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Clinicians, Consumers, Evidence
Centre for Clinical Effectiveness

# Rapid Review

## Review of evidence to inform a best practice model of community diabetes education

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## Executive Summary

### Background

Monash Health's Community Services is undertaking a review of Community Based Diabetes Education in line with Chronic Disease Strategy. Part of this process involves consideration of contemporary models of care and strategies in order to establish a best practice model for Community Based Diabetes Education.

### Objective

The review aims to inform a best practice model of diabetes education by including evidence that addresses the following key areas:

- Components of models/pathways and their effectiveness
- Existing models/pathways/frameworks
- Role of diabetes educators where mentioned in the included literature

### Search Strategy

Three medical databases and three grey literature sources were searched for synthesised peer-reviewed and grey literature. Documents were screened according to the inclusion/exclusion criteria in Table 1, and selected for inclusion according to Figure 2.

### Results

A total of nine documents of peer-reviewed literature and three items of grey literature were selected for inclusion in the review. Selected peer-reviewed literature includes four systematic reviews that included evidence from randomised and non-randomised studies on diabetes education interventions and strategies [1-4]; and five literature reviews that included studies on strategies, models and framework of diabetes education [5-9]. Selected grey literature includes one national standard document [10], and two documents published by the Australian Diabetes Educators Association (ADEA) [11] and Diabetes UK [12]. Figure 1 outlines the high level areas of literature reported and also includes specific aspects of each of these high level areas.

**Figure 1.** Summary of findings and the high level areas reported in this review

| Components of diabetes education are categorised according to: [1, 3, 7, 8] | Effectiveness of components of diabetes education are reported in the populations: [1-3, 7, 9] | Models of diabetes education may incorporate the following: [1, 2, 5-7, 10, 11] |
|---|---|---|
| • Context<br>• Content<br>• Format<br>• Mode<br>• Deliverer | • Adult populations<br>• Older populations<br>• Low-middle income/disadvantaged or ethnic minority populations | • Context-adapted service model<br>• Community Health Worker and Credentialed Diabetes Educator models<br>• Framework to promote motivation for behaviour change in people with diabetes<br>• National Standards for Diabetes Self-Management Education and Support |

## Conclusions

Evidence, based on limited low quality studies, includes diabetes education on foot care, psychological, lifestyle, nutritional education that may be translated, and delivered in a group-setting, individually or in combination. Sessions vary between 15 minutes to 2 hours each session, and duration of programs may vary from 1 week to up to 2 years. Diabetes education may include verbal, written, visual, technology-based, or face-to-face strategies/interventions, delivered by multidisciplinary team of trained individuals. Evidence suggests that these trained individuals may include community health workers, credentialed diabetes educators, and healthcare workers with different levels of expertise.

There is no “one size fits all” model and different education programs are required to suit local community needs. This review identifies a context-adapted service delivery model for Type 2 diabetes mellitus, a practical three step approach (as part of an overarching framework) to promote positive behaviour change, as well as nine national standards for diabetes self-management and support; all of which could inform best practice for incorporation in models of community diabetes education. Evidence included involve the tailoring of diabetes education to include individualised assessments of cultural dimensions and modifications sensitive to varying degrees of acculturation, social-economic status, and language ability.

# Full Report

## Background

Monash Health's Community Services is undertaking a review of Community Based Diabetes Education in line with Chronic Disease Strategy. Part of this process involves consideration of contemporary models of care and strategies in order to establish a best practice model for Community Based Diabetes Education.

## Objectives

The review aims to inform a best practice model of diabetes education by including evidence that addresses the following key areas:

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- Role of diabetes educators where mentioned in the included literature

## Scope

The scope includes the adult population not limited to any particular type of diabetes, however excludes gestational diabetes. It may be difficult to dissect models of diabetes education from the strategies, principles or interventions that make up the model, therefore these latter components are included at the reviewer's discretion. Diabetes education, promotion, support, awareness, counselling, and teaching are closely related, and not distinguished in this review; as a result education and the aforementioned related components are included for the purpose of the review. The implementation of models of diabetes education is beyond the scope of this review.

## Search strategy

### Inclusion/Exclusion Criteria

**Table 1.** Inclusion/Exclusion criteria

| | |
|---|---|
| **Population** | **Include:** All populations, adult<br>**Exclude**: Gestational |
| **Interventions** | **Include:** Community diabetes education |
| **Outcomes** | **Include:**<br>• Components of education models and their effectiveness<br>• Models of care<br>• Clinical pathways<br>• Role of diabetes educators |
| **Context** | **Include:** Community-based<br>**Exclude:** Clinics, hospitals |
| **Types of evidence** | **Include:** Synthesised peer-reviewed and grey literature<br>**Exclude:** Documents with no clear details (content/context/format) of the education models or components |
| **Limits** | **Date**: 2015-2018<br>**Language:** English |
| **Databases** | **Peer-reviewed literature:** PubMed, Cochrane Database, TRIP<br>**Grey literature:** Australian Diabetes Educators Association (ADEA), Diabetes Australia, King's Fund |

### Search strategy

Three medical databases and three grey literature sources were searched for synthesised peer-reviewed and grey literature listed in Table 1. Documents were screened according to the inclusion/exclusion criteria in Table 1.

