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Nursing Led Interventions Regarding Self-Management Of Type 2 Diabetes In Community Of Asian Countries: A Systematic Review

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Abstract

Diabetes mellitus (DM) is a highly prevalent chronic disease associated with serious and costly complications largely the result of obesity and physical inactivity. Around 387 million people live with DM worldwide, and type 2 diabetes mellitus (T2DM) is the most common comprising 90% of those with diabetes. The presented meta-analysis was developed in response to the publication of several studies addressing Nursing led Interventions regarding self-management of Type 2 diabetes in community. Online database search was performed in Pubmed, Cinhal, Medline and relevant studies were included with no language restriction. Following on from this, databases were accessed to enable a more in depth search of the literature using key words and Boolean operators to generate articles relevant to the topic. These articles were filtered using an inclusion /exclusion criteria in order to refine the results to a manageable level or eight articles. These 8 articles were analyzed and the results reported that the vaccine hesitancy and the vaccine acceptance showed high heterogeneity. It has been observed that people with T2DM undertake adequate self-management to optimize blood glucose levels which may reduce and delay diabetes-related complications. Therefore, DSME is necessary to support people with T2DM to develop effective diabetes self-management skills. This review provides some evidence that Nursing led interventions are effective in improving glycemic control for people with T2DM.

Key words: Type 2 Diabetes Mellitus, Interventions, diabetes self-management, nursing interventions

Introduction

Diabetes mellitus (DM) is a highly prevalent chronic disease associated with serious and costly complications largely the result of obesity and physical inactivity. Around 387 million people live with DM worldwide, and type 2 diabetes mellitus (T2DM) is the most common comprising 90% of those with diabetes.(1) Furthermore, 138 million people with T2DM live in the Asian region representing 30% of the total number of people with diabetes around the world(2) The number of people with diabetes in

Southeast Asia in 2017 is 80 million and this is expected to increase to 151 million by the year 2045.(3) According to the World Health Organization, almost 10% of all adults in China (about 110 million people) currently have diabetes compared to <5% in 1980.(3) In urban India, diabetes rates increased from 3% in 1970 to 12% in 2000 and in urban South India from 13.9% in 2000 to 18.6% in 2006.(4) In rural Bangladesh, the prevalence of diabetes increased from 2.3% to 6.8% between 1999 and 2004, and in 2009, it was 7. 9%.(5)In a national survey done in 2001, 8% of Korean adults had diabetes, with little difference between urban and rural areas. In a nationwide survey in Singapore in 1998, Indians had the highest prevalence of diabetes (12.8%), followed by Malays (11.3%) and Chinese (8.4%) Other Asian countries including Japan, Sri Lanka, Indonesia, Thailand and Vietnam also have experienced a marked increase in the prevalence of diabetes. While some Asian countries such as China and India have a very large number of patients with diabetes, the prevalence of diabetes can be as high as 40% in some Pacific island populations(6)

There could be a number of reasons for the diabetes epidemic in Asia. Initially, due to a better climate and food, human migration shifted towards Asia. This was followed by Arabian, Portuguese and British invasion for wealth, resulting in multiculturalism, multiracial and religious variations. Earlier many Asian countries had experienced extensive poverty during wartime or civil unrest or famine. However, in recent times, most Asian countries are experiencing an economic upsurge resulting in a rapid change of lifestyles including choice of foods, especially in China and India. This has resulted in better chances of survival of the newborn leading to improved longevity which is one of the causes of the diabetes epidemic.

Justification

Till date, the best evidence for prevention of T2D comes from randomized controlled trials of lifestyle interventions (e.g., to modify diet and physical activity and achieve weight loss) delivered to individuals at the high risk, usually those with IGT or prediabetes.(7) Randomized clinical trials have shown that T2D can be prevented or at least postponed by rather modest lifestyle changes. In the Finnish study, the effect of lifestyle intervention in decreasing diabetes incidence was found to be 58%. The Diabetes Prevention Programme lifestyle intervention also demonstrated a 58% decrease in the incidence of T2D among overweight adults of diverse race/ethnicity at the high risk of developing T2D(8). These two studies laid the foundation for lifestyle intervention as an effective approach to prevent the occurrence of diabetes in the first place. This was documented further in a number of studies across the globe with varying effectivity. However, the effectivity of lifestyle in decreasing the incidence of T2D in Indians with IGT was found to be only 28% and the same 28% reduction was observed in Pakistani individuals with IGT.(9)

Self-management is defined as the active participation of patients in their treatment. Self-management support is one of the essential components of the Chronic Care Model, a well-known guide to improve the management of chronic conditions. Previous research has shown that successful support of self-management of patients with T2DM can have a positive impact on their lifestyle and, ultimately, result in improved health outcomes(10)

Aim

This dissertation aims to critically review current evidence contributing to the vaccination hesitancy.

