Chronic disease self-management education: what is the evidence?

Sharan Ermel, Angela Crombie, Jenni Ham, Bendigo Health Care Group

Introduction

Chronic disease has reached epidemic proportions in the western world, including Australia where almost $50 billion dollars was attributed to disease cost in the 2000–2001 period.1 Chronic disease has been defined as a chronic condition that presents itself for longer than six months, and that has slow changes.3 At present, approximately 34% of Australia’s population live in rural and remote areas, with higher rates of chronic disease risk factors, higher mortality rates, and generally less access to both specialised medical and other health services.4 To address this health-risk imbalance there is a call to identify and introduce effective chronic disease self-management (CDSM) behaviours and interventions suitable for rural and regional settings. Engagement in self-management has the potential to ease the increasing burden of chronic disease, not only on the health care system but also on the individual enduring the chronic disease; therefore self-management activities and commitment must increase3 and be incorporated into daily life and each health care encounter, regardless of locale.

Nonetheless, while the literature surrounding the concept and development of self-management is expanding, self-management defies a consensual definition.3 CDSM is focused on increasing the individual consumer’s capacity to engage in “activities to promote (their own) health”5, and empowering them to monitor and respond appropriately to the signs and symptoms related to their disease, and as thus, minimise the negative impact on their level of “functioning, emotions and interpersonal relationships.”5 Also, it has been postulated that self-management provides “the mechanisms for coping with compliance to prescribed medical regimes”3 and importantly collaborate with health professionals in planning and implementing care and disease management strategies. Further to these definitions, it is proposed that self-management enables...

• participants to make informed choices, to adopt new perspectives and generic skills that can be applied to new problems as they arise, to practice new health behaviours, and to maintain or regain emotional stability5

• …all of which are behaviours that enhance an individuals’ ability to self-manage in a perpetuating cycle of increasing self-efficacy and resourcefulness.

However, while there are a burgeoning number of CDSM approaches, programs and theories in existence, it is increasingly difficult for health care providers to clearly identify and critique potentially suitable interventions. To optimise engagement in CDSM, interventions employed should be evidence-based, sustainable, accessible, adaptable and individualised to meet the specific needs of the individual, regardless of the setting. Therefore the aims of this review are to identify and assign levels of evidence to existing self-management intervention literature to facilitate dissemination, and to formulate recommendations for possible implementation in rural and remote regions in Australia.

Methods

An exploratory review and critique of the available literature was undertaken to identify the scope of the evidence surrounding CDSM programs currently being undertaken. Intentionally the approach to the literature review was broad to capture the extent of CDSM programs that are being developed and implemented in a variety of settings, and to arbitrarily categorise these interventions according to a pre-determined level of evidence8. It was beyond the scope of this project to further examine the quality of individual studies within each of the assigned levels of evidence8. The breadth of the literature review reflects the broadness of the concept of CDSM and the subsequent range of interventions being developed to optimise the engagement of those with chronic illnesses in successful self-management activities. A secondary aim of the review process was to ensure that all included literature was...
straightforward to access, and in a format that was readily interpreted by clinicians, especially those without a research background or degree.

Inclusion criteria
The inclusion criteria that the literature needed to fulfil to be included in the review were as follows:

- in print in English
- readily accessible
- evaluated the impact of self-management education programs
- participants were aged over 18 years of age
- had an education and problem solving focus, rather than a primary aim of skill acquisition

The publications were also restricted on the chronic disease focus content. The chronic diseases considered relevant, and therefore included in this review were those outlined by the Australian Institute of Health and Welfare and included coronary heart disease, stroke, lung and colorectal cancer, depression, diabetes, asthma, chronic obstructive pulmonary disease (COPD), chronic renal disease, oral diseases, osteo- and rheumatoid arthritis and osteoporosis.

In addition, the evaluation had to provide sufficient data and information for the completion of a data matrix for each intervention being evaluated to enable the determination of level of evidence that the literature contributed. Data extraction was restricted to the published data only, as it was beyond the scope and resources of this project to contact individual authors to gain additional data. A member of the project team undertook the data extraction process and descriptive matrix construction independently. The information extracted for the matrix included:

- the identified model or theoretical basis for the self-management program
- the study design
- sample demographics and inclusion criteria
- intervention description
- outcome measures studied
- results
- methodological issues.

