LOC in modulating the psychological impact of the COVID-19 pandemic. In a large population in Europe, a more pronounced internal LOC attenuated the stress caused by the pandemic.[21] Similarly, an Italian study suggested that an internal LOC has a protective role against perceived stress.[22]

It is likely that the predominantly internal LOC helped our elderly patients maintain good metabolic control and QoL. We can hypothesize that people with a more pronounced internal loc, who tend to attribute events to their behavior and are self-reliant, interpret self-isolation as something they self-determine and engage in a self-protective behavior. Accordingly, the internal LOC predicts patients' tendency to comply with lockdown rules[23] and seek information about COVID-19 infection and therapy.[24,25]

To better interpret our results, we need to underline that study subjects periodically received outpatient visits by telephone and/or by

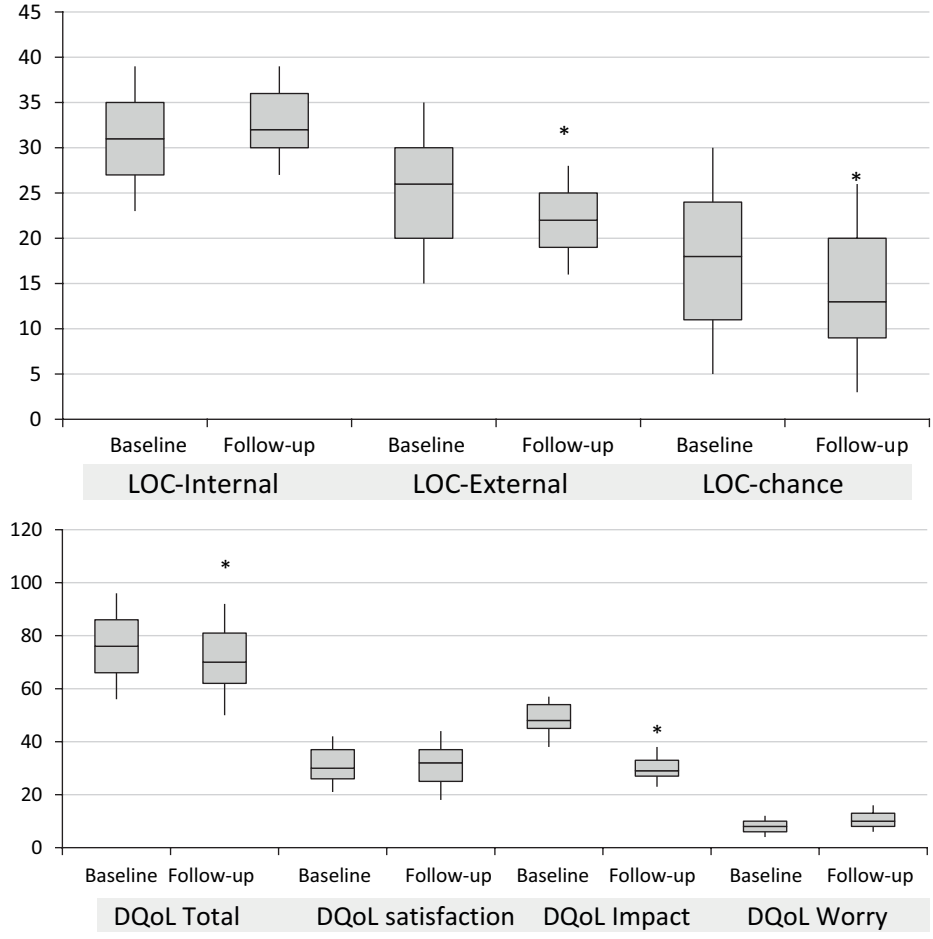

Figure 1. Locus of control (LOC) and diabetes quality of life (QoL) scores at baseline and follow-up evaluation. *$P < .05$ for comparison between baseline and follow-up scores. All variables were evaluated at baseline and 12 months after the onset of the COVID-19 pandemic. The DQoL questionnaire contains 39 items and explores 3 areas: diabetes impact on daily life (20 items, range: 20-100), satisfaction (14 items, range: 14-70), and diabetes-related worry (5 items, range: 5-25). The total DQoL score ranges between 39 (highest level of QoL) and 195 (lowest level of QoL). Locus of control scores: each domain score ranges from 6 to 36, and the domain with the highest score indicates the main locus to which the patient attributes the responsibility for diabetes-related events.

email, and that remote management was likely to positively impact metabolic variables. Even the slight decrease observed in body weight, contrary to what occurred in some studies, which documented an increase in body weight and a worsening of eating habits in T2D subjects during the COVID-19 pandemic,[26-29] suggests once again the positive impact of the constant contact with patients.

