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Research Article

Effectiveness of Nurse Led-home Based Diabetic Management Program on Glycemic Control and Quality of life of People Living with Diabetes: A Systematic Review

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ABSTRACT

Background: Diabetes mellitus (DM) is common medical condition which is prevalent among all the age groups due to which the quality of life (QOL) of the individuals gets affected. With this background, systematic literature search and meta-analysis were carried out. **Objective:** The objective of the study was to assess the effectiveness of nurse led-home based diabetic management program (N-HBDMP) on glycemic control and QOL among people living with diabetes (PLD), with particular focus on its efficacy as an adjunctive treatment. **Materials and Methods:** Reviewers searched nine databases for systematic reviews published in English language peer-reviewed journals between 2005 and 2018. Systematically, the search of significant articles was carried out in various search engines with the following key words: "PLD," "Glycemic Control," "QOL," and "N-HBDMP." Results were narrated and synthesized. **Results:** Thirty-five papers were retrieved from the search. Among them, 25 were evaluated to be of higher quality. Studies recruiting samples of diabetic people with type 2 DM, with various risk factors or those who were dependent on care were insufficient according to high incidence rate of T2DM. **Conclusion:** The incidence of T2DM, its related symptoms, and its complications can be reduced by the N-HBDMP which deals with controlling the glycemic level and improving the QOL of PLD.

Keywords: Glycemic control, Nurse led-home based diabetes management program, People living with diabetes, Quality of life

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Introduction

Living with diabetes can sometimes be tough. There may be many problems and hassles concerning diabetes and they can vary greatly in severity. The International Diabetes Federation Atlas (2017) states that 424.9 million people suffer from diabetes mellitus (DM) and that the number is expected to rise further to 628.6 million by 2045.[1] Diabetes is a disease with which people can still lead a normal life, and their life expectancy can remain high.

Type 2 DM is a disease which needs continuous support and guidance to lead a normal life without complications. It is a common metabolic disease but with profound life-threatening consequences and severe complications such as visual impairment, renal failure, neuropathy with risk of amputation, myocardial infarction, stroke, and increased mortality.[2] It is a lifestyle disease, with multiple causes which can be easily modified.

Type 2 DM accounts for 90%–95% of DM cases and can be attributed to the effects of population aging combined with an unhealthy lifestyle such as poor eating habits and

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sedentary lifestyle.[3] The behavioral changes required to control the condition of diabetes, especially those related to non-pharmacological treatment, contribute to a low adherence to self-care, which is a challenge for both people with diabetes and professionals involved in health care.[4] Primary health care is a favorable scenario for the implementation of the diabetes educational program which has sought to develop pedagogical practices based on the user's approach, such as group education, home visit, and telephone intervention.[5,6]

Quality of life (QOL) has been defined by the WHO as "individual's perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns."[7] It is a broad-ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs, and their relationship to salient features of their environment. QOL evaluation has emerged as an important outcome measure for chronic disease management.[8] This review emphasizes the most essential feature of measuring QOL, which is to capture the individual's subjective evaluation of their QOL and not what others imagine it to be. Efforts to achieve excellent health may damage QOL.[9] If the demands of a treatment regimen do not fit in with how the patients wish to live their lives, they may choose to compromise achieving right blood glucose control to protect their QOL. Therefore, results can be highly misleading if we interpret health status measures as if they are measures of QOL.[10]

It is increasingly recognized that in diabetes psychosocial factors have an important impact on self-care, acceptance of therapeutic regimens, and treatment success and that metabolic measures like glycemic control are poorly correlated with QOL necessitating separate assessment. In turn, management models for diabetes that include strategies to identify and enhance patient's health-related QOL issues have the potential to improve compliance and thereby their metabolic status. Hence, this study was conducted to know the sociodemographic profile glycemic control and health-related QOL of type 2 DM patients.[11]

Materials and Methods

Reviewers searched nine databases for systematic reviews published in English language peer-reviewed journals between 2005 and 2018. Relevant articles were identified by search engine; PubMed, Medline, SCOPUS, CINAHL, PsycINFO, Embase, Elsevier, EBSCOHost, and Google Scholar with the following key words: "people living with diabetes (PLD)," "glycemic control," "QOL," and "nurse led-home based diabetes management program (N-HBDMP)."

Inclusion

The included studies were evaluated according to predefined quality criteria. Data not pertaining to diabetes and glycemic control and the effect of N-HBDMP on QOL were excluded from the study. Information from these 20 studies was extracted. Figure 1 shows the flow chart for the 35 articles retrieved and reviewed for this research strategy in the diabetes and quality of life.

Exclusion

The study excluded those discussed about the other method to deal with diabetes and QOL among diabetic people.