Objectives

1. To critically analyse current literature on Nursing led Interventions regarding self-management of Type 2 diabetes in community of Asian Countries.

2. To draw precise recommendation of what should be done to promote the self-management

3. To draw conclusions from the findings of the eligible studies to enable meta-analysis

4. To interpret the findings of the chosen studies, put these into context, and present them in the form of a summary and conclusion.

Research Question

The research question of this study is to ascertain key significant Nursing led Interventions regarding self-management of Type 2 diabetes in community of Asian CountriesLiterature **Review**

Literature search is a systematic and well-organized search from the already published data to identify a breadth of good quality references on a specific topic. The reasons for conducting literature search are numerous that include drawing information for making evidence-based guidelines, a step in the research method and as part of academic assessment(11)However, the main purpose of a thorough literature search is to formulate a research question by evaluating the available literature with an eye on gaps still amenable to further research. The process of search involved Key texts which were identified based upon their accessibility to, and prominence within, United Kingdom systematic reviewing practice(12).The authors sought to populate an evidence base of supporting studies that contribute to existing search practice. Studies were first identified by the authors from their knowledge on this topic area and, subsequently, through systematic citation chasing key studies with the help of the search terms. Having determined the key stages to literature searching, we then read and re-read the sections relating to literature searching again, extracting specific detail relating to the methodological process of literature searching within each key stage

Overview of Prevalence of Type 2 diabetes

With this type, your body either doesn't make enough insulin or your body's cells don't respond normally to the insulin. This is the most common type of diabetes. Up to 95% of people with diabetes have Type 2. It usually occurs in middle-aged and older people. Other common names for Type 2 include adult-onset diabetes and insulin-resistant diabetes. Your parents or grandparents may have called it "having a touch of sugar."

South Asian countries, or countries of the Indian subcontinent, constituting India, Pakistan, Bangladesh, Sri Lanka and Nepal, have emerged as the hot spots for the epidemic of diabetes, within a short span of two to three decades. National prevalence of diabetes in adults of 20–79 years are: Bangladesh 9.85%, India 8.31%, Nepal 3.03%, Pakistan 6.72% and Sri Lanka 7.77%(13)

Rapid urbanization, industrialization and modernization have resulted in social and economic uplift, but unfortunately this also has produced adverse health outcomes such as rising rates of diabetes and other metabolic diseases. South Asian populations living in their native lands or in affluent foreign countries have a high prevalence of diabetes(14). It is now evident that 'internal migration' from rural to urban areas within a country unmasks the predisposition for Type 2 diabetes, to the same extent as in South Asian migrants in affluent countries(15)

Risk Factors

The risk factors of Type 2 diabetes are common in any part of the world, but racial and geographical differences are apparent in their intensity and in the age at manifestation. South Asians have strong racial and genetic predisposition and a strong vulnerability to develop these diseases. In addition, the susceptibility and genetic predisposition to environmental triggers, such as weight gain, unhealthy diet and sedentary behaviour, predisposes them to develop diabetes at a much younger age than in Western populations(16)

Genome

Genome-wide association studies have shown that at least 40 genetic loci are associated with Type 2 diabetes, but these loci confer only a modest effect and do not add to the risk prediction of clinical diabetes beyond the traditional environmental risk factors. Although many of these genes discovered in Caucasians have been replicated in Asians, intra-ethnic differences in the location and frequency of the risk alleles exist. However, the combined effects of multiple genetic variants using genetic scores based on the number of risk alleles appear to be similar in different ethnic groups.(17)

Epigenetic effects

Epigenetic effects are defined as heritable changes to DNA structure that do not involve changes to the DNA sequence. Methylation status of gene promoters in utero affects related phenotypes later in a child's development. Epigenetic changes occurring during gestation, possibly maternal nutrition-mediated, appear to influence adiposity and related metabolic phenotypes . Clinically, the findings have the potential to reinforce the importance of adequate nutrition counselling during pregnancy.(18)

