

## Multidiscipline Care for Type 2 Diabetes Patients: from General to Asian Population

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### **ABSTRAK**

Tatalaksana multidisiplin didefinisikan sebagai tatalaksana yang melibatkan setidaknya satu dokter, satu perawat, dan petugas kesehatan lainnya (contohnya dietisien). Tatalaksana multidisiplin dapat memberikan keuntungan, baik dalam aspek medis (misalnya meningkatkan kepatuhan berobat pasien) dan non-medis (misalnya meningkatkan efektivitas biaya dibandingkan tatalaksana konservatif). Terdapat beberapa model tatalaksana multidisiplin; namun demikian, model yang paling cocok untuk tatalaksana diabetes mellitus tipe 2 belum jelas. Dalam kajian ini, penulis bertujuan mengidentifikasi dan membandingkan berbagai jenis tatalaksana multidisiplin dalam menurunkan kadar hemoglobin glikosilasi (HbA1C) pada pasien diabetes mellitus tipe 2, terutama pasien ras Asia, karena golongan ini memiliki kecenderungan untuk mengidap diabetes mellitus tipe 2 pada derajat obesitas yang lebih rendah dan usia yang lebih muda dibandingkan kelompok ras Kaukasia. Penelitian mengenai tatalaksana multidisiplin pada pasien diabetes mellitus tipe 2 masih terbatas, terlebih untuk pasien ras Asia. Studi-studi tersebut menunjukkan hasil yang bervariasi mengenai efektivitas tatalaksana multidisiplin untuk mencapai target HbA1C. Kunjungan tenaga medis, baik dalam sesi perorangan ataupun kelompok, tampak efektif pada populasi pasien diabetes mellitus tipe 2 secara umum dan pada ras Asia. Penelitian lebih lanjut masih diperlukan untuk mengetahui model tatalaksana multidisiplin mana yang paling cocok untuk pasien di wilayah tertentu dengan kebudayaan, kondisi sosial ekonomi dan fasilitas kesehatan yang beragam.

**Kata kunci:** Asia, diabetes melitus tipe 2, hemoglobin glikosilasi, tatalaksana multidisiplin, tim multidisiplin.

### **ABSTRACT**

Multidiscipline care is defined as a care consisting of at least a physician, a nurse, and other healthcare worker (eg. dietician). Multidiscipline care has generated benefits, both in medical aspects (eg. increasing patients' compliance) and nonmedical aspects (eg. more cost-effective than conventional treatment). There are several models of multidiscipline care; however, which model is more suitable for type 2 diabetes care is not clear yet. In this review, we aimed to identify and compare multidiscipline care method for reducing glycated hemoglobin (HbA1C) levels in type 2 diabetes patients, particularly Asian patients because they have greater tendency to develop type 2 diabetes at lower degrees of obesity and at younger ages than Caucasian ethnic group. There were limited number of studies examining multidiscipline care for type 2 diabetes patients, moreover for Asian patients. They showed mixed results on the efficacy of multidiscipline care in achieving HbA1C target. Healthcare personnel visit, either personal or group session, appeared effective both for general and Asian T2DM patients. It needs further studies to clarify which models are most effective for practices of varying cultures, socio-economic condition, and healthcare settings.

**Keywords:** Asian, type 2 diabetes mellitus, glycated hemoglobin, multidiscipline care, multidiscipline team.

## INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder which affects more than 300 million people worldwide; this number is expected to reach 438 million by 2030 for those aged between 20-70 years old.<sup>1-3</sup> However, the proportion of those achieving optimal glycemic control is predicted to be less than half. Several factors, such as non-adherence to the prescribed medications or improper administration of drugs by the patients, contribute to this failure.<sup>4-12</sup>

Multidiscipline care, defined as a healthcare consisting of at least an attending physician, a nurse, and other healthcare worker (eg. dietitian), has generated positive impact on both medical and nonmedical aspects. Increased treatment compliance and cost-effectiveness are some examples of its benefit. It is also associated with statistically significant reduction in HbA1C level.<sup>4,13</sup> Asians have greater tendency to develop T2DM at lower degrees of obesity and at younger ages than their Caucasian counterparts.<sup>14-15</sup> Asian patients also face more cultural and familial barriers in T2DM treatments. Culturally meaningful food, such as white rice, has to be reduced due to its glycemic content. Dietary modifications can compel patient to skip somethings in a family meal, such as sweet desserts. In some cultures which value certain staple food and sharing meals with family members, these lifestyle changes can be very unpleasant. Additionally, family members can consider the patient as a burden that needs to be cared for – determining who should be the primary caregiver sometimes cannot be settled peacefully between family members, and potentially create a family conflict.<sup>16,17</sup>

There are several types of multidiscipline care, but little is known about its capability of achieving glycemic control, especially for Asian patients. This review examines various multidisciplinary care models in T2DM treatment to achieve HbA1c target and also provides the basics of multidiscipline approach for general practitioners.

