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Satisfaction with Life and Personal Well-being of Diabetic Patients Across Healthcare Systems: A Multicenter Cross-sectional Study

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Abstract

Background

Personal well-being and life satisfaction are increasingly recognized as important patient-reported outcomes in diabetes care. However, evidence remains limited among Egyptian adults with diabetes, particularly regarding differences between tertiary and primary healthcare settings.

Methods

This multicenter cross-sectional study enrolled 430 adults with type 1 or type 2 diabetes mellitus attending the Endocrinology and Diabetes Outpatient Clinics of Mansoura University Hospitals (tertiary care, n = 207) and three primary healthcare units (n = 223) in Dakahlia Governorate, Egypt, between January and June 2026. Life satisfaction and personal well-being were assessed using the validated Arabic Satisfaction With Life Scale and the seven-item core-domain Personal Well-being Index Index (PWB). SWL scores ≥ 20 were classified as satisfied with life, and PWB scores ≥ 70% were classified as normal well-being. Predictors were fied using forward stepwise binary logistic regression.

Results

Overall, 69.8% of participants were satisfied with life, while 41.6% had normal well-being based on the seven-item PWB score. Glycemic control was not significantly associated with either satisfaction with life or normal well-being. In the final adjusted model, low well-being was associated with lower odds of satisfaction with life (AOR 0.11, 95% CI 0.06–0.19, p ≤ 0.001). Normal well-being was independently associated with healthcare setting, diabetes-related complications, and satisfaction with life. Participants attending primary healthcare centers had higher odds of normal well-being than those attending the tertiary hospital (AOR 4.58, 95% CI 2.83–7.42, p ≤ 0.001), whereas patients with diabetes-related complications had lower odds of normal well-being (AOR 0.25, 95% CI 0.14–0.46, p ≤ 0.001). Participants who were not satisfied with life also had lower odds of normal well-being (AOR 0.085, 95% CI 0.044–0.160, p ≤ 0.001).

Conclusions

Patients attending primary healthcare units reported better personal well-being than those attending tertiary care; however, this association should be interpreted cautiously because causality cannot be inferred from the cross-sectional design. Differences in patient complexity, accessibility, care experience, or continuity of follow-up may partly explain this finding. Diabetes-related complications and life satisfaction were important correlates of personal well-being, whereas glycemic control was not

significantly associated with either patient-reported outcome. These findings support incorporating brief patient-reported well-being assessments into routine diabetes care.

1. Background

Diabetes mellitus is one of the world's leading public health challenges, affecting hundreds of millions of people and contributing substantially to morbidity, mortality, and healthcare burden. The 11th edition of the International Diabetes Federation Diabetes Atlas states that 589 million adults aged 20–79 years had diabetes in the 2024, a number expected to rise to 853 million by 2050 [1] Egypt faces similarly substantial burden, with an estimated 13 million adults living with diabetes in 2024, projected to rise to 24.7 million by 2050 [1]. These estimates are consistent with global evidence showing a sustained rise in diabetes prevalence and diabetes-related disability over recent decades [2]. Diabetes is associated with both microvascular, and macrovascular complications affecting the eyes, kidneys, nervous system, and cardiovascular system, thereby increasing morbidity and mortality and reducing overall quality of life [3, 4].

Diabetes research has traditionally focused on biomedical outcomes, including glycemic control, disease complications, and treatment adherence. More recently, patient-reported outcomes have gained recognition as an important complement to biomedical measures, offering insight into how patients experience living with diabetes [5, 6]. This shift is reflected in contemporary diabetes care guidelines, which emphasize emotional well-being alongside lifestyle behaviors and biomedical targets as part of comprehensive diabetes management [7]. The clinical importance of this integration is highlighted by meta-analytic findings showing that depression in patients with diabetes is linked to poor glycemic control and low engagement in self-care [8].

In Egypt, psychological symptoms among patients with diabetes have been increasingly documented. A cross-sectional study of 679 patients with diabetes in Fayoum, Egypt, found that 34.2% had depression and 38.0% had anxiety symptoms, with older age, neuropathy, and sexual dysfunction independently associated with depression [9]. Another study conducted among 403 patients with diabetes attending primary healthcare centers during the COVID-19 pandemic found that severe diabetes distress, depressive symptoms, and anxiety symptoms were present in 13.4%, 9.2%, and 4.0% of participants, respectively, with diabetes distress more common than either depression or anxiety alone [10]. A further primary care study examined the overlap between diabetes distress, depression, and anxiety and their association with glycemic control, reporting that 24.9% of patients experienced one of these symptoms, 8.2% experienced two, and 4.5% experienced all three concurrently [11]. However, these symptom-oriented measures capture constructs that differ from the life satisfaction and subjective well-being examined in the present study.

