






# BMJ Open Diabetes care components effectively implemented in the ASEAN health systems: an umbrella review of systematic reviews

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## ABSTRACT

**Objectives** Association of Southeast Asian Nations (ASEAN) is among the hardest hit low-income and middle-income countries by diabetes. Innovative Care for Chronic Conditions (ICCC) framework has been adopted by the WHO for health system transformation towards better care for chronic conditions including diabetes. We conducted an umbrella review of systematic reviews on diabetes care components effectively implemented in the ASEAN health systems and map those effective care components into the ICCC framework.

**Design** An umbrella review of systematic reviews and/or meta-analyses following JBI (Joanna Briggs Institute) guidelines.

**Data sources** Health System Evidence, Health Evidence, PubMed and Ovid MEDLINE.

**Eligibility criteria** We included systematic reviews and/or meta-analyses which focused on management of type 2 diabetes, reported improvements in measured outcomes and had at least one ASEAN member state in the study setting.

**Data extraction and synthesis** Two reviewers independently extracted the data and mapped the included studies into the ICCC framework. A narrative synthesis method was used to summarise the findings. The included studies were assessed for methodological quality based on the JBI critical appraisal checklist for systematic reviews and research syntheses.

**Results** 479 records were found of which 36 studies were included for the analysis. A multidisciplinary healthcare team including pharmacists and nurses has been reported to effectively support patients in self-management of their conditions. This can be supported by effective use of digital health interventions. Community health workers either peers or lay people with necessary software (knowledge and skills) and hardware (medical equipment and supplies) can provide complementary care to that of the healthcare staff.

**Conclusion** To meet challenges of the increased burden of chronic conditions including diabetes, health policy-makers in the ASEAN member states can consider a paradigm shift in human resources for health towards the multidisciplinary, inclusive, collaborative and complementary team.

## INTRODUCTION

Diabetes is one of the chronic conditions directly contributing to the death of an

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study could be the first attempt to map the effective care components for diabetes implemented in the Association of Southeast Asian Nations (ASEAN) health systems into the Innovative Care for Chronic Conditions building blocks.
- ⇒ The findings of this umbrella review were syntheses of systematic reviews and/or meta-analyses, which were critically appraised for methodological quality.
- ⇒ The search in only four databases might potentially miss out other publications discussing effective care components for diabetes in other sources of data.
- ⇒ The study gave a narrative overview of the systematic reviews and/or meta-analyses that at least included one ASEAN member state in their study settings, but this did not directly translate that the effectiveness was exclusively attributable to the ASEAN settings. It merely means that the ASEAN settings were taken into analyses of the included systematic reviews and/or meta-analyses.

estimated 1.5 million people worldwide in 2019 (ranked ninth of the world leading causes of death).<sup>1</sup> In 2021, globally 1 in 10 adults aged 20–79 were living with diabetes.<sup>2</sup> The WHO Western Pacific (206 million) and South East Asia regions (90 million) were ranked first and second for having the most adults living with diabetes, respectively.<sup>2</sup>

Diabetes is one of the major risk factors for cardiovascular diseases and other non-communicable diseases, and between 2000 and 2016, there was an increase of premature mortality (deaths before the age of 70) from diabetes by 5% in both high-income countries (HICs) and low-income and middle-income countries (LMICs).<sup>1</sup> To cope with the increased prevalence of diabetes, more robust and proactive healthcare systems are needed.<sup>3</sup> Nevertheless, many health systems are still reactive, episodic, fragmented and physician-centred, rendering them less well



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equipped to continuously manage chronic conditions.<sup>4</sup> Consequently, needs of people living with diabetes are likely to go unmet, and coping with the chronic complications is often an individual struggle.