## BENEFITS OF MULTIDISCIPLINE CARE

Collaborative, multidiscipline teams are best suited to provide care for people with chronic

conditions, such as diabetes, and to facilitate patients' self management.<sup>18</sup> T2DM treatment includes medication, changes in diet and physical activity. Patients need knowledge, motivation, training, and ongoing support to incorporate treatment regimens in their daily lives.<sup>19</sup> For this purpose, cooperation between physicians and other health care personnels is inevitable, creating a multidiscipline team to provide all aspects of the T2DM treatment. Multidisciplinary approach involves multiple contacts with different healthcare personnel, each specialized in a particular process or expertise – including nurse educators, nutritionists, pharmacists, physical trainers and podiatrists.<sup>4</sup> Tailored care that supplied culturally-appropriate diabetes self-management education and treatment approach will yield better outcomes according to National Institute for Health and Care Excellence (NICE) and American Diabetes Association (ADA) guidelines.<sup>4,18,20</sup>

Systematic reviews and observational studies in both developed and developing countries showed drug compliance rate among T2DM patients were poor; it could be as low as 16%. Patients had numerous reasons for non-adherence, such as lack of disease knowledge and fear of medication side effects – these might be intervened effectively using multidisciplinary approach.<sup>4,10,21-23</sup> A randomized clinical trial (RCT) in T2DM patients with baseline HbA1C >8% showed that multidiscipline care with pharmacist increased medical compliance and drug knowledge significantly compared to standard care.<sup>11</sup>

## MULTIDISCIPLINE CARE MODEL

Several multidiscipline care models will be discussed in this review: (1) telephone coaching, (2) healthcare personnel visit, and (3) combination of both. Telephone coaching was done either by nurse or pharmacist - its content varied between studies, but it included: introduction of nurse/pharmacist's role, confirmation of medical history, exploring patient's knowledge about diabetes, identification of barriers to adherence, identification of attainable behavioral goals, and providing advice on lifestyle improvements. Healthcare personnel visit was also done either

by nurse or pharmacist. Intervention duration varied between studies (**Table 1**). Meta-analyses and randomized clinical trials (RCT) showed mixed results on the effectivity of multidiscipline care in achieving HbA1C target. Healthcare personnel visit appeared effective, while telephone coaching and combined method seemed not beneficial for reducing HbA1C.<sup>9, 27, 29,31-33</sup> There were only 2 RCTs specifically assessed T2DM Asian patients, both showed significant reduction in glycated hemoglobin level.<sup>11,30</sup>

Several RCTs showed that team-based care was associated with statistically significant reductions of HbA1C value.<sup>4,24</sup> However, meta-analysis revealed mixed results. There was no significant difference in HbA1C between multidisciplinary and standard approach, albeit a lower tendency of HbA1C in multidiscipline group. Only one meta-analysis involving 31 studies and 4263 patients showed a significant decrease in HbA1C, but this benefit declined shortly after the multidiscipline care had stopped. Several factors might lead to this inconsistency, for example diversity of intervention method, team composition and presence of commorbidity. Intensity and duration of intervention also varied between clinical trials. All studies in these meta-analysis were conducted in Western countries, mostly in the United States.<sup>25-26</sup>

### Telephone Coaching

Intervention using telephone coaching showed mixed results. One RCT using telephone call up to 18 sessions and total 420 minutes showed significantly lower HbA1C than standard care, while other RCT using up to 5 sessions and total 150 minutes had no significant HbA1C difference.<sup>19,27</sup> On the other hand, a large well-conducted RCT showed that telephone coaching by pharmacist could increase drug compliance and reduce mortality risk significantly in T2DM patients receiving polypharmacy.<sup>28</sup> Currently, there was no standard for frequency and duration of telephone sessions needed to yield significant effect on achieving T2DM treatment goals.

### Healthcare Personnel Visit

Visits by nurse or pharmacist seemed effective. In reviewed RCTs, the initial visits were more frequent before treatment goal achieved (weekly to three-monthly), then less frequently afterwards (monthly to four-monthly). Intervention duration varied from 6 to 24 months, but all showed a significant difference in HbA1C reduction compared to standard care. These visits could be given for an individual patient or a group of patients. However, it needs to be noted that some of these RCTs had small sample size, one study had only 99 subjects in total.<sup>11,29-31</sup> In our opinion, meeting face-to-face with the patient is more effective than telephone call for