The Satisfaction With Life Scale (SWL) provides an efficient measure of global cognitive judgments of life satisfaction, and recent evidence supports the suitability of its Arabic version in Arabic-speaking

populations [12]. The Personal Well-being Index, used here to assess personal well-being (PWB), evaluates satisfaction across multiple life domains and has been recommended as a suitable measure of overall well-being [13]. Used together, the SWL and PWB provide feasible tools for capturing patient-reported well-being in routine care while assessing a construct distinct from clinical depression or psychiatric diagnosis [14]. To our knowledge, no prior Egyptian study has directly compared life satisfaction and personal well-being among patients with diabetes receiving tertiary versus primary care. This is relevant because continuity of care and patient–provider relationships may influence outcomes such as complications, treatment satisfaction, healthcare utilization, physician trust, and glycemic control [15, 16]. Thus, the limited use of SWL and PWB measures among Egyptian patients with diabetes, together with the lack of comparisons between tertiary and primary healthcare settings, represents an important research gap.

2. Aim

This study aimed to estimate the prevalence of life satisfaction and personal well-being among adults with diabetes receiving care in tertiary and primary healthcare settings and to examine their associations with sociodemographic characteristics, glycemic control, diabetes-related complications, and other clinical factors.

3. Methods

3.1. Study design

This was a multicenter cross-sectional analytical study.

3.2. Study location and duration

The study was performed at the Endocrinology and Diabetes Outpatient Clinics of Mansoura University Hospitals, representing the tertiary care setting, and at three primary healthcare units affiliated with the Ministry of Health and Population in Dakahlia Governorate (Batra, Diast, and Mit Zonkor Family Health Units) representing the primary care setting. These sites were selected because of their accessibility and high patient volume. The study protocol was developed in September 2025, and data collection took place between January and June 2026.

3.3. Target population

The target population included adult patients aged 18 years or older with clinically diagnosed type 1 or type 2 diabetes mellitus who attended the selected diabetes outpatient clinics during the study period. Diabetes diagnosis was verified by reviewing patients' medical records according to WHO diabetes criteria [17].

3.4. Inclusion criteria

Eligible participants were adults aged 18 years or older who had been diagnosed with diabetes mellitus for at least six months, provided written informed consent, and completed the study questionnaire.

3.5. Exclusion criteria

Patients were excluded if they were pregnant, terminally ill, had severe psychiatric illness such as dementia or psychosis that could interfere with participation, or were critically ill or hospitalized during the data collection period.

3.6. Sampling and sample size

Participants were recruited using consecutive sampling. All eligible patients attending the participating clinics during the data collection period were invited to participate until the target sample size was reached. Eligibility was assessed by reviewing participants' clinical records before enrollment. Sample size was calculated using Epi Info (CDC) for a cross-sectional design. Given the lack of prior data on the prevalence of low life satisfaction or well-being among patients with diabetes in Egypt, a conservative prevalence estimate of 50% was used to obtain the largest required sample size. With a 95% confidence level and a 5% margin of error, the required sample size was 385 participants. To account for an expected 10% non-response rate, the final target sample size was set at 424 participants. Participants were initially targeted in equal numbers from the tertiary and primary care settings because reliable attendance records were not available to support proportional allocation. The response rate was approximately 94%. A total of 437 questionnaires were completed; seven were excluded because of missing data, leaving a final sample of 430 participants, including 223 from primary healthcare centers and 207 from Mansoura University Hospital.

3.7. Data collection tools and variables

Data were collected using a structured interviewer-administered questionnaire comprising two components: a sociodemographic and clinical data form developed by the research team for this study (English version provided in Additional File 1), and two previously published, validated patient-reported outcome measures described below. The sociodemographic and clinical form covered health facility type, age, sex, residence, educational level, marital status, occupation, time to reach the facility, duration of diabetes, type of diabetes, treatment modality, diabetes-related complications, comorbidities, other medications, and the most recent HbA1c value obtained from medical or laboratory records. Glycemic control was categorized as controlled (HbA1c < 7.0%) or uncontrolled (HbA1c ≥ 7.0%), according to the American Diabetes Association criteria [18].

Satisfaction With Life Scale (SWL): Life satisfaction was assessed using the Arabic-validated version of the SWL, a five-item self-report measure of global cognitive life satisfaction rated on a seven-point Likert scale, with higher scores indicating greater life satisfaction. The Arabic version was validated by Abdallah, with an internal consistency of $\alpha = 0.79$ and test–retest reliability of $r = 0.83$ [19]. Total scores were interpreted as follows: 30–35, extremely satisfied; 25–29, satisfied; 20–24, slightly satisfied; 15–19, slightly dissatisfied; 10–14, dissatisfied; and 5–9, extremely dissatisfied. For regression analysis,

SWL scores were dichotomized into satisfied with life (scores 20–35) and dissatisfied with life (scores < 20).

