Social Isolation of Older Adults With Diabetes

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Abstract

We aimed to conduct a scoping review of social isolation in elderly patients with diabetes and to clarify current knowledge and gaps and future challenges. A literature search was conducted using Medline, Web of Science, CINAHL, CiNii, and Ichushi, and included studies with an eligibility criterion of a survey of social isolation in elderly patients with diabetes and aged ≥60 years. Social isolation was defined as limited or non-face-to-face contact with family and community. A data extraction form describing characteristics of studies incorporated in the present review was prepared. A total of six studies met eligibility criterion (sample size, 451–3,500). Subjects' age averaged 67 years, and 42% were female. Social isolation ranged from 9% to 49%. Factors related to social isolation included vascular complications, decreased activities of daily living, death, dementia, glycemic fluctuation, disturbance of lifestyle habits, and poor self-management and -rated health. However, research on the cause and mechanism of the relationship and impact of sex-based differences was lacking. In conclusion, additional research is needed on the definition of social isolation in elderly patients with diabetes, the causal relationship with related factors and their mechanisms, and the relationship with other outcomes.

Keywords

aging, diabetes mellitus, elderly, social interaction, social isolation

Manuscript received: May 13, 2022; **final revision received:** July 1, 2022; **accepted:** July 10, 2022.

Introduction

The percentage of elderly people in the population is increasing worldwide, and Japan has one of the highest aging rates (Statistics Bureau, 2010; World Health Organization, 2011). Changes associated with aging include impaired physical and mental function along with an increased risk of reduced social interactions (Saito et al., 2010; Valtorta et al., 2018). There are reports of reduced opportunities to interact with relatives, friends, and neighbors with aging (Landeiro et al., 2017; Saito et al., 2010; Valtorta et al., 2018), and reduced social interaction of the elderly is considered a social issue. Specifically, when interaction with society is reduced significantly, it is called social isolation, and it has been actively studied recently (Fujiwara et al., 2017; Sakurai et al., 2019; Townsend, 1963). Although there is no consistent definition of social isolation, it usually means "an objective state of having hardly any contact with family and community." (Townsend, 1963) Therefore, it is different from loneliness, which is a subjective state. Although there is no established method of measuring social isolation, there are studies that defined social isolation as infrequent contact with relatives and friends (Fujiwara et al., 2017; Sakurai et al., 2019), a lack of friends or living alone (Chappell & Badger,

1989; Kawai, 2009), or with the composite score of multidimensional items such as the number of contacts with family and friends and household composition (Rubinstein et al., 1994; Wenger, 1984). In a recent study that targeted community-dwelling elderly people (Sakurai et al., 2019), it was reported that social isolation, defined as infrequent contact with relatives and friends, was linked to death. In other studies investigating community-dwelling elderly people, it was reported that regardless of whether the person lives alone, social isolation, defined as infrequent contact with relatives, friends, or neighbors, is related to decreased activities of daily living (ADL; Fujiwara et al., 2017) or cognitive function decline and death (Saito et al., 2015). This suggests that social isolation, which is defined as infrequent contact with family and community, is clinically important and related to clinical outcomes.

To the best of our knowledge, there is no scoping review of social isolation in elderly patients with

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diabetes. Compared to patients without diabetes, patients with diabetes interact with society less frequently (Eller et al., 2008), where a notable negative impact of social isolation on health is a concern. We assumed that it would be clinically and academically significant to clarify what is already known, gaps, and future challenges in regard to social isolation in elderly patients with diabetes. As discussed earlier, it was assumed that the definition of social isolation varies among previous studies; therefore, we determined that a scoping review would be more appropriate than a meta-analysis. The purpose of this study was to perform a scoping review of the proportion of social isolation and related factors in elderly patients with diabetes and to identify what is known and what issues need to be addressed in the future.

Methods

Study Design

The present review was based on the following five stages of a scoping review as propounded by Arksey and O'Malley (2005): (1) identify the research items; (2) identify relevant studies; (3) select studies; (4) chart the data; and (5) collate, summarize, and report the results.

Identify the Research Questions

The research questions for this review are "What is the proportion of social isolation in older adults with diabetes?" "What are the factors associated with social isolation in older adults with diabetes?" "What are the factors associated with social isolation in older adults with diabetes?