Exclusion criteria
Citations were excluded if there was insufficient detail to establish relevance to the subject included in the title and abstract. Publications that had insufficient description of the program or model and its implementation and evaluation were also excluded. In addition, programs that were affiliated with the Sharing Health Care Initiative scheme were excluded, as the final report was unavailable at the time of the review, and only limited mid-cycle intervention evaluations were accessible.

Search strategy
To identify the relevant literature, the Cochrane, Medline, Pre-Medline, CINAHL, Psych Info and Journals@Ovid databases were searched using combinations of the keywords: chronic disease, client education, patient education, self-management, self-care, education, model and program, with the search results restricted to “research” where this limitation was possible. To ensure that all linguistic variations of these keywords were accessible, wildcard characters were also utilised. The search was further restricted to literature published or available since 2000 and up until the time of the review in August 2005, to ensure currency of evidence. An internet search using a common generic search-engine utilising the keywords was also undertaken to identify the existence of relevant available grey literature not published elsewhere. In addition, existing literature and resources were hand searched to identify
potentially relevant literature. Full-text articles and publications were retrieved through various available resources, including either online or via institutional libraries.

The literature review process was guided by the principles outlined by the National Health & Medical Research Centre. The citations captured through the search process were scrutinised to elicit their relevance to the review aims and objectives, and duplicates were discarded. Each citation title and abstract was reviewed by two members of the project team to ascertain the applicability of the study to the review. Where the relevance of the citation to the review could not be established from the title and/or the available abstract, the full text article or publication was retrieved. A total of 1579 unduplicated citations were identified initially; in addition, reference lists of retrieved citations were also hand searched to identify potentially relevant papers.

Attributing levels of evidence
In order to add to the weight of the exploratory nature of this review, and to facilitate post hoc comparisons by clinicians and policy-makers, the retrieved literature was categorised according to its design methodology against scientific levels of evidence, which is an accepted National Health & Medical Research Council (NH&MRC) standard. The National Breast Cancer Centre Psychosocial working group expanded the NHMRC’s evidence rating system in order to “highlight the distinction between level IV evidence gained from well-conducted descriptive research (level IVa), and evidence drawn from clinical expertise (level IVb).” This evidence rating system allows for the insight offered by “well-conducted research or clinical consensus on pertinent issues which may have not yet been subject to investigation using randomised control trial methodology”. Two members of the research project team independently undertook the process of evaluating and attributing the levels of evidence to each of the eligible studies. There was 100 per cent concurrence with the grading process between the two researchers.

Table 1 Level of evidence according to study design

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Study design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>Evidence is obtained from a systematic review of all relevant randomised controlled trials, usually found in a meta-analyses</td>
</tr>
<tr>
<td>Level II</td>
<td>Evidence is obtained from at least one properly-designed randomised controlled trial</td>
</tr>
<tr>
<td>Level III</td>
<td>Evidence is obtained from well-designed controlled trials without randomisation; or from well-designed cohort or case-control analytic studies, preferably from more than one centre of research; or from multiple time series, with or without the intervention</td>
</tr>
<tr>
<td>Level IVa</td>
<td>Evidence is obtained from descriptive studies of provider practices, patient behaviours, knowledge, or attitudes or a systematic review of the descriptive studies</td>
</tr>
<tr>
<td>Level IVb</td>
<td>Represents the opinions of respected authorities based on clinical experience or reports of expert committees</td>
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Categorisation of self-management interventions
Due to the complex and layered approaches utilised in the self-management interventions currently being developed and implemented, the process of categorisation undertaken has been based upon the fundamental aims, content and delivery method of the self-management intervention under investigation. Therefore the interventions were delineated to these three arbitrary categories:

- self-management education focused group interventions
- process or health professional focused interventions
- supportive individual interventions.

It is acknowledged that a number of the interventions could have been allocated to multiple categories; however it was the predominant premise that determined the categorisation process. An example of this was the CDSM program established in South Australia that was underpinned by the Flinders...
model, which incorporates health professional interventions and tools, but the focus within this setting was a case-management style of individualised care co-ordination, and as thus it integrated into the supportive individualised category.

