

Psychological Well-Being in Adults with Type 2 Diabetes Mellitus: A Scoping Review

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Abstract: Diabetes is a chronic metabolic disease, and focusing merely on its medical management is not sufficient. The integration of psychological health is equally important. The present study undertakes a scoping review related to psychological well-being (PWB) among adults with type 2 diabetes mellitus (T2DM), addressing various populations, geographical areas, methodologies and associated health outcomes. Google Scholar, PubMed, Crossref, Semantic Scholar, and Scopus databases were used to identify papers published between 2013-2024 (November), in English, by following the PRISMA-ScR guidelines. Out of 22 studies reviewed in this article, 14 were cross-sectional and 8 were quasi-experimental studies, conducted across various countries. The results indicated that the Ryff PWB scale was used most often to assess PWB. People with diabetes moderately adhered to diet and physical activities but less so to medication. PWB and self-care behaviour were less frequent among those with perceived stress, depression, and anxiety. PWB was positively associated with self-efficacy, emotional regulation, self-compassion, and psychological flexibility. The review indicated the effectiveness of various interventions designed to increase PWB. The findings show a need for the integration of these interventions in diabetes management programmes. Healthcare models must take into account the physical and cultural aspects of healthcare settings. Further, longitudinal, qualitative, mixed-method and randomised controlled trial (RCT) studies are required that focus on PWB in T2DM patients.

Keywords: psychological well-being, adults, type 2 diabetes mellitus, scoping review, PRISMA-ScR

Psychological well-being (PWB) is a multidimensional concept that focuses on personal growth, autonomy, purpose in life, positive relationships, self-acceptance, and environmental mastery (Ryff, 1989). Chronic diseases, such as diabetes, impact not only the physical health of the individual but also their psychological well-being (Massey et al., 2018; Mirahmadizadeh et al., 2021; Aseela et al., 2024). Therefore, focusing solely on the medical management of diabetes is not sufficient. The integration of psychological health and lifestyle changes as a part of diabetes management is equally important. Modifications in diet, exercise, and lifestyles, along with the enhancement of psychological well-being, postpone the onset of complications, yield favourable health outcomes, and elevate the quality of life (Sugandh et al., 2023; Çalli & Kartal, 2021).

The present scoping review explains the concept of psychological well-being (Ryff, 1989) in terms of positive functioning rather than as the absence of psychopathology or distress. Type 2 diabetes mellitus (T2DM) is the focus of this review, as it affects the majority (90-95%) of people with diabetes and has global economic impacts (Sugandh et al., 2023). In 2021, it was responsible for 6.7 million deaths globally (IDF Diabetes Atlas, 2021; Yadavar et al., 2017), and in India, diabetes is a leading

cause of mortality. This review aims to study psychological well-being (PWB) among adults with type 2 diabetes mellitus (T2DM) with the objective of highlighting affected populations, various geographical areas, methodologies, context, and associated health outcomes.

Method

A scoping review approach was utilised in this article by following the PCC (population, concept, and context) framework (Pollock et al., 2022) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews, PRISMA-ScR guidelines (Tricco et al., 2018).

Search Strategy and Selection of Sources of Evidence

A comprehensive literature search was conducted to gather data from online databases, including Google Scholar, PubMed, CrossRef, Semantic Scholar, and Scopus. The search terms included "psychological well-being", "adults", and "type-2 diabetes mellitus", and the selected period was 2013 to 2024 (November). The process yielded 2,404 articles.

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Inclusion Criteria

- Peer-reviewed journal articles published between 2013-2024 (November) with human adult participants
- English-language articles on T2DM.
- PWB as a primary or secondary outcome.
- Quantitative, qualitative, and mixed-method studies.

Exclusion Criteria

- Studies that do not evaluate PWB in T2DM.
- Studies that used depression, anxiety, stress, or diabetes distress scales to measure PWB.
- Unreliable datasets, registers, and non-journal articles.
- Review articles and research articles without available full text.
- Book chapters, conference papers, theses, case reports, case series, and abstract-only articles.

