

Review Article

Is Physical Activity and Diet Having a Spot in Periodontal and Respiratory Health - A Review

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Abstract

Physical activity and diet are having enthusiastic effect along with conventional mode of intervention in the management of periodontal diseases and respiratory illness in order to combat the diseases burden rate. This scooping review was conducted with the aim to approximation of the effect of Physical activity and diet on the oral health and respiratory health. For this PubMed, Cochrane Library, Google Scholar databases were searched for relevant studies. It was observed that physical activity and healthy diet significantly enhanced the periodontal parameters and respiratory illness. Even the current substantiation suggested that physical and healthy diet is having a positive effect on improving oral health and lung function.

Keywords: Physical Activity; Healthy Diet; Periodontal Health; Respiratory Illness; Asthma; COPD; Bronchiectasis

Introduction

In today's era, our deskbound lifestyle leads to many health-related issues such as Cardiovascular Disease (CVS), chronic respiratory disease, cancer and diabetes and it has been said through WHO report 2020 that approximately 41 million deaths happened every year due to these health-related issues [1,2]. The interplay of genetic, physiological, lifestyle and environmental factors are having a crucial role in the pathogenesis of these conditions as well as in oral health related illness. More than a few familiar behavioral risk factors such as physical inactivity, unhealthy diets and tobacco and alcohol consumption are found to be associated with oral health [2]. Periodontal Diseases (PD) are the common chronic oral diseases that consequences in progressive obliteration of the periodontal ligament and alveolar bone [3]. It

has been said through any of the epidemiological studies that there is widespread acquaintance between chronic periodontitis and respiratory disorders such as asthma, Chronic Obstructive Pulmonary Disease (COPD) etc. that further endangers the people's health [2,4].

Physical activity is any movement of the body produced by skeletal muscles which result in energy dissipation and acknowledged for improved lung capacity, cardiovascular care, etc or helps to reduce the fat mass or any systemic illness [5]. Various exercises like swimming, walking, running, aerobics, yoga, sports etc are included in physical activities which enhance tolerance power of the body and diminish the breathlessness symptoms of respiratory diseases along with reduction in the pervasiveness of periodontal conditions [2,6]. Not only physical activity, even the diet also plays a significant role while maintaining the symmetry between health and disease. Many studies reported that diet reduces the gingival inflammation, it also protects the lungs from oxidative damage by modulating the acute adverse effects of smoking or pollution over the lung

[3,7]. On the other side; malnutrition, packaged or refined food stuff enhances the asthmatic, COPD, bronchiectasis [8]. Physical activity and diet can prove to be vigorous therapeutic gear in the management of periodontal diseases and respiratory illness in order to reduce its allied co morbidities and death toll.

Aim

The aim of this scoping review is to approximation of the effect of Physical activity and diet on the oral health and respiratory health.

Focused Question

Rather than interventional therapies; what all are the dietary and physical activities available for treating various periodontal as well as respiratory illness among living subjects?

Material and Methods

Eligibility criteria: The articles which were published in English, dated from the year 2010 to 2023 were included in this review. The search terms for articles were either in the title or abstract. Full text original research articles were taken. Unpublished articles in press and personal communications were excluded from the study. All the human studies irrespective of their study design whosever estimated the role of Physical activity and diet in the respiratory as well as oral health were taken into consideration (Table 1).

Inclusion Criteria	Exclusion Criteria
Original Research Articles	Research articles where study population with other non-infectious diseases like CVS, neurological diseases etc
Observational Studies	<i>In-vitro</i> studies, Case Series, Cases Reports and Letters to the Editors due to the lack of accessible information and integrity
<i>In-Vivo</i> Studies	Articles who are accessible with abstract only
Randomized Control Trials	

Table 1: Inclusion and exclusion criteria.

Search strategy for the identification of studies: For the credentials of the studies included in this review, we formulated the search strategy for each database. The search strategy used an amalgamation of controlled vocabulary and free text terms. The electronic database platform including PubMed, Google scholar and Cochrane library was utilized to perform the literature search between 2010 and 2023 (Fig. 1 and 2).