Personal Well-being (PWB): Personal well-being was assessed using the Arabic version of the Personal Well-being Index. For the present analysis, PWB was scored using the seven core domains: standard of living, health, achievements in life, personal relationships, safety, community connectedness, and future security. Two additional non-core items assessing satisfaction with life as a whole and spirituality/religion were collected but were not included in the total PWB score. The Arabic version of the Personal Well-being Index has demonstrated acceptable psychometric properties among Arabic-speaking adults by Lotfy, with an internal consistency of α = 0.75 [20]. The exclusion of the optional life-as-a-whole and spirituality/religion items from the core score follows the scale developers' own guidance, which designates the spirituality/religion domain as discretionary rather than part of the core seven-domain set [21], and is further supported by Rasch analysis demonstrating excellent model fit and unidimensionality for the seven core domains, with the spirituality/religion item shown to misfit the measurement model [22]. The total score was converted to a standardized percentage score ranging from 0 to 100%. Scores were interpreted as follows: ≥70% indicating normal well-being, 50–69% compromised well-being, and < 50% challenged well-being [21] (the PWI manual's own diagnostic triage terms these "Well," "UnderWell," and "NoWell" respectively). For regression analysis, PWB was dichotomized into normal well-being (≥ 70%) and low well-being (< 70%).

This dichotomization was used to support binary logistic regression and maintain adequate numbers within outcome categories.

3.8. Ethical considerations

The study protocol was approved by the Medical Research Ethics Committee, Faculty of Medicine, Mansoura University (Approval Number: R.25.08.3319), before data collection. Participation was voluntary, and all eligible patients were informed about the study objectives, procedures, and their right to withdraw at any time without consequences. Written informed consent was obtained from all participants before inclusion. Data were collected anonymously, stored securely, and used solely for research purposes. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki [23].

3.9. Statistical analysis

Statistical analysis was conducted using SPSS statistical software. Quantitative variables were summarized as mean ± standard deviation (SD), while categorical variables were summarized as frequencies and percentages. Satisfaction with life was analyzed as a binary outcome, with SWL scores ≥ 20 classified as satisfied and scores < 20 classified as dissatisfied. Personal well-being was analyzed using the seven-item core-domain PWB percentage score and was dichotomized into normal well-being (≥ 70%) and low well-being (< 70%). Associations between sociodemographic and clinical variables and the binary outcomes of satisfaction with life and normal well-being were assessed using the chi-square

test or Fisher's exact test, as appropriate. Crude odds ratios (CORs) with 95% confidence intervals (CIs) were calculated for bivariate associations. Variables showing statistically significant associations in bivariate analysis were considered for multivariable binary logistic regression. Forward stepwise logistic regression was used to identify independent predictors of satisfaction with life and normal well-being. Adjusted odds ratios (AORs), 95% CIs, regression coefficients (β), model chi-square values, and classification accuracy were reported. A two-sided p-value ≤ 0.05 was considered statistically significant.

4. Results

Table 1 shows that the overall mean SWL score was 22.16 ± 5.82. Overall, 69.8% of participants were classified as satisfied with life, including 11.4% who were extremely satisfied, 23.7% satisfied, and 34.7% slightly satisfied. The seven-item core-domain PWB score had a mean of 65.06 ± 16.30. Based on the PWB classification, 41.6% of participants had normal well-being, 42.3% had compromised well-being, and 16.0% had challenged well-being. In the univariate analysis shown in Table 2, satisfaction with life was significantly lower among patients with diabetes-related complications (COR 0.56, 95% CI 0.32–0.96, p = 0.034) and among those treated with insulin compared with oral medication alone (COR 0.57, 95% CI 0.36–0.91, p = 0.018). Satisfaction with life was strongly associated with personal well-being; participants with low well-being had significantly lower odds of being satisfied with life than those with normal well-being (COR 0.11, 95% CI 0.06–0.19, p ≤ 0.001). Normal well-being was observed in 41.6% of participants. In univariate analysis, normal well-being was significantly more frequent among patients attending PHCs than among those attending MUH (57.8% vs. 24.2%; COR 4.31, 95% CI 2.85–6.52, p ≤ 0.001), among males compared with females (COR 1.62, 95% CI 1.08–2.42, p = 0.019), and among participants with basic education (COR 2.10, 95% CI 1.22–3.59, p = 0.007) or university education (COR 5.46, 95% CI 3.23–9.24, p ≤ 0.001) compared with illiterate participants. Normal well-being was also more frequent among employees (COR 5.01, 95% CI 2.57–9.79, p ≤ 0.001) and those working in business or trades (COR 4.00, 95% CI 1.88–8.53, p ≤ 0.001) compared with housewives.