**Table 1.** Summary of multidiscipline care models used in clinical studies during the last decade (2006-2016)

Author	Year	Country	Duration	Participant (total)	Multidiscipline Care Model	HbA1c reduction in Multidiscipline Care compared to Standard Care
Frosch, et al <sup>9</sup>	2011	United States	6 months	201	Telephone coaching	Not significant
Pape, et al <sup>27</sup>	2011	United States	24 months	6 963	Telephone coaching	Not significant
Chan, et al <sup>11</sup>	2012	China (Hongkong)	9 months	105	Healthcare personnel visit	Significant
Cohen, et al <sup>29</sup>	2011	United States	6 months	99	Healthcare personnel visit (group session)	Significant
Ko, et al <sup>30</sup>	2011	China (Hongkong)	24 months	205	Healthcare personnel visit	Significant
Katon, et al <sup>31</sup>	2010	United States	12 months	214	Healthcare personnel visit	Significant
Katon, et al <sup>32</sup>	2012	United States	24 months	214	Combination (telephone coaching and healthcare personnel visit)	Not significant
Johnson, et al <sup>33</sup>	2014	Canada	12 months	1 924	Combination (telephone coaching and healthcare personnel visit)	Not significant

self-management education and support.

The duration and frequency of these sessions should be planned based on patients' characteristics, such as presence of comorbidity. For patients without psychiatric or cognitive problems, a monthly multidiscipline team visit with 15-30 minutes for each session was used. Only one RCT assessed T2DM patients with psychiatric comorbidity – in this study, patients with T2DM and depression were visited by trained nurses every two weeks.<sup>11,29-31</sup>

### **Combination of Telephone Coaching and Healthcare Personnel Visit**

Combining telephone call and healthcare personnel visit appeared to be not beneficial for glycemic control. All patients involved in the studies had depression, in which depression symptoms reduced significantly, while HbA1C reduction was insignificant. Only one RCT involving 214 patients in 14 primary clinic showed significant reduction in both HbA1C and depression symptoms. However, after the intervention was stopped, HbA1C target achievements quickly declined in just 6 months.<sup>32-33</sup> It might imply that behavioral changes needed to achieve optimal glycemic control, such as medication adherence and healthy lifestyle, could not be fostered in a short amount of time. Based on the effective intervention duration from reviewed RCTs,<sup>11,29-31</sup> it might need at least 6 months of multidiscipline care to achieve behavior changes that could lead to significant HbA1C reduction, and at least 12 months to maintain those changes.

Many working patients might be unable to attend clinical visits if they were more frequent than regular physician consultation. Scarcity of healthcare centres in some regions also meant that patients must travel long distance, making it more difficult to attend frequent sessions. In these situations, combining healthcare personnel visits with telephone calls could be effective to create more frequent follow-up or educational sessions.

Modification on the combination – stepped-care or stepwise approach – was another potential solution. In this approach, the frequency of clinical visit was tailored according to clinical outcomes. Patients with worse clinical outcomes would receive more intensive multidiscipline

care, and telephone sessions could be changed into face-to-face meeting sessions if their outcomes declined over-time. This way, patients could avoid unnecessary visits and receive more intensive care when truly needed. However, current ADA guideline specifically recommended this stepwise multidiscipline care approach for patients with comorbid diabetes and depression, focusing on the depression symptoms management.<sup>18</sup>

### **Group-based Session**

Recent RCT using group-based session, with four to six patients in each group, significantly reduced HbA1C level compared to standard care.<sup>29</sup> Additionally, patients could benefit from peer-support. Current NICE guideline recommended group-based programmes as preferred option.<sup>20</sup> There's also growing evidence for the role of community health workers, peer, or lay leaders.<sup>34-40</sup> In our opinion, this method is particularly useful in centres with many T2DM patients and/or few healthcare providers available, as happened in many primary healthcare centres. However, T2DM patients with complication or comorbidity may need personal session tailored to individual clinical profile.

### **MULTIDISCIPLINE TEAM COMPOSITION**

There were several multidiscipline team composition used in studies, such as primary care physician (PCP) – nurse, PCP-pharmacist, PCP-nurse-dietician, and PCP-nurse-specialist (endocrinologist or psychiatrist). Intervention duration varied between studies (**Table 1**). We found that additional team member used in clinical trials were mostly nurse or pharmacist, both had mixed results. Until now, there is no study comparing the effectivity of involving nurse and pharmacist in conducting multidiscipline approach.<sup>11,19,29-33</sup> It seemed that pharmacists were more specialized for educating patients about their medication, especially patients with multipharmacological treatment, and assisting physician in monitoring potential drug interaction. On the other hand, nurses were more specialized for educating patients about their lifestyle changes, monitoring symptoms or other clinical outcomes, and counseling—especially

for patients with comorbidity. However, in healthcare centres with limited number of healthcare personnel, choosing additional team member could be done based on their availability.