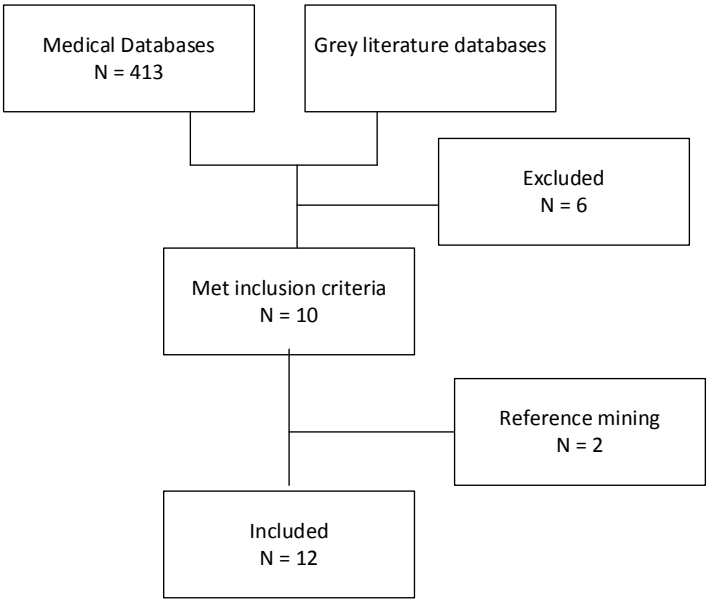
### Study Selection

Titles and abstracts identified were exported to EndNote X7 (Thompson, Reuters, Carlsbad, California, USA). Papers identified were screened using inclusion and exclusion criteria established *a priori.* Searches of PubMed, the internet websites were screened by one reviewer in a first round of screening. Only literature that met the above inclusion criteria was included. Selected full texts were then screened by two other colleagues in a second round of screening. Documents that met the inclusion criteria that were identified during reference mining were also included.

## Results

### Summary of Findings

**Figure 2.** This diagram indicates the flow of identified and included articles from the different sources searched.




Documents were screened according to title and abstract, and full text was retrieved if a decision could not be made. Documents that did not provide adequate detail on settings or intervention/model were excluded in a first round of screening. Selected documents were also screened with another colleague and requestor in a second round of screening.

A total of six full texts were further excluded.

A total of nine documents of peer-reviewed literature and three items of grey literature were selected for inclusion in the review.

Selected peer-reviewed literature includes four systematic reviews that included evidence from randomised and non-randomised studies on diabetes education interventions and strategies [1-4]; and five literature reviews that included studies on strategies, models and framework of diabetes education [5-9]. An overview of included peer-reviewed publications is found in Table 2.

Selected grey literature includes one national standard document [10], and two documents published by the Australian Diabetes Educators Association (ADEA) [11] and Diabetes UK [12]. An overview of included items of grey literature is found in Table 3.

## Overview of included papers

**Table 2.** Peer reviewed literature included in this review

| Reference | Review | Setting | Program/Model | Population | Quality of Evidence |
|---|---|---|---|---|---|
| Chew B. *et al.* (2017) [4] | High quality systematic review of RCT | Majority community-based | Psychological interventions on diabetes-related distress | Adults >18 years<br>Type 2 diabetes mellitus<br>High-income countries and two each in Asia and Latin America. | Overall, the quality of the evidence was low because of small studies, missing data, and limitations in the design and implementation of the included studies. |
| Sharoni A. *et al.* (2016) [1] | High quality systematic review of RCT and Non-RCT | Diabetic clinics, non-emergency department, community health or podiatry clinics, patient homes<br>Countries: International | Programmes to treat foot self-care/ problems | Older (mean age >60 years) | Most were low quality studies lacking details on study design, randomisation process, sampling procedures, sample size calculation<br>Many included studies were non-randomised studies at high risk of bias. |
| Bhurji N. *et al.* (2016) [3] | High quality systematic review of RCTs | Community-based; outpatient hospitals, diabetes clinics, health centre, GPs<br>Countries: Europe and South Asia | Control and management of diabetes | Type 2 diabetes mellitus;<br>South Asian patients (Pakistani/ Bangledashi/Indian) | Overall quality was low to moderate. Some studies reported on randomisation and allocation concealment, blinding. |
| Alaofe H. *et al.* (2017) [2] | High quality systematic review of RCT, pre- and post, cohort, cross-sectional, case control | Community health<br>Countries: *Low- and middle-income countries | Diabetes prevention and management | Type 2 diabetes mellitus;<br>Ages 25 to 92 years | Overall quality was varied.<br>Varied in methodological design and quality to make an overarching statement on quality. |
| Fisher L. *et al.* (2017) [5] | Literature review | Community health | Practical framework for programmes | All diabetes population | Not mentioned. |
| Lopez L. *et al.* (2016) [8] | Literature review | Community-based, homes | Effective eHealth strategies | Type 2 diabetes mellitus;<br>Latino | Not mentioned. |
| Ruddock J. *et al* (2016) [9] | Literature review | Community health | Innovative strategies to improve diabetes outcomes | All diabetes population;<br>Racial/ethnic minorities; low socio-economic status | Not mentioned. |
| Lepard M. *et. al* (2015) [7] | Literature review | Community-based, web-based; clinics, health centres, primary care clinics | Diabetes self-management education strategies | Type 2 diabetes mellitus<br>Rural population | Not mentioned. |
| Ku G. *et. al.* (2015) [6] | Contextual review | General<br>Countries: *Low- and middle-income countries | Delivery model for Type 2 DM and similar chronic conditions | Type 2 diabetes mellitus; | Not mentioned. |

