



## The Role of Digestive Disorders in Melasma

Marjan Mahjour<sup>1</sup>, Mohammad Reza Noras<sup>1</sup>, Arash Khoushabi<sup>2</sup>, Roshanak Salari<sup>3\*</sup>

<sup>1</sup>Department of Persian Medicine, School of Persian and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>2</sup>Health Department, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>3</sup>Department of Clinical Persian Pharmacy, School of Persian and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

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### Abstract

Melasma is a skin disorder characterizing by hyperpigmentation affecting the sun-exposed areas. This disorder, accounts for 0.25 to 4% of the patients observed in skin clinics in south East Asia. In spite of several reports according to the relationship between digestive problems such as gastritis with melasma, these disorders are not included in the diagnostic criteria of melasma in the texts. This study aims to find the relationship between digestive problems and melasma. In this study, the relationship between gastric problems and melasma was investigated by searching the Persian medicine references such as the Canon of Medicine by Avicenna and Al-Havi of Razi with the terms such as stomach, melasma (kalaf in the Canon) and also the electronic databases such as PubMed, Scopus, Magiran with the keywords of gastritis, stomach, melasma, hyperpigmentation and digestive problems. This study searched the etiology and symptoms of melasma. The results showed accompaniment between some digestive disorders and melasma in Al-Havi and the Canon as well as in articles retrieved from the electronic databases. However, we noticed poor attention to the relationship between digestive problems and melasma due to attention to various topical creams produced by different companies. Considering the results, it is required to pay attention to systemic aspects such as digestive problems in the treatment of melasma. The researchers suggest doing more studies about these issues to find this relationship to be included in one of the main diagnostic criteria of melasma.

**Keywords:** Melasma, Digestive disorder, Hyperpigmentation, Avicenna

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\*Corresponding author: Roshanak Salari

Faculty of Persian and Complementary Medicine, next to the Faculty of Medicine, Azadi Square, Pardis Campus, Mashhad, Iran.

Email: salarir@mums.ac.ir

Tel: +98-5138848930, +989151110785

Fax: +98-5138829278.

## Introduction

Melasma is a skin disorder characterizing by hyperpigmentation affecting the sun-exposed areas. It is common and recalcitrant to available therapies [1, 2]. This disorder accounts for 0.25 to %4 of the patients observed in skin clinics in south East Asia [3]. Pathogenesis of melasma is not yet understood [4]. However, the studies demonstrated the probable role of some risk factors such as sunlight, hormones such as alpha-melanocyte stimulating hormone ( $\alpha$ -MSH), pregnancy, age, genetics, thyroid dysfunction and some drugs in this disorder. Melasma has long and costly treatment with a moderate result. It decreases quality of life [5-7].

One of the observed problems with a high prevalence (307 per 100,000 population/year) in the patients with melasma is digestive disorders such as stomach complaints [8, 9]. Also, it has been claimed in one study that cirrhosis of the liver can cause melasma [10].

Some investigations have confirmed the relationship between melasma and digestive problems too [11]. Also, some ancient scientists such as Avicenna expressed this subject [12]. Despite the reports, these disorders are not reflected as one of the etiologies of melasma in the textbooks.

The purpose of this study is to find the relationship between digestive problems and melasma. If proven, to be included in the textbooks as one of the etiologies of melasma.

## Methods

This is a review article by investigating some ancient books such as the Canon of Medicine

by Avicenna, (a famous Persian scientist born in Afshaneh near Bokhara in Iran in AD 980), [13] and Al-Havi of Razi (a famous scientist lived in the 9th century and writer of the first encyclopedia of Persian medicine (PM) named Al-Havi fil Tibb) [14, 15]. Also, some electronic databases such as PubMed, Scopus, Magiran with the key terms such as stomach, digestive problems, melasma, hyperpigmentation and gastritis were searched through to find a probable relationship between them.

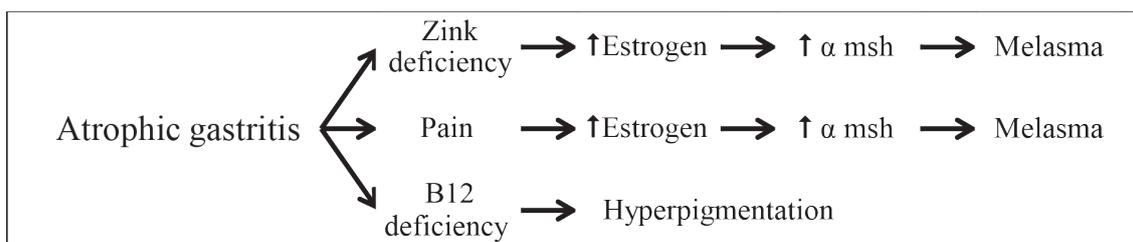
## Results

Searching in the ancient books and the electronic databases, the researchers found that there were some indications of the relation between digestive problems and melasma, many centuries ago. These disorders were emphasized by Avicenna and Razi and also have been quoted as one of the reasons of melasma by them [12, 16, 17].

