

## REVIEW

# Use of Aromatherapy in Diabetes Management

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### Abstract

Diabetes has become a global health issue on a worldwide scale in our present day. In addition to long-term treatment, diabetes is a chronic disease with the participation of individuals in the disease and treatment processes, the self-care and self-efficacy of individuals. Individuals include complementary and supportive practices, along with medical treatments such as medication, nutrition, and exercise, into disease management processes. Complementary and supportive practices are among the practices frequently preferred by individuals in the management of chronic diseases. Complementary and supportive practices are preferred due to the side effects of the treatment protocols used in diabetes, which is one of the common chronic diseases, problems in the process of adherence with drug treatment and the need for long-term medical treatment, as well as the cost-effectiveness of complementary and supportive applications, easy accessibility and applicability. Aromatherapy, which is one of these practices, is preferred because it is effective, reliable, and can be easily applied by the patient. Aromatherapy is known as the use of essential oils obtained from plants for therapeutic purposes. Although aromatherapy has different methods of application, inhalation and massage often come to the fore. Positive effects of the application on anxiety, fatigue, sleep problems, and neuropathic pain were reported by many studies. In line with the results of the study, it should be supported with more sample groups and randomized controlled studies in this field. This review was planned to emphasize aromatherapy usage areas, methods of application, and their effectiveness in diabetes management.

**Keywords:** Diabetes Mellitus, Complementary Therapies, Aromatherapy, Nursing.

### INTRODUCTION

Diabetes is an important healthcare problem at alarming levels with nearly half a billion people diagnosed on a worldwide scale. Although diabetic individuals were known to be 463 million in 2019, it is estimated to reach 578 million in 2030, and approximately 700 million with a 51% increase in 2045<sup>1</sup>. According to the International Diabetes Federation (IDF), Turkey has the highest comparative prevalence (11.1%) corrected according to age among countries in the European region. The biggest number of diabetic individuals is in Germany (9.5 million), in Russian Federation (8.3 million), and in Turkey (6.6 million)<sup>1</sup>.

Diabetes, which is one of the most common chronic diseases, increases direct medical costs causing early mortality with complications, such as cardiovascular system diseases, renal failure, extremity amputations, vision loss, and nerve damage and great economic losses for individuals, families, healthcare systems, and national economies<sup>2</sup>. It was reported that approximately 4.2

million people between the ages of 20 and 79 died, which corresponded to a mortality level of every eight seconds because of complications associated with diabetes<sup>1</sup>. Diabetes-related complications are among the most important reasons for increased diabetes expenses in Turkey, and it is considered that complications make up three-quarters of the expenses<sup>3</sup>. As well as the drug treatment, medical nutrition treatment and exercise treatment<sup>4</sup>, managing the disease processes for diabetic individuals includes maintaining ideal body weight, self-monitoring of blood sugar, and lifestyle changes, which leads to difficult and complex processes, complicating the adaptation processes because such self-management behaviors cause behavioral changes in diabetic individuals<sup>5,6</sup>.

Since the disease management of diabetic individuals is difficult and complex, medical treatment, lifestyle changes, and complementary and supportive practices are used to improve the management of the process and quality of life<sup>7</sup>. It was reported that such practices

are preferred for decreasing or balancing blood glucose<sup>8,9</sup>, for avoiding complications<sup>9</sup> since they are cost effective and applied easily<sup>10</sup>.

According to the results of the study, it was found that the frequency of using complementary and supportive practices in diabetic individuals varied by 27.6 - 75.3%<sup>8-15</sup>. Among the complementary and supportive practices used by diabetic individuals, there are cognitive-behavioral approaches, manipulative approaches, energy approaches, alternative medical systems, and biological approaches<sup>10</sup>.

One of the most frequently used and most popular practices in biological approaches of complementary and supportive practices is aromatherapy, which is a non-pharmacological application that can be safely applied by nurses and transferred to clinic with different application methods, such as topical, internal, inhalation and oral routes<sup>7</sup>. Aromatherapy helps to alleviate health problems and improve quality of life<sup>16</sup> as an inexpensive and non-invasive method<sup>17</sup>.