Literature related to glycemic control and QOL of PLD

The main goal of diabetes management is to keep the glycemic level under control and within normal range, thereby helping the PLD to lead a quality life and also prevent or delay the onset of complications.

Glycemic control has been shown to prevent microvascular and macrovascular complications in PLD**.** Two large-scale studies – the UK Prospective Diabetes Study and the diabetes control and complications trial demonstrated that improving hemoglobin A1c (HbA1c) by 1% (or 11 mmol) for people with type 1 diabetes *or* type 2 diabetes cuts the risk of microvascular complications by 25%. Microvascular complications include retinopathy, neuropathy, and diabetic nephropathy (kidney disease).

Research has also shown that people with type 2 diabetes who reduce their HbA1c level by 1% are, 19% less likely to suffer from cataracts, 16% less likely to suffer heart failure (HF), and 43% less likely to suffer amputation or death due to peripheral vascular disease.[12]

The level of glycemic control is directly linked with the frequency of measurement of HbA1c in various populations. In a case–control study of 193 subjects with type 2 diabetes seen over a 6-month period in a rural practice in the United States showed that patients in our rural primary care practice

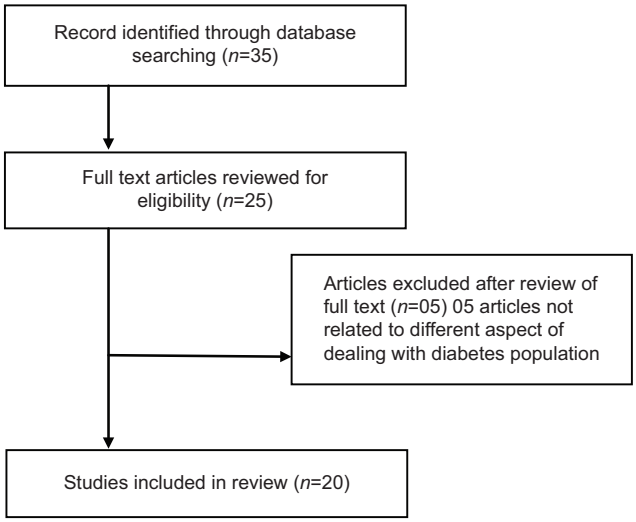

Figure 1: A flow chart for the 35 articles retrieved and reviewed for this research strategy in the diabetes and quality of life

who adhered to ADA guidelines for frequency of monitoring hemoglobin A1C had better diabetes control than did those who did not.[13] Good control of diabetes based on HbA1c levels was positively associated with adherence to recommendations on the frequency of monitoring of HbA1c. In a cross-sectional study of 1511 patients recruited from 15 hospitals in China, poor glycemic control was found to be associated with a lower frequency of monitoring of HbA1c. The extremely low frequency of HbA1c testing indicates that large proportions of the population with diabetes in India do not have recent data on their status of glycemic control, leading to delay in intensification of treatment and accumulation of avoidable glycemic burden.[14]

Uncontrolled glycemic levels among PLD not only are affected with many serious short-term and long-term consequences but also their QOL. According to the World Health Organization, 90% of people with Type 2 diabetes worldwide will be facing great pressure to treating themselves and may have lower QOL than healthy persons.[15]

A systematic review conducted to assess the related factors (including characteristics related to the disease, lifestyles, and mental health factors) of QOL of type 2 diabetes patients showed that physical exercises (the pooled ORs ranged from 0.635 to 0.825 for different scales, <1.00), glucose check more frequently (pooled OR [95% confidence interval (CI)]: 0.175 [0.041, 0.756]), were associated with a better QOL. The presence of complications (the pooled ORs ranged from 1.462 to 3.038 for different scales, more than 1.00), presence of hypertension (pooled OR [95%CI]: 1.389 [1.173, 1644]), longer duration of diabetes (pooled OR [95%CI]: 1.865 [1.088, 3.197]), diet with more red meat (pooled OR [95%CI]: 2.085 [1.063, 4.089]), and depression (the pooled ORs ranged from 3.003 to 11.473 for different scales, higher than 1.00) were associated with a worse QOL. Another study reports education and support are an important way to increase the self-care behaviors of PLD which can markedly reduce complications and improve QOL.[16]

Literature related to effectiveness of N-HBDMP on glycemic control and QOL of PLD

