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### **Lifestyle Management for Type 2 Diabetes: Barriers and Facilitators**

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#### **ABSTRACT**

Type 2 diabetes mellitus (T2DM) is a chronic disease and its management requires lifelong adherence to diet, exercise and medications. Adherence to diet and physical activity and can promote adequate glycemic control and also prevent complications. However, noncompliance to diet and physical activity is a major concern in T2DM individuals. The purpose of this review therefore is to document the barriers and facilitators to lifestyle management of T2DM.

**KEY WORDS:**T2DM, Dietary Management, Lifestyle Intervention, Physical Activity, Barriers, Facilitators.

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## INTRODUCTION

Type 2 diabetes mellitus (T2DM) is emerging as one of the most common public health concerns globally and is the most widely occurring form of diabetes.<sup>1</sup>The worldwide prevalence of diabetes among adults aged 20-79 was 6.4% in 2010 and is expected to increase to 7.7% by 2030.<sup>2</sup> Genetic influence in combination with environmental factors (abdominal obesity, sedentary lifestyle, stress, increased consumption of calorie dense low fiber and micronutrient deficient food) contributes to impaired insulin secretion and insulin resistance leading to the development of T2DM.<sup>3,4</sup> As per the World Health Organization, the treatment of T2DM comprises of two things. The first is lifestyle therapy which includes healthy diet, physical activity, avoidance of tobacco and alcohol and the second being drug therapy that consists of intake of oral hypoglycemic agents and insulin.<sup>5</sup>

Of the articles on which this review is based, while some scholars have focused on barriers and facilitators to diet therapy,<sup>6-8</sup> others have studied barriers and facilitators to physical activity<sup>9-11</sup> in T2DM subjects. Still others have examined the combined effect of both these aspects.<sup>12-14</sup> Some have even gone beyond to include factors affecting pharmacotherapy compliance.<sup>15-18</sup> Though diet and lifestyle intervention is the mainstay in treatment of diabetes,<sup>19</sup> dietary compliance is a major issue that patients face.<sup>7,8</sup> So, the purpose of this review is to explore the barriers and facilitators for non-compliance of diet, lifestyle modification and physical activity in T2DM patients.

## METHODOLOGY

The articles on which this review is based were published between 2000 and 2017 and were collected through the use of Google scholar and Pubmed database. The key words searched included “management”, “treatment”, “ diet compliance”, “barriers”, “facilitators”, “dietary counseling” “lifestyle modifications” and “physical activity” in combination with T2DM. More articles on the topic were drawn from the references used in these. Both qualitative and quantitative researches were included in this review.

## REVIEW

### *Lifestyle Management for Prevention and Treatment of T2DM*

As mentioned earlier, lifestyle management (comprising diabetes self-care, medical nutrition therapy, increased physical activity and smoking discontinuation) is vital component of diabetes care.<sup>20</sup> It is

found that lifestyle intervention is cost saving and cost effective option for prevention of T2DM.<sup>21-23</sup> Espeland et al reported that intensive lifestyle intervention in T2DM subjects lead to reduced inpatient admissions, decreased medications and reduced expenditure on health care.<sup>24</sup>

Apart from cost-benefit analysis, the effectiveness of lifestyle intervention for prevention or management of T2DM has been studied a lot in recent years across all age groups (children and adolescent,<sup>25</sup> adults<sup>26,27</sup> and elderly<sup>28,29</sup>) and income levels.<sup>30,31</sup>

Studies have found that T2DM can be averted with dietary modifications, increased exercise and avoidance of smoking and by restricting alcohol consumption.<sup>27,32</sup> The Finnish Diabetes Prevention Programme and The Diabetes Prevention Programme — most commonly cited lifestyle intervention— that advocate that T2DM can be prevented or delayed in impaired glucose tolerance (IGT) subjects with moderate reduction in weight and increased physical activity.<sup>33,34</sup> The Physical Activity and Nutrition for Diabetes in Alberta (PANDA) trial reported the effectiveness of dietary intervention in Canadian T2DM subjects.<sup>35</sup> Ramachandran et al. also reported similar findings for Asian-Indian subjects, who generally have a higher Impaired Glucose Tolerance (IGT) to diabetes progression rate.<sup>36</sup> Gregg et al. reported that intensive lifestyle intervention leads to partial remission of T2DM in subjects who were not on insulin therapy, had a lower HbA1c level and a shorter duration of diabetes.<sup>37</sup>