Identifying Relevant Studies

A literature search was conducted on December 1, 2020 using Medline, Web of Science, CINAHL, CiNii, and Ichushi. Search terms were those associated with "elderly patients with diabetes" and "social isolation." The Medline search strategy: ("social isolation"[MeSH Terms] OR "social isolat*"[All Fields] OR "social* engage*"[All Fields] OR "social* activ*"[All Fields] OR "social* disconnect*"[All Fields] OR "social participation"[All Fields] OR "social relationship*"[All Fields] OR "social* integrat*"[All Fields] OR "social network*"[All Fields] OR "social tie*"[All Fields] OR "social contact*"[All Fields] OR "social* connect*"[All Fields] OR "social alienation"[All Fields] OR "living alone" [All Fields]) AND ("elderly"[All Fields] OR "elder"[All Fields] OR "old age"[All Fields] OR "old people"[All Fields] OR "older"[All Fields] OR "aged"[MeSH Terms] or "aged"[All Fields] OR "aging"[MeSH Terms] OR "aging"[All Fields] OR "aging"[All Fields]) AND ("diabetes mellitus"[MeSH Terms] OR "diabet*"[All Fields]). We did not search for gray literature. We manually searched the references of all papers included in the present review.

Selection Criteria

We identified original research articles written in English or Japanese. To be eligible, the study had to investigate social isolation in elderly patients with diabetes. Diagnosis of diabetes was made according to the diagnostic criteria of the Japan Diabetes Society (Araki et al., 2020). We included studies on patients with diabetes 60 years of age or older or studies where the average age of the participants with diabetes was 60 years or older. The definition of social isolation was an objective state of infrequent contact with family and community as noted previously (Townsend, 1963). We did not include studies in which social isolation was identified simply as subjects living alone or having a small number of relatives or experiencing a subjective state of loneliness. Previously, social isolation was defined by limited contact with family and community over a specific period of time (1 week, several months, or 1 year; Courtin & Knapp, 2017; Donovan & Blazer, 2020). Based on these previous studies, the present review defined social isolation as infrequent contact with family and community over a certain period of time whether face-to-face or non-face-to-face. We excluded studies that targeted patients in facilities or hospitals. When interpretation was difficult, we consulted another reviewer (KM).

Charting the Data, Summarizing, and Reporting the Findings

We prepared a data extraction form that included the study characteristics to be incorporated into the present study (key author's name, publication year, study location, design of study, sample size, participants' basic information, definition of social isolation, prevalence of social isolation, and primary findings). Continuous variables were expressed as the mean with standard deviation, or 95% confidence interval (CI). Binary variables were expressed as a ratio (%).