**NRT – non-randomised trials; DM – diabetes mellitus; Low-income countries have gross national incomes per capita of $1045 or less as of 2014. Middle-income countries have gross national incomes per capita of at least $1045 but less than $12,736.46 as defined by World Bank 2016 classification [13]*

**Table 3.** Grey literature included in this review

| Reference | Title of document | Type | Setting | Objective | Applicability |
|---|---|---|---|---|---|
| Beck J. et al (2017) [10] | 2017 National Standards for Diabetes Self-Management Education and Support | National standards | United States | • Define timely, evidence-based, quality diabetes self-management education and support (DSMES) services<br>• Assist and guide those who provide DSMES services<br>• Used in the field for recognition by the American Diabetes Association (ADA) and accreditation by the American Association of Diabetes Educators (AADE) | • Solo practice<br>• Large multicentre programs<br>• Care-coordination programs, population health programs, technology-based models of care<br>• Both accredited and non-accredited providers of diabetes education |
| Diabetes, UK (2016) [12] | Diabetes education: the big missed opportunity in diabetes care | Summary of the published evidence | United Kingdom | • Provide evidence base of published evidence on structured education | • NHS health service |
| Australian Diabetes Educators Association (2015) [11] | The role and scope of practice for credentialed diabetes educators in Australia. | Publication | Australia | • Articulate the role and scope of practice of credentialed diabetes educators (CDE) and the factors that contribute to the scope of practice of CDEs<br>• Drive and promote standards of practice in diabetes education and care | • Diabetes educators in Australia |

## Synthesis of Results

## 1. Components of diabetes education

**1.1. Context** [1, 3, 4, 8]

- Diabetic clinics
- Community health or podiatry clinics
- Patient homes

**1.2. Content**

- **Foot self-care** education programmes, diabetes self-care education programmes, such as foot care aspect [1]
- **Lifestyle and nutritional** education (i.e. physical activity, blood glucose monitoring, hypoglycaemia, timing of meals). [2, 3, 8, 9, 11]
- **Translated** diabetes education [3]
- **Health promotion** and prevention, clinical management, counselling and health education [6]
- **Medication**, problem solving, coping strategies [8, 11]
- **Psychological** (cognitive/behavioural therapy, self-management, mindfulness, relaxation) [4]

**1.3. Format**

- **Interaction:** Group-based or individual-based; or a combination [1, 2, 4]
- **Length**: Varied between 15 min and 2 h each session [1, 2]
- **Duration**: Varied from 1 week – 12 months [2, 4, 9] to up to 2 years [7]

**1.4. Mode of delivery**

Techniques include: [1, 3, 7, 8]

- **Verbal** (e.g. teaching, discussion, assessment, home visit, phone call)
- **Written** (e.g. pictorial form, booklet, leaflet, handbook and newsletter)
- **Visual** (e.g. demonstration, visual aids, videotaped)
- **Technology-based** (web-based, telecommunication, telephone hotlines, telemedicine, mobile health, interactive voice response, videoconferencing, internet, social media, mobile phone)
- **Face-to-face** or via telehealth.
  The current gold standard is face-to-face group education classes, despite the risk of poor attendance [8]

**1.5. Who delivered content**

**Interdisciplinary** team of individuals ranging from personnel trained in the research field and who had medical and health science backgrounds (e.g. nurse, diabetic educator, dietician, psychologist, occupational therapist, physician and/or podiatrist), to health promotors/community health workers and volunteers [1-3, 6, 7]

In Australia, Credentialled Diabetes Educators (CDEs) integrate diabetes self-management education with clinical care as part of a therapeutic intervention to promote physical, social, spiritual and psychological wellbeing for individuals, communities and populations at risk of, or affected by diabetes [11].