Table 2
Univariate analysis of factors associated with satisfaction with life and normal personal well-being

	Total	Satisfied with life			Normal well-being		
	N	**N(%)**	**p**	**COR (95% CI)**	**N(%)**	**p**	**COR (95% CI)**
	430	**300 (69.8)**			**179 (41.6)**		
Health facility							
MUH	207	142 (68.6)		r(1)	50 (24.2)		r(1)
PHC	223	158 (70.9)	0.611	1.11 (0.74–1.68)	129 (57.8)	**≤ 0.001**	4.31 (2.85–6.52)
Age							
<50	86	60 (69.8)		r(1)	40 (46.5)		r(1)
50–69	273	189 (69.2)	0.925	0.97 (0.58–1.65)	113 (41.4)	0.403	0.81 (0.50–1.32)
70+	71	51 (71.8)	0.777	1.10 (0.55–2.21)	26 (36.6)	0.212	0.66 (0.35–1.26)
Sex							
Female	282	195 (69.1)		r(1)	106 (37.6)		r(1)
Male	148	105 (70.9)	0.700	1.09 (0.70–1.68)	73 (49.3)	**0.019**	1.62 (1.08–2.42)
Residence							
Rural	379	261 (68.9)		r(1)	158 (41.7)		r(1)

SWL: Satisfaction With Life, PWB: personal well-being, MUH: Mansoura University Hospital, PHC: primary healthcare centers, COR = crude odds ratio, CI = confidence interval, r = reference category

*Single (n = 8), widow (n = 42) & divorced (n = 2)

**Complications (n = 336 patients with ≥ 1 complication, not mutually exclusive): neuropathy (n = 300), retinopathy (n = 120), diabetic foot (n = 60), nephropathy (n = 14), cataract (n = 13), gastroparesis (n = 3), cellulitis (n = 3), and gynecological complications (n = 2). ***Comorbidities (n = 313 patients with ≥ 1 comorbidity, not mutually exclusive): hypertension (n = 274), cardiovascular disease (n = 42), endocrine disorders (n = 19), gastrointestinal disorders (n = 14), rheumatological disease (n = 10), genitourinary disorders (n = 5), and respiratory disease (n = 5).

	Total	Satisfied with life			Normal well-being		
	N 430	N(%) 300 (69.8)	p	COR (95% CI)	N(%) 179 (41.6)	p	COR (95% CI)
Health facility							
Urban	51	39 (76.5)	0.269	1.47 (0.74–2.91)	21 (41.2)	0.944	0.98 (0.54–1.77)
Marital status							
Married	377	268 (71.1)		r(1)	160 (42.4)		r(1)
Not Married	53	32 (60.4)	0.114	0.62 (0.34–1.12)	19 (35.8)	0.363	0.76 (0.42–1.38)
Education							
Illiterate	147	100 (68.0)		r(1)	37 (25.2)		r(1)
Basic	104	68 (65.4)	0.661	0.89 (0.52–1.51)	43 (41.3)	**0.007**	2.10 (1.22–3.59)
Secondary	57	40 (70.2)	0.767	1.11 (0.57–2.15)	20 (35.1)	0.158	1.61 (0.83–3.11)
University	122	92 (75.4)	0.183	1.44 (0.84–2.47)	79 (64.8)	**≤ 0.001**	5.46 (3.23–9.24)
Occupation							
Housewife	207	141 (68.1)		r(1)	67 (32.4)		r(1)
Farmer & manual worker	67	47 (70.1)	0.755	1.10 (0.60-	23 (34.3)	0.766	1.09 (0.61–

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	Total	Satisfied with life			Normal well-being		
	N	**N(%)**	**p**	**COR (95% CI)**	**N(%)**	**p**	**COR (95% CI)**
	430	**300 (69.8)**			**179 (41.6)**		
Health facility							
				2.00)			1.96)
Not working	70	44 (62.9)	0.420	0.79 (0.45–1.40)	30 (42.9)	0.113	1.57 (0.90–2.73)
Employee	51	41 (80.4)	0.089	1.92 (0.91–4.06)	36 (70.6)	**≤ 0.001**	5.01 (2.57–9.79)
Business & trades	35	27 (77.1)	0.287	1.58 (0.68–3.66)	23 (65.7)	**≤ 0.001**	4.00 (1.88–8.53)
DM type							
Type 1	32	18 (56.3)		r(1)	11 (34.4)		r(1)
Type 2	398	282 (70.9)	0.088	1.89 (0.91–3.93)	168 (42.2)	0.389	1.39 (0.65–2.97)
Disease duration (years)							
<5 years	72	50 (69.4)		r(1)	41 (56.9)		r(1)
>=5 years	358	250 (69.8)	0.948	1.02 (0.59–1.77)	138 (38.5)	**0.004**	0.47 (0.28–0.79)
HbA1C							
Good control	58	39 (67.2)		r(1)	29 (50.0)		r(1)