Association of Southeast Asian Nations (ASEAN) formed in 1967 at the juncture of the above-mentioned WHO regions are among the LMICs hardest hit by diabetes. The ASEAN consists of 10 member states: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.<sup>5</sup> Health systems of these member states are struggling at various stages to deal with increased chronic conditions among their populations.<sup>6</sup> By income level classified by the World Bank in 2020, all the member states were classified as LMICs except Brunei Darussalam and Singapore already classified as HICs.<sup>7</sup>

In 2002, the WHO proposed an Innovative Care for Chronic Conditions (ICCC) framework to serve as a roadmap for health system transformation, given that chronic conditions are to be lived with for a prolonged period of time and mostly with multiple morbidities.<sup>3</sup> Adapted from the Chronic Care Model (CCM) that has been found to be effective for management of diabetes in primary care in terms of improved clinical outcomes,<sup>8–16</sup> the ICCC framework is more comprehensive and applicable to a wider international context including LMICs. The ICCC care components are grouped into three levels of building blocks namely, microlevel (a building block at the triad interaction between people with chronic conditions and their families, healthcare team and community partners), mesolevel (a building block for the healthcare organisation and for the community) and macrolevel (a building block for the positive policy environment). Each level of the building blocks is guided by six principles: (1) evidence-based decision-making, (2) population focus, (3) prevention focus, (4) quality focus, (5) flexibility and adaptability and (6) integration, coordination and continuity.<sup>3</sup> Each level interacts with and influences the other levels in a dynamic manner. Further details of the building blocks can be found in the WHO publication on the ICCC framework.<sup>3</sup>

In 2012, Nuño *et al* published a review on the contribution of the ICCC framework to the health system transformation towards better care for chronic conditions.<sup>4</sup> They saw that the ICCC framework fitted well in the context of LMICs on the health policy development where integration and coordination at the policy environment is of vital importance to link the patient and family, healthcare organisation, and community together to ensure the continuity of care. The community role in supporting care for chronic conditions is as equally important as the one of healthcare organisation. People with chronic conditions and their families as well as other community networks have gained more influence in decision-making on their health conditions through the framework. The review found that the ICCC framework had been used as a reference for policy development and evaluation on healthcare reorientation towards chronic care

in various countries including: the Russian Federation, Spain, England, Morocco, Rwanda and Australia.<sup>4</sup> Yet, no single study was identified in the literature to assess the framework comprehensively across the health system.<sup>4</sup> Its implementation in the ASEAN health systems also has not been widely documented. Two questions arise: (1) What are the care components for diabetes effectively implemented in the ASEAN health systems? and (2) How are they placed in the ICCC framework?

In this study, we aim to conduct an umbrella review of systematic reviews to identify the care components for diabetes which were effectively implemented in the ASEAN health systems and map those care components into the ICCC building blocks.

## METHODS

### Study design

An umbrella review of systematic reviews and/or meta-analyses was conducted to identify the care components for diabetes effectively implemented in the ASEAN health systems, following JBI guidelines for conducting the umbrella review.<sup>17</sup>

### Search strategy and study selection

Four databases were searched: Health System Evidence, Health Evidence, PubMed and Ovid MEDLINE for relevant systematic reviews and/or meta-analyses published between 2009 and 2021. The search strategy was based on concepts of “type 2 diabetes”, “disease management in healthcare systems” and “ASEAN region”. Boolean operator “AND” was employed to combine the concepts, while Boolean operator “OR” was used to combine index terms and keywords of an individual concept. Detailed strategy for locating relevant studies in each database can be found in online supplemental table 1.

The reporting of study selection was done according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses.<sup>18</sup> The search results were collected in ENDNOTE software, a reference manager. We also used the software to remove duplicates. Then, studies for the review were selected based on a set of eligibility criteria (table 1). The studies had to be a systematic review or meta-analysis or review of systematic reviews of experimental studies such as, randomised controlled trials, cluster-randomised controlled trials, etc researching type 2 diabetes or type 2 diabetes-related conditions in English language. The studies had to focus on disease management as defined by the Care Continuum Alliance as ‘a system of coordinated healthcare interventions and communications for populations with conditions in which patient self-care efforts are significant’.<sup>19</sup> Therefore, any intervention or strategy related to plan of care; primary healthcare; support of physicians in care; patient empowerment/self-management; patient health education; enhancement of physician and patient relationship; evidence-based practice guidelines on prevention of conditions and complications; evaluation of clinical,