Screening

Out of the 2,404 articles initially identified, 1,942 were screened. Then, 343 records comprising book chapters, conference papers, theses, case reports, case series, and abstract-only articles were removed. 37 articles were excluded because their titles or abstracts were not available in English. Further, 1,100 irrelevant articles,

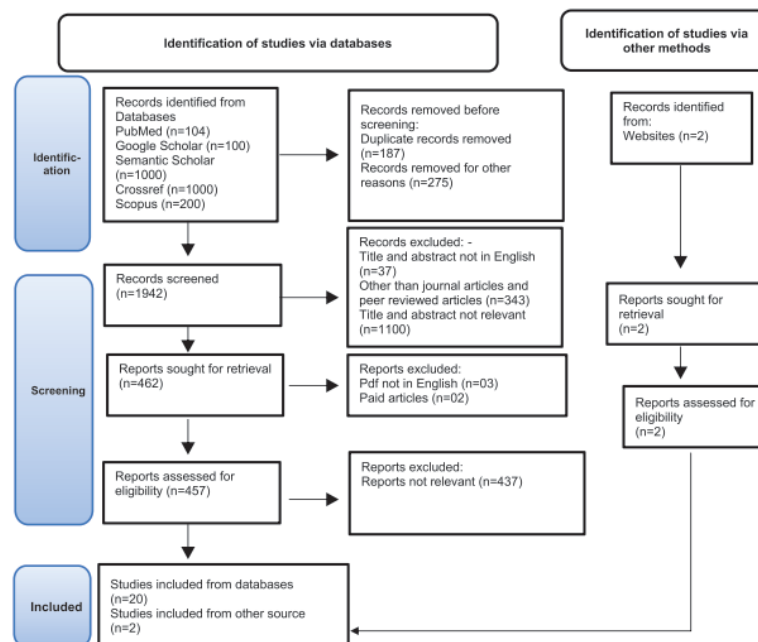
such as those involving non-diabetic populations or other variables, were excluded. The remaining 462 articles were sought for retrieval. Two paid articles and three articles whose full-text PDFs were not in English were removed. Following an in-depth reviews of each resulting article, a final selection of 20 articles was made by excluding 437 articles that (a) focused solely on type 1 or gestational diabetes; (b) focused on clinical issues related to type 2 diabetes rather than psychological well-being; or (c) focused on a different population. Then, a manual search by title was conducted, yielding two additional articles that were also included. Thus, a total of 22 articles were finally included in the scoping review.

Data Extraction

A data extraction template, PRISMA (Figure I), was used to classify the articles included or excluded in this scoping review. The main findings and any limitations associated with each article, as well as some general information, were extracted.

Figure 1

Diagrammatic representation of PRISMA (2020). Research papers were identified, screened and included in this study



Data Charting Process and Data Items

Data charting was conducted using an Excel spreadsheet to consolidate all relevant information. The data charting form included information about article characteristics (author, country of origin), study characteristics (aim, context, concept), population, variables, analysis method, main findings of the study, implications, and limitations. Data items included in experimental designs were based on PICO (population, intervention, duration of intervention, comparison, and outcomes). The primary variable was PWB, and the population consisted of adults with T2DM.

Study Variables

Psychological Well-Being

Ryff (1989) defines “psychological well-being through six dimensions: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance.”

Type 2 Diabetes Mellitus

According to WHO (2019), “diabetes is a chronic, metabolic disease having a raised level of glucose or sugar in the blood. In T2DM, the body of the individual becomes resistant to insulin or doesn’t make enough insulin to neutralise the blood glucose level.”

Adults:

WHO defines adults as “people aged 18-65 years”

Synthesis of Results

The studies were grouped into two types: cross-sectional studies in Table 1 and intervention studies in Table 2. The characteristics of all the 22 studies are explained in further detail later in the article.

Ethical Considerations

The scoping review does not meet the registration criteria of PROSPERO. Therefore, ethical approval and registration were not required. (<https://www.crd.york.ac.uk/prospERO/#aboutpage>).

Results

Study Population and Design

The results of the scoping review are presented in Tables 1 and 2. Only 22 studies that had PWB as a primary or secondary outcome on adults with T2DM were included. A total of 17,170 participants were studied in 22 research studies, out of which 549 people participated in eight intervention studies, and 16,618 people were part of correlational or association studies. All the studies were quantitative in nature. Out of these, fourteen (63.63%) cross-sectional studies involved prediction, association, or correlation (Table 1), while eight (36.36%) were intervention studies (Table 2). There has been an increasing interest in this topic in recent years, as 32% of studies were conducted before 2020 and 68% were done after this period.