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	Total	Satisfied with life			Normal well-being		
	N	**N(%)**	**p**	**COR (95% CI)**	**N(%)**	**p**	**COR (95% CI)**
	430	**300 (69.8)**			**179 (41.6)**		
Health facility							
Poor control	372	261 (70.2)	0.653	1.15 (0.63–2.07)	150 (40.3)	0.166	0.68 (0.39–1.18)
Complications							
No	94	74 (78.7)		r(1)	67 (71.3)		r(1)
Yes	336	226 (67.3)	**0.034**	0.56 (0.32–0.96)	112 (33.3)	**≤ 0.001**	0.20 (0.12–0.33)
Comorbidities							
No	117	80 (68.4)		r(1)	65 (55.6)		r(1)
Yes	313	220 (70.3)	0.701	1.09 (0.69–1.73)	114 (36.4)	**≤ 0.001**	0.46 (0.30–0.71)
DM medications							
Oral	297	217 (73.1)		r(1)	131 (44.1)		r(1)
Insulin	107	65 (60.7)	**0.018**	0.57 (0.36–0.91)	41 (38.3)	0.300	0.79 (0.50–1.24)
Combined	26	18 (69.2)	0.674	0.83 (0.35–1.98)	7 (26.9)	0.096	0.47 (0.19–1.14)
Other medications							

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	N	**N(%)**	**p**	**COR (95% CI)**	**N(%)**	**p**	**COR (95% CI)**
	430	**300 (69.8)**			**179 (41.6)**		
Health facility							
No	138	97 (70.3)		r(1)	71 (51.4)		r(1)
Yes	292	203 (69.5)	0.871	0.96 (0.62–1.50)	108 (37.0)	**0.005**	0.55 (0.37–0.83)
Time to reach facility							
<15 mins	71	54 (76.1)		r(1)	40 (56.3)		r(1)
15–30 mins	102	68 (66.7)	0.184	0.63 (0.32–1.25)	52 (51.0)	0.487	0.81 (0.44–1.48)
30–60 mins	158	112 (70.9)	0.418	0.77 (0.40–1.46)	53 (33.5)	**0.001**	0.39 (0.22–0.69)
>60 mins	99	66 (66.7)	0.187	0.63 (0.32–1.25)	34 (34.3)	**0.005**	0.41 (0.22–0.76)
PWB							
Normal well-being	179	164 (91.6)		r(1)			
Low well-being	251	136 (54.2)	**≤ 0.001**	0.11 (0.06–0.19)			
SWL							
Satisfied	300				164 (54.7)		r(1)

SWL: Satisfaction With Life, PWB: personal well-being, MUH: Mansoura University Hospital, PHC: primary healthcare centers, COR = crude odds ratio, CI = confidence interval, r = reference category

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	N	N(%)	p	COR (95% CI)	N(%)	p	COR (95% CI)
	430	300 (69.8)			179 (41.6)		
Health facility							
Not satisfied	130				15 (11.5)	**≤ 0.001**	0.11 (0.06–0.19)
SWL: Satisfaction With Life, PWB: personal well-being, MUH: Mansoura University Hospital, PHC: primary healthcare centers, COR = crude odds ratio, CI = confidence interval, r = reference category							
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**Complications (n = 336 patients with ≥ 1 complication, not mutually exclusive): neuropathy (n = 300), retinopathy (n = 120), diabetic foot (n = 60), nephropathy (n = 14), cataract (n = 13), gastroparesis (n = 3), cellulitis (n = 3), and gynecological complications (n = 2). ***Comorbidities (n = 313 patients with ≥ 1 comorbidity, not mutually exclusive): hypertension (n = 274), cardiovascular disease (n = 42), endocrine disorders (n = 19), gastrointestinal disorders (n = 14), rheumatological disease (n = 10), genitourinary disorders (n = 5), and respiratory disease (n = 5).							

In contrast, lower odds of normal well-being were observed among patients with diabetes duration ≥ 5 years (COR 0.47, 95% CI 0.28–0.79, p = 0.004), diabetes-related complications (COR 0.20, 95% CI 0.12–0.33, p ≤ 0.001), comorbidities (COR 0.46, 95% CI 0.30–0.71, p ≤ 0.001), and those taking other medications (COR 0.55, 95% CI 0.37–0.83, p = 0.005). Participants taking 30–60 minutes or > 60 minutes to reach the facility had lower odds of normal well-being compared with those taking < 15 minutes (COR 0.39, 95% CI 0.22–0.69, p = 0.001; and COR 0.41, 95% CI 0.22–0.76, p = 0.005, respectively). Glycemic control was not significantly associated with either satisfaction with life or normal well-being.