Environmental factors

The traditional lifestyle of South Asians, characterized by a diet consisting of complex carbohydrates, low saturated fat and a good amount of physical activity, has been protective against cardiovascular disease and diabetes, even in the presence of enhanced genetic predisposition. Overweight and obesity are increasing rapidly in Asia with the global shift in diet towards energy-dense foods and sedentary lifestyle. These changes, originally observed in Asian immigrants in affluent countries, are now manifested even within the native land(19)

Complications

Long term complications develop over many years and they all relate to how blood glucose levels can affect blood vessels. Over time, high blood glucose can damage the body's blood vessels, both tiny and large.Damage to your tiny blood vessels causes microvascular complications; damage to your large vessels causes macrovascular complication. Type 2 diabetes can also affect the large blood vessels, causing plaque to eventually build up and potentially leading to a heart attack, stroke or vessel blockage in the legs (peripheral vascular disease).Damaged blood vessels don't deliver blood as well as they should, so that leads to other problems, specifically with the eyes, kidneys, and nerves.(20)

Prevention

Primary prevention is of paramount importance to curb the epidemic of the disease. Moving from the 'prevalence–incidence' studies, a paradigm shift is now occurring, with a main focus on primary prevention of Type 2 diabetes. Several landmark studies in varied racial and geographical areas have proved that Type 2 diabetes is a preventable disease . Prevention strategies that improve insulin action and preserve β-cell function can reduce the deterioration of pre-diabetic stages to diabetes(21)

Preventive strategies instituted in potential mothers in the pre-conception stage, ensuring adequate nutrition, avoidance of pregnancy in teens or a late pregnancy, appropriate screening for diabetes, infections/inflammation and adequate micro- and macronutrient supply during pregnancy, are steps to reduce the risk of in utero malnutrition and its ill effects. Good nutrition during infancy and childhood and adequate physical activity among children are important for the development of a healthy child and an adult. Physical activity, healthy diet, stress-free environment are congenial to healthy life and these habits need to be cultivated and practiced during the 'Life Circle'.(22)

Methodology

Data gathering is a vital element of systematic reviews since it lays the groundwork for the conclusions made. This entails ensuring sure data is dependable, accurate, complete, and readily accessible. Once the review questions have been set, modifications to the protocol should be allowed only if alternative ways of defining the populations, interventions, outcomes or study designs become apparent. Multiple resources (both computerized and printed) were searched without language restrictions. Further more, various internet engines were searched for web pages that might provide references The study selection criteria flowed directly from the review questions and be specified a priori. Reasons for inclusion and exclusion were recorded. Selected studies were subjected to a more refined quality assessment by use of general critical appraisal guides. These detailed quality assessments were used for exploring heterogeneity and informing decisions regarding suitability of meta-analysis

A comprehensive technique was developed for this assessment in order to determine the appropriate sample group (see table below). The criteria for evaluating the literature were developed with P.I.C.O. in mind. This demonstrated that the study question had been addressed and that publications with an adequate design had been chosen, as advised by (23)

Due to the fact that this research will be examining the efficacy of an intervention, both RCTs and uncontrolled clinical trials were judged suitable. (Pati & Lorusso, 2018) emphasise though that the

inclusion and technology used to prevent bias in a literature search may add bias, detailed documentation of the inclusion and criteria for inclusion may assist generate trust and credibility. Researchers must justify the exclusion of certain sources from analysis, but concede that in certain circumstances, determining why certain publications were excluded might be challenging.

A clinical question needs to be directly relevant to the patient or problem at hand and phrased in such a way as to facilitate the search for an answer. PICO makes this process easier. It is a mnemonic for the important parts of a well-built clinical question. It also helps formulate the search strategy by identifying the key concepts that need to be in the article that can answer the question(24).

Criteria for PICO

Participants	Adults over 18 years having Type 2 DM
Intervention	Nursing interventions
Comparison/Control	Control groups
Outcome	Effectiveness of interventions

Data Collection Strategies

Three databases were chosen and utilised throughout the data collection method for this investigation. PubMed, CINAHL, and also the Cochrane library were consulted. To avoid oversaturation of the data, keywords were searched and Logical operators were used inside the search. (Pati & Lorusso, 2018) demonstrate that depending on how a search is conducted, purposeful or accidental bias may be evident. As a result, it is vital to prove that a thorough, extensive, and broad search was conducted.