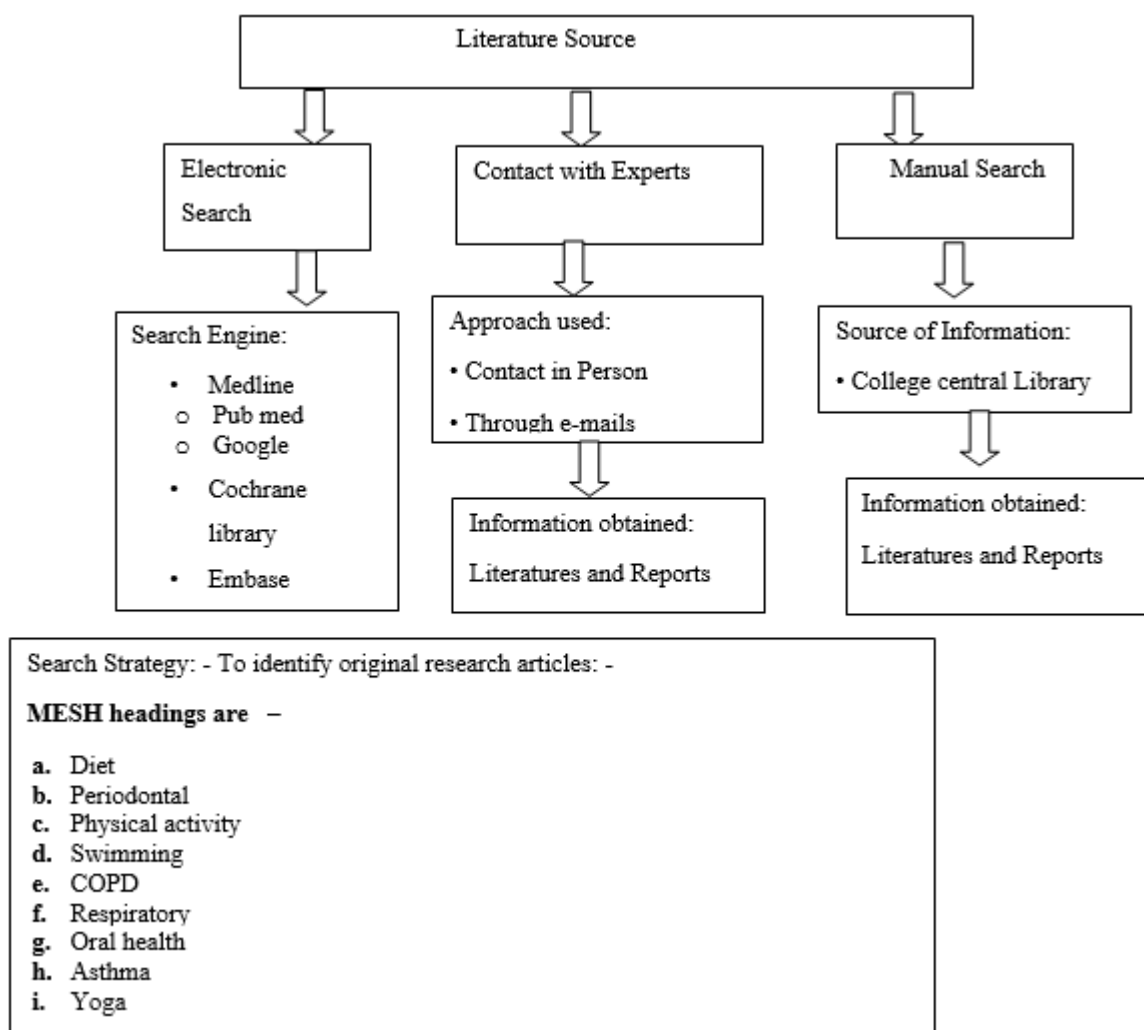


Figure 1: Search strategy.