Table 3 shows the final multivariable logistic regression models. In the model predicting satisfaction with life, low well-being was the only retained independent predictor. Participants with low well-being had significantly lower odds of being satisfied with life than those with normal well-being (AOR 0.11, 95% CI 0.06–0.19, p ≤ 0.001). The SWL model was statistically significant (model χ^2=77.7, df = 1, p ≤ 0.001) and correctly classified 69.8% of participants. In the model predicting normal well-being, the final adjusted model retained healthcare setting, diabetes-related complications, and satisfaction with life. Participants attending PHCs had significantly higher odds of normal well-being than those attending MUH (AOR 4.58, 95% CI 2.83–7.42, p ≤ 0.001). Patients with diabetes-related complications had significantly lower odds of normal well-being than those without complications (AOR 0.25, 95% CI 0.14–0.46, p ≤ 0.001). Participants who were not satisfied with life also had markedly lower odds of normal well-being compared with those satisfied with life (AOR 0.085, 95% CI 0.044–0.160, p ≤ 0.001). The PWB model was statistically significant (model χ^2=158.2, df = 3, p ≤ 0.001) and correctly classified 79.3% of participants.

Table 1
Overall scores and categories of satisfaction with life and personal well-being among patients with diabetes

	N(%)	Total score Mean ± SD
SWL		
Extremely satisfied	49 (11.4)	22.16 ± 5.82
Satisfied	102 (23.7)	
Slightly satisfied	149 (34.7)	
Slightly dissatisfied	82 (19.1)	
Dissatisfied	40 (9.3)	
Extremely dissatisfied	8 (1.9)	
PWB		
Normal well-being	179 (41.6)	65.06 ± 16.30
Compromised well-being	182 (42.3)	
Challenged well-being	69 (16.0)	

SWL: Satisfaction With Life, PWB: personal well-being, N: number, SD: standard deviation

Table 3
Multivariable logistic regression models for satisfaction with life and normal personal well-being

	Satisfied with life			Normal well-being		
	β	**p**	**AOR (95% CI)**	**β**	**p**	**AOR (95% CI)**
Health facility						
MUH						r(1)
PHC				1.52	**≤ 0.001**	4.58 (2.83–7.42)
Complications						
No						r(1)
Yes				-1.39	**≤ 0.001**	0.25 (0.14–0.46)
SWL						
Satisfied						r(1)
Not satisfied				-2.47	**≤ 0.001**	0.085 (0.044–0.160)
PWB						
Normal well-being			r(1)			
Low well-being	-2.22	**≤ 0.001**	0.11 (0.06–0.19)			
Constant	0.168 (p = 0.186)			-0.647 (p = 0.001)		
Model χ^2	77.7 (1), p ≤ 0.001			158.2 (3), p ≤ 0.001		
% correctly predicted	69.8%			79.3%		

AOR = adjusted odds ratio, CI = confidence interval, r = reference category, SWL = satisfaction with life, PWB = personal well-being, MUH = Mansoura University Hospital, PHC = primary healthcare centers

5. Discussion

This multicenter cross-sectional study assessed life satisfaction and personal well-being among 430 adults with diabetes receiving care at tertiary and primary healthcare facilities in Dakahlia Governorate, Egypt. Overall, 69.8% of participants were classified as satisfied with life, while only 41.6% had normal personal well-being. The mean SWL and seven-item core-domain PWB scores were 22.16 ± 5.82 and 65.06 ± 16.30, respectively. Although most participants reported satisfaction with life, fewer than half demonstrated normal personal well-being, highlighting the value of assessing multidimensional patient-reported outcomes alongside conventional glycemic targets in diabetes care.

One of the main findings was the association between healthcare setting and personal well-being. Patients receiving care at primary healthcare units were more likely to report normal well-being than those attending Mansoura University Hospital. This association was observed in both the unadjusted analysis (COR 4.31, 95% CI 2.85–6.52) and the final adjusted model (AOR 4.58, 95% CI 2.83–7.42). However, this finding should be interpreted cautiously because healthcare settings may reflect differences in patient complexity, accessibility, continuity of care, and referral patterns rather than the effect of facility type alone. Several factors may partly explain this association. Primary healthcare services may offer easier access, shorter travel and waiting burdens, and more familiar patient–provider relationships, which may contribute to more favorable patient-reported experiences [15, 16]. In contrast, patients attending tertiary hospitals may represent a more clinically complex population, including individuals referred because of complications, advanced disease, or difficulty achieving disease control. Such clinical complexity may adversely influence perceived well-being, regardless of the technical quality of care received.