Table 1*Cross-sectional studies*

S. no	Author, year, country	Aim of the study	Assessment of health country	Main findings	Implications
1	Antoniou et al., 2022, Greece	To investigate clinic-demographic predictors of well-being and the mediatory role of undiagnosed anxiety and depression.	Well-being Mental Health Continuum Short-Form (MHC-SF) $\alpha=0.89$, Anxiety-HADS-A, Depression-HADS-D, Demographics, BMI, HbA1c level, T2DM duration, comorbid hypertension or dyslipidaemia, and medication.	HbA1c and BMI have a negative correlation with well-being and are mediated by depression. Depression was a stronger predictor for well-being. 21.1% had comorbid depression, and 5.1% had anxiety.	Vigilant screening of depression.
2	Aseela et al., 2024, India	To assess the correlation of diabetes self-efficacy with glycaemic control and the well-being of patients with T2DM and associated factors of self-efficacy.	The Stanford Diabetes Self-Efficacy Scale, WHO-5 Well-Being Index HbA1c level	51.25% report high levels of self-efficacy. People with low self-efficacy have more complications and poorly controlled blood sugar levels. Self-efficacy is significantly negatively associated with HbA1c level	Primary care providers are advised to take the initiative to increase the self-efficacy of diabetic patients. Barriers and facilitators of self-efficacy should be identified in the future.
3	Rahmania et al., 2020, Indonesia	To determine the relationship between emotional regulation and the PWB of diabetes mellitus patients	Emotion Regulation Questionnaire Psychological Well-being Scale	People with high emotional regulation have high PWB (significant correlation $r=0.771$), Levels of self-reported emotional regulation are 18.87%	Focus on cognitive reappraisal

S. no	Author, year, country	Aim of the study	Assessment of health country	Main findings	Implications
4	Mirahmadizadeh et al., 2021, Iran	To examine the effects of adherence to medication, adherence to diet, Physical activity, glycaemic control, comorbidity, and associated complications on PWB in patients with T2DM.	Ryff PWB scale, Morisky Medication Adherence Scale. International Physical Activity Questionnaire (IPAQ) Diet: 14-point Mediterranean Diet Adherence Score (MEDAS)	(very low), 9.43% (low), 32.07% (moderate), and 39.62% (very high); PWB levels are 13.21% (very low), 24.53% (low and moderate each), and 18.87 (high and very high each).	Prevention of complications and promotion of PWB, adherence to diet and medication are important to achieve good health outcomes and quality of life

S. no	Author, year, country	Aim of the study	Assessment of health country	Main findings	Implications
5	Majidzadeh et al., 2022, Iran	To investigate the mediating role of self-compassion in the relationship between perceived stress, PWB, and self-care behaviours among patients of T2DM	Self-Compassion Scale Perceived Stress Scale Ryff's PWB scale-18 Summary of Diabetes Self-Care Activities (SDSCA) questionnaire	Perceived stress is negatively correlated with self-care, PWB, and self-compassion. Self-compassion is positively related to self-care and PWB, and it mediates the relationship between PWB, self-care, and perceived stress	Self-compassion should be incorporated in diabetic psychotherapy. Future research should focus on the impact of self-compassion interventions on glucose level control.
6	Park et al., 2016, Korea	To assess the PWB and treatment satisfaction in patients with T2DM.	Well-Being Questionnaire-12 Diabetes Treatment Satisfaction Questionnaire	Negative well-being was high in low-education, low-income, female participants. It was linked with a higher number of hospital admissions; positive well-being was linked with high income, treatment satisfaction, compliance with exercise and diet, and medications.	Attention should be given to psychosocial support
7	Lukasiewicz et al., 2022, Poland	To assess the relationship between the occurrence and number of T2DM complications and sociodemographic, clinical, and psychological variables	WHO-5 Well-Being Index The Sense of Influence on the Diabetes Course – A Clinical Assessment Scale, Brief Method of Evaluating Coping with Disease	Macroangiopathy in 44.7%, retinopathy in 33.4%, nephropathy in 10.5%, and neuropathy in 27.9%. Females, young adults, and those with higher education have fewer complications. Higher HbA1c level, longer diabetes duration, higher BMI, worse well-being,	Not given