Non-exhaustive list of educators as mentioned in literature:

- Health professionals [3]
- Medical practitioners [11]
- Nurses [1, 3, 6, 7, 11]
- Certified/credentialed diabetes educators [7, 11] (Appendix Table 6)
- Podiatrists [1, 3, 11]
- Dieticians [1, 3, 7, 11]
- Pharmacists [3, 11]
- Exercise Physiologists [11]
- Physiotherapists [11]
- Bilingual community-based peers [3]
- Health promoters (paid or volunteers) [2, 6]
- Expert patients [6, 7]
- Community Health Workers (CHW) [2, 7-9] (Appendix Table 5)

The role of CHW and CDE are detailed in Appendix Tables 5 and 6

## 2. Effectiveness of components of diabetes education

### 2.1. Adult populations

Based on a 2017 Cochrane systematic review, psychological interventions have a small and positive effect on confidence for self-care and glycosylated haemoglobin A1c (HbA1c – a long-term measure of glucose control) in adults with Type 2 diabetes mellitus [4]. However compared to usual care, psychological interventions showed no firm effect on diabetes-related distress, health-related quality of life, death from any cause, adverse events or blood pressure levels [4] (*Low quality evidence)*

### 2.2. Older populations

Limited studies in older populations showed improvements in the incidence in foot problems and/or foot care scores; all education programmes resulted showed improvement in foot self-care scores and foot problems (such as neuropathy, foot disability, foot score, treatment session, lesion, ulcer, tinea pedis and callus grade) among the older people with diabetes. Strategies in health education, such as foot assessment, verbal and written instruction, discussion, counselling, problem-solving, social support, home visits and phone calls, were proved to significantly improve the effect of education programmes. *(Low quality evidence)* [1]

### 2.3. Low-middle income/disadvantaged or ethnic minority populations

In one systematic review, the author suggested that Community Health Workers (CHW) have the potential to improve knowledge related to prevention and management of Type 2 diabetes mellitus in low-middle income countries. Given the limited number of studies included in this review, robust conclusions could not be drawn. *(Quality of evidence was inconclusive)* [2]

In a systematic review on indigenous Indians, effectiveness of interventions differed by region. The majority of studies targeting diabetes knowledge and related practices as well as patients' quality of life through educational interventions reported significant improvement in the targeted outcomes. Among education studies conducted in Europe targeting knowledge of and practices related to diabetes, education intervention was not consistently associated with the improvement of the outcomes. *(Low-moderate quality evidence)* [3]

In one literature review of self-management interventions for adults with Type 2 diabetes mellitus living in rural areas, both telehealth interventions and face-to-face interventions resulted in improved behavioural, biologic, and diabetes knowledge-related outcomes in adults with Type 2 diabetes mellitus living in rural areas. *(Quality of evidence was not appraised)* [7]

In another literature review on eHealth strategies in disadvantaged populations, authors suggest that telehealth, peer support, and CHW interventions can successfully improve clinical outcomes of HbA1c control, self-management behaviours such as increased physical activity, blood glucose monitoring, self-care behaviours, and medication adherence. Authors conclude that CHW interventions were efficacious in improving outcomes in remote or poor communities where individuals are affected by poverty and other psychosocial/physiological barriers. *(Quality of evidence was not appraised)* [9]

Evidence from another literature review also suggests that multimodal information technology approaches (mobile texting, tablets, apps, internet based program, etc.) in a specific Latino population may show greater outcomes and reduced attrition when coupled with in-person support. *(Quality of evidence was not appraised)* [8]

## 3. Models of diabetes education

### 3.1. In Scotland [12]

**Level one** - Information and one-to-one advice.

**Level two** - Ongoing learning that may be quite informal, perhaps through a peer group. For more information about other levels of education, including a King's Fund review of approaches to level two education. (Resources; page 13)

**Level three** - Structured education that meets nationally-agreed criteria (defined by NICE/SIGN) [14], including an evidence-based curriculum, quality assurance of teaching standards and regular audit.

### 3.2. In the UK [12]

A structured self-management education is embedded in the primary care system with National guidelines (NICE Quality Standards) recommending that "structured patient education is made available to all people with diabetes at the time of initial diagnosis and then required on an ongoing basis, based on formal, regular assessment of need" [14].

### 3.3. Context-adapted service model

A context-adapted service delivery model for chronic care services based on the level of expertise of health care personnel in low-middle income countries (i.e., Philippines) was conceptualised in a review by Ku and colleagues (2016) [6].

- The model incorporates care for diabetes into a current package health care activities making use of pre-existing human resources for health.
- It taps the potential of a workforce that may assume simple and standardised diabetes prevention and care activities.
- It decreases the additional burden on professional healthcare workers who are required to focus attention on both acute and chronic conditions.