Keywords usedas per MeSH: Type 2 Diabetes Mellitus, Interventions, diabetes self-management, nursing interventions

Inclusion/exclusion criteria

Researchers more than 10 years old to make the search results fair. (25) stated that the goal of nurses examining books is to improve service. Because nurses are required to practise evidence-based medicine, they must have access to the most recent research. He does admit, though, that arbitrarily defining time periods may be counterproductive, since some older content may be just as significant or useful as new information. Articles were eliminated that have not been originally published in English due to the probability of linguistic prejudice as a consequence of the authors' limited expertise and the chance of an incorrect translation. (26)However, they claim that although this technique has minimal effect on overall results, they acknowledge that studies conducted in French are more prone to be noted by other writers and to be printed several times. I started by doing a basic Boolean search for relevant terms and then filtering them using different filters depending on my inclusion criteria (See table below). This limited my query to 214 CINAHL records, 139 Medline records, and 75 PubMed records.

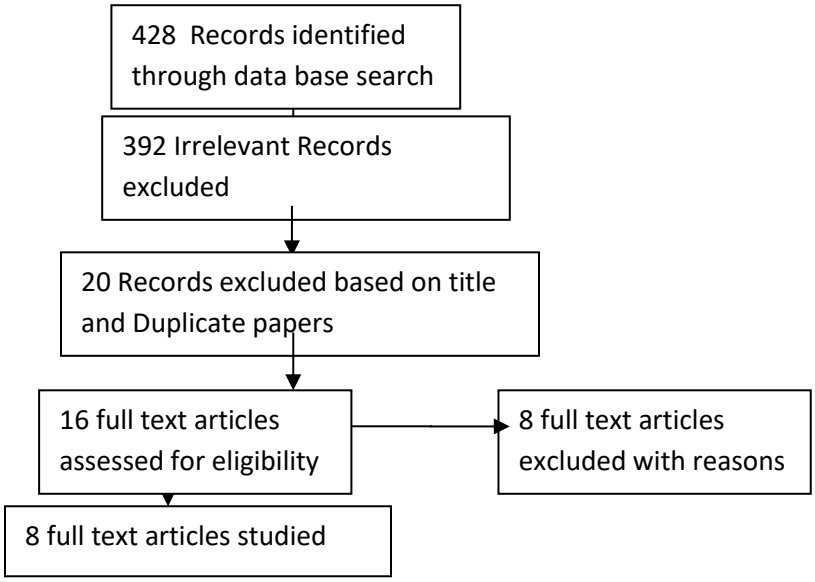
A PRISMA flow diagram was framed. Numerous things were deleted due to their insignificance to the study's subject. Duplicates were removed and studied the abstracts of each article. Additionally, papers

were excluded that did not include meta - analytic review, leaving a total of eight publications that fit the inclusion criteria for this systematic review.

16 studies that we recognised as potentially helpful but later eliminated are included, along with their respective reasons for exclusion.

Inclusion Criteria	Exclusion Criteria
Adults over 18 years of age with Type 2 DM	Adults over 18 years of age with Type 1 DM
Articles written in English	Articles published more than 10 years ago
Articles Free to access	Paid articles
Peer reviewed articles	Non Peer reviewed articles

PRISMA FLOWCHART



Results

The finished compositions will be subjected to critiques and analysis. Eight studies are included in the study. The use of a conceptual framework (The C.A.S.P. tool, 2018) enabled the assessment of the overall and understanding of the literature. The table below summarises each article.

Author and date	study design	Sample size	Intervention	Key findings
Chao et al 2015(27)	RCT	100	Educational (didactic and facilitative teaching) for 18 months	Increased knowledge and health status.