A prospective study conducted to evaluate a home-based DSME intervention in rural Guatemala using a quasi-experimental, single-group pretest-posttest design on 90 participants. The intervention included six home visits (May 2014–July 2016) conducted by a diabetes educator using a curriculum culturally and linguistically tailored to rural Mayan populations. Primary outcomes were changes in mean HbA1c and mean systolic and diastolic blood pressure at baseline and at 12 months. Secondary outcomes were diabetes knowledge and self-care activities at baseline and intervention completion. The results HbA1c decreased significantly from baseline to 12 months (absolute mean change, −1.5%; 95% CI, −1.9% to −1.0%; $P < 0.001$). Systolic blood pressure also improved significantly at 12 months (−6.2 mmHg; 95% CI, −10.1 to −2.2 mmHg; $P = 0.002$); changes in diastolic blood pressure were not significant (−1.6 mmHg; 95% CI, −3.9 to −0.7 mmHg; $P = 0.17$). There were significant improvements in diabetes knowledge and self-care activities from baseline to intervention completion. The study concludes need for more DSME research in resource-limited settings globally.[17]

Another a randomized controlled trial to assess effectiveness of a N-HBDMP (HOME-N) was conducted on 50 outpatient HF patients visiting a tertiary care hospital. The control group received usual routine care, and the experimental group received HOME-N, which included formal health teaching, a HF checklist (Hriday card), telemonitoring of vital parameters (blood pressure, heart rate, and weight) weekly through a mobile application named as "Dhadkan," and telephonic follow-up for 3 months. The outcome measures were the QOL, drug compliance, hospitalization, and mortality rate. After intervention, the QOL domain score of KCCQ as well as drug compliance improved significantly both within the experimental group ($P = 0.001$, $P = 0.001$) and as compared to control group ($P = 0.001$, $P = 0.004$, respectively). The study concluded that the HOME-N was significantly effective in improving QOL and drug compliance in HF patients.[18]

Sample review

A cluster randomized trial study was conducted on Effectiveness of a Training Course for General Practice Nurses in Motivation Support in Type 2 Diabetes Care among affiliated diabetes population living in Aarhus, Denmark. A total of 3635 subjects were taken for the study by convenient sampling of those aged 40–74 years and the data were collected by registered primary outcomes based glycated HbA1c, Problem Areas in Diabetes Scale (PAID), and the mental component summary score, SF12 (SF12, MCS) by self-report outcomes method. Thus, the result of the study showed that mean age of the subjects was 60.4±8.6 years and 56.5% were men. The median HbA1c at baseline was 6.7% (quartiles: 6.2, 7.6). Among the 1879 patients, where a measurement was performed in the intervention practices, 373 (19.9%) had a baseline HbA1c $8% compared with 354 (18.5%) of the 1910 patients where a measurement was performed in the usual practices. The mean total cholesterol at baseline was 4.6 mmol/l in both groups. The study also concluded that training course for general practice nurses in applying the self-determination theory in type 2 diabetes care had no effect as compared with usual practice measured by HbA1c and total cholesterol levels and wellbeing at 18 months of follow-up in a comprehensive register-based diabetes population. Subgroup analyses suggested a possible effect in women, which deserves further attention.[19]

A cross-sectional study was conducted to assess the effectiveness of tailored, in-home symptom focused diabetes intervention for improving the health outcomes of females

with type 2 diabetes attending tertiary health-care institute of Rajasthan. A total of 623 subjects with type 2 diabetes were included in the study. The data were collected with the help of PAIDS, ADA criteria with the help of self-report method. Thus, the study result revealed that 598 (96%) patients had lack of exercise, 406 (65.2%) patients were more than 60 years of age, 394 (63.2%) patients had dyslipidemia, 210 (33.7%) patients were smoker as per the mentioned criteria, 144 (23.1%) patients were obese, 118 (19%) patients had HTN before emergence of DM, and 90 (14.4%) patients had positive family history. The study concludes high prevalence of risk factors in Indian community is alarming. Health education, promotion of exercise, favorable lifestyle, dietary modification, cessation of smoking, screening programs for early detection of derange blood pressure, blood sugar, and lipid profile can be effective prevention strategies.[20]

Conclusion

Home-based diabetes program is based on what nursing activities are performed at home to improve the self-care behavior of the PLD, the nurses have their own patient case loads, provide educative role to promote health, provide psychological support, monitor the patient's condition, and perform nursing interventions. Patients can develop the skills and confidence needed to participate fully in their diabetes management with proper coaching at home. Patients who are physically unable to fully participate in their self-management may be willing to have a family member or other caregiver assist with the process. It is important to allow patients to make the determination about involving others in their care too.

A community health nurse can improve patient outcomes in a cost effective and efficient way, as she can help people to manage their symptoms and reduce the risks of developing complications in their own home setting.

There are very few therapeutic interventions and persistent lack of high-quality research as part to clinical issues of the management of diabetes, especially in terms of glycemic control and QOL. Hence, the efficacy of N-HBDMP in controlling the glycemic level and improve the QOL of PLD would make a great difference.

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