### Aromatherapy

Although aromatherapy is known as the therapeutic use of essential oils that are extracted and distilled from flowers, barks, stems, roots or leaves of plants, its main purpose is to provide symptom control instead of treatment<sup>18,19</sup>. Essential oils, which are also defined as "etheric oils" or "essence", are called in this way as they evaporate at room temperature<sup>20</sup>. Aromatherapy, which means odor molecules and healing in literal terms<sup>21,22</sup> is used as a natural method to improve physical and psychological health<sup>23</sup>. It is known in our present day that there are approximately 150 essential oils<sup>24</sup>. Although more than 40 plant derivatives were identified for therapeutic usage, lavender, eucalyptus, rosemary, chamomile, and mint are the most commonly used ones<sup>25</sup>.

Essential oils constitute a mixture of saturated and unsaturated hydrocarbons, alcohols, aldehydes, esters, ethers, ketones, oxides, phenols, and terpenes, which can produce characteristic odor. In this respect, they are colorless and fragrant liquids<sup>22</sup>. Essential oils are used after they are diluted with vegetable oils, which are also known as carrier oils because of their high concentrations<sup>26,27</sup>. Essential oils of plants are 100 times denser compared to the plant itself; and are stored in the veins, sacs, and glands of the plant revealing the aroma of essential oils when they are crushed or rubbed<sup>28</sup>. The parts of

the plants some essential oils that are employed in aromatherapy are obtained from are given in Table 1.

**Table 1.** Plants producing essential oils<sup>22</sup>

Essential oils	Parts of the plant
Bergamot, lemon, lime, sweet orange, tangerine, mandarin	Fruit peel
Cinnamon	Bark
Citronella, lemongrass, petitgrain, palmarosa, patchouli	Leaves
Geranium, lavender, rosemary, spike lavender	Entire plant
Ginger, vetiver	Roots
Jasmine, neroli (orange blossom), rose, ylang ylang	Flowers

### Usage areas of aromatherapy

Aromatherapy has a wide range of therapeutic usage areas in physical, emotional, and mental conditions.<sup>20</sup> Many essential oils employed in aromatherapy are known to have antimicrobial, anti-inflammatory, anti-stress, anti-depressive, and immune-enhancing effects<sup>29</sup>.

There are many studies in the literature on different usage areas of aromatherapy<sup>16,18,19,23,29-34</sup>. When studies on aromatherapy were examined, aromatherapy was shown to be employed as an effective application to decrease fistula pain<sup>30</sup>, and itching problems in individuals who receive hemodialysis treatment<sup>31</sup>. It was reported in previous studies that with their anti-inflammatory, antiseptic, analgesic and sedative effects, they can reduce pain caused by rheumatoid arthritis<sup>19</sup>, the aromatherapy applied by using orange essential oil reduced pain and anxiety levels in individuals with extremity fractures<sup>23</sup>, and can help to increase positive effects on fatigue and sleep quality in individuals<sup>32</sup>. Studies on the effects of aromatherapy on students reported that aromatherapy has positive effects on test anxiety in students<sup>18</sup> and the use of aromatherapy in tests may be a good option to help students<sup>33</sup>.

It was also shown that aromatherapy provides better sleep quality<sup>29</sup>, has positive effects on blood glucose levels<sup>16</sup> and decrease pregnancy-related lower back pain<sup>34</sup> result in lower perceived stress and depression levels. Some commonly used essential oils and their usage areas are given in Table 2.

### Aromatherapy application methods

The oils used in aromatherapy are used as topically (it can be applied by touch, through compress to the skin, or baths), internally (application as mouthwash, vaginal or by rectal route to the mucosa), inhalation (directly or indirectly, with steam, or by non-vapor inhalation), and orally (by applying with gelatin capsules or by watering in honey, alcohol or any other diluents)<sup>19,28,35</sup>.