S. no	Author, year, country	Aim of the study	Assessment of health country	Main findings	Implications
8	Lukasiewicz et al., 2022, Poland	To assess the relationship between psychological and sociodemographic factors with the levels of glycated haemoglobin (HbA1c) and Body Mass Index (BMI) among people with advanced T2DM.	WHO-5 Well-Being Index The Sense of Influence on the Diabetes Course – A Clinical Assessment Scale, Brief Method of Evaluating Coping with Disease	lower sense of influence, and an emotion-orientated coping style are associated with more complications. High HbA1c was associated with younger age, high BMI, a greater number of complications, rural population, low perceived self-influence over the disease course, maladaptive coping styles, and a high risk of depression. Psychosocial factors and HbA1c showed a low but significant association with the number of complications, well-being, perceived self-influence, and disease duration, and a weak association with BMI.	Focus should be placed on the prevention of disease and psychoeducating the rural population.
9	Ramkisson et al., 2016, South Africa	To explore the prevalence and association of anxiety, depressive features, and PWB in T2DM patients.	Anxiety – HADS anxiety scale Depression – HADS depression scale PWB-WHO-5 Well-Being Index	Negative correlation was found between PWB and HADS scores. 31% of participants had poor well-being, 46% had mild to severe depressive symptoms, and 32% had mild to severe anxiety features	Routine assessment of depression and anxiety, followed by proper referral.

S. no	Author, year, country	Aim of the study	Assessment of health country	Main findings	Implications
10	Bolge et al., 2016, U.S	The Burden of Poor Mental Well-being among Patients with T2DM	Mental Well-Being-36-Item Short Form Survey Instrument version 2 (SF-36v2), Health resource use Work productivity loss	People with very poor mental well-being used more health resources, and their work productivity was impaired and considered to be a major economic burden. People who were younger, female, non-white, less educated, and had lower incomes had very poor or poor mental well-being.	Focus should be on those who don't have a clinically diagnosed mental disease but have very poor or poor mental well-being.
11	Maor et al., 2022, Israel	To examine the association of Psychological Flexibility (PF) with adjustment and well-being among T2DM patients.	Psychological Flexibility Questionnaire Adjustment to Diabetes (ATT-39) Well-being-Mental Health Inventory	PF and adjustment have a significant positive relation with well-being. Positive perception and adjustment are different constructs; A positive perception of the disease can enhance well-being independently.	Psychological flexibility and positive perception can be incorporated in the counselling of diabetics. Future research is to be done in clinical settings like clinics and hospitals.

S. no	Author, year, country	Aim of the study	Assessment of health country	Main findings	Implications
12	Peyrot et al., 2019, Cross-country research.	To examine well-being and diabetes-related distress across several diabetic countries	WHO-5 Well-Being Index Diabetes-Related Distress – A Multi-Item Scale	Diabetic people with more complications, rigorous medication management, and a recently diagnosed complication have the worst PWB and distress. Distress is also significant with the longer use of insulin. The number of complications is associated with a decrease in psychological adjustment	Diabetic people should always be monitored for the psychological impact of treatment intensification and the occurrence of complications
13	Kayaaslan & Lok, 2019, Turkey	To determine the mental well-being levels and their differences according to socio-demographic, health, and disease characteristics in T2DM patients.	The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)	Most mental well-being levels were high in males, educated working individuals, high-income individuals, married people and those without any other chronic diseases.	Diabetic patients who are single, less educated, and poor need more support to maintain their mental well-being.
14	Calli & Kartal, 2021, Turkey	To examine the relationship between self-efficacy of diabetes management and well-being in patients with T2DM.	Self-Efficacy Scale for Diabetes Management WHO-5 Well-Being Index Sociodemographic variables	Moderate self-efficacy and well-being scores were found. Self-efficacy was found to be positively correlated with well-being. Age (negative), treatment compliance (positive), and exercise status (positive) were significant predictors of well-being.	Regular screening and well-planned self-efficacy interventions should be provided to the diabetic patients

Table 2*Intervention studies*

S. no	Author, year, country	Intervention name year, country	Assessment of mental and duration	Main findings health outcomes	Implications
15	Rohmawati et al., 2024, Indonesia	Spiritually Situated Mindfulness Interventions 30-minute training sessions, two times per week, for one month for the experimental group.	60 participants in each group, random sampling and random assignment, conducted at a private clinic	The Ryff PWB Scale Blood sugar levels – with glucometer	yes
16	Shabani & Mahmoudi, 2021, Iran	Logotherapy and Meaning Training 90 minutes, 8 sessions for 2 months, and a post-test after one month of training	15 participants in each group, selected via random sampling, conducted at a Health centre	The Ryff PWB Scale Life Expectancy Questionnaire	yes
17	Sari et al., 2021, Indonesia	Spiritual emotional freedom technique (SEFT)	55 participants in each group selected through random sampling, conducted at a health centre	The Ryff PWB Scale Hamilton Rating Scale for Anxiety (HARS)	yes
18	Nematollahi, 2020, Iran	QoL Education Program 90 min., 12 sessions once a week.	15 participants in each group, selected through convenience sampling, Random assignment to conditions, conducted in Health centres	The Ryff PWB Scale Hayes's General Adherence Scale (GAS)	yes