**Figure 3.** The tiered model stratifies activities according to levels of expertise of healthcare personnel. The figure below is adapted from context-adapted service delivery model by Ku et al. (2016) [6] See Appendix Figure 5 for full model.

| | | |
|---|---|---|
| Health care workers perform ***population-based health promotion*** and prevention activities. | Health care workers perform ***health education and clinical management*** of patients in good glycaemic control and with stable co-morbidities. | Health care workers deliver ***clinical expertise, judgement, management and counselling*** to patients with poor glycaemic control and unstable co-morbidities. |
| **Less formal expertise** | **More formal expertise** | **Highest expertise** |
| Volunteers/ community-based health workers and expert patients | Paramedical personnel (midwives, nurses) | Physicians (general practitioners, specialists) |

**Increasing level of expertise of health care workers**

### 3.4. Community Health Worker and Credentialed Diabetes Educator models

Community Health Worker-led interventions have improved health behaviours and outcomes, particularly for racial/ethnic minorities and individuals without adequate healthcare. In addition, this hybrid model can overcome literacy, health literacy, and computer/digital literacy barriers, and may provide solutions to the growing strain on the health care workforce. [2, 6, 7]

Some evidence suggests that trained lay educators can deliver Type 2 diabetes education courses effectively when they are teamed with a healthcare professional. [12]

In Australia, the Australian Diabetes Educators Association (ADEA) benchmarks excellence in the practice of diabetes education and supports a cycle of best practice diabetes education and conducts the ADEA Credentialling Program. The Program provides professional and national recognition for Credentialled Diabetes Educators (CDEs) in Australia. [11]

The role, scope and impact of CHW and CDE are found in Appendix Tables 5 and 6.

### 3.5. Framework to promote motivation for behaviour change in people with diabetes

The application of behavioural theories varied across literature for intervention design, implementation, and evaluation. Literature mentions a range of specific behaviour theory or conceptual frameworks to guide their interventions (i.e. health belief model, self-efficacy, social cognitive theory, stages of change model, adult learning theory, empower and discovery learning theories, symptom-focused model, and the chronic care model). [1, 5, 7]

In the real world of diabetes, care efficacy is often dependent upon on how well a clinician is able to support personal engagement and motivation of the person with diabetes to use new tools and knowledge. Traditional hierarchical models of care and current 'data-driven' health systems often ignore or undermine the motivations and preferences of people with diabetes that need to be harnessed so that informed decisions about the management may be made. [5]

Therefore, the three-step process of the proposed framework focuses on changing clinician behaviour.

Clinicians are encouraged to shift to a different interactional mindset and to focus attention on the motivational needs of the person with diabetes (Step 1); apply both components through the medium of the clinician/person with diabetes interaction by relationship building (Step 2); and then, once engagement and motivation are addressed by this process, and only then, use specific behavioural tools to facilitate behaviour change (Step 3) [5].

**Figure 4.** Practical framework for encouraging and supporting positive behaviour change in a person with diabetes (PWD); pp 1660 Fisher et al (2017) [5]

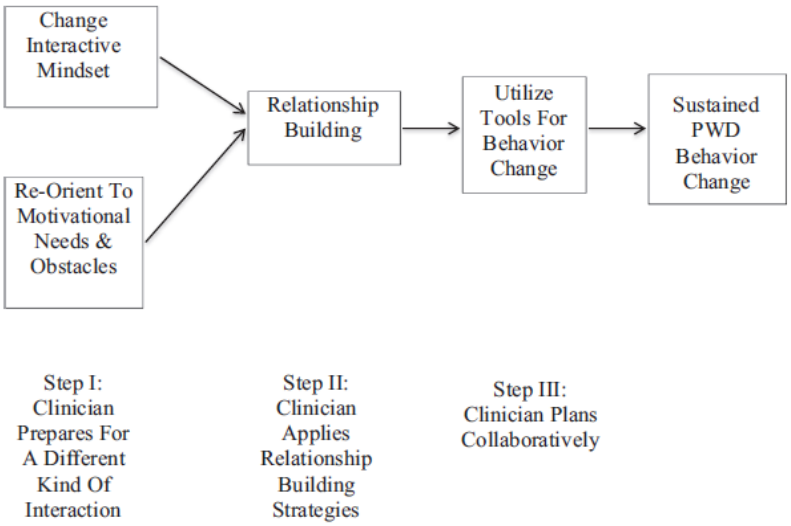



**Table 4.** Illustrative application and characteristics of the three steps of the practical framework; pp 1661 Fisher et al. (2017) [5]

**Step 1: Clinician preparation for a different kind of clinical encounter**

- **Self-determination theory**: focuses on individual's personal autonomy and self-direction to satisfy needs and enhance effective behaviour change.

**Step 2: Relationship Building**

- **Empowerment-based communication**: helps person self-identify areas for change through clarifying values and exploring feelings and motivations.
- **Motivational interviewing:** fostering ambivalence by identifying factors that foster change vs those that foster maintaining status quo, and tilt ambivalence toward change.
- **Anticipate feelings, acknowledge feelings, standardise/normalise feelings, accept feelings, plan (AASAP**): focuses on identifying, labelling and normalising feelings and expectations that drive behavioural change.
- **Common-sense self-regulatory model:** focus on basic beliefs and cognitive perceptions about disease and its management. How people think about disease impacts how they manage it.

**Step 3: Utilise tools for behaviour change**

- **Cognitive behavioural tools:** emphasis on actions regarding specific types of defined behaviour change using highly structured cognitive/behavioural methods.
- **Mindfulness:** Training to be aware and accepting of internal emotional states to facilitate decisions around action.
- **Diabetes Education** (DAFNE, DESMOND): provide information delivery.
- **Web-based, wearable, and other electronic information storage and delivery systems:** electronic prompting, monitoring and data storage of specific behaviours.