**Table 2.** Some essential oils and their properties<sup>28</sup>

Oils	Properties
Lavender ( <i>Lavandula angustifolia</i> )	Skin regenerative: For burns, wound healing, insect bites, mild eczema. Calming, good for insomnia and depression, good for stress. Reduces agitation in dementia. Enhances sense of well-being. Effective against ticks. Fungistatic, not fungicidal.
Peppermint ( <i>Mentha piperita</i> )	Analgesic, migraine, postherpetic neuralgia. Antinausea, opiate detoxification. Useful in treatment of irritable bowel syndrome (antispasmodic). Antibacterial; useful in sinusitis.
Tea Tree ( <i>Melaleuca alternifolia</i> )	Bacterial infections, acne. Fungal infections including athlete's foot, tinea. Most skin infections, including impetigo, cold sores, herpes, and warts. Mouth infections. Antiviral, including influenza, antitumoral. Vaginal infections, especially <i>Candida albicans</i> . Tea tree can be diluted and used as a vaginal douche for infections, or it can be diluted in carrier oil and used on tampon: put 2 drops of tea tree oil in 1 teaspoonful of carrier oil, roll tampon in mixture, and insert into vagina. Repeat with fresh tampon every 4 hours and leave in overnight. Relief should occur within 48 hours. Vaginal thrush should not reoccur
Blue Gum ( <i>Eucalyptus globulus</i> )	Respiratory complaints, Effective against pneumonia in ventilated patients. Effective against head lice. Antibacterial.

Although inhalation is a method used commonly to apply in aromatherapy<sup>36</sup>, it shows its effect faster<sup>37</sup>. Fats enter the body via the nasal mucosa and lungs, reach the bloodstream and have systemic effects<sup>36</sup>. The sense of smell plays important roles in the physiological functions in individuals. The olfactory molecules of essential oils are transmitted to the brain via olfactory sensory neurons in the nasal cavity. Even a small amount of odor molecules in breath cause indirect physical effects by activating the olfactory memory or via absorption of it in the bloodstream<sup>38</sup>. Steam, aroma stones, strips of oil-scented fabrics (cloth soaked in oil solution), or diffuser aromatherapy inhalation are also used in this respect<sup>39</sup>.

Topical application of aromatherapy can be in the form of essential oils absorbed by the skin via diffusion and since they are lipophilic with the ability to be stored in fatty areas of the body and cross the blood brain barrier. It was also reported in previous studies that there is some evidence showing that massage and hot water increase absorption<sup>28</sup>. Each massage type can be employed in aromatherapy, and the key in aromatherapy massage is selecting the proper oil. The effects of aromatherapy massages appear with the massage itself and the oil used<sup>19,36</sup>. Oils circulate in about 30 minutes during aromatherapy massage and are then excreted from the body in a few hours<sup>26,27</sup>.

Another option for the topical application of aromatherapy is aromatherapy bath. The therapeutic substances in essential oils pass through the oil and sweat glands, and via the airway into the bloodstream during aroma therapeutic bathing. It is recommended that the temperature of the water is approximately 40°C, and the bath lasts about 15-30 minutes. It is also important not to use soaps and foaming agents. After the bath, the body should be rinsed with water and dried completely. Aromatherapy bath can be supported with hydro massages or underwater massages<sup>36</sup>.

The oral use of essential oils is applied with gelatin capsules<sup>39</sup> after being prepared by mixing alcohol, honey water, and vegetable oils<sup>35</sup>. Oral use of essential oils is reported to be safe when the appropriate dosage guidelines are followed<sup>40</sup>.

The application of essential oils via internal absorption includes fragrant mouthwash, fragrant suppository, and vaginal shower<sup>39</sup>. Vaginal application is considered to be effective in cystitis and fungal infections<sup>28</sup>.

#### Use of aromatherapy in diabetes management

Aromatherapy is used for the solution of many problems in diabetic individuals. Studies conducted show that aromatherapy was related with the management of anxiety in individuals with diabetes<sup>41,42</sup> fatigue<sup>32,42</sup>, sleep quality<sup>16,32,43</sup>, and neuropathic pain<sup>44,45</sup>.

Diabetic individuals face many accompanying problems, which include anxiety and fatigue<sup>42,46,47</sup>. Factors, such as a chronic disease, hospitalization process, problems in adapting to the disease and treatment processes, complications that might develop because of diabetes, emotional stress, and the long-term treatment process cause more anxiety with the diagnosis of diabetes in diabetic individuals<sup>42,48</sup>. It was reported in studies which examined the effects of aromatherapy on anxiety that orange and bitter orange oil were preferred frequently, and aromatherapy applied with inhalation was a useful application in anxiety management<sup>41,42</sup>.