### ***Compliance and Adherence to Lifestyle Treatment***

Although the terms “compliance” and “adherence” are used interchangeably, the two concepts are different from each other.<sup>6</sup> The degree to which a patient is able to follow medical advice is termed as compliance. On the other hand, noncompliance means inability to follow medical guidance. Meichenbaum and Turk have defined adherence as the “active, voluntary and collaborative involvement of the patient in a mutually acceptable course of behavior to produce a therapeutic result.”<sup>39</sup>

Parajuli et al. conducted a study among Nepalese and reported non-adherence to dietary and physical activity advice in 87.5% and 42.1% subjects respectively and poor adherence in 12.5% and 36.6% T2DM subjects respectively.<sup>14</sup> Similar results were reported by Thamilarasi and Sowmiya among semi urban population where diet non-compliance was reported in 79.2% and compliance was reported in only 20.8% subjects.<sup>18</sup> Sharma et al. reported a lower (23.3%) dietary adherence among patients attending diabetes clinic.<sup>[17]</sup> Patel et al. conducted a research among T2DM subjects from Ahmadabad and reported that 73% subjects were consuming diabetic diet.<sup>8</sup> While Khan et al. documented a lower diet adherence rate (64.7%) among diabetic subjects from Saudi Arabia.<sup>16</sup> Studies reported different physical activity adherence rate, Patel et al. 54%, Parajuli et al. 21.3%,

Khan et al. 45.3% and Sharma et al. 31.7%.<sup>8,14,16,17</sup> Since adherence to diet, lifestyle intervention requires giving up on long standing habits so non-compliance is a major problem in achieving glycemic control in T2DM. The section below will focus on the barriers and facilitators for T2DM management using diet and physical activity approach.

### ***Barriers to Practicing Diet and Physical Activity Compliance***

The identified barriers are sub divided into five broad areas as individual related (Age, gender, socioeconomic status, duration of T2DM, educational Level, knowledge level, marital status, vicinity to the hospital, family history of T2DM and lack of time), social, psychological, health care facility related and miscellaneous.

#### **Individual Related**

Increasing age is associated with reduced compliance.<sup>11,14</sup> Goderis et al. reported that imposing strict recommendations of diet and physical activity is difficult in elderly patients.<sup>40</sup> In terms of gender, adherence related problems for diet are found to be more common in females in comparison to males<sup>14</sup> and this pattern remains true in the context of physical activity too.<sup>15</sup> Social and cultural values<sup>10</sup> and household work and childcare<sup>12</sup> were reported to be the main reasons for reduced physical activity in females.

Socioeconomic status and financial constraints are also determining factors behind physical activity compliance.<sup>6,40,41</sup> People belonging to the lower middle-income group are more compliant than upper middle-income group.<sup>14</sup> Adherence to treatment decreases as the duration of disease increases.<sup>7,14</sup>

Patel et al. studied the factors associated with diabetic diet compliance and reported that higher educational level was associated with higher dietary adherence.<sup>8</sup> Most of the literature cites lack of knowledge as the most important factor for noncompliance of dietary and lifestyle advice.<sup>6,13-15,17</sup> The vicinity to the hospital determines the treatment compliance. Less distance leads to greater adherence since the patients can frequently visit a hospital for follow up visits, diet counseling sessions.<sup>14</sup>

A positive family history of T2DM was also found to be linked to practicing dietary advice<sup>8</sup> and physical activity.<sup>14</sup> Type of family also impacts adherence. People from the nuclear family system were more adherent to diet and physical activity as compared to people belonging to joint or extended family.<sup>7,14</sup> Compliance was also poor in living alone<sup>6</sup> married or separated subjects.<sup>11</sup> On the contrary, widowed were more adherent to dietary advice.<sup>14</sup> Paucity of time was the major barrier for practicing physical activity.<sup>10,11,17</sup>