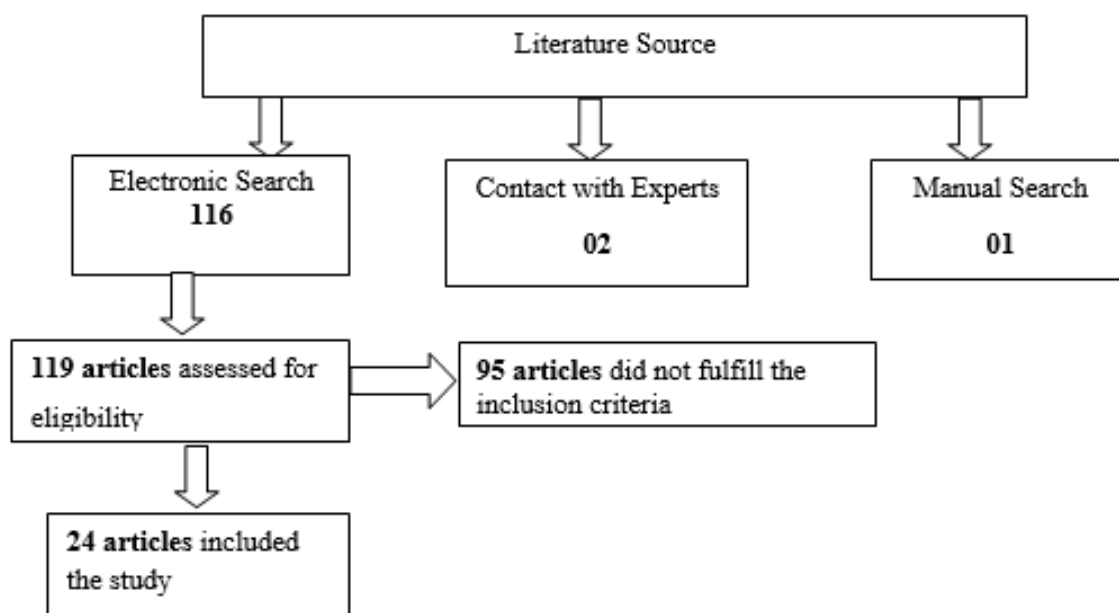


Figure 2: Flow chart of selection of studies included in the study.

Results

In this scoping review 119 articles were assessed in the preliminary search and 24 were incorporated as per the eligibility criteria. Here the information from extracted data encompassed outline characteristics, a period of follow-up, evaluation of consequences and critical findings and the intervention of each included article is summarized in Table 2 and 3.

It has been reported through few of the included studies that there was reduction in the periodontal diseases along with lofty antibodies titer against pathogenic bacteria with good and optimum physical activity. Even yoga helps to reduce the interleukin IL-6(IL-6) that imitated the affirmative periodontal health. Not only this much, even it improves the asthmatic patients' health also if it should be done under proper guidance.

Even the literature reported that diet also plays a crucial role in the periodontal as well as respiratory health. It has been proved through fewer studies that there is reduction in gingival and periodontal inflammation with an optimized diet. When people are more on antioxidant diet, then significant improvement was seen in pulmonary function among the respiratory illness related patients.

Periodontal Health			
Author's Name	Year	Type of Study	Study Findings
Sudhansh, et al., [9]	2017	RCT	Pocket Probing Depth, Bone Loss, Bleeding on probing, had shown a considerable improvement after the physical activity (Yoga/Walking) along with standard line of treatment.
Petrini, et al., [10]	2018	A Cross sectional study	Reduction in oral malodour, gingival inflammation and tongue coating along with enhanced oral hygiene.
Virtanen, et al., [11]	2018	A Cross sectional study	Remarkable oral hygiene was among those who were physically active whereas obesity and smoking were allied with infrequent tooth brushing.
Andersonet, al., [12]	2018	A Cross sectional study	Among the physically active individuals, elevated antibody titres were present in opposition to periodontal pathogens that revealed good oral health but at non-significant level.
Omori, et al., [13]	2018	A Prospective interventional study	There was significant reduction in pocket depth and bleeding on probing among the studied patients at significant level.
Wernicke K, [14]	2018	RCT	Physical activity showed a positive effect on periodontal health. Both the BOP and the severity of periodontitis were significantly reduced in the intervention group compared to the control group.
Oliverieia A, et al., [15]	2021	A cross-sectional observational study	Physically active individuals had a significantly lower chance of severe periodontitis. Physically active individuals had less sites with calculus than sinactive individuals
COPD			
Waschki, et al., [16]	2011	Cohort	Physical activity is associated in positive manner with health as there was reduction in the relative risk of death.
Yu, et al., [17]	2015	Cohort study	Depression or anxiety was likely to seen in less among those who were more of physically active
Awotidebe, et al., [18]	2017	Cross sectional study	A positive correlation was seen in people with good exercise capacity and respiratory parameter.
Lavoie, et al.,	2019	RCT	Increase daily activity enhances the psychological and cognitive outcomes in COPD