S. no	Author, year, country	Intervention name year, country	Assessment of mental and duration	Main findings health outcomes	Implications
19	Alvani et al., 2015, Malaysia	Cognitive behavioural therapy – CBT Eight sessions over 3 months.	30 participants in each group, selected using convenience sampling, in a clinic.	Well-being Questionnaire – WBQ 22 (Bradley, 1990) Glycaemic control – HbA1c level	yes
20	Esmaeili et al., 2016, Iran	Stress inoculation training (SIT) Eight 90-minute sessions of SIT.	15 participants in each group, selected through clustered random sampling, then randomly assigned to different conditions at a Health centre	The Ryff PWB Scale	yes
21	Khayatan et al., 2020, Iran	Compassion-focused therapy (CFT) and acceptance and commitment therapy (ACT) combined therapy Vs cognitive-behavioural therapy (CBT) & a control group. Ten weekly sessions for two hours for both the CF- ACT and CBT groups, while no intervention was given to the control group. Follow up after 2 months.	20 participants in each of the three groups, selected through purposive sampling and then randomly assigned to groups. As per exclusion criteria, the CFT-ACT group was reduced to 18, CBT to 15 and control group to 14 Conducted in a Health centre	The Ryff PWB Scale	

S. no	Author, year, country	Intervention name year, country	Assessment of mental and duration	Main findings health outcomes	Implications
22	Montazernia et al., 2024, Iran	Acceptance and Commitment Therapy (ACT) and Dialectical Behaviour Therapy Skills Training (DBT-ST) Group 1 ACT – eight 2-hour sessions, twice a week for four weeks. Group 2 DBT-ST: twelve 2- hour sessions for six weeks.Control group – no intervention.Follow-up test after 45 days.	15 participants in each group, selected using purposive-convenient sampling, were later reduced to 14 in each group, with 42 participants conducted in a Clinic.	The Ryff PWB Scale Self-Care Questionnaire (Toobert et al., 2000)	Yes. ACT was found to be more effective than DBT-ST.

Cultural and Geographical Aspects

Table 3 below shows the country-wise classification of studies. It highlights the need to study PWB and T2DM among people from other countries as well.

Table 3

Country-wise number of studies

Name of Countries	Number of studies
Iran	7 (31.81%)
Indonesia	3 (13.63%)
Poland	2 (9.09%)
Turkey	2 (9.09%)
India	1 (4.54%)
Greece	1 (4.54%)
Israel	1 (4.54%)
Korea	1 (4.54%)
Malaysia	1 (4.54%)
South Africa	1 (4.54%)
U. S	1 (4.54%)
Cross-country comparison: Australia, France, Germany, India, Japan, Netherlands, Poland, Scandinavia, Spain, United States, and the United Kingdom	1 (4.54%)

The studies above have shown diabetes to be a widespread phenomenon in low and middle-income countries. The prevalence of diabetes in Asia is significantly higher than in Europe. In 2025, India reported 69.9 million cases, while Iran had 5.2 million cases. (Aseela et al., 2024; Montazernia et al., 2024). Ramkissoon et al.'s study conducted in South Africa (2016) found that more than 50% of the participants with high levels of diabetes were Indian. Contributory factors were unhealthy diet, physical inactivity, and insulin resistance. Indians with diabetes were found to have better psychological well-being as compared to people of African origin because of favourable socio-economic status and educational level. In U.S.A., Bolge et al. (2016) found that Black and Hispanic populations had poorer mental well-being. According to Lukasiewicz et al.'s (2022) study in Poland, people with diabetes from rural areas suffered more from complications because of inaccessibility to the healthcare system. Adherence to the Mediterranean diet was found to improve PWB in Korea and Iran (Mirahmadizadeh et al., 2021; Park et al., 2016).

Tools Used to Collect Data

The most widely used scale to measure psychological well-being was the Ryff PWB Scale (41%). One cross-sectional study and one intervention study (Park et al., 2016; Alvani et al., 2015) used the Well-Being Questionnaire-12 (WBQ-12). According to Antoniou et al. (2022), the Mental Health Continuum Short-Form (MHC-SF) was used for the first time for T2DM in their study and was considered a good marker of undiagnosed depressive symptoms. Four studies used the PWB Scale by Prameswari (Rahmania et al., 2020), the 36-Item Short Form Survey Instrument, the Warwick-Edinburgh Mental Well-Being Scale, and the Well-Being Mental Health Inventory. Thus, the Ryff Psychological Well-being Scale is the most reliable, validated, culturally adapted, and widely accepted scale across various countries.