Results

Description of Included Studies

The present search identified 1,487 papers with six studies meeting eligibility criteria (Figure 1; Brinkhues et al., 2018; Hempler et al., 2016; Ida et al., 2020a, 2020b; Regidor et al., 2012; Schiøtz et al., 2012). Table 1 summarizes the characteristics of the studies that were included in the present review. The majority of the studies were reported from Europe, while the remainder was from Japan, and 67% of the included studies were from 2015 or later. One study was longitudinal while the remaining were cross-sectional studies. Approximately 42% of the subjects were women.
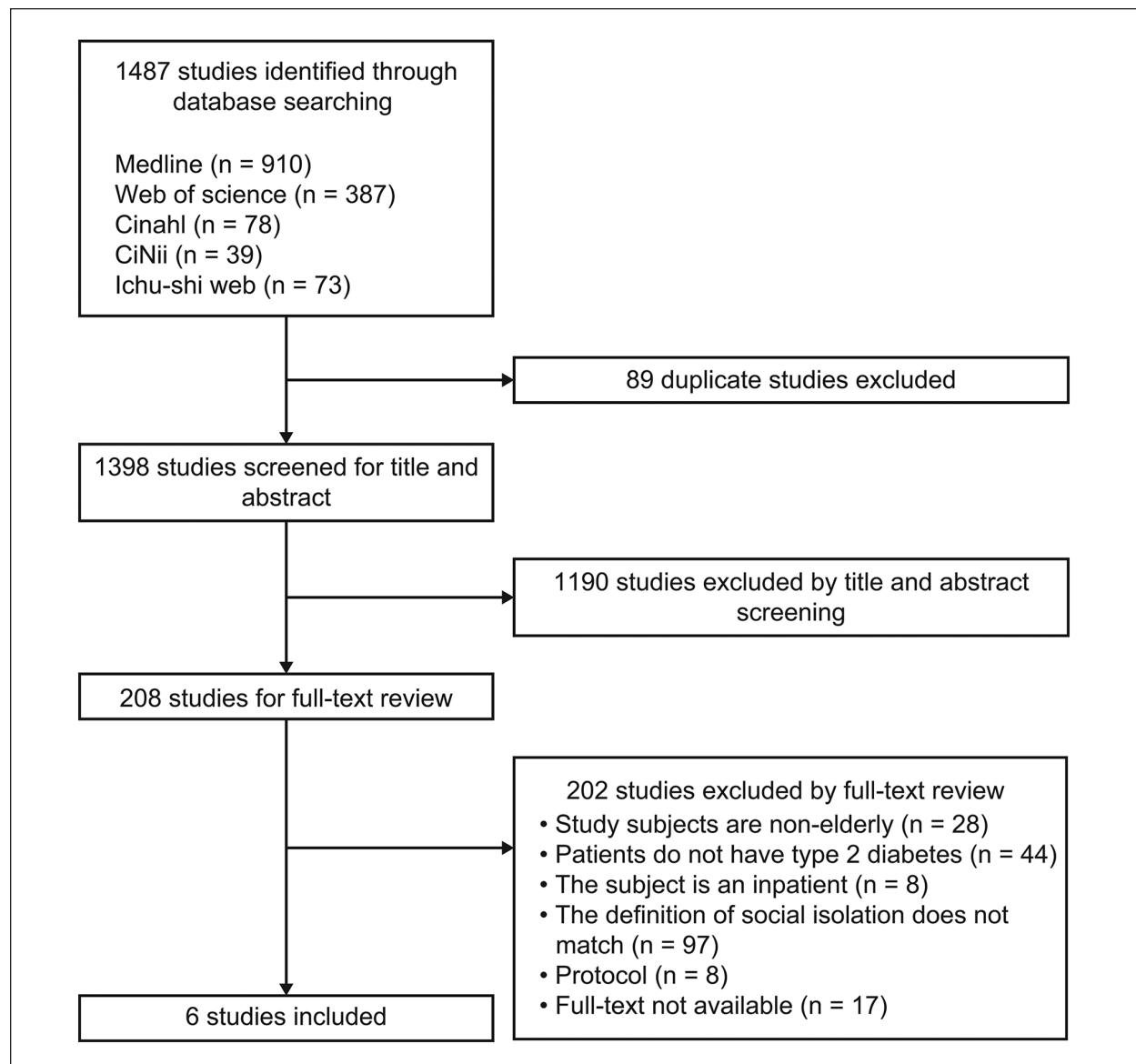
Figure 1. Study flow diagram.

Studies that defined social isolation by infrequent contact with friends and neighbors whether face-to-face and non-face-to-face (Brinkhues et al., 2018; Hempler et al., 2016; Ida et al., 2020a, 2020b) and studies that defined social isolation by infrequent visits to friends and relatives (Regidor et al., 2012; Schiøtz et al., 2012) were included. In all studies, social isolation was measured using a self-administered questionnaire or interview. The lowest frequency of social isolation was 9% (Schiøtz et al., 2012), and the highest frequency was 49% (Brinkhues et al., 2018).

Factors Related to Social Isolation

Glycemic parameters, hypertension, and dyslipidemia. Out of the two studies that examined the relationship with glycemic parameters (Ida et al., 2020a; Regidor et al., 2012). Ida et al. (2020a) examined the relationship with

dyslipidemia and reported that a glycemic fluctuation index and glycoalbumin (GA)/hemoglobin A1c (HbA1c) is related to social isolation, while HbA1c individually did not show a relationship with social isolation, as per Regidor et al. (2012). No studies examining a possible relationship between social isolation and dyslipidemia identified such a correlation (Ida et al., 2020a).