Results

Identified literature

Table 2 provides a numeric summary of the citations sourced according to database and cross referenced to the search terms which elicited the corresponding number of potential studies. The total number of citations retrieved through this process was 5302, which following the discarding of duplicates was reduced to a pool of 1579. A common internet search engine was also investigated as a potential strategy to access relevant literature. However, 70 000 and 5500 potential sites were identified respectively with the worldwide and Australian specific search restrictions. This method of identifying potential publications was abandoned after hand searching 1000 hits as it was deemed too time consuming for the research team and not a viable option for replication for health clinicians subsequently.

The search strategy and screening process of titles and abstracts led to a short list of 89 potentially relevant titles. Through adherence to the specified inclusion criteria and through a process of manual search strategies, 46 papers detailing 45 studies of CDSM programs or models were identified. In addition, there were 13 systematic9–21 and five descriptive reviews22–26 identified and retrieved that were deemed relevant to this investigation.

Table 2 Number of articles identified from each database according to keyword combination

| Database        | a & b | a & c | a & b & d | a & b & c | a & b & e | a & b & f | a & c & d | a & c & e | a & c & f | a & c & g | a & c & h |
|-----------------|------|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Cochrane 2005 Issue 2 | 127  | 94   | 88       | 81       | 58       | 62       | 56       | 53       |          |          |          |          |
| Medline         | 125  | 257  | 49       | 23       | 75       | 24       | 15       | 20       |          |          |          |          |
| Pre-Medline     | 2    | 1    | 1        | 0        | 0        | 0        | 0        | 0        |          |          |          |          |
| CINAHL          | 52   | 123  | 14       | 4        | 23       | 8        | 4        | 13       |          |          |          |          |
| Psych-Info      | 12   | 7    | 2        | 1        | 1        | 1        | 1        | 0        |          |          |          |          |
| Journals@Ovid   | 503  | 620  | 398      | 279      | 417      | 279      | 294      | 338      |          |          |          |          |
| Pub med Medline | 292  | 298  | 51       | 26       | 80       | 28       | 15       | 20       |          |          |          |          |

(a) chronic disease (b) self-management (c) self-care(d) education (e) program (f) model (g) client (h) patient

Evidence levels

Thirteen papers were identified that fulfilled the Level I Evidence requirements8 outlined in table one. Of these, two reviews related to multiple chronic diseases16,18, four pertained to diabetes9,13,15,19 (primarily Type II Diabetes Mellitus), three related to arthritis type chronic diseases,12,14,17 and four related to the respiratory chronic diseases of asthma10,20 and COPD.11,21

Only the data relevant to the self-management interventions examined in the systematic review undertaken by Balas15 and colleagues was considered for this current literature review. Of the studies that fulfilled the inclusion criteria, 21 studies were randomised controlled trials.27–47 In accordance with the methodology of this review and congruent with the levels of evidence7 (outlined in Table 1) the aforementioned 21 randomised controlled trials27–47 were rated as Level II evidence. The methods of randomisation described within these studies included the use of random number tables or sequences30,33,38–9,43, randomisation according to region or site27–29,32,35, the use of sealed envelopes to facilitate randomisation16,40,42, or the use of computer programs to randomise subjects.41,44–46 In three studies31,37,47 insufficient descriptions were provided to determine the method of randomisation.
According to the guidelines outlined for the levels of evidence\textsuperscript{7} there were sixteen studies\textsuperscript{48–62,72} which fulfilled the criteria of Level III evidence, eight studies\textsuperscript{63–70} which fulfilled the Level IVa evidence status; and one study\textsuperscript{71} which was critiqued as meeting the requirements of the Level IVb evidence criteria. Of the retrieved studies, seven were deemed grey literature, sourced from internet websites or publications\textsuperscript{35,50,54,56,58–9,61}, and one was sourced from published conference proceedings.\textsuperscript{55} The mean length of follow-up period for the intervention studies graded Level II to Level IVb was 11.8 months, with the shortest follow-up period being six weeks\textsuperscript{45}, and the longest identified as five years.\textsuperscript{39}

Interventions identified

The studies included within this literature review dealt with a wide range of self-management interventions. These ranged from programs and interventions developed for, and focused on:

- individual participants \textsuperscript{32, 40–3, 46–7, 51–3, 57, 64, 70–72}
- specific chronic condition groups\textsuperscript{27–28, 49, 54–5, 65, 67}
- generic chronic condition groups \textsuperscript{31, 33–4, 36, 48, 50, 58, 60–1, 66}
- culturally-specific generic condition groups\textsuperscript{29–30}
- health providers \textsuperscript{35, 38–9, 55–6, 59, 62–3, 68–9}

The group based models or programs were divided into three distinctive groups, according to those that were disease specific, i.e. for participants with diabetes only, generic groups were suitable for participants with a range of chronic diseases, and the culturally-specific groups had been modified for cultural groups, for example Hispanic or Italian participants. The extent of intervention description varied within the reviewed literature, however, generally there was sufficient evidence to describe the underlying structure and aims of the interventions. Table three illustrates the attributed levels of evidence of the reviewed literature while cross-referencing to the underlying focus and method applicable to the intervention.