**DAFNE – dose adjustment for normal eating; DESMOND – diabetes education and self-management for ongoing and newly diagnosed*

### 3.6. 2017 National Standards for Diabetes Self-Management Education and Support (DSMES) [10]

The nine standards are designed to define quality diabetes self-management education and support (DSMES), and assist those who provide DSMES services to implement evidence-based DSMES by delineating the commonalities among effective and evidence-based DSMES strategies. By following the standards, DSMES should be incorporated into new and emerging models of care. [10]

**Standard 1 – Internal Structure**

The provider(s) of DSMES services will define and document a mission statement and goals. The DSMES services are incorporated within the organisation large, small, or independently operated.

**Standard 2 – Stakeholder Input**

The provider(s) of DSMES services will seek ongoing input from valued stakeholders and experts to promote quality and enhance participant utilization.

**Standard 3 – Evaluation of Population Served**

The provider(s) of DSMES services will evaluate the communities they serve to determine the resources, design, and delivery methods that will align with the population's need for DSMES services.

**Standard 4 – Quality Coordinator Overseeing DSMES Services**

A quality coordinator will be designated to ensure implementation of the Standards and oversee the DSMES services. The quality coordinator is responsible for all components of DSMES, including evidence-based practice, service design, evaluation, and continuous quality improvement.

**Standard 5 – DSMES Team**

At least one of the team members responsible for facilitating DSMES services will be a registered nurse, registered dietitian nutritionist, or pharmacist with training and experience pertinent to DSMES, or be another health care professional holding certification as a diabetes educator (CDE) or Board Certification in Advanced Diabetes Management (BC-ADM). Other health care workers or diabetes paraprofessionals may contribute to DSMES services with appropriate training in DSMES and with supervision and support by at least one of the team members listed above.

**Standard 6 – Curriculum**

A curriculum reflecting current evidence and practice guidelines, with criteria for evaluating outcomes, will serve as the framework for the provision of DSMES. The needs of the individual participant will determine which elements of the curriculum are required.

**Standard 7 – Individualisation**

The DSMES needs will be identified and led by the participant with assessment and support by one or more DSMES team members. Together, the participant and DSMES team member(s) will develop an individualised DSMES plan.

**Standard 8 – Ongoing Support**

The participant will be made aware of options and resources available for ongoing support of their initial education, and will select the option(s) that will best maintain their self-management needs.

**Standard 9 – Participant Progress**

The provider(s) of DSMES services will monitor and communicate whether participants are achieving their personal diabetes self-management goals and other outcome(s) to evaluate the effectiveness of the educational intervention(s), using appropriate measurement techniques.

## Discussion

### *Effectiveness of diabetes education and its components*

Studies differed in the design of their interventions including the strategies used, the duration, and the delivery format [7]. The effectiveness of components of diabetes education mentioned in this review varied across populations and is based on limited and low quality evidence [1-4]. As results varied greatly, the author was not able to conclude which education interventions/ components resulted in most significant improvements [2]. Nevertheless the positive effectiveness of diabetes education [1-4] are consistent with previous literature published, where a systematic review conducted by Norris and colleagues (2002) showed that diabetes self-management education was associated with an improvement in knowledge, frequency, and accuracy of self-monitoring of blood glucose, self-reported dietary habits, and glycaemic control, particularly in the short term [15]. In addition, Massey and colleagues (2010) had previously identified several promising strategies to increase diabetes education in rural areas such as telephone hotlines, telemedicine, web-based education, and community health worker interventions [16].

### *Models of diabetes education*

There is no "one size fits all" model and different education programs are required to suit local community needs. Nevertheless this review has identified several components from models and frameworks that may be considered when developing a best practice community diabetes education model.

The context-adapted service delivery model for the delivery of care for Type 2 diabetes mellitus patients stratifies activities of healthcare workers according to their level of expertise of health care, therefore decreasing the additional burden on professional healthcare workers [6]. Although this model may be thought to be far removed from that in higher income countries, but it is designed to deliver prevention and care that encompass the spectrum of diabetes, i.e. from those at risk to those with poor glycaemic control and/or unstable co-morbidities and includes counselling for self-management education and support [6].

It is noted that clinician-directed treatment and education alone have not fully recognised that people with diabetes make far more health management decisions than clinicians. Fisher and colleagues (2015) propose a conceptual rationale and a three-step framework that fully recognises personal needs for autonomy, competence and relatedness, and that channels these needs into the clinical encounter through the effective use of specific clinician relationship-building skills and behavioural tools [5]. This framework has practical considerations to be applied in diabetes education models, as does the nine standards designed to define quality diabetes self-management education and support [10]. By

following the standards, diabetes self-management education and support should be incorporated into new and emerging models of care [10].