### **Social Aspects**

The social network (family, friends and colleagues) of T2DM people also impacts their compliance to diet and physical activity. Thamilarasi&Sowmiya reported that social events were responsible for 40% noncompliance in T2DM subjects.<sup>18</sup> Social obligations<sup>10</sup> and socializing with friends<sup>11</sup> were the commonly identified barriers to physical activity. Jansiraninatarajan reported that patients find difficulty in adhering to dietary advice during family gatherings.<sup>15</sup> Similar results were reported by Booth et al. and the reason was the availability of unhealthy temptations and lack of healthier options.<sup>13</sup> Lack of family support also leads to noncompliance to dietary regimen.<sup>7,15,41</sup> Paucity of time was the major barrier for practicing physical activity.<sup>10,11,17</sup>

### **Psychological Aspects**

In addition to the above factors, non-compliance can also occur due to psychological factors as the disease leads to psychological distress. Psychological aspects for non-compliance includes lack of motivation,<sup>6,12,13,40,42</sup> lack of confidence, fear associated with worsening of the disease, depression,<sup>11</sup> fear and shame<sup>10</sup> and negative attitude associated with leaving well established habits and adapting to new pattern.<sup>13</sup>

### **Health Care Facility Related**

Barriers that are identified at the level of health care facility included lack of knowledge related to diet therapy among physicians.<sup>7</sup> Patel et al. reported that in their study 73 % subjects were following diabetic diet but HbA1c level below 7% was reported in only 35% subjects the reason could be that only 4% subjects referred to dietitians for counseling while 77% of them relied on physicians.<sup>8</sup> The technical language used by health professionals (doctors, dietitians) was a major barrier in receiving, understanding and following recommendations for management of T2DM.<sup>7,43</sup>

### **Miscellaneous**

Other aspects include lack of energy,<sup>6</sup> difficulty in controlling appetite and limited access to dietitians.<sup>12</sup> Barriers to physical activity (other than discussed above) include tiredness, television viewing,<sup>11</sup> bad weather, arthritis, safety related issues, shortage of ideal space for walking,<sup>13</sup> co-morbid conditions, lack of interest,<sup>9</sup> lack of facilities<sup>44</sup> and domestic help.<sup>12</sup> Winter season was found to be a barrier to physical activity in one study<sup>9</sup> but not so by other.<sup>12</sup>

### ***Facilitators to Practicing Diet and Physical Activity Compliance***

There is a scarcity of literature on the facilitators to lifestyle management. Making people aware of the linkage between diet and health is important for better adherence to the lifestyle intervention.<sup>7</sup> Improvement in health status and meeting the short term and long term targets acts as a motivating fact.<sup>13</sup> Visit to a dietitian for diet and lifestyle counseling and frequent follow ups lead to greater adherence.<sup>7</sup> Health professional's positive attitude, belief,<sup>15</sup> praise, encouragement and reinforcement<sup>7</sup> also works as an inspiration for better compliance to the treatment regimen. The constant supervision and support works as a promoter to physical activity.<sup>9</sup> Social support (spouse, family members) is a determining factor to diet and physical activity compliance.<sup>13,44,45</sup>

## **CONCLUSION**

Lifestyle management that comprises of Medical Nutrition Therapy (MNT) and physical activity is an integral component in the management of T2DM and prevention of complications related to it. Noncompliance to lifestyle intervention is found to be a major problem with the patients. This review identified the barriers and facilitators to lifestyle management in T2DM patients and divided them into five broad areas as individual or patient related, social, psychological, health care facility related and miscellaneous. At the **Individual level**, long duration of disease, joint or extended family system, low education level, lack of knowledge about diet modifications and physical activity recommendations, greater distance from hospital and lack of time were commonly reported barriers. **Social** barriers included lack support from family and colleagues, family functions and gatherings. **Psychological** barriers include lack of motivation. The major barriers that were discussed at the level of **health care facility** included lack of dietary knowledge and use of technical language by health care professional which led to incomplete understanding among patients. While **miscellaneous** barriers were lack of energy, tiredness, television viewing, bad weather, health conditions. Although the facilitators were few but regular follow up, visit to a dietitian, motivation and encouragement from health professionals were the factors that lead to lifestyle compliance. Diet counseling by dietitians, repeated exposure, frequent follow up sessions, nutrition education programmes, and development of Information Education Communication (IEC) material and involvement of family members in treatment counseling are the strategies that can be adapted to improve diet and physical activity compliance.

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