<table>
<thead>
<tr>
<th>Chronic disease self-management models</th>
<th>Level II</th>
<th>Level III</th>
<th>Level IVa</th>
<th>Level IVb</th>
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<tbody>
<tr>
<td>Self-management group education models</td>
<td></td>
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<tr>
<td>Stanford: Disease Specific</td>
<td>27, 28</td>
<td>49</td>
<td>65, 67</td>
<td></td>
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<tr>
<td>Stanford: Culture/language modified</td>
<td>29, 30</td>
<td></td>
<td></td>
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<tr>
<td>Stanford: Generic</td>
<td></td>
<td>49,50,58, 60–1</td>
<td></td>
<td></td>
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<tr>
<td>Professional/Peer Led Group</td>
<td>31,33–4, 36</td>
<td>55</td>
<td>66</td>
<td></td>
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<tr>
<td>Process/health professional delivery model</td>
<td></td>
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<tr>
<td>Flinders Model</td>
<td>35</td>
<td>56</td>
<td></td>
<td></td>
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<tr>
<td>Flinders with SM intervention</td>
<td></td>
<td>54,59</td>
<td>69</td>
<td></td>
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<tr>
<td>Chronic Care Model</td>
<td>62</td>
<td>63,68</td>
<td></td>
<td></td>
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<tr>
<td>Group Doctor Visits</td>
<td>37–9</td>
<td></td>
<td></td>
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<tr>
<td>Supportive interventions</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Peer support or relationship</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Brief with Guideline</td>
<td>42</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivational Interviewing</td>
<td>32, 40–1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Management/Support</td>
<td>44–5</td>
<td>53,72</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>Technological Support</td>
<td>46–7</td>
<td>52,57</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Total number of evaluations for each evidence level</td>
<td>21</td>
<td>16</td>
<td>8</td>
<td>1</td>
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</table>
Outcomes measured

The reviewed CDSM evaluations employed a vast array of outcome measures and data forms to appraise the individual intervention instruments and measures included those that conceptualised health status, such as the Health Assessment Questionnaire (HAQ)\(^{27-8,48}\); functional status, for example the Activities of Daily Living scale\(^{55}\); self-reported symptoms\(^{36}\); specific clinical outcome measures such as the Body Mass Index\(^{32-3, 38-9,63-4}\) and six-minute walk test\(^{33,36}\), health behaviours including the Cognitive-behavioural technique scale\(^{28,49,60}\) and the Behavioural Risk Factor Surveillance System\(^{47}\); as well as the self-report evaluation of satisfaction post involvement in a self-management program\(^{66}\).

Health care costs and utilisation trends\(^{28,30-3,64,72}\) and the psychosocial variables of cohesiveness, helplessness, knowledge and self efficacy\(^{31}\) were also well represented as valued measures of the potential impact of interventions on program participants. Several investigations utilised qualitative\(^{65,67,69,70}\) and mixed\(^{34,50,54,59}\) methodologies, rather than solely employing quantitative measures. Appendix I provide a brief edited summary of the potential positive outcome benefits of program participation and results for the Level II to Level IVb graded literature. Additionally, interventions that have not demonstrated positive outcome results are also identified.

Location

It was extremely difficult to identify from the published literature the exact setting within which the CDSM program was delivered, unless it was explicitly specified. The Australian literature was relatively clear in establishing the locale being metropolitan \(^{32,35,54,65}\) or regional and remote\(^{56,59,69,72}\). Some of the international literature specified their program delivery setting to be metropolitan \(^{27,37,40}\), suburban\(^{30,43}\) or rural\(^{62}\), or seemingly without geographical restriction, such as internet or telephone based interventions\(^{46-7,57}\).