Some interconnected data can raise reasonable doubts about the relationship between melasma and digestive problems, which are expressed as follow.

\* Atrophic gastritis is a digestive problem that causes zinc deficiency [18]. Zinc deficiency may increase estrogen [19]. Excess estrogen increases alpha melanocyte stimulating hormone ( $\alpha$  msh) [20].  $\alpha$  msh can cause melasma [21].

\*Atrophic gastritis can cause B12 deficiency [22]. B12 deficiency can cause hyperpigmentation [23] (Figure1).



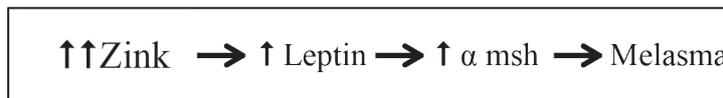
**Figure 1.** Algorithm of melasma due to atrophic gastritis

\* One of the symptoms of the atrophic gastritis is pain [24]. Dyspepsia causes pain [25]. Pain induces stress [26]. Stress increases estrogen [27]. High estrogen increases  $\alpha$  msh [20].  $\alpha$  msh can cause melasma [6, 21] (Figure2).



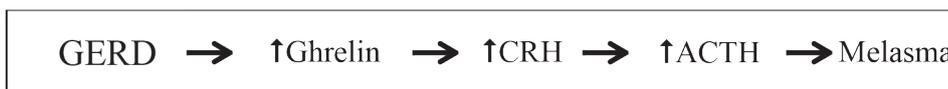
**Figure2.** Algorithm of melasma due to dyspepsia

\* There are leptin receptors in the stomach [28]. There is high zinc in beef liver and egg yolk [29]. High zinc increases leptin [30]. High Leptin increases  $\alpha$  msh [31].  $\alpha$  msh can cause melasma [21].



**Figure3.** Algorithm of melasma due to leptin

\* Gastro Esophageal Reflux Disease (GERD) induces high ghrelin (ghrelin is a peptide secreted by the stomach and regulating the secretion activity and motility of the stomach) [32, 33]. Ghrelin stimulates corticotropin-releasing Hormone (CRH) [32]. CRH increases adrenocorticotrophic hormone (ACTH) [34]. ACTH causes melasma [35] (Figure4).



**Figure4.** Algorithm of melasma due to GERD

Of course, there was some evidence in the recent articles about a direct association between skin problems and internal diseases based on the modern articles as follows:

In one article the skin named as a mirror, reflecting various pathological processes occurring in the human body, especially in the digestive system [10]. Another article emphasizes accompanying of gastritis with melasma [11].

In an investigation it has been expressed that cutaneous changes are combined with gastrointestinal problems such as epigastralgia and loss of appetite [10].

It has been claimed in one paper that cirrhosis of the liver can cause melasma [10].

In addition, ancient PM scientists have treated gastrointestinal problems in removing melasma and emphasised on this subject [12, 16, 17].

## Discussion

Melasma is a common skin disorder and it recalcitrant to available therapies. The exact cause of melasma is unknown, but some risk factors such as sunlight, hormones, pregnancy, age, genetics, thyroid dysfunction, cosmetic and some drugs are mentioned as a probable reason for this disorder [2]. Even though, there is some supporting evidence that digestive problems are associated with melasma and these problems such as stomach disorders are observed in many melasma patients, these problems are not considered as a reason for melasma. Reviewing the Canon and Al-Havi which are inherited from many centuries ago, have noted the relationship between digestive disorders and melasma [12, 16, 17].

With regard to the treatment of gastrointestinal problems in removing melasma by the ancient scientists of PM and their emphasis on this subject and due to the high levels of melasma with digestive problems in the community as well as the data mentioned above, paying attention to this problem should be considered seriously. Recently, various cosmetic companies compete together to win the production chance. They produced various topical anti spot creams for hyperpigmentation which they are expensive with a moderate treatment outcome. Attention in the systemic etiology and treatment of melasma has been ignored because of this attention to topical anti- melasma creams produced by these companies. Also, it should be said that in ancient times, there was no diagnostic tool for detecting gastric receptors or hormones. Nonetheless, the ancient scientists considered melasma in many patients as a consequence of digestive problems and to relieve melasma, treated the digestive problems. Based on the results, some

factors such as zinc deficiency, B12 deficiency and digestive disorders such as dyspepsia and GERD can cause melasma, therefore, the scientists should take seriously this issue for proper treatments.

## Conclusion

Considering the costly treatments and mental or emotional problems caused by melasma, it is required to pay attention to digestive problems as one of the reasons for melasma along with the other aspects. Thus, the authors suggest conducting extensive clinical trials to determine the impact of digestive problems in developing melasma and considering the digestive problems as one of the etiologies of melasma.

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## Conflict of interest

The authors have no conflicts of interest.

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