Collaboration with specialist is inevitable in managing complicated cases and contributes to treatment goal achievement. In one RCT, collaboration between primary care physician and psychiatrist for T2DM and depressed patients led to better outcomes for both conditions.<sup>31</sup> Another RCT showed that collaboration between nurse and endocrinologist for T2DM patients with chronic kidney disease (CKD) led to better diabetic and renal outcomes.<sup>30</sup> An open-controlled trial showed that a community-based care led by general practitioner in partnership with endocrinologist can produce more clinical and process benefits compared with a tertiary diabetes outpatient clinic.<sup>41</sup>

#### **MULTIDISCIPLINE CARE FOR TYPE 2 DIABETES ASIAN PATIENTS**

Studies evaluating medication adherence in Asian population were limited. An observational study in Malaysian primary clinics showed that only half (47%) patients were adherent.<sup>21</sup> An RCT involving 105 T2DM patients in Hongkong with baseline HbA1C >8% showed that team-based care with pharmacist increased medical compliance significantly compared to standard care (22.5%+13.4% vs 2.0%+5.0%,  $p < .001$ ).<sup>11</sup> It might imply that the causes of non-adherence in Asian patients could be improved by multidisciplinary approach.

Only two RCTs specifically evaluated multidiscipline care in Asians for achieving glycemic target. They were conducted in Hongkong, China, with relatively small samples and used healthcare personnel visits as their multidiscipline care method—both showed significant HbA1C reduction. The longest follow-up duration was twentyfour months.<sup>11,30</sup> However, these results cannot be generalized to all Chinese, or to other Asian ethnicity.

Most Asian countries are developing countries, and many T2DM patients have low income. Taking multiple jobs to sustain living could make patients unable to attend

scheduled visits, even though healthcare cost was free.<sup>19</sup> Additionally, T2DM prevalence in Asia increased markedly, potentially causing unbalanced healthcare providers and patients ratio.<sup>2,14</sup> In our opinion, mixed approach combining telephone coaching and healthcare personnel visits (individual or group sessions) may become beneficial in this situation. Stepwise approach according to patient's risk stratification is also potentially beneficial, especially for T2DM patients with depression.

We found no study evaluating multidiscipline care in Asian patients living in non-Asian countries. This data is also important, because Asians make considerable portion of overall population in many Western countries. In United Kingdom, for example, Asians currently make 7.5% of population and will most likely increase due to incoming refugees.<sup>42-43</sup> A small observational study in Chinese-Americans showed that they faced many more social and cultural barriers in T2DM management, especially for female patients. Family barriers consisted of the perception that diabetes disrupted family harmony, cultural food practice, and family role/responsibilities.<sup>16-17</sup> There was no study evaluating socio-cultural problems for T2DM management in Asian ethnicities other than Chinese.

#### **CONCLUSION**

Current evidence is few regarding how to deliver multidiscipline care specifically for T2DM Asian patients. Physicians and other healthcare providers should have cultural sensitivity to recognize whether T2DM management for a particular patient is culturally appropriate or not. This review cannot be used as a guide for tailoring multidiscipline care in Asian population. However, it provides some insight on possible methods of multidiscipline care delivery and problems potentially encountered in treating T2DM Asian patients with multidiscipline approach. In healthcare centre with high number of patients, using group session with or without telephone coaching for delivering multidiscipline care seems beneficial.

## LIMITATIONS

This systematic review has several limitations. First, there was no study comparing the efficacy between multidisciplinary care models in general or Asian population. Second, studies evaluating T2DM Asian patients, especially with complication or commorbidity, were very few. Therefore, they should be interpreted carefully and could not be extrapolated in all T2DM Asian patients, with or without complication and commorbidity. Third, the longest intervention duration in the studies was twentyfour months, both for general and Asian population, while T2DM is a life-long disease. Therefore, its true efficacy in the long haul is not clear. Lastly, other T2DM treatment targets, such as blood pressure and cholesterol, were not examined.

Unlike type 1 diabetes management which already has a well-defined multidiscipline care (including self-management education and support) in current guidelines, there are no clear guidelines on how to tailor a multidiscipline care for type 2 diabetes patients. Therefore, determining types of multidiscipline approach most effective for each of type 2 diabetes patients is a very important and interesting topic. The results from Joint Asia Diabetes Evaluation (JADE) trial, which examine the effectiveness of stepwise approach with calculated risk stratification in T2DM Asian patients within various Asian countries will shed some light on this topic. This knowledge is necessary for family physicians all over the world, because almost all medical centres in both developing and developed countries have a considerable number of type 2 diabetes Asian patients to treat. Further studies need to clarify which models are most effective for practices of varying cultures, socio-economic condition, and healthcare settings.

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