Interventions led by Community Health Workers (CHW) have also improved health behaviours and outcomes, particularly for racial/ethnic minorities and individuals without adequate healthcare. In addition, this hybrid model can overcome literacy, health literacy, and computer/digital literacy barriers, and may provide solutions to the growing strain on the health care workforce [2, 6, 7]. Some evidence also suggests that trained lay educators can also deliver Type 2 diabetes education courses effectively when they are teamed with a healthcare professional [12]. Other education models include Credentialed Diabetes Educators (CDE) in Australia. CDEs integrate diabetes self-management education with clinical care as part of a therapeutic intervention to promote physical, social, spiritual and psychological wellbeing [11].

## Limitations

The effectiveness of components of diabetes education models of care as mentioned in Section 2 of the review are based on a varied levels of evidence. Conclusions were based on a low quality of evidence drawn from systematic reviews of randomised and non-randomised control trials [1, 3, 4] to literature reviews that may be based on methodologically flawed studies subject to high risks of bias [7-9]. There was significant heterogeneity in study design, methodological quality, where populations, settings, outcomes measured, follow-up and evaluation differed, and these should be taken into consideration when interpreting the findings. [1, 2]

It was not always clear in literature that diabetes education was community-based, and it was dependent on the reviewer's discretion to include evidence where majority of the included studies within the review were community-based, and if this was apparent from the content although not stated explicitly. There was also a lack of distinction between ethnicity and socio-economic status within the groups being studied [9], and for the purpose of this review, the findings based in low-middle income/disadvantaged or ethnic minority populations settings were reported together. It is important for the reader to note that majority of included synthesised literature were based in these aforementioned settings [2, 3, 6-9] so this may limit the generalisability of the results.

## Conclusions

Evidence, based on limited low quality studies, includes diabetes education on foot care, psychological, lifestyle, nutritional education that may be translated, and delivered in a group-setting, individually or in combination. Sessions vary between 15 minutes to 2 hours each session, and duration of programs may vary from 1 week to up to 2 years. Diabetes education may include verbal, written, visual, technology-based, or face-to-face strategies/interventions, delivered by multidisciplinary team of trained individuals. Evidence suggests that these trained individuals may include community health workers, credentialed diabetes educators, and healthcare workers with different levels of expertise.

There is no "one size fits all" model and different education programs are required to suit local community needs. This review identifies a context-adapted service delivery model for Type 2 diabetes mellitus, a practical three step approach (as part of an overarching framework) to promote positive behaviour change, as well as nine national standards for diabetes self-management and support; all of which could inform best practice for incorporation in models of community diabetes education. Evidence included involve the tailoring of diabetes education to include individualised assessments of cultural dimensions and modifications sensitive to varying degrees of acculturation, social-economic status, and language ability.

## References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## Additional Resources

1. CEC: https://www.cdc.gov/diabetes/ndep/training-tech-assistance/training-courses.html
2. ADEA (2017) tools and resources: https://www.adea.com.au/wp-content/uploads/2017/08/Health-Literacy_Position-Statement_3.0_Approved_170808.pdf
3. ADEA publications and guideline documents: https://www.adea.com.au/about-us/our-publications/
4. King's Fund approach to Diabetes education: https://www.diabetes.org.uk/Professionals/Resources/Resources-to-improve-your-clinical-practice/Diabetes-self-management-education
5. Diabetes Australia: https://www.diabetesaustralia.com.au/reports