Self-management/lifestyle habits. Schiøtz et al. (2012) reported social isolation, defined as infrequent contact with friends, was related to a decreased desire for self-management of diabetes, a low regard for care, low physical activity, and poor foot care management. Additionally, the same study reported that social isolation, defined as infrequent contact with family, was related to a low assessment of diabetic care, but not with a decreased desire for self-management, low physical activity, and poor foot care management. Furthermore,

Table I. Characteristics of Included Studies.

Reference	Region	Design of study	No. of patients with diabetes	Type 2 diabetes, %	Age (years)	Women (%)	Social isolation measurements	Social isolation (%)	Covariates	Main findings
Ida et al. (2020a)	Japan	Cross-sectional study	558	91	72	42	Contact with friends and neighbors less than once a week	31	Age, GA/HbA1c, Neuropathy, Cardiovascular disease, Sleep disorder, ADL, Depression, Insulin	Glycemic fluctuations and decline in high-level functional capacity are associated with social isolation. HbA1c, smoking, alcohol consumption, hypertension, dyslipidemia, vascular complications, depression, sleep disturbance, dementia, and antidiabetic drugs were not associated with social isolation.
Ida et al. (2020b)	Japan	Cross-sectional study	451	92	>65	43	Contact with friends and neighbors less than once a week	Men, 37; Women, 28.9	age, BMI, HbA1c, number of comorbidities, sarcopenia, cognitive impairment, depression, and living alone	There was a significant relationship between social isolation and decline in high-level functional capacity.
Brinkhues et al. (2018)	Netherlands	Cross-sectional study	797	100	62	31	Contact with partner, sister, friends, and neighbors less than once a week	44–49	sex, age, HbA1c, QoL, hypertension, BMI, total/HDL cholesterol, smoking status, educational level, and employment status	Social isolation is not associated with macrovascular and microvascular complications.
Hempler et al. (2016)	Denmark	Cross-sectional study	3,500	30	NR	35% (T2DM)	Contact with friends or family less than once a month	10–12	Age, diabetes duration, education level	Social isolation (defined by the frequency of interaction with friends) was negatively associated with healthy eating and physical activity. Social isolation (defined by the frequency of interaction with family) was negatively associated with physical activity only in women.
Regidor et al. (2012)	Spain	Longitudinal study (8 years follow up)	667	NR	>60	NR	Visit to friends and relatives less than twice a week	12	age, marital status, education level, occupational social class, medical consultation, and current treatment with statins, angiotensin II antagonists, or aspirin	Social isolation was not associated with death.
Schiøtz et al. (2012)	Denmark	Cross-sectional study	2,572	100	60	34	Visit to friends and relatives less than once a month	9–13	Medication adherence, foot examination, smoking status, and self-reported HbA1c levels	Social isolation (defined by the frequency of interaction with friends) was associated with poor self-management, low regard for care, distress, low physical activity, and poor foot care management. Social isolation (defined by the frequency of interaction with family) was associated with low regard for care. HbA1c, smoking, and drug adherence were not associated with social isolation.

Note. Unless indicated otherwise, data are shown as mean values. T2DM = type 2 diabetes mellitus; HbA1c = hemoglobin A1c; NR = not reported; GA = glycoalbumin.

Hempler et al. (2016) reported that social isolation, defined as infrequent contact with friends, had a negative correlation with healthy eating habits and physical activity. There was no relationship between social isolation and smoking (Ida et al., 2020a; Regidor et al., 2012) or drinking (Ida et al., 2020a) habits.

Diabetes treatment/medication adherence. A study examined the relationship with diabetes treatment (Ida et al., 2020a) and another study examined the relationship with medication adherence (Regidor et al., 2012). Oral administration of diabetic medications, insulin, or medication adherence was not related to social isolation.

Microangiopathy and macroangiopathy. Two studies examined the relationship social isolation with microangiopathic complications and the relationship with macroangiopathy (Brinkhues et al., 2018; Ida et al., 2020a). No studies examining a possible relationship between social isolation and macroangiopathy identified such a correlation (Brinkhues et al., 2018; Ida et al., 2020a).

Mortality/ADL/dementia. A study by Regidor et al. (2012) evaluated 667 patients aged ≥60 years with diabetes and found no relationship between social isolation and future death (hazard ratio 1.13; 95% CI [0.76, 1.67]).

