

A Short Glance at Oral Health and Depression

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Abstract

Depression is one severe neuropsychiatric disorder, the occurrence of which is resulted from genetic and environmental factors. Compared to other fruitful studies, relatively fewer studies are available for the association between oral health status and depression. Here we briefly summarized the current status regarding oral health and depression, aiming to highlight the importance of good oral health and hopefully provide some insights into clinical therapy of depression. Oral health is increasingly considered as an important public health concern, and oral health problems are closely associated with depression. Multiple studies strongly indicate the bi-directional relationship between oral health and depression. The positive association between depression and oral diseases further emphasizes that the efficient management of depressed patients with oral problems should be considered from different aspects. The reciprocally complicated interactions between poor oral health and depression also make it imperative to put more efforts to clarify the underlying mechanisms regarding oral health problems-induced depression. The great changes in gut microbiota composition induced by poor oral health can potentially induce dysfunctions in immune system and abnormal communication between gut and brain, further leading to depressive symptoms. In view of such a complicated association between oral health status and depression, more work are warranted to decipher the underlying mechanism in the pathogenesis of poor oral health-induced depression.

Keywords: Oral Health Problems; Antidepressant Medications; The Pathogenesis of Depression

Introduction

Depression is one severe neuropsychiatric disorder, the occurrence of which is attributable to both genetic and environmental factors [1]. Depression was classified as the third main cause of global disability in 2015 [2], and it affects about 20% population worldwide and has made great social and economic burdens [3]. Environmental factors (accounts for ~65%) such as light exposure, life stressors and oral hygiene/health status have close association with depression [4-10]. Compared to studies on the relationship between other environmental factors and depression, relatively fewer efforts are made on investigating the potential association between oral health status and depression. Research in recent years emphasized the fact that oral diseases are closely associated with depression [11-14]. Here in this short review we briefly summarized the current status regarding oral health and depression, in order to bring more public attentions to keep oral health and hopefully provide some insights into clinical therapy of depression from a perspective of maintaining good oral hygiene.

A bi-directional relationship between oral health and depression

Oral hygiene is one necessary and important factor in maintaining oral health. Oral health is defined by the World Health Organization (WHO) as a state free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal diseases, and disorders characterized by limitation in biting, chewing, smiling, speaking, and psychosocial wellbeing [15]. Oral health has been increasingly considered as an important public health concern, and oral health problems such as toothache, gum bleeding and tooth loss are closely associated with depression [10]. In fact, oral health should not be underestimated and it was suggested that poor oral health could, to some extent, greatly contribute to depression [16-18]. Based on the database originated from standardized questionnaires on 201,953 adults aged ≥ 18 years from 50 countries which participated in the World Health Survey (WHS) 2002 - 2004, Tyrovolas and colleagues emphasized the edentulism-related depression in younger persons from low- and middle-income countries [16]. A questionnaire study from large samples from several participants in universities showed that patients with burning mouth syndrome exhibited remarkably higher mean scores for depression compared to controls [17]. In fact, the poor oral health-induced depression has actually been a tough medical problem worldwide. One historic research on 853 homeless people in Scotland suggested that decayed and missing teeth may lead to depression via the psychological constructs of oral-health-related quality of life and dental anxiety, and concluded that dental health status and oral-health-related factors could predict depression [19]. Another large scale, population-based study on 10214 participants in Australia demonstrated that poor oral health positively associated with depression and the association was independent of after adjustment for covariates such as markers of inflammation and adiposity [20]. A recent longitudinal study on Japanese participants aged 65 years and older from the database of the Japan Gerontological Evaluation Study in 2010 and 2013 implicated that people without teeth and having oral health problems may influence the development or worsening of depressive symptoms [18], which further highlighted the crucially negative role of poor oral health in depression.

As a coin has its two sides, the great contribution of depression to poor oral health was also emphasized by several studies in recent years [14,21-23]. For example, in a large survey study on a total of 4866 individuals, it was confirmed that compared to participants without depression, participants with depression showed a higher prevalence of self-reported dental pain and revealed that depression was independently associated with dental pain after adjustment for potential covariates such as age, sex, smoking and oral health status [24]. This study also implicated the contribution of depression in inducing periodontal disease or poor dental health. Taken together, these evidence aforementioned indicate a bi-directional relationship between oral health and depression, which could be strongly supported by a recent study based on meta-analysis from 2504 studies on adults and elders showing that there was a positive association between depression and oral diseases including tooth loss, dental caries as well as edentulism [25]. From the analyses on studies published between 2012 and 2015 (sample sizes: 390 to 4667 individuals) with a high methodological quality, the authors suggested that depression could contribute greatly to dental caries. In addition, based on five studies with sample sizes ranging from 701 to 63,540 individuals, the positive association between periodontal disease and depression was further strengthened. Similarly, the positive relationship between tooth loss, edentulism and depression was further validated depending on several historic studies with great number of sample sizes. Based on this systematic analysis from multiple lines of evidence, the association between oral health and depression was interrogated and validated at a population level.