**Table 1** Eligibility criteria and their descriptions

| Eligibility criterion                          | Description  |
|--|--|
| Disease/condition                              | Type 2 diabetes or type 2 diabetes-related conditions  |
| Study type                                     | Systematic review or meta-analysis or review of systematic reviews of experimental studies (with at least two reviewers) |
| Language                                       | English  |
| Study setting                                  | At least having one ASEAN member state   |
| Area in focus                                  | Disease management   |
| ASEAN, Association of Southeast Asian Nations. |  |

economic and humanistic outcomes; professional health workforce; health information system and health service delivery would be part of the disease management.

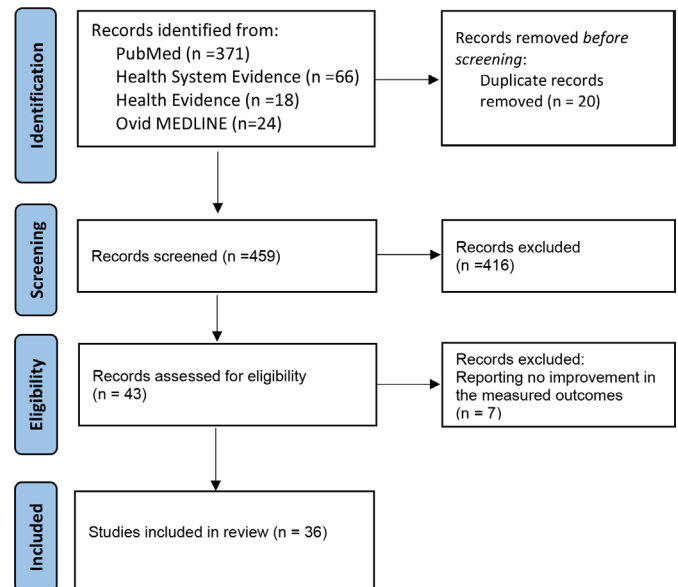
Studies had to meet all the eligibility criteria. The eligible studies were assessed of care effectiveness aspects as part of the disease management. Only the studies reporting improvements in any of the following measured outcomes were included for the full-text review.

The measured outcomes included: clinical outcomes (eg, glycated haemoglobin, blood glucose, blood pressures, body mass index, waste circumference, lipid profile, readmission, length of hospital stay, adverse events with complications, emergency department presentation and mortality), psychosocial outcomes (eg, self-efficacy, self-care competencies, health-related quality of life, knowledge and attitudes) and behavioural outcomes (eg, lifestyle modification, physical activity, diet, medication adherence, treatment concordance and attendance to clinical appointments).

Titles and abstracts of the studies found in the databases were screened by VT and SM based on the above-mentioned eligibility criteria to exclude irrelevant studies. Then, the remaining studies were assessed to identify the effectiveness of the interventions or strategies and classify them based on the ICCC framework. The classification was based on constructs of each care component detailed in online supplemental table 2. Study objectives, interventions or strategies under study and study conclusions were independently reviewed by VT and SM, and a consensus had to be reached between the two reviewers. The included studies were required to have relevancy to at least one of the constructs of each care component.

### Data extraction and synthesis

Two reviewers (VT and SM) extracted the data important to the research objectives and tabulated them in Microsoft Excel (online supplemental table 3). Those variables were: authors and year of publication, study objective, number of included studies, study design, study setting, intervention or strategy, measured outcome and study conclusion. We independently evaluated the extracted data thoroughly and categorised each study into the ICCC



**Figure 1** PRISMA flow diagram of the study selection. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

building blocks, using the constructs of care components as an analytical framework. A narrative synthesis method was used to summarise findings of the included studies which were also assessed for methodological quality, following the JBI critical appraisal checklist for systematic reviews and research syntheses.<sup>17</sup> In the checklist, there were 11 items with 4 response categories: 'yes', 'no', 'unclear' and 'not applicable or N/A'.