Variables Studied in Relation to PWB

Studies have reported PWB to various degrees; Bolge et al. (2016), for instance, found 46% of the population to have poor well-being, Aseela et al. (2024) reported 39.2% of participants to have poor well-being. In contrast, Kayaaslan & Lok (2019) found higher mental well-being than the average.

Various factors have been studied to predict the PWB of the T2DM patients. Predictors reported by Calli and Kartal (2021) to increase PWB were high levels of self-efficacy, compliance with treatment, and engagement with regular exercise. Kayaaslan and Lok (2019) reported gender, higher education, higher income, marriage, and absence of any other chronic disease as factors that predicted high mental well-being. Calli and Kartal (2021) found a decrease in the level of PWB with an increase in age, leading to the inference that younger individuals have higher PWB, whereas Bolge et al. (2016) reported poor well-being in young adults. Perceived stress and self-compassion were found to predict 89% of changes in PWB and 90% of self-care behaviours, according to the study by Majidzadeh et al. (2022). Glycated Haemoglobin (HbA1c) and BMI were found to be the strongest predictors of undiagnosed depressive symptoms. But the mediating effect of undiagnosed depressive symptoms was not significant on the relationship of HbA1c and BMI with well-being (Anastasia et al., 2022). Other studies remained consistent with the findings that T2DM patients' HbA1c and BMI were high when well-being was low (Calli & Kartal, 2021; Lukasiewicz et al., 2022). Factors of high HbA1c were young age, high BMI, having more complications, living in a rural area, lower perception of self-influence on the course of disease, maladaptive styles of coping, avoidance or emotion-orientated styles, and high risk of depression (Lukasiewicz et al., 2022). Similarly, self-efficacy was significantly negatively associated with HbA1c level; in addition, 48.75% of diabetics were found to have low self-efficacy. In contrast, high self-efficacy was found to significantly increase well-being (Aseela et al., 2024). Similar findings were observed in another study, and their study participants were found to have a moderate level of self-efficacy (Calli & Kartal, 2021). When psychological well-being is poor and the HbA1c level is high, it adversely affects the mental state of the patient.

Antoniou et al. (2022) found depression in 21.1% and anxiety in 5.1% of the participants. Ramkissoon et al. (2016) found higher levels of depression (46%) and mild to severe anxiety (32%). Depression was also found to be a risk factor by Lukasiewicz et al. (2022). when well-being was low. Diabetic people who were on an intense medication regimen or insulin and had a longer duration of complications were found to have worse well-being and diabetes-related distress. Those who had recently

diagnosed complications were more distressed when compared with those who had complications of just more than a year (Peyrot et al., 2019). Lukasiewicz et al. (2022) found macroangiopathy in 44.7% of participants, retinopathy in 33.4%, nephropathy in 10.5%, and neuropathy in 27.9% of participants. Lower levels of retinopathy (7.5%), lower levels of neuropathy (13.8%), and 5.5% prevalence of diabetic foot were found in another study (Aseela et al., 2024). Mirahmadizadeh et al. (2021) found that 14% of participants had retinopathy, 13% had nephropathy, 5.8% had neuropathy, 30.2% had cardiovascular disease (CVD), 67.2% had hypertension (HTN), and 4.6% had diabetic foot ulcers. The number of complications is associated with the decrease in psychological adjustment (Peyrot et al., 2019). Psychological adjustment and flexibility are other predictors of PWB. Positive perception and adjustment are different constructs; Positive perception towards disease can enhance well-being independently (Maor et al., 2022). Additionally, self-compassion can reduce the negative effect of perceived stress on PWB (Majidzadeh et al., 2022). Emotional regulation has been found to increase the PWB of diabetic patients. However, only 39.62% of participants in Rahmanian et al.'s (2020) study had high emotional regulation.

T2DM patients were found to adhere poorly to medication, diet, and physical activity, which are crucial components of diabetes treatment management. For instance, 12% of participants were not taking any glucose-lowering medicine in the study conducted by Peyrot et al. (2019). Mirahmadizadeh et al. (2021) found high adherence only in 14.8% of participants to medicine, 19.4% to diet, and 15% to physical activity. In contrast, higher adherence to a diabetic diet was found among participants in diabetes education programmes in Aseela et al.'s study (2024). When diabetic patients do not follow their medicine regimen, diet, and physical activity properly, it disturbs their sugar level, which in turn increases their hospital visits and affects their work. According to Bolge et al. (2016), people with very poor mental well-being use more health resources, and their work productivity was impaired, which is considered to be a major economic burden.