[19]			patients
Asthma			
Turner, et al., [20]	2011	RCT	Swimming/physical activity enhance the cardio-pulmonary fitness that further increases the Lung function among asthmatic patients.
Pinto, et al., [21]	2014	RCT	Aerobic training improved the quality of life and asthma exacerbation in patients with moderate or severe asthma.
Refaat, et al., [22]	2015	RCT	Physical training improved cardiac and pulmonary function among asthmatic patients
Jaakkola, et al., [23]	2019	RCT	Regular exercise improved asthma control
Bahçecioglu, et al., [24]	2019	RCT	Yoga had shown relevant significant pre-test and post-test scores of respiratory function and ACT and AQLQ.
Bronchiectasis			
Lee, et al., [25]	2014	RCT	Momentous progress in exercise capacity. Even dyspnoea and fatigue was reported less frequent but sustainability was accounted less at follow up.
Zanini, et al., [26]	2015	Retrospective analysis	Marked improvement in exercise capacity that reported further not as much of dyspnoea

Table 2: Role of physical activity in periodontal and respiratory health.

Oral Health			
Zare, et al., [27]	2013	RCT	In the chronic periodontitis patients' accurate dietary habits improved the antioxidant status of the body.
Woelber, et al., [28]	2017	RCT	A healthier rich fibrous diet along with added supplementation of vitamins considerably abridged the inflammation of gingiva and periodontium.
COPD			
Keranis, et al., [6]	2010	RCT	Improvised lung function is strongly associated with higher antioxidant food intake
Nguyen, et al., [29]	2019	Cross sectional study	Malnutrition was extensively allied with disease severity at significant level. It was also seen that malnutrition decreased 5.6 times with an extra meal per day.
Asthma			
Sexton, et al., [30]	2012	RCT	Diminutive but reliable improvements were seen in quality of life among the asthmatic patient group with healthier and favourable diet.
Kurti, et al., [31]	2016	RCT	Ascorbic acid and alpha tocopherol led to relevant improvement during pre and post treatment activities.
Bronchiectasis			
Olveira, et al., [32]	2015	RCT	Oral nutrition supplements improved the body composition, Bone mineral density, muscle strength in bronchiectasis patients.
Boussoffara, et al., [33]	2018	A Cross sectional study	High prevalence in patients with non-cystic fibrosis bronchiectasis was associated with malnutrition.

Table 3: Role of diet on periodontal and respiratory disease.

Discussion

Oral health is an indispensable indicator of general health and in close association of overall health and Health-Related Quality of Life (HRQoL) Even oral health impinges on general health through various dietary habits and physical activities [1,34]. It has been said through various studies that physical activity along with proper diet influence the respiratory and oral health predominantly periodontium. Daily basis exercises stimulate the local immune competent cells like macrophages, neutrophils

and lymphocytes which are unswervingly linked to the reduced prevalence of periodontitis [21]. Moreover, low level of gingivitis, malodor and tongue coatings has been found among those children who were actively involved in sports activities [10]. On the other side, water-based sports activities cause more of dental stains, trauma with negative penalty on health grade. It was also reported through various existing literature that those who are less active physically are having more chances of getting airflow obstruction with enhanced death rate among COPD patients [32]. However, airflow got improved after the aerobics that further advantages the asthma as well as bronchiectasis condition. Even avoidance of sedentary lifestyle during early days of life causes less of hospital admissions rate [32,34]. Many of the studies reported that yoga also plays a well-liked positive role while maintaining the general well-being of the body through enhancing pulmonary stamina, lungs expansion along with alleviation of stress that leads to decrease in inflammatory cytokines [9].

Diet is also having a significant role in maintenance of health as well as oral health of the body and various researches approved the same that diet also theater an imperative role in the management of chronic inflammatory diseases. Sucrose rich diet causes tooth decay due to tooth demineralization and even the sucrose is famously known as Arch Criminal also. In the wound healing after surgical or non-surgical interventions, vitamins, calcium, magnesium grounds the favorable results [3]. Furthermore malnourishment, protein degradation, muscle wasting are more seen in COPD patients which ultimately lead to deteriorated health related quality of life. But healthier diet along with physical activity produces a melodious effect over the body.

Conclusion

Oral health impinges on general well-being of the people and that further persuades the health through dietary habits and physical activities. These lifestyle activities are of having paramount importance which helps in prevention and comprehensive management of COPD, asthmatic or periodontal diseases. Even the dietary intake modifications can be considered as adjuvant to the management of periodontal or respiratory illness.

Conflict of Interest

The authors have no conflict of interest to declare.

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