Discussion

Chronic disease self-management literature

CDSM programs were found to vary significantly across content, delivery style and target audience, as did the method and quality of intervention evaluations. While the level I evidence demonstrated the success of CDSM interventions in a variety of settings, it was reluctant to recommend a specific program for generalised adoption. In addition, the level I evidence systematic reviews raised the criticism that intervention research frequently neglects to acknowledge, or investigate the issues that potentially impact on the external validity of investigated studies\(^{12,20}\), such as restrictive inclusion criteria that prohibits generalisation beyond the studied population\(^{75-7}\). This view was previously postulated by Victora, Habicht and Bryce\(^{73}\) who argued that randomised controlled trials (RCTs) were inappropriate in the evaluation of interventions that involve complex or long causal pathways due to the inability of the research design to account for the confounding factors of individual consumers or health settings. Rothwell\(^{75-6}\) supported this view, further questioning the external validity and subsequence applicability of RCTs to clinical practice due to their inherent focus on measuring the efficacy of the intervention, rather than measuring the benefits, or effectiveness, gained from participation in an intervention.

Also, during this review, it was noted that many participants self-selected involvement in the interventions, and yet the reported dropout rate from programs and interventions remained between eight and 49%. Another issue identified was the lack of investigation by researchers into potential participants’ readiness to engage in self-management or to adopt new behaviours, confounding variables that may account for the high dropout rates.

However, the primary aim of this review, to catalogue and grade the available literature enables the presentation of a broad range of CDSM interventions within a convenient format. The arbitrary categorisation of interventions into three conceptual domains increases the accessibility of the research results to health care clinicians with limited time and resources with which to conduct extensive individual reviews and investigations into interventions that may be suitable for their clientele and setting. It is anticipated that a future publication of the results of this review will summarise the target populations and external validity issues pertinent to each of the CDSM interventions.
There is strong evidence that CDSM interventions must be theory-based to optimise potential benefits to participants and communities. Social Learning, Trans-theoretical, Reasoned Action and Health Belief models and theories provide sound foundations on which to base self-management interventions. Standardised approaches to evaluation of interventions would also assist in addressing some of the issues raised regarding the methodological standards of the studies scrutinised during the systematic review process. The use of established theories has demonstrated benefits within the literature despite uncertainty regarding which elements of programs deliver the most benefits, and how best to ensure that those who would draw most benefit from these programs actually participate.

**Identified chronic disease self-management interventions**

The CDSM group education interventions accounted for the 21 of the 46 reviewed publications. This model of CDSM intervention may present rural and regional settings with particular difficulties that limit the effectiveness of these types of programs, as issues related to distance, transport may threaten ongoing group participation, and available resources, expertise and staffing may limit program viability and sustainability, especially if operated as standalone interventions. The literature revealed Level II evidence that the Stanford disease and culture adapted programs demonstrated improvement in self-efficacy, health status, health care usage, and health behaviours could be achieved. The diabetes specific Level I systematic reviews identified that clinically important outcomes arise from group education involvement and that there was no observed difference between efficacy of interventions in primary and secondary settings, or if delivered by self-management education trained physicians, dieticians or nurses. However, the transferability of these results to other client and patient populations and settings is not clear due to the complexities associated with behaviour change, self-management and the lack of a demonstrated definitive causal link between group participation and positive clinical outcomes.

The Professional/peer led groups literature also provided Level II evidence that clinical outcomes could be improved through participation in these interventions, for the groups of patients investigated. Level I evidence demonstrated that programs based on principles of empowerment, participation and adult education are efficacious, and there was no observed difference in results between group sizes of four to six or 16–18 participants or programs of varying duration. Additionally, the inclusion of ongoing annual education sessions resulted in long term benefits to psychosocial outcomes. Regardless of the mode of CDSM group delivery, the compact delivery mode, over a number of weeks, may be an advantage to enable the engagement of clients in a health service, facilitate the establishment of relationships with health care professionals, and other community members with similar chronic diseases, and provide a starting point for additional self-management activities. Rural and regional communities may gain benefits through sharing or exchanging staff and resources with expertise in this type of CDSM program, with regular inter-regional visits that could include both program delivery and skill sharing with local health clinicians and community members. Ongoing support and upskilling may increase the available resources and promote sustainability of these CDSM interventions within rural and regional settings with a train-the-trainer approach. It is anticipated that benefits of CDSM group education interventions could be capitalised on when participation in this program was undertaken as a component of a suite of CDSM strategies, individualised to the client needs and goals.