Findings From the Intervention Studies

Table 2 shows that 36.36% of the intervention studies used a quasi-experimental design. Half of the studies used a random sampling method and random assignment, 2 used

purposive sampling, and the other two used convenience sampling. Two of the studies used the ACT intervention. The first study compared ACT with DBT skill training (Montazernia et al., 2024). Their health outcomes were PWB and self-care. ACT is the willingness to accept pain and disturbing events instead of suppressing them and the belief that particular psychological distress is a part of life experiences (Pears & Sutton, 2021; Ahmadi & Valizadeh, 2021). DBT is a combination of CBT interventions that includes mindfulness, distress tolerance, emotional regulation, and interpersonal effectiveness as change components (Miller et al., 2006). According to its author, this study was the first to use these two interventions on people with T2DM. In the post-test, the mean self-care scores for the experimental groups (DBT-ST and ACT) were significantly higher than those of the control group. The follow-up scores showed the same trend. Both were effective, but the effect of ACT was found to be greater (Montazernia et al., 2024).

In the second study, ACT was combined with compassion-focused therapy (CFT). Here, ACT was considered a short-term treatment, but since diabetes is a chronic disease, it may require long-term commitment. CFT was added to ACT and then compared with CBT in women with T2DM. The scores of the experimental groups in the post-test of CFT-ACT and CBT improved significantly compared to the control group in all six aspects of PWB. There was a significant difference between the experimental group of CFT-ACT combined therapy and CBT in self-acceptance, positive relationships with others, purposeful life, and individual development subscales (Khayatan et al., 2020).

In another study, CBT was given as a group therapy, and an effect was seen on PWB and HbA1c levels. PWB scores among participants in the experimental group increased from 37.56 (pretest) to 49.83 (post-test) after the intervention, and the HbA1c level decreased from 8.66 to 7.33, whereas no changes occurred in the control group (Alvani et al., 2015).

Rohmawati et al. (2024) also examined PWB and HbA1c in T2DM patients with spiritually situated mindfulness interventions, and a significant difference was found. Sari et al. (2021) also studied the Spiritual Emotional Freedom Technique (SEFT) with a spiritual base and saw its significant effects on PWB and anxiety during the COVID-19 period. The SEFT utilises inner energy and spiritual elements to foster positive

acceptance, sincerity, and hope for healing through a relaxing effect that reduces anxiety and enhances PWB. Intervention studies conducted in Indonesia and Iran in particular focused on spiritual elements like Mindfulness-Based Spiritual Interventions, the Spiritual Emotional Freedom Technique (SEFT), and Logotherapy, which emphasise spiritual freedom (Rohmawati et al., 2024; Shabani & Mahmoudi, 2021; Sari et al., 2021).

One study employed only women as participants and examined a single outcome, PWB, with the intervention based on Stress Inoculation Training (SIT). This is a form of cognitive behavioural therapy that helps people handle stress by building coping abilities through exposing them to acceptable amounts of stress to build resistance against future stressors (Meichenbaum & Deffenbacher, 1988). SIT was found to be significantly effective, especially for aspects of positive relationships with others and personal growth. Overall PWB increased from 317.40 to 333.20 (Esmaeili et al., 2016).

Shabani and Mahmoudi (2021) examined the effect of Logotherapy training on PWB and life expectancy by providing teaching on various topics related to it. Its results were consistent with other intervention studies. Both PWB and life expectancy scores increased after the intervention. Nematollahi (2020) studied the effect of a quality of life (QoL) education programme (proper diet, sleep, physical activity, developing coping skills, optimism, humour, purposefulness, enjoyment of an experience, hope, compassion for others, gratitude, moral behaviour, and spirituality) on adherence to treatment and PWB and found it significantly effective.

When comparing all the above interventions combined, CFT-ACT was found to be most effective, increasing the PWB level by 49 points, followed by individual CBT with a 34.93 point increase, then ACT with a 25.28 point increase. Spiritually based mindfulness intervention and SEFT equally increased well-being by 23 points, followed by SIT with an increase of 16 points and DBT-ST with an increase of 14 points. Group CBT was found to be less effective than individual CBT. Logotherapy and QoL education had the lowest increase in the PWB levels. These differences notwithstanding, all the intervention groups showed more positive outcomes than the control groups in increasing the levels of PWB.