### Patient and public involvement

There was no involvement of patients and members of the public in the design, conduct, reporting or dissemination of this study.

## RESULTS

### Study retrieval

Based on the search strategy, 479 records were found (figure 1). Twenty duplicates were identified, and 416 did not meet all the eligibility criteria. Forty-three studies were eligible of which seven did not report improvements in any of the measured outcomes (online supplemental table 4). Therefore, 36 studies were finally included for the analysis.

### Characteristics of included studies

Among the 36 included studies, by study type, 16 conducted systematic reviews; 3 conducted meta-analyses; and 17 conducted both systematic reviews and meta-analyses. The total number of studies included in the systematic reviews and/or meta-analyses was 1082 in which the study design in majority was randomised-controlled trial. Key findings of the included studies are summarised in online supplemental table 5. Detailed results of the



**Table 2** Distribution of the ASEAN member states appearing in the study settings

| ASEAN member states                            | No of studies  |
|--|--|
| Thailand                                       | 18 studies <sup>20 28–34 36 37 39 47 48 51 55–58</sup> |
| The Philippines                                | 9 studies <sup>20 21 24 40 41 43 44 48 55</sup>        |
| Malaysia                                       | 11 studies <sup>21 23 25 26 28 31 32 38 45 48 58</sup> |
| Singapore                                      | 7 studies <sup>22 27 28 38 49 56 59</sup>              |
| Cambodia                                       | 4 studies <sup>21 35 46 55</sup>                       |
| Vietnam  | 5 studies <sup>23 40–42 51</sup>                       |
| ASEAN, Association of Southeast Asian Nations. |  |

methodological quality assessment can be found in online supplemental table 6. It was noted that more than half of the included studies did not assess the publication bias (21 out of 36). Among the ASEAN member states, only six namely: Thailand, the Philippines, Malaysia, Singapore, Cambodia and Vietnam appeared in the study settings of the included studies. Thailand appeared in 18 out of the 36 studies (table 2).

## The ICCC building blocks

### Microlevel

The microlevel—the building block at the triad interaction between people with chronic conditions and their families, healthcare team and community partners—was given attention in most of the reviewed studies (28 out of 36 studies). Most of the studies focused on self-management interventions supporting people with diabetes to improve their clinical outcomes, psychosocial outcomes or behavioural outcomes. Self-management strategies for people with diabetes had been proven to have positive effect on glycaemic control, especially with those having poorer glycaemic control. The most frequently used self-management strategies were psychological strategies, lifestyle advice and support, and information sharing about the condition and its management.

### Mesolevel for the healthcare organisation

The mesolevel for the healthcare organisation was found in 24 studies in which 22 studies addressed the microlevel and mesolevel for the healthcare organisation together. The self-management interventions supported by the healthcare organisation could be carried out remotely in a form of telemedicine via smartphone functions to provide self-care education, facilitate self-monitoring, serve as a reminder and collect feedback for healthcare professionals to make treatment recommendations.<sup>20 21</sup> It was found to be more cost-effective, especially for teleophthalmology (retinal screening).<sup>22</sup> Teleconsultation, which refers to communication between healthcare providers and patients or between clinicians via email, automated messaging system, mobile phone or other forms of internet-based communication for provision of care from distance, was the most effective strategy.<sup>23</sup> Some focused

on automated brief messaging or mobile phone text messaging with a preplanned algorithm.<sup>24–27</sup> A considerable number of studies identified the effectiveness of face-to-face interventions supported by healthcare professionals, in particular, pharmacists.<sup>28–35</sup> Those studies indicated that pharmacists could effectively provide self-management activities to people with diabetes, when equipped with appropriate knowledge and skills<sup>36</sup> and integrated in a healthcare team.<sup>28 29 33 37 38</sup> A specialist care setting at the hospital was found to be effective in facilitating the coordinating role with primary care to promote the continuity of care.<sup>39</sup> There was one study revealing that pharmacists and nurses could substitute for physicians in prescribing medications for the patients with comparable clinical outcomes, medication adherence, health-related quality of life and patient satisfaction.<sup>34</sup>

### Mesolevel for the community

The mesolevel for the community was found in 7 studies. The self-management activities could effectively be supported by the community groups—either peers sharing similar experience, knowledge and characteristics to the patients<sup>40–42</sup> or lay people fulfilling the role as community health workers in a form of task shifting.<sup>43–46</sup> These community people needed to be prepared, informed and motivated to provide care complementary to that of the healthcare workers.