Multiple aspects should be considered in the efficient management of depressed patients with oral problems

The association between oral health status and depression raises the question that how to keep good oral health so as to reduce the occurrence probability of depression, and how to efficiently manage depressed dental patients with poor dental health. It is undoubtedly understandable for the importance and necessity of maintaining good oral health and its effect on life quality [26-28]. Here this review mainly focused on the management of depressed dental patients with poor oral health. Depressed patients usually take antidepressant drugs normally which may potentially affect the rate of salivation [29] and further worsen the oral hygiene. It could be imagined the dif-

difficulties and frustrations to provide dental care to patients with poor oral health [30]. These difficulties and frustrations could be highlighted in several aspects. First of all, due to the economic burden, the depressed patients may be less likely to take the expensive dental care, which is probably resulted from the lack of motivation and the inner unhappiness of patients [30,31]. Second, the depressed dental patient may not be likely to completely follow the doctor's suggestions for improving oral hygiene. It is hard to imagine that the depressed dental patients who lost interest to almost everything could brush their teeth diligently and completely as a patient who were not depressed [32]. Accordingly, the efficient management of depressed patients with oral problems should be considered in several aspects including avoiding side effects resulted from antidepressant medications, seriously taking suggestions from psychiatric or psychological doctors, positively interactions between the dentist and patients as well as emotional support from the dentist [32]. The poor oral hygiene status of depressed dental patients and the tough management further mirrors the importance and necessity for maintaining good oral health even for healthy individuals, which could be guaranteed by daily oral care and regular assessment by healthcare professionals.

Possible ways pertaining to the reciprocal interactions between poor oral health status and depression

The reciprocally complicated interaction between poor oral health and depression makes it imperative to put more efforts to clarify key factors that are induced by oral health problems leading to depression. Poor oral health status can greatly influence the homeostasis of gut microbiota [33]. There is evidence showing that people with poor oral health exhibited a less diverse gut microbiota which usually happened in some systemic inflammatory diseases [34]. In addition, several lines of evidence indicated that the homeostatic disturbance of gut microbiota was closely associated with neuropsychiatric disorders including depression [35-40]. It is quite possible that poor oral health induces great changes in gut microbiota composition, which in turn results in immune dysregulation [36], abnormal communication between gut and brain [35] and so on, and in the end, leads to depressive symptoms. The other way around, depression is also one of the key factors worsening oral health and inducing potential oral diseases such as periodontitis [41]. A plethora of evidence showed that the dysregulated hypothalamic-pituitary-adrenal (HPA) axis in depression could lead to homeostatic disturbances of cortisol and adrenal, as well as immune dysfunction and excessive secretion of proinflammatory cytokines [42-45]. Changes of these processes triggered by depression probably induce a much poorer oral health status and result in oral diseases such as periodontitis [46], which might be related to a worsen therapy effects via a delay of wound healing [47]. In view of such a complicated association between oral health status and depression, much more work are warranted to decipher the underlying mechanism in the pathogenesis of depression that induced by poor oral health problems including some common oral diseases.

Conclusion

Collectively, in this short review we concisely summarized the current status regarding oral health and depression. Oral health is considered as an important public health concern, and oral health problems are closely associated with depression. The bi-directional relationship between oral health and depression has been solidly validated by several lines of evidence in recent years. Multiple studies also showed the positive association between depression and oral diseases. Based on current available evidence, we further emphasized that the efficient management of depressed patients with oral problems should consider different aspects seriously, such as avoiding side effects resulted from antidepressant medications, taking suggestions from psychiatric or psychological doctors, positively interactions between the dentist and patients as well as emotional support from the dentist. In addition, in view of the reciprocally complicated interaction between poor oral health and depression, we appeal for more efforts to clarify the underlying mechanisms regarding oral health problems-induced depression, in which the great changes in gut microbiota composition induced by poor oral health should be paid more attention. Hopefully this short review could bring more public attentions to keep oral health and provide some insights into clinical therapy of depression from a perspective of maintaining good oral hygiene.

Authors Contribution

Jianliang Zhu, Sunqiang Hu, Fengchun Hu these authors contributed equally to this work.

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