Discussion

The review demonstrates a scarcity of studies on the PWB of T2DM patients in several countries, as most (31.81%) studies were conducted in Iran, and the rest in 10 other countries. Differences can be seen in the context in which the T2DM people were studied, as 27.27% of studies were conducted in a clinic, 27.27% of studies took place in health centres, 22.72% in a hospital, and 13.63% among general samples. Notably, 95.45% of the studies used a primary data source. Among the studies reviewed, 63% were cross-sectional, no causal relationship was established, and a self-reported questionnaire was used. Most studies employed standardised instruments, with the Ryff PWB scale being the most extensively used. Several studies (60%) examined the reliability and validity of the employed tool. Nearly 40% of the participants were found to have low PWB.

Socio-demographic factors like youth, female gender, lower education levels, rural residence, single or unmarried status, and low socio-economic status appear to increase vulnerabilities, as these were found to be associated with low well-being. (Bolge et al., 2016; Park et al., 2016). In addition, physical and disease factors such as high HbA1c level, high BMI, longer duration of diabetes, presence of comorbidities or complications, and the type of treatment also affect well-being. Psychological factors that can decrease PWB are perceived stress, depression, and anxiety (Majidzadeh et al., 2022; Lukasiewicz et al., 2022; Antoniou et al., 2022; Ramkisson et al., 2016). On the other hand, high self-efficacy, psychological adjustment, psychological flexibility, self-compassion, and emotional regulation can increase PWB. Adherence to medication, diet, and physical activity varied across studies from low (Mirahmadizadeh et al., 2021) to high (Calli & Kartal, 2021), although these are essential aspects of diabetes management.

When evaluating the intervention studies, the most effective intervention was found to be ACT combined with CFT. Individual CBT was the second most effective therapy, but when provided as group therapy, its effectiveness decreased. Other interventions, like spirituality-based mindfulness, SEFT, SIT, DBT-ST, logotherapy, and QoL education programmes, were also found to be effective. None of the intervention studies

followed an experimental design or adopted a randomised controlled trial (RCT). Six of them were reported as quasi-experimental, one was semi-experimental (Esmacili et al., 2016), and another was not reported as an RCT (Alvani et al., 2015). Thus, all designs were quasi-experimental in nature. To our best knowledge, there are RCTs on diabetics, but they may not be in the time period chosen for this review or did not have T2DM as participants. Studies done using the RCT approach can provide more effective and reliable results and need to be designed and conducted for populations affected by T2DM.

With the increasing rate of immigration in various countries like the US, populations are becoming more diverse. 50% of the population of the US includes African American, Native American, Asian, and Hispanic populations. India, in contrast, has been a land of varied culture for millennia, in terms of region and religion. In both contexts, the diabetes management plans need to be culturally sensitive (Alibejí & Stewart, 2016). Although the Mediterranean diet is found to improve PWB, one cannot recommend a 'one-size-fits-all' approach; instead, there is a need to integrate traditional foods in diabetic diets for lifelong adherence (Mirahmadizadeh et al., 2021; Park et al., 2016). Furthermore, one scoping review found the South Asian population as unable to follow Western dietary advice. Therefore, a diabetic diet should be aligned with people's traditions, regions, and religions (Iqbal, 2023). Clearly, there is a need to focus on cultural competence and cultural humility in diabetes treatment plans (Dragomanovich & Shubbrook, 2021; Alibejí & Stewart, 2016).

Limitations

Using a robust search technique, this review gathered a sufficient number of articles and is presented in compliance with PRISMA-ScR principles to identify the broad trends regarding PWB for this patient population and to identify suggestions for further research. Since the primary goal of the scoping review was to provide a broad overview of the available literature, a critical appraisal of individual sources of evidence was not done. Only five databases were checked because of time constraints and a small team of researchers.

Future Directions and Conclusion

Future research can be based on a systematic review and provide robust reporting of data through quality and risk bias checks of the articles. Further research may be required to examine the effect of PWB on other types of diabetes and with different age groups. A scoping review can be conducted only on intervention studies to offer a thorough explanation of interventions, their elements, and their effectiveness. Following a cultural perspective, the focus needs to be on incorporating spiritual values in interventions and modifying educational materials to comply with local literacy and health needs. Therefore, the present review highlights the importance of psychological well-being in the management of diabetes and the need to integrate psychotherapies in the treatment of diabetes so as to promote general management and well-being of individuals with type 2 diabetes mellitus.

Funding

The authors received no funding and have no conflicts of interest.

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