### Macrolevel for the policy environment

There were limited studies focusing on the care components at the policy environment—only four studies. One study concluded that targeted screening, which only includes specific groups of population who have one or more risk factors for type 2 diabetes, was more cost-effective in comparison to universal screening, particularly initiated with people aged around 45–50 with every 5-year repetition.<sup>47</sup> Integrating diabetes care with HIV services was seen as feasible, with the pharmacist aide.<sup>35</sup> For the integration to be successful, a multidisciplinary team should be adopted with clear protocols, and the community should be used as locus for advocacy and health services.<sup>35</sup> A study examining health system-level factors showed that effective care for diabetes was hampered by limited access to health services and medications and financial constraints encountered by patients. It was enabled by increased involvement of pharmacists, educational programmes led by healthcare professionals and support of innovative care models.<sup>48</sup> In terms of cost-effectiveness, combining programmes such as diet and physical activity promotion programmes was proven cost-effective and economically efficient, especially with the use of group sessions.<sup>49</sup> Figure 2 shows the mapping of those studies in relation to the care components of the ICCC framework.

|   |   |
|---|---|
| <b>Macro-level (4 studies)</b> <ul style="list-style-type: none"> <li>Integrate policies<sup>47 35</sup></li> <li>Provide leadership and advocacy<sup>48</sup></li> <li>Promote consistent financing<sup>48 49</sup></li> </ul>   |   |
| <b>Meso-level—Community (7 studies)</b> <ul style="list-style-type: none"> <li>Provide complementary services<sup>40-42 44-46 55</sup></li> </ul>   | <b>Meso-level—Health Care Organisation (24 studies)</b> <ul style="list-style-type: none"> <li>Use information systems<sup>20-25 27 51</sup></li> <li>Support self-management and prevention<sup>21 28-33 36-39 51 55 58 59</sup></li> <li>Organise and equip health care teams<sup>28-33 36-39 39 56</sup></li> <li>Promote continuity and coordination<sup>39 56</sup></li> </ul> |
| <b>Micro-level (28 studies)</b> <ul style="list-style-type: none"> <li>Prepared, informed, and motivated patients and families<sup>20-24 27-33 37-42 44-46 50-59</sup></li> <li>Prepared, informed, and motivated health care teams<sup>28 29 39</sup></li> <li>Prepared, informed, and motivated community partners<sup>40-43</sup></li> </ul> |   |

**Figure 2** Mapping of the included studies in relation to the care components of the ICCC framework. ICCC, Innovative Care for Chronic Conditions.

## DISCUSSION

This overview of systematic reviews and/or meta-analyses found that most of the care components for diabetes effectively implemented in the ASEAN health systems were centred around the patients' self-management due to the fact that care for diabetes like other chronic conditions is reliant mainly on individual patients and not totally on medical treatment. In fact, patients could know and manage their conditions better, with correct and appropriate guidance, as they have lived with the conditions for ages.<sup>50</sup> Thus, self-management strategies have been prioritised to support people with the condition to increase their self-confidence in taking an active role in managing their conditions in all aspects.<sup>51</sup> This overview showed that the self-management strategies with effective outcomes were more frequently supported by the healthcare organisation, although community support was also effective, indicating that more interventions were targeting the healthcare organisation. The community role in supporting care for diabetes is complementary to that of healthcare organisation in the context of limited healthcare staff.<sup>43</sup> Either lay people or peers (expert patients) could provide added value to diabetes intervention programmes in terms of shared culture and language that is beneficial to a close rapport with the patients, resulting in greater mutual understanding and increased emotional assistance.<sup>40 52</sup> People with the condition, their families or caregivers and other community networks can also gain more influence in decision making on the health conditions through the self-management strategies.