				Quality score was high
Jaipakdee et al 2015(28)	RCT	403	Educational (didactic and facilitative teaching) for 6 months with psychological support	Increased QoL and High health quality score
Li et al 2012(29)	RCT	280	Educational didactic teaching for 18 months	Increased QoL with high score
Guo et al 2014(30)	RCT	1511	Educational (didactic and facilitative teaching) for 4 months	High Quality score
Liu et al 2012(31)	RCT	233	Psychological (CBT) for 12 months	Increased diabetic self efficacy scale and quality score was high
Song et al 2012(32)	RCT	40	Educational (didactic and facilitative teaching) for 3 month	Low quality score
Wong et al 2014(33)	Observational cohort study	2282	Psychological (CBT) underpinned self-efficacy theory for 12 months	Low quality score
Yuan et al 2014 (34)	RCT	88	Educational (didactic and facilitative teaching) for 2 months	High Quality score

Eight studies were analysed. Chao et al conducted study to evaluate the effect of integrated health management model on the health of older adults with diabetes. The integrated health management model was applied included health management (such as: diet advice, psychological aspects of health, education/skills training on health self-management, regular blood glucose monitoring, long-term diabetes drug monitoring, etc. The management group demonstrated improvement on the following variables: health knowledge score, self-evaluated psychological conditions, overall self-evaluated health conditions, diet score, physical activity duration per week, regular blood sugar monitoring, waist-to-hip ratio, diastolic blood pressure and fasting blood sugar, the days of hospital admissions in the preceding 6 months

Jaipakdee et al conducted a cluster randomized controlled trial to assess the effectiveness of a DSMS program incorporating the computer-assisted instruction. Over six months, adjusted mean changes of hemoglobin A1c fasting plasma glucose, health behaviors, and quality of life were significantly improved

in intervention compared to control group. In conclusion, the DSMS program facilitates Public Health Centers to accomplish their support for people with diabetes

Li et al explored the effectiveness of systematic self-management education on blood sugar level of patients in the community with type 2 diabetes. The intervention group received systematic self-management education, while the other received routine community education. After the intervention, these three indicators were all statistically significant between the 2 groups. After intervention, blood sugar levels in the intervention group were obviously improved while in the control group, fasting plasma glucose was not statistically improved, plasma glucose and glycosylated hemoglobin levels were improved. Systematic self-management education effectively encourages patients with type 2 diabetes to control their blood sugar levels, and deserves further promotion

Guo et al assessed the efficacy of structured education in insulin-treated type 2 diabetes mellitus (T2DM) patients. In a 16-week open-label randomized controlled study, 1511 T2DM patients with inadequate responses to two or more oral antidiabetic drugs (OADs) for >3 months (HbA1c >7.5%) were randomized (1:1) to either an education group (structured diabetes education plus insulin therapy) or a control group (usual care plus insulin therapy). At the end of the study, significant reductions in HbA1c versus baseline were evident in both groups, but the reduction was greater in the education group. A higher proportion of patients in the education group achieved target HbA1c levels. In addition, patients in the education group showed greater increments in scores and improvement in the Morisky Medication Adherence Scale.The overall incidence of hypoglycemic events was similar in the two groups. Structured education can promote the ability of patients to self-manage and their compliance with medications, thereby achieving better outcomes.

Liu et al developed a diabetes group visit program as an alternative approach to support patient self-management and examined its effectiveness on self-management behaviors, self-efficacy and health status for patients with type 2 diabetes in rural communities. Compared with controls, the intervention patients, on average, increased their duration of aerobic exercise by more than 40 minutes per week; had significant increase of 0.71 in mean score on self-efficacy to manage diabetes; and had significant improvements in measures of illness intrusiveness and systolic blood pressure. The intervention patients attended an average of 10.1 of the 12 program sessions with 75.6% of them attended 10 and more sessions.

Song et al examined the effect of a combined program of exercise training and self-management education on risk factors for diabetes complications and adherence behavior. A two-group, quasi-experimental study design was used to test the 12-week intervention program with community-dwelling older adults in Korea. Change scores of outcome variables were compared between the intervention group and the control group. The change scores in triglyceride levels, body weight, body mass index, and diabetes self-management behavior showed significant differences between groups. However, no significant differences were found in A1C and blood pressure change scores between the groups in this sample, in which these characteristics were relatively well controlled at baseline. The results of this study

showed some promising synergistic effects of lowering cardiovascular risk factors from combining the two interventions.

Wong et al evaluated the effects of a large population-based patient empowerment programme (PEP) on clinical outcomes and health service utilization rates in type 2 diabetes mellitus (T2DM) patients in the primary care setting. Clinical outcomes of HbA1c, SBP, DBP and LDL-C levels, and health service utilization rates including numbers of visits to GOPC, specialist outpatient clinics (SOPC), emergency department (ED) and inpatient admissions, were measured at baseline and at 12-month post-recruitment. Compared with non-PEP group, PEP group achieved additional improvements in clinical outcomes over the 12-month period. A significantly greater percentage of patients in the PEP group attained HbA1C≤7% or LDL-C≤2.6 mmol/L at 12-month follow-up compared with the non-PEP group. PEP group had a mean 0.813 fewer GOPC visits in comparison with the non-PEP group. PEP was effective in improving the clinical outcomes and reduced the general outpatient clinic utilization rate over a 12-month period. Empowering T2DM patients on self-management of their disease can enhance the quality of diabetes care in primary care.