The supportive interventions evaluations were represented by the next largest proportion of literature, with 16 of the 46 reports detailing the results of these evaluations. Level II evidence across each of these intervention sub-categories demonstrated positive outcomes for both clinical and psychological measures with these participant groups. These interventions may be readily adapted to meet individual consumer requirements, and may not be dependent on face-to-face interaction. Also, these types of CDSM interventions may be easily adapted to rural, regional and remote areas where distances and time limit resource usage. The model developed and implemented by Vale and colleagues in a metropolitan setting could be transposed to more remote locations. Ah Kit and associates reported the gains achieved within an Aboriginal community program that combined the case-management style of care co-ordination with Flinders model tools to formulate individualised care plans and strategies, based on the participants expressed problems and goals. The most clinically significant objectively measurable outcome in this twelve month study was the modest mean reduction in Hb1Ac results.
The Process or Health Professional Delivery model had the least literary representation; though this may be attributed to the limitation of this review that the results of the Australian Sharing Health Care Initiative\textsuperscript{74}, a project that the Flinders Model featured in, were unavailable when the review was conducted. There was however, Level II and III evidence available demonstrating that participation in the Flinders Model could result in positive improvements in clinical\textsuperscript{35,54,59}, and behavioural\textsuperscript{34,56,59} measures for client participants. The Flinders model utilises Enhanced Primary Care initiatives\textsuperscript{72} for funding sustainability, but appears labour intensive for health professionals during the assessment phases. This may be problematic due to the already overburdened general practitioners working in rural and regional areas\textsuperscript{4}. Although redistribution of workload and the up-skilling of alternate health professionals to collaboratively integrate and deliver these programs in partnership with general practitioners and their clients with may be a viable alternative while adding depth of skilled resources to the community. The previously described integration of Flinders based model interventions\textsuperscript{72} into health professionals’ practice demonstrates that by engaging clients in, and utilising a range of services and programs that support CDSM has a potential cumulative effect in that the client focused outcomes are greater than if a single pronged approach were utilised.

Due to the heterogenic outcome measures, results, samples and interventions, definitive answers regarding specific efficacious intervention components or programs could not be drawn within this review\textsuperscript{17}. There is not a ‘one program suits all’ answer to CDSM, especially in rural and regional settings where the barriers and enablers to self-management participation may vary between settings and individuals. Rather, embedded within the literature are recommendations for action that can guide health professionals as they seek to source, adapt and implement programs and interventions. It is clear from the evidence, that a single approach is insufficient to address the self-management needs of those with chronic diseases in any setting. Partridge and Hill\textsuperscript{22} were adamant that morbidity associated with chronic disease could be reduced through the immediate implementation of current knowledge of CDSM programs and interventions, rather than delaying program implementation until additional investigation into the efficacy and effectiveness of individual programs in various settings is undertaken and completed.

In general, there is agreement within the literature that to ensure success of future CDSM interventions, health professionals require the generic skills to deliver and adapt these interventions to meet the needs of consumers, rather than the consumers needs being moulded to fit the available resources and skills of the health professional. It is clear that self-management education and support programs need to be tailored to the expressed needs of those they endeavour to support and assist\textsuperscript{26}. However, to identify needs and to select, adapt and deliver appropriate interventions accordingly requires specialised skills. There is strong level I evidence\textsuperscript{26} that argues that education and support providers should be contemporaneously trained in behaviour change, education and counselling skills to facilitate maximum effectiveness of program provision and that written program curriculum and guidelines should extend beyond knowledge acquisition to include individual goal setting and attainment, and the psychosocial issues that affect those living with chronic disease.