In diabetes, fatigue is a common condition in diabetic individuals, and is associated with physiological conditions caused by the changes in blood glucose levels. The course of the disease, blood glucose levels, sleep disorders, decreased physical activity, and diabetes-related complications are considered to be among the factors causing fatigue<sup>49,50</sup>. Fatigue has adverse impacts on the ability of diabetic individuals to perform self-management behaviors<sup>46</sup>. There are also several studies reporting that aromatherapy has effects on fatigue. Aromatherapy was reported as an

application that may have positive impacts on fatigue in individuals<sup>32,42</sup>.

One of the problems diabetic individuals often face is sleep disorders, which are considered to affect glucose metabolism<sup>43</sup>. Problems such as diabetes-related nocturia, polyuria, diabetic neuropathy, and neuropathy-related pain cause sleep problems in individuals<sup>51</sup>. It was reported that aromatherapy has effects on sleep quality in diabetic individuals<sup>32</sup>, and improves sleep duration and overall sleep quality<sup>16,43</sup>. For this reason, it is considered that aromatherapy may be a safe, non-invasive, and effective approach for clinical nurses in routine care to improve the sleep quality of diabetic individuals<sup>16</sup>.

Both microvascular and macrovascular complications develop because of diabetes, and neuropathy is common among microvascular complications<sup>2</sup>. Peripheral distal neuropathy, mononeuropathy, and autonomic neuropathy are among the types of neuropathy<sup>52</sup>. The reported prevalence of peripheral neuropathy related to diabetes ranges between 16% and 87%, and the rate of painful neuropathy was reported as approximately 26%<sup>1</sup>.

Aromatherapy is applied in diabetic individuals who have neuropathic pain, and it was reported that combining aromatherapy with different massage techniques increased its effectiveness on neuropathic pain management<sup>45</sup>. The study that examined the effects of aromatherapy massage on neuropathic pain was conducted with 46 diabetic individuals and 5 different essential oils (e.g. coconut oil as the carrier oil, and rosemary, geranium, lavender, eucalyptus, and chamomile oil) were used as essential oils in aromatherapy massage. The patients who underwent aromatherapy massage received 12 aromatherapy massage sessions throughout 4 weeks with each massage lasting 30 minutes. Aromatherapy massage was determined to be a simple, effective, and non-pharmacological nursing intervention that could be used to manage neuropathic pain and to improve

quality of life in diabetic individuals with painful neuropathy<sup>44</sup>. Another study that examined the effect of aromatherapy massage on neuropathic pain in individuals with type 2 diabetes was conducted with 60 diabetic individuals, and rosemary, eucalyptus, and lavender oil were preferred as essential oils; and sunflower oil was used as the carrier oil for one month 3 times a week for each patient with each session lasting about 30 minutes. It was concluded that aromatherapy massage is an effective nursing initiative in decreasing neuropathic pain in individuals with type 2 diabetes<sup>45</sup>.

## CONCLUSION

Although diabetes has become a global epidemic, complications related to diabetes increase mortality and morbidity in individuals affecting their quality of life, self-care, and self-sufficiency levels. As well as drug therapy, nutritional therapy, and exercise therapy, non-pharmacological treatment methods are also used in diabetes. Aromatherapy, which is among the complementary and supportive practices, is applied in many areas, such as anxiety, fatigue, quality of life, sleep problems, and neuropathic pain, which are common in diabetic individuals. It was determined that inhalation and aromatherapy massage method are used most commonly in aromatherapy. It is considered that the quality of life increases after applying aromatherapy on sleep problems, neuropathic pain, anxiety, and fatigue, which are associated with diabetes, by decreasing these effects in individuals. Aromatherapy is considered a holistic nursing initiative, which can be applied by nurses to the problems experienced by individuals. Nurses must pay attention to the effects, contents, appropriate way, appropriate oil, appropriate frequency of aromatherapy oils used during aromatherapy. They are expected to have the necessary knowledge and skills to perform these practices. Studies are needed with larger sample groups and different disease groups to determine the efficacy of aromatherapy and increase evidence levels.

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