Certainly, diabetes treatment may have influenced our results since most of the study participants were on diabetes drugs with low/no risk of hypoglycemia, which may negatively impact not only adherence to prescribed therapy and consequently glycemic control but also well-being and QoL. Due to the study design, patients on injectable hypoglycemic agents at baseline (either insulin or GLP-1RAs) were excluded from the current analysis for their potential impact on QoL and perceived complexity of care. Although this inclusion criterion probably led to selecting subjects all in fair/good glycemic control, it allowed us to explore the effects of stressful events, such as pandemic restrictions, on LOC and QoL in a homogeneous group of elderly patients.

We have also explored possible gender differences in this area since numerous evidences indicate that men and women with T2D show differences in clinical and psychological variables, including QoL, risk of anxiety, and depression; sex differences in LOC have also been described, with women presenting a prevalent external LOC which could make them more exposed to poorer mental health than men.[30,31]

Gender also influences QoL, and men with diabetes tend to report lower diabetes-related worries and a lower impact of diabetes on QoL and mental well-being than women.[32,33] Recently, a significant association between the male gender and higher QoL was observed in T2D, which the authors attribute to sociocultural and health behavior factors.[34]

Accordingly, in our study population, the median satisfaction DQoL score was significantly higher in women, and social restrictions had a lower impact on male patients. Furthermore, the external LOC score was significantly higher in men, suggesting the attitude of male patients to attribute other people (family members, caregivers, health-care professionals, etc.) an important role in managing their disease. Notably, the LOC—chance score significantly decreased only in men at the end of the observation, signifying that male patients learned to attribute less importance to chance and destiny.

Our study has some limitations: the study population, which includes only elderly subjects with T2D on oral hypoglycemic drugs, does not allow us to extend our results to different and more heterogeneous populations. Secondly, the inevitable absence of a control group on face-to-face visits, which prevents us from affirming that our results are entirely attributable to telemedicine approach during the lockdown period or even to other variables. Notably, since the study subjects were overall in good glycemic control, we could not assess the effects of pandemic restrictions on the glycemic control of subjects with baseline elevated HbA1c levels. Furthermore, further evaluation of the questionnaires in the actual phase of the COVID-19 pandemic could provide updated information on its ultimate impact on patients' QoL. Longitudinal studies are needed to investigate possible long-term effects of the pandemic on mental health and well-being in T2D.

In conclusion, in this group of elderly T2D outpatients with good glycemic control receiving telemedicine consultations, the restrictions imposed by the COVID-19 pandemic did not negatively affect health-related QoL and increased awareness of their role in disease control, especially in men.

Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Committee Approval: This study was approved by Ethics Committee of Messina, Italy (approval number: 98/16- 4, date: October 2016).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

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Supplementary Table 1. Gender Differences in DQoL and LOC Scores Changes from Baseline

	Men			Women		
	Baseline	**Follow-up**	**Change from baseline, median (CI 95%)**	**Baseline**	**Follow-up**	**Change from baseline, median (CI 95%)**
DQoL	74 (66-82)					
Total	29 (25-32)	67 (60-72)		78 (67-89)	77 (69-83) #	+1 (-4-6)
Satisfaction	36 (32-42)	29 (23-33)	-8 (-12-3)	35 (28-41) *	34 (31-40) #	0 (-3-3)
Impact	7 (5-9)	28 (27-33)	-1 (-4-3)	33 (32-40)	29 (28-32)	-4 (-7-1)
Worry		10 (7-13)	-5 (-8-2)	8 (7-10)	11 (8-13)	+2 (0-3)
			+2 (1-3)			
LOC	31 (27-34)					
Internal	26 (24-31)	33 (31-36)	+4 (1-6)	32 (28-35)	31 (28-36)	0 (-3-3)
External	19 (10-24)	22 (19-25)	-3 (-6-0)	23 (18-28) *	21 (18-26)	-1 (-4-3)
Chance		10 (6-14)	-5 (-7-2)	18 (13-24)	17 (11-26) #	+1 (-3-5)

Data are median (Interquartile Range) and median (95% Confidence Interval). DQoL, diabetes quality of life; LOC, locus of control.
The DQoL questionnaire contains 39 items and explores three areas: diabetes impact on daily life (20 items, range: 20-100), satisfaction (14 items, range: 14-70), and diabetes-related worry (5 items, range: 5-25). The total DQoL score ranges between 39 (highest level of QoL) and 195 (lowest level of QoL).
LOC-scores: Each domain score ranges from 6 to 36, and the domain with the highest score indicates the main locus to which the patient attributes the responsibility for diabetes-related events.
*P < .05 for comparison between men and women at baseline;
#P < .05 for comparison between men and women at follow-up evaluation.
The change from baseline values in the LOC Chance domain was significantly different in the two genders (P < .05).