**Conclusion**

There is a wealth of evidence in existence supporting the use, and benefits of CDSM interventions across a range of settings and patient groups. This review provides an avenue for dissemination of CDSM intervention research, and as thus increasing health professional access to research results and program evaluations. It is clear that there is not a singular intervention that will provide the panacea for CDSM problems, given the complexity and magnitude of the issues surrounding multiple chronic diseases. Rather, a multi-faceted approach that incorporates change at the health professional and service delivery level, that investigates, identifies and offers strategies and supports for individuals to assist them to self-manage to fulfil their own needs and goals in partnership with the health professional multi-disciplinary team is required. Innovative practice with resource sharing and distribution is required by those working in rural and remote areas to ensure that benefits for individuals and communities arising from participation in CDSM activities are not restricted to those living in larger regional and metropolitan locations.
In summary, it is clear that there is sufficient evidence to warrant the implementation of CDSM programs into rural and regional clinical practice. To achieve maximal results, programs and interventions being developed and implemented should be theoretically based\textsuperscript{9,13,17,19}, and continue to be scrutinised through ongoing, standardised published evaluations. It is also necessary that further investigation of the issues related to the participants willingness and readiness to implement the prescribed changes or behaviours to enable ongoing self-management activity\textsuperscript{9,13,17,21} be undertaken to aid the identification of the reasons for success and failure of interventions, and to facilitate recognition of the patient groups whom would benefit most from the various interventions. To enable this, there is a long-term need for the principles of, and skills required to enhance and nourish self-management to be incorporated into the curricula of health professionals’ under-graduate education and to be reiterated within a framework of ongoing post-graduate and professional development education. Until this outcome is achieved, health professionals in regional, rural and remote locations will need to develop, adopt and share innovative programs and resources to benefit not only their clients with chronic diseases, but the communities within which they co-exist.

**Presenter**

Sharan Ermel has a background in nursing, having been registered as both a Division Two nurse, and more recently as a Division One nurse since completing her nursing degree at La Trobe University. Throughout her career Sharan has worked in a variety of fields, including aged care, rehabilitation, palliative care, and acute care settings. Currently, Sharan divides her time between Bendigo Health’s Collaborative Health Education and Research Centre where she is engaged as a research assistant and project co-ordinator and a busy emergency department that treats in excess of 35 000 patients per annum. Her most recent project involvement includes an evaluation of ACAS system changes, development and implementation of a Stroke Unit at Bendigo Health, an emergency department pain management audit, a national post-operative pain management study and an extensive chronic disease self-management project that sought to scope and grade the evidence surrounding self-management that is available to clinicians involved in this field.
### Appendix I  Summary of Outcome Results Associated with each Model across each Evidence Level with number of participants completing the intervention (n=)