Healthcare setting was not independently associated with satisfaction with life. This suggests that the care environment may be more closely related to multidimensional personal well-being than to the broader cognitive evaluation of life captured by the SWL. Studies directly examining SWL and PWB among people with diabetes remain limited, particularly within Arab populations. A population-based study in Saudi Arabia reported poorer psychological well-being among individuals with diabetes compared with those with prediabetes and those without diabetes, using the General Health Questionnaire (GHQ-12) rather than the PWB [24]. Although that study measured psychological distress rather than personal well-being and did not compare healthcare settings, its findings support the broader relevance of psychological and well-being-related outcomes among people with diabetes in the region.

Using the same SWL measure, a study of young Polish adults with type 1 diabetes reported a lower mean life satisfaction score of 19.9 ± 6.2 compared with the mean score of 22.16 ± 5.82 observed in the present study, which predominantly included participants with type 2 diabetes [25]. This difference may reflect differences in age, diabetes type, disease experience, and the greater day-to-day self-management demands often associated with type 1 diabetes. Regional evidence also supports the relevance of care experience to patient-reported outcomes. A Palestinian study involving patients with diabetes attending primary healthcare clinics found that individuals with greater treatment satisfaction had significantly better quality-of-life scores than those with lower treatment satisfaction (73.8 vs. 69.8, $p = 0.016$) [26]. Although treatment satisfaction, quality of life, and subjective well-being are distinct constructs, these findings are broadly consistent with the observed relationship between care setting and patient-reported well-being in the present study. Several sociodemographic and access-related factors, including educational level, occupation, sex, and time to reach the facility, were associated with normal well-being in the univariate analysis but were not retained as independent predictors in the final multivariable model. These associations may therefore be partly explained by other correlated factors, particularly healthcare setting, diabetes-related complications, and life satisfaction. Accordingly, these

variables should be interpreted as unadjusted correlates rather than independent determinants of well-being in the present study.

In the univariate analysis, treatment modality was associated with satisfaction with life: participants receiving insulin had lower odds of being satisfied with life than those treated with oral medication alone (COR 0.57, 95% CI 0.36–0.91, p = 0.018). This may reflect the perception of insulin therapy as a marker of more severe or difficult-to-control diabetes, as well as the psychological and practical burdens related to injections, treatment complexity, monitoring requirements, and concerns about disease progression [27]. However, treatment modality did not remain an independent predictor of either satisfaction with life or personal well-being after adjustment, suggesting that its unadjusted association may be partly explained by other clinical factors such as diabetes-related complications.

Diabetes-related complications and comorbidities were associated with less favorable patient-reported outcomes in the univariate analyses. Diabetes-related complications were associated with lower odds of satisfaction with life (COR 0.56, 95% CI 0.32–0.96) and normal well-being (COR 0.20, 95% CI 0.12–0.33), while comorbidities were associated with lower odds of normal well-being (COR 0.46, 95% CI 0.30–0.71). In the final adjusted model, diabetes-related complications remained independently associated with lower odds of normal well-being (AOR 0.25, 95% CI 0.14–0.46), whereas comorbidities were not retained. This suggests that diabetes-specific complications may be more closely related to multidimensional well-being than comorbid conditions more broadly. Complications did not remain independently associated with satisfaction with life, suggesting that they may affect the broader construct of personal well-being more directly than the global cognitive judgment captured by the SWL. A strong statistical relationship was observed between satisfaction with life and personal well-being. Participants who were not satisfied with life had markedly lower odds of reporting normal well-being than satisfied participants (AOR 0.085, 95% CI 0.044–0.160), while low well-being was also associated with lower odds of satisfaction with life. This relationship is expected because the two constructs are conceptually related, although not identical. SWL captures a global cognitive evaluation of life, whereas PWB reflects satisfaction across multiple life domains. Because of the cross-sectional design, however, the direction of this relationship cannot be established.

Glycemic control was not significantly associated with either satisfaction with life (COR 1.15, 95% CI 0.63–2.07) or normal well-being (COR 0.68, 95% CI 0.39–1.18), and HbA1c was not retained in either final adjusted model. Several explanations may account for this finding. First, a single recent HbA1c value may not adequately capture a patient’s long-term glycemic experience. Second, the small proportion of participants with good glycemic control in this sample (13.5%) may have limited statistical power to detect an association. Third, SWL and PWB assess broad cognitive and personal evaluations of life that may be shaped more strongly by complications, treatment burden, healthcare experience, social support, and socioeconomic context than by a single biochemical marker. This interpretation is consistent with evidence that psychological distress in diabetes is closely related to the burden of complications and self-management demands [8].

Clinical and policy implications

The findings of this study have several potential implications for diabetes care. First, the lower personal well-being observed among patients attending tertiary care facilities suggests that tertiary diabetes clinics may benefit from greater attention to patient-centered aspects of care. These may include improving continuity of follow-up, enhancing patient–provider communication, reducing waiting burdens where possible, and strengthening the role of diabetes educators. Because the present study was cross-sectional, these strategies should be considered as potential areas for service improvement rather than proven interventions for improving well-being.