## Appendix

**Figure 5.** Context-adapted service delivery model for Type 2 diabetes mellitus and similar chronic conditions [6]

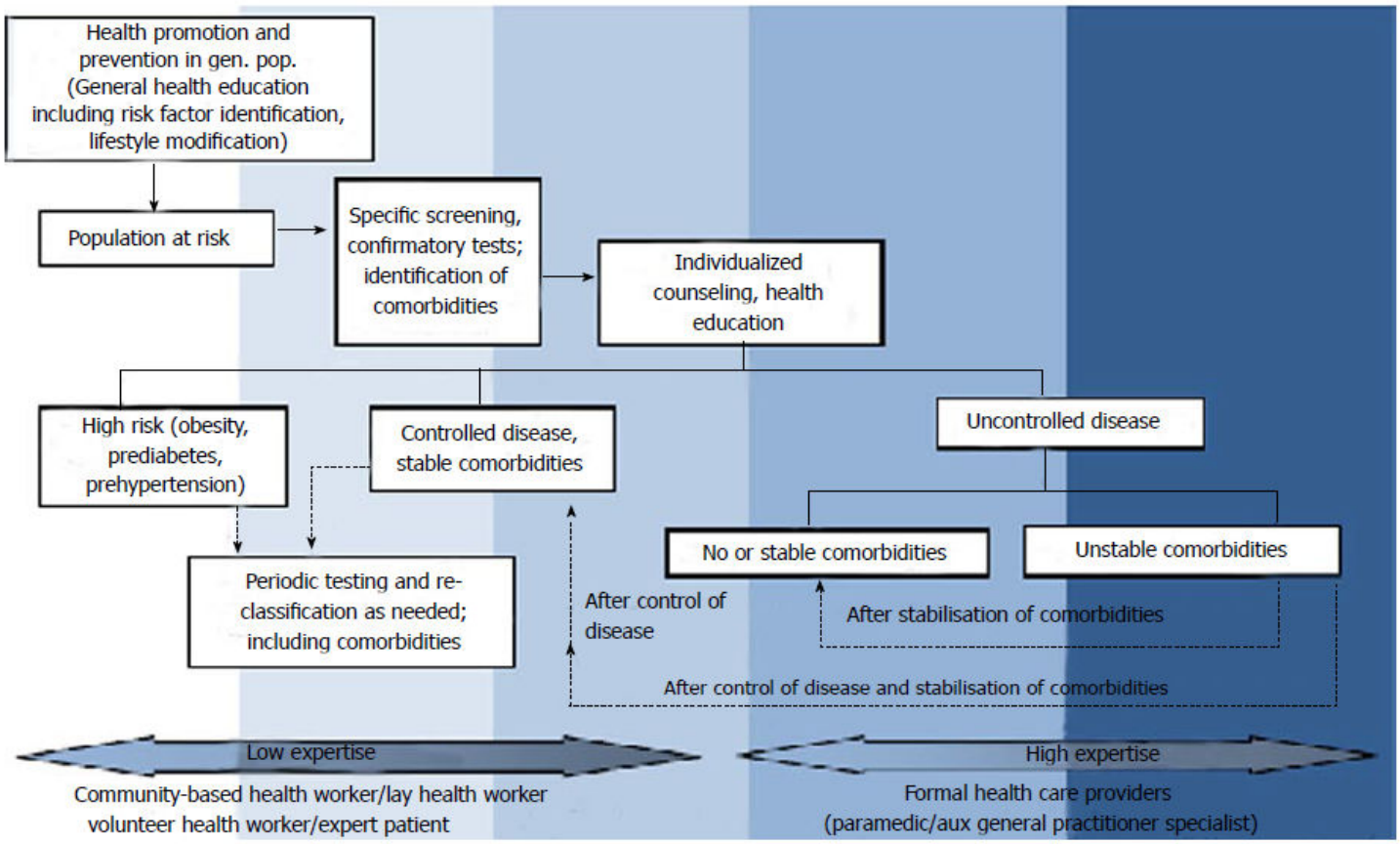


**Figure 4 The context-adapted service delivery model for type 2 diabetes mellitus and similar chronic conditions.**

### 4.1 Community Health Workers (CHW)

The role and impact that Community Health Workers (CHW) and their variants (bilingual community peers, lay advisors) have in low-middle income countries, or rural and ethnic minority populations are discussed in four sources of literature [2, 3, 6, 7]

**Table 5.** The role and impact of Community Health Workers (CHW) and their variants

| Role | Impact |
|---|---|
| • Collaborate with diabetes educators and other health care providers | • Increase knowledge and self-sufficiency through outreach, community education, informal counselling, social support, and advocacy |
| • Bridge the gap between ethnic, cultural, or geographic communities and health care providers | • Instil ownership of health problems, foster trust, and facilitate the assimilation of medical innovations |
| • Educate patients, identify resources, provide case management, coordinate care with the health care system | • Reduce per capita demand for health care providers and provide solutions to the growing strain on the health care workforce |

### *4.2 Credentialed diabetes educators (CDE)*

The role and scope of practice for credentialed diabetes educators in Australia is mentioned in one document published by the Australian Diabetes Educators Association [11].

**Table 6.** Role and scope of practice for credentialed diabetes educators in Australia

| **Role** | **Scope of practice** |
|---|---|
| • Develop the knowledge, skills and confidence for the everyday management of diabetes<br>• Understand personal health risks<br>• Explore the meaning and implications of these risks in the context of personal, social and cultural influences and in terms of current lifestyle behaviours<br>• Activate the determination of a comprehensive self-management plan that will maximise health outcomes. | • Clinical Practice, Diabetes Education and Counselling<br>• Research and evidence-based practice<br>• Management, Administration and Leadership |

**Table 7.** Information sources and search terms (as 14th Sept 2018)

| **Medical databases information sources** | **Results** | **Included** |
|---|---|---|
| PUBMED | 179 | 10 |
| TRIP | 60 | 1 |
| Cochrane Database of Systematic Reviews | 174 | 1 |
| **Grey literature databases information sources** | **Results** | **Included** |
| Australian Diabetes Educators Association (ADEA) | - | 1 |
| King's Fund | - | 0 |
| Diabetes Australia | - | 0 |

**Table 8.** Database Search Terms

| **Search terms in PubMed** | | |
|---|---|---|
| **1** | (diabetes education) AND community | 5241 |
| **2** | (diabetes education) AND community Sort by: Best Match Filters: Publication date from 2013/01/01 to 2018/12/31 | 1814 |
| **3** | (diabetes education) AND community Sort by: Best Match Filters: Review; Publication date from 2013/01/01 to 2018/12/31 | 179 |
| **Search terms for Grey literature** | | |
| **Terms around "diabetes" AND "education"** | | |