Two studies examined the relationship with higher-level ADL (Ida et al., 2020a, 2020b); In the former (Ida et al., 2020a), social isolation was significantly correlated with a decrease in higher-level ADL regardless of sex (Ida et al., 2020a), but, in the latter (Ida et al, 2020b), it was significantly correlated in men only.

There was one cross-sectional study (Ida et al., 2020a) that examined the relationship with dementia That reported that there was no relationship between social isolation and dementia.

Mental health/sleep disorders. According to a cross-sectional study that examined the relationship with diabetes-related distress (Schiøtz et al., 2012), social isolation, defined as infrequent contact with friends, had a significant correlation with distress. However, when the same report examined social isolation defined as infrequent contact with family, there was no relationship. A cross-sectional study that examined the relationship with depression and sleep disorders (Ida et al., 2020a) found no significant correlation with social isolation.

Self-rated health. According to a longitudinal study that examined the relationship of self-rated health and type 2 diabetes over 12 years (Eller et al., 2008), there was a significant relationship between social isolation and having high self-rated health in the future.

Discussion

This present review found that the frequency of social isolation in elderly patients with diabetes varied from 9% to 49%. Factors related to social isolation were decreased ADL, glycemic fluctuations, poor self-management, disturbance of lifestyle habits, and poor self-rated health. Reports included in the present review were published relatively recently and are from multiple countries, indicating that social isolation of elderly patients with diabetes appears to be considered an important issue. To the best of our knowledge, the present study is the first scoping review of social isolation among elderly patients with diabetes.

First, we will consider the frequency of social isolation in the present review. According to reports that targeted community-dwelling elderly people (Cudjoe et al., 2020; Fujiwara et al., 2017; Sakurai et al., 2019), the frequency of social isolation was 22% to 30%, while the overall range of social isolation in this review was 9% to 49%. When studies were limited to those that used the definition of less than one contact per week (Fujiwara et al., 2017; Sakurai et al., 2019), the frequency of social isolation increased to 28% to 49%. Therefore, it is possible that the frequency of social isolation in elderly patients with diabetes may be higher than in the general population of elderly. Elderly patients with diabetes often have cognitive and physical impairments and vascular complications such as microangiopathy and macroangiopathy (Huxley et al., 2006; Sinclair et al., 2018). Suffering from these complications might have been a cause for the high frequency of social isolation among elderly patients with diabetes. However, the frequency of social isolation among the studies in the present review varied considerably. The potential reasons include the following: First, different definitions of social isolation are used across the six studies. Second, there is a possible impact of different backgrounds of the subjects. Prior studies reported that advanced age, being male, a low level of education (Cudjoe et al., 2020), and having type 2 diabetes (Hempler et al., 2016) were factors related to social isolation. The background factors of the studies included in the present review varied, which might have had an impact on the different frequencies of social isolation.

The mechanisms through which social isolation is related to lifestyle habits and health outcomes can impact the relationship of social isolation with elderly patients with diabetes. Previous studies have shown that social isolation is related to a lack of information on health, induction of physical and mental stress, exacerbation of inflammation, and decreased physical activity (Donovan & Blazer, 2020; Hempler et al., 2016). These are all factors considered to be closely related to a decreased ability to self-manage, and physical function impairment in elderly patients with diabetes (Sinclair et al., 2015; Sinclair et al., 2018). In contrast, poor self-management of diabetic treatment, poor glycemic control, comorbidity with vascular complications, depression, and decreased ADL lead to decreased physical activity or self-stigma, negative opinions about oneself, or agreeing with the negative and emotional

reaction of others (Kato et al., 2017; Uchigata, 2018). This, in turn, leads to social isolation. It is possible that lifestyle habits and health outcome in elderly patients with diabetes have a mutual exacerbating relationship with social isolation.