<table>
<thead>
<tr>
<th>CDSM Model</th>
<th>Level II</th>
<th>Level III</th>
<th>Level IVa</th>
<th>Level IVb</th>
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<tbody>
<tr>
<td><strong>Self-management education focused models</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Stanford: Disease Specific</td>
<td>Non-significant outcomes (n=113) (^a)</td>
<td>Pre and post test: positive outcomes (p=0.04) in depression, symptoms, self-efficacy and behaviours(n=21) (^b)</td>
<td>Qualitative data only identified helping strategies and lifestyle modifications (n=27) (^a)</td>
<td>Qualitative data with themes related to knowledge/ motivation, sense of achievement &amp; maintenance of gains(n=37) (^b)</td>
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<td>Positive outcomes (p&lt;0.001) on ASE, Cognitive-behavioural techniques, &amp; health status measures(n=234)(^a)</td>
<td>Positive outcomes (p&lt;0.05) in Health behaviours/ Health status/ Healthcare utilization(n=265)(^a)</td>
<td>Positive outcomes (p&lt;0.05) in Health Status, Behaviours, Health-care Usage, Self-efficacy(n=430)(^a)</td>
<td>Positive outcomes (p&lt;0.05) in Health-care usage and self efficacy(n=489)(^a)</td>
</tr>
<tr>
<td>Stanford: Culture/ language modified</td>
<td>Positive outcomes (p&lt;0.05) in Health behaviours/ Health status/ Healthcare utilization(n=265)(^a)</td>
<td>Positive outcomes (p&lt;0.05) in Health Status, Behaviours, Health-care Usage, Self-efficacy(n=430)(^a)</td>
<td>Qualitative data only identified helping strategies and lifestyle modifications (n=27) (^a)</td>
<td>Qualitative data with themes related to knowledge/ motivation, sense of achievement &amp; maintenance of gains(n=37) (^b)</td>
</tr>
<tr>
<td>Stanford: Generic</td>
<td>Positive outcomes (p&lt;0.05) in Health Behaviour, status, health-care usage and self efficacy(n=489)(^a)</td>
<td>Small to moderate improvement in depression, self-efficacy and symptom scores(n=185)(^a)</td>
<td>Improvement (p=0.05) in PIH scale, Hb1Ac, and Problems &amp; Goals Assessment(n=60)(^a)</td>
<td>Improvement (p=0.006) in health status measures of physical function, vitality, social function, and mental health, and (p&lt; 0.001) for pain, stiffness and physical function(n=68)(^a)</td>
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<tr>
<td>Professional/ Peer Led Group</td>
<td>Positive outcomes (p&lt;0.05) in Health-care usage, symptoms, SF-36, walk test and weight(n=223)(^a)</td>
<td>Positive outcomes (p&lt;0.05) in pain self-efficacy, helplessness and knowledge(^a)</td>
<td>Improvement in outcome scores across measures(n=13)(^a)</td>
<td>Improvement in outcome scores across measures(n=13)(^a)</td>
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<td>Positive outcomes (p=0.01) in self-monitoring and attitude(n=53)(^a)</td>
<td>Positive outcomes (p&lt;0.05) in pain self-efficacy, helplessness and knowledge(^a)</td>
<td>Positive improvement (p=0.05) in all instruments except SF–12 physical measure(n=31)(^a)</td>
<td>Positive improvement (p=0.05) in all instruments except SF–12 physical measure(n=31)(^a)</td>
</tr>
<tr>
<td>Process/ Health Professional Delivery Model</td>
<td>Significant (p&lt;0.01) time effects at 12 months for FEV1, and at 6 months (p&lt;0.05) for inspiratory capacity(n=18)(^a)</td>
<td>Improvement (p=0.05) in PIH scale, Hb1Ac, and Problems &amp; Goals Assessment(n=60)(^a)</td>
<td>Improvement in outcome scores across measures(n=13)(^a)</td>
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<tr>
<td>Flinders Model</td>
<td>Improvement in outcome scores across measures(n=13)(^a)</td>
<td>Improvement in outcome scores across measures(n=13)(^a)</td>
<td>Outcomes per se not measured, reported qualitative data(n=14)(^a)</td>
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</tr>
<tr>
<td>Flinders with SM intervention</td>
<td>Improvement in outcome scores across measures(n=13)(^a)</td>
<td>Improvement in outcome scores across measures(n=13)(^a)</td>
<td>Positive improvement (p=0.05) in all instruments except SF–12 physical measure(n=31)(^a)</td>
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<tr>
<td>CDSM Model</td>
<td>Level IIa</td>
<td>Level IIIa</td>
<td>Level IVa</td>
<td>Level IVb</td>
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<tr>
<td>Chronic Care Model</td>
<td>Improvement (p=0.05) in knowledge scores and clinical markers (n=17)</td>
<td>Reported improvement in rate of positive provider and patient practices and clinical outcome measures (n=166)</td>
<td>Reported improvement in health behaviours (n=17)</td>
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<tr>
<td>Group Doctor Visits</td>
<td>Positive outcomes (p=0.04) in health-care usage (n=146)</td>
<td>Positive outcomes (p&lt;0.05) in HbA1c, knowledge and QOL (n=42)</td>
<td>Positive outcomes (p&lt;0.05) in health behaviours (n=17)</td>
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<tr>
<td>Supportive Interventions</td>
<td>Positive outcomes (p&lt;0.05) in SCHFI and UCLA-SSI measures (n=31)</td>
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<tr>
<td>Peer support or relationship</td>
<td>Positive outcomes (p&lt;0.05) in SCHFI and UCLA-SSI measures (n=31)</td>
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<td>Brief with Guideline</td>
<td>Positive outcomes (p&lt;0.05) in SCHFI and UCLA-SSI measures (n=31)</td>
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<td>Motivational Interviewing</td>
<td>Positive outcomes (p&lt;0.05) in SCHFI and UCLA-SSI measures (n=31)</td>
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<tr>
<td>Case Management/Support</td>
<td>Positive outcomes (p&lt;0.05) in SCHFI and UCLA-SSI measures (n=31)</td>
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<td>Technological Support</td>
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</table>

*Level II results pertain to available comparison data between control and intervention groups

1. Arthritis Efficacy Scale
2. Results of comparison between IG and CG at 4mths
3. Sickness Impact Profile
4. Single group—no control or comparison group
5. Partners in Health Scale
6. Quality of Life scale
7. Health Provider data
8. Note: refer to specified citation for specific scale details and availability
References