There has been increasing evidence of the effective role of pharmacists in the multidisciplinary healthcare team in supporting patients' self-management, aided by effective use of digital health. For sustainable benefits of the self-management strategies, multicomponent of diabetes care components was recommended.<sup>53</sup> This is consistent with other reviews which showed that combined care components had greater positive impact on the patients in terms of both processes and outcomes.<sup>4</sup> A meta-regression analysis on quality improvement strategies for type 2 diabetes care showed significant effects of two strategies (team changes and case management) on blood glucose control.<sup>54</sup> Team changes in that study were referred

briefly to changes (eg, adding a team member, sharing care, employing a multidisciplinary team, expanding or revising professional roles) to the organisation of the primary healthcare team, which was similar to delivery system design component of the CCM.<sup>4 54</sup> Likewise, the case management was defined as a system for coordinating the care processes from diagnosis, treatment and management of the condition under control (eg, referral arrangement, follow-up care) by a specific person or the multidisciplinary team.<sup>54</sup> A systematic review also found that healthcare costs and utilisations related to usage of the multidisciplinary collaborative care model did not incur excessive costs either.<sup>38</sup>

It was noted that effective care components at the macrolevel were limitedly identified, indicating that the ICCC framework still has limited influence in the health systems transformation towards better care for chronic conditions despite two decades after its inauguration. Most of the studies identified and included in this review concentrated on the CCM care components (patient and healthcare organisation levels). It could be that the CCM care components have been feasibly and frequently evaluated through experimental studies and directly linked to the patients, caregivers and healthcare professionals at the microlevels and mesolevels. Nevertheless, the ICCC framework was found to be a useful reference for policy development and evaluation on healthcare reorientation towards chronic care in various countries as described above.<sup>4</sup>

This study could be the first attempt to map the effective care components for diabetes implemented in the ASEAN health systems into the ICCC building blocks. The findings of this umbrella review were syntheses of systematic reviews and/or meta-analyses which were critically appraised for methodological quality. This study, nevertheless, had limitations. The search in only four databases and from 2009 to 2021 might potentially exclude other publications discussing effective care components for diabetes in other sources of data or outside the publication year limit. This study gave a narrative overview of the systematic reviews and/or meta-analyses that at least included one ASEAN member state in their study settings, but this did not directly translate that the effectiveness was exclusively attributable to the ASEAN settings. It merely means that the ASEAN settings were taken into analyses of the included systematic reviews and/or meta-analyses. Future review should include more sources of data including grey literature and measure effect of studies in the ASEAN settings.

## CONCLUSION

This umbrella review identified effective care components for diabetes implemented in the ASEAN health systems. From the findings, it is recommended that the multicomponent care be adopted. The multidisciplinary healthcare team including pharmacists and nurses could effectively support patients in self-management of their conditions

and improve clinical, psychosocial and behavioural outcomes. With clear guidelines and supported supervision, there is a possibility that pharmacists and nurses be given the prescribing autonomy within the agreed level. Effective use of digital health interventions can be beneficial to the self-management support. Where there are staffing shortages in healthcare organisation, community health workers either peers or lay people could be equipped with necessary software (knowledge and skills) and hardware (medical equipment and supplies) to provide the complementary care. The findings are insightful for health policy makers in the ASEAN member states to consider a paradigm shift in utilisation of human resources for health to support implementation of the ICC framework to meet challenges of the increased burden of chronic conditions including diabetes. It is the shift towards the multidisciplinary, inclusive, collaborative and complementary team.

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**Contributors** VT and SM conducted the searches, screened and reviewed the identified studies, and did the analysis on the included studies. JvO and EW offered advice on the ICC conceptual framework and prepared the first draft with VT. IP and WVD provided feedback on the methodology and consultation on the review of the included studies. VT is responsible for the overall content as the guarantor. All the authors provided feedback on the drafts and approved the final manuscript.

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**Data availability statement** All data relevant to the study are included in the article or uploaded as online supplemental information.

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