Yuan et al evaluated the effect of a short-term diabetes self-management education (DSME) on metabolic markers and atherosclerotic parameters in patients with type 2 diabetes. The patients in the intervention group received a 3-month intervention, including an 8-week education on self-management of diabetes mellitus and subsequent 4 weeks of practice of the self-management guidelines. There was a significant reduction in hemoglobin A1c and body weight in the intervention group as compared to the control group. However, no significant improvements were found in other metabolic markers, CIMT and CAS.

Discussion

It was found that most group-based DSME interventions provided a good effect on glycaemic control compared with one-to-one interventions, particularly programmes conducted for 10 hr or more (high-intensity programmes). Interventions that integrated practical sessions reported an exceptional clinical improvement in glycaemic control . Tw studies Li et al and song et al reported statistically significant improvements in glycaemic control, for both educational and psychological interventions. These were group-based interventions, demonstrating moderate effect size ranging from 0.5–0.6 which had represented high-intensity programmes (>10 hr sessions). Chao et al., demonstrated a significant difference between the intervention and the control group regarding Impact of the educational and psychological interventions on psychological well-being, diabetes knowledge and self-management. Guo et al and Liu et al assessed psychosocial self-efficacy have shown statistically significant improvement. Chao et al., Jaipakdee et al., Song et al integrated practical sessions such as exercise classes and healthy diet preparation into the DSME intervention. It has been observed that people with T2DM undertake adequate self-management to optimize blood glucose levels which may reduce and delay diabetes-related complications. Therefore, DSME is necessary to support people with T2DM to develop effective diabetes self-management skills. This review provides some evidence that Nursing led interventions are effective in improving glycaemic control for people with T2DM. This review is also consistent with the review by Steed, Cooke, and Newman (35)who reported that didactic teaching approaches alone had less overall effect on glycaemic control and Norris, Engelgau, and Narayan (36)who

concluded that interventions incorporating “hands-on” sessions were more effective than didactic approaches. The finding that high-intensity programmes appeared to be more beneficial supports the review by Pillay et al.(37) who revealed that DSME with less than 10 hr of sessions (less intensive) is less effective compared with more intensive sessions**.** Steinsbekk, Rygg, Lisulo, Rise, and Fretheim (38)synthesizing DSME RCTs concluded that interventions conducted with longer hours (more than 12 hr and between 6–10 sessions) have proven to be more beneficial in optimizing blood glucose level.

Limitations

The purpose of this dissertation was to determine the acceptance and refusal of the COVID 19 immunisation. The search technique made use of databases to track for relevant stuff. This was done via the use of keyword combinations and Boolean operators. Although the study's goals specified that official statistics would be included, it was not done due to time constraints, and so broad evidence selection bias may exist. According to (AM et al., 2016), here is where certain research may be overlooked and all accessible data may be overlooked. While doing a literature search for this research, it became clear that there was substantially more data accessible in addition to other factors. Moreover, the selected studies in this review are subject to volunteer bias, where participants who actively decide to participate in the research may systematically differ from the general population. This review included non-randomized study designs and was carried out using a discursive analysis rather than meta-analysis, due to the heterogeneity in both the interventions and outcome measures, as well as the difference in populations and settings. Thus, the results should be interpreted with extreme caution since they cannot predict the future changes in vaccine acceptance rates. The results of this study can be used as an initial motivation and guide for future studies and vaccine awareness campaigns.

Conclusion

The review concluded that overall group-based DSME is associated with improved clinical and psychosocial outcomes and interventions underpinned by behavioral theory with longer contact hours and the inclusion of active, hands-on participatory sessions may maximize the potential benefit of these programmes. Likewise, involving the participation of the multidisciplinary team may also be important. However, what we do not yet know is how to target DSME in this region so that it is culturally appropriate and whether beliefs and attitudes towards diabetes in ethnically diverse groups are being addressed and how this is achieved, which suggests more research is needed

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