Second, because diabetes-related complications remained independently associated with lower odds of normal personal well-being, patients with established complications may require closer psychosocial attention during routine diabetes follow-up. This supports integrating well-being screening alongside prevention, early detection, and clinical management of diabetes-related complications.

Finally, the strong association between satisfaction with life and personal well-being suggests that brief validated patient-reported outcome measures, such as the SWL and PWB, may be useful additions to routine diabetes follow-up. Regular assessment of these outcomes could help healthcare professionals identify patients experiencing broader psychosocial difficulties that may otherwise remain unrecognized and guide referral for appropriate psychosocial support when needed.

Strengths and limitations

The findings of this study should be interpreted in light of several limitations. First, the cross-sectional design does not allow conclusions regarding causality or the temporal direction of the observed associations. This is particularly important when interpreting relationships involving healthcare settings, treatment modalities, satisfaction with life, and personal well-being.

Second, participants were recruited consecutively from a limited number of healthcare facilities within one Egyptian governorate. Therefore, the findings may not be fully generalizable to all patients with diabetes in other regions of Egypt or to those not regularly attending healthcare facilities.

Some estimates, particularly those related to less frequent categories, had relatively wide confidence intervals; therefore, the precision of these estimates should be interpreted with caution. Furthermore, because life satisfaction and personal well-being were self-reported and collected using interviewer-administered questionnaires, social desirability and interviewer-related bias cannot be completely excluded [28, 29].

Despite these limitations, the study has several important strengths. It is among the first studies in Egypt to directly compare satisfaction with life and personal well-being among patients with diabetes receiving care in tertiary and primary healthcare settings using validated Arabic instruments. It is also one of the relatively few studies in the region to use both the SWL and PWB within the same population of patients with diabetes.

Future longitudinal studies are needed to clarify the temporal direction of the observed associations and to evaluate whether continuity-focused and patient-centered care interventions can improve patient-reported outcomes among patients with diabetes. Further research should also examine whether differences between tertiary and primary care settings persist after more detailed assessment of disease severity, care continuity, waiting time, and patient–provider relationships.

6. Conclusions

In this multicenter cross-sectional study of Egyptian adults with diabetes, 69.8% of participants were satisfied with life, while 41.6% had normal personal well-being. Normal personal well-being was associated with attending primary healthcare centers, absence of diabetes-related complications, and satisfaction with life, whereas glycemic control was not significantly associated with either satisfaction with life or normal well-being. These findings support integrating brief patient-reported well-being assessments into routine diabetes care, particularly for patients with diabetes-related complications or low satisfaction with life. Longitudinal studies are needed to clarify the direction of these associations and to determine whether continuity-focused interventions may improve personal well-being among patients with diabetes.

Abbreviations

• DM
Diabetes Mellitus
• WHO
World Health Organization
• HbA1c
Glycated Hemoglobin
• GHQ
General Health Questionnaire
• SWL
Satisfaction With Life
• PWB
Personal Well–being
• MUH
Mansoura University Hospital(s)
• PHC
Primary Healthcare Center(s)
• SPSS
Statistical Package for the Social Sciences
• SD
Standard Deviation
• COR

Crude Odds Ratio
• AOR
Adjusted Odds Ratio
• CI
Confidence Interval

Declarations

8.1. Ethics approval and consent to participate

The study protocol was approved by the Medical Research Ethics Committee, Faculty of Medicine, Mansoura University (Approval Number: R.25.08.3319), before data collection. Participation was voluntary, and all eligible patients were informed of the study objectives, procedures, and their right to withdraw at any time without consequence. Written informed consent was obtained from all participants before inclusion. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

8.2. Consent for publication

Not applicable.

8.4. Competing interests

The authors declare that they have no competing interests.

8.6. Authors' contributions

MME and AHE conceived and designed the study. MME, KAR, MKS, MHE, MOE, and RA collected the data. KAR and MKS performed the statistical analysis. AAq, AAr, and MHE drafted the manuscript. AAl, as senior endocrinologist, provided clinical expertise and revised the manuscript for important intellectual content. AHE, as principal investigator, supervised the study and critically reviewed the manuscript. All authors read and approved the final manuscript.

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Author Contribution

M.M.E. and A.H.E. conceived and designed the study. M.M.E., K.A.R., M.K.S., M.H.E., M.O.E., and R.A. collected the data. K.A.R. and M.K.S. performed the statistical analysis. A.A.q., A.A.r., and M.H.E. drafted the manuscript. A.A.l., as senior endocrinologist, provided clinical expertise and revised the manuscript for important intellectual content. A.H.E., as principal investigator, supervised the study and critically reviewed the manuscript. All authors read and approved the final manuscript.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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