There were several knowledge gaps and future challenges that were identified in the present review. First, there were not many studies that identified the specific group of people with whom lack of frequent contact caused feelings of isolation or the specific details of the interaction that were important. According to Hempler et al. (2016) and Schiøtz et al. (2012), infrequent contact with friends had a stronger relationship with a decreased ability for self-management and disturbance in lifestyle habits than the interaction with relatives. It is possible that information sharing with people of a similar age group, with similar life histories and comorbidities, leads to desirable healthy activities (Arcury et al., 2012). However, although social interactions are diverse, such as hobbies, volunteer activities, and community activities, interactions associated with helping others are strongly related to one's own health (Kennedy et al., 2015). Therefore, details of the interactions are also important when considering the relationship with health outcomes. It is necessary to examine what type of social isolation (with whom and what type of interaction has decreased) is related to negative health outcomes. Second is that the reason for social isolation has not been examined. A previous study (Bennett, 1980) proposed that social isolation includes isolation that was and was not desired by the person, and these need to be differentiated. Specifically, there are cases in which a person chooses to be isolated based on their values, feelings toward the community, and the strength and acceptance of the community. Therefore, the relationship with health outcomes may differ from that associated with undesired social isolation, which may be due to inability to access necessary support for physical and mental diseases (Bennett, 1980; Fratiglioni et al., 2000). Third, there was no clear cutoff value for the frequency of contact with family and community, which is the definition of social isolation. The reports of Saito et al. (2015) and Fujiwara et al. (2017) targeted community-dwelling elderly, and they found that social isolation, defined as less than one contact with family and community per week, was related to decreased ADL or death. However, the frequency of social isolation among elderly patients with diabetes is higher than among the general population of elderly. Thus, cutoff values of interaction frequency specific to elderly patients with diabetes as it relates to health outcomes needs to be examined. Fourth is the lack of studies targeting patients with type 1 diabetes. The majority of the studies included in the present review targeted patients with type 2 diabetes. Hempler et al. (2016) noted that the frequency of social isolation was higher for patients with type 2 than for patients with type 1 diabetes, and suggested that factors related to

social isolation might differ between those with type 1 or type 2 diabetes. Therefore, examination of the differences in social isolation between patients with type 1 and type 2 diabetes is an important area for future study. Fifth, there is a lack of sex-based analysis of social isolation. The frequency of social isolation is reported to be higher in men than women (Ida et al., 2020b). In the studies included in the present review, a decrease in high-order life functions was limited to men (Ida et al., 2020b) and decreased physical activity was limited to women (Hempler et al., 2016). Previous studies showed that there are sex-based differences in how problems and challenges are perceived and what measures are taken (Diehl et al., 1996; Kishi & Horikawa, 2004). This may have led to the sex-based differences noted in these studies. The frequency of social isolation and sex-based differences is another area that needs to be examined. Sixth, there is a paucity of studies examining the relationship of social isolation with sarcopenia and frailty, the need for long-term care, falls, hypoglycemia, and medical economic indicators. The relationship of social isolation with falls and requiring long-term care has been reported among community living elderly (Donovan & Blazer, 2020; Petersen et al., 2020), but no studies have targeted elderly patients with diabetes. To the best of our knowledge, there have been no studies of the relationship of social isolation with hypoglycemia and medical economic indicators among elderly patients with diabetes, and it is important to examine these interactions. Finally, there were no interventional studies that targeted elderly patients with diabetes or that used prevention of social isolation as the outcome. Therefore, additional studies are necessary to verify the causal relationship of factors related to social isolation identified in the present review.

This review clarified what is known regarding social isolation among elderly patients with diabetes and clarified knowledge gaps and future challenges. However, there are some limitations. The first is that although multiple databases were reviewed to search for publications, it is possible that some were overlooked. Also, the present study only included papers written in English or Japanese; therefore, papers written in other languages might have been overlooked. The second is that since the present study was a scoping review, the quality of the included studies was not assessed. Therefore, caution is required when interpreting the results of the present review.

The present scoping review found that the frequency of social isolation among elderly patients with diabetes varied from 9% to 49%. Factors related to social isolation included vascular complications, decreased ADL, death, dementia, glycemic fluctuations, poor self-management, disturbance of lifestyle habits, and poor self-rated health. However, the definition of social isolation varied among the included studies. This review highlighted the need for further examination of the definition

of social isolation among elderly patients with diabetes, the causal relationship with related factors and mechanisms of isolation, the relationship with other outcomes, and the need for stratified analyses.

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