

# Integration of oral health into primary health care: A systematic review

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## ABSTRACT

Integration of oral health into primary health care holds the key to affordable and accessible health care as oral health is still a neglected component in many countries. This review aims to determine integration of oral health into primary health care and provide an evidence-based synthesis on a primary oral healthcare approach. Searches were conducted in various databases like Biomed Central, MEDLINE, Cochrane databases, NCBI (PubMed), Sci-Hub, Google Scholar, and WHO sites. The studies included in this review are according to the following eligibility criteria: the articles in English language, the articles published from January 2000 to October 2018, and only full text article. The search yielded 500 articles. After removal of duplicates: 410 articles screened based on title and abstract, 100 full text articles were assessed for eligibility, and 30 full text articles were included. This review showed evidence how oral health is related to general health: focused on common risk factor approach and bidirectional relationship. There are various ways of integration, such as interprofessional education, interprofessional collaborative practice, closed-loop referral process, and various public and private partnerships, and at the same time, there are a lot of barriers in integration. Thus, the primary oral health care needs to be developed as an integral part of primary health care. Consequently, there is a need to increase finance, health care workforce, government support, and public-private partnership to achieve the goal of affordable and accessible health care, i.e. health for all.

**Keywords:** General health, integration, oral health, primary health care

## Introduction

Primary health care has been defined by the World Health Organization (WHO) as essential health care based on practical, scientifically sound, and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain. It is the first level of contact of individuals, the family, and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process (HCP).<sup>[1]</sup>

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Oral health is considered an integral part of general health. In 2009, the WHO 7<sup>th</sup> global conference has advocated the integration of dental care into primary healthcare services and reliance on the collaborative work of a diverse array of HCP. This integrative strategy rests on the premise that a cluster of modifiable risk factors such as diet and smoking contribute to oral and noncommunicable diseases together.<sup>[2]</sup> In almost every country of the world, there are significant number of people who have no permanent access to dental services and this can be compromised at many levels. First, at the microlevel (the individual or psychological level), dental anxiety, self-identity (e.g. a low self-esteem), self-regulation (e.g. self-efficacy), social competence, sense of coherence and coping, thought suppression, self-evaluation of

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oral health, and perceived susceptibility to poor oral health, seriousness, and care efficacy can all influence care-seeking barriers. Second, at the mesolevel (social processes and community structures), social support and engagement, transport availability and range of information about dental health and availability of services are potentially limiting factors, contributing to societal definitions of dental health, potential distrust of services and an individual's willingness and ability to seek dental health care. Third, at the macrolevel (overarching population-wide structures and policies), a range of factors limit access.<sup>[3]</sup>

The primary oral health care approach empowers health promotion and oral disease prevention and favors health equity. It includes various domains such as risk assessment, oral health evaluation, preventive intervention, communication, and education as well as interprofessional collaborative practice. Thus, the purpose of the review was to determine integration of oral health into primary health care and provide an evidence-based synthesis on a primary oral healthcare approach.

## Materials and Methods

### Database search

The original research was identified through a comprehensive and systematic search of various electronic databases, such as Biomed Central, MEDLINE, Cochrane databases, NCBI (PubMed), Sci-Hub, Google Scholar and WHO sites. The studies included in this review according to the following inclusion criteria: 1) The articles in English language, 2) The articles published from January 2000 to October 2018 and 3) Only full text article.

### Search strategy

S1 lists the keywords and combinations of keywords as well as of MeSH terms (Medical Subject Headings) used in the searches. Articles were retrieved using the appropriate search strategy for each database. Additional articles were identified by reviewing the reference lists and bibliographies of the articles obtained by database searching [Table 1].

**Table 1: Search Strategies**

Search strategies for various databases	
Search strategy for various databases (S1)	["Oral healthcare" OR "Dental health" OR "Oral health" OR "Oral care"] AND ["Primary health care" OR "General health" OR "Primary oral health care"] ["Oral healthcare coverage" OR "Dental health" OR "Oral health" OR "Oral care"] AND ["Primary health care" OR "General health" OR "Primary oral health care" OR "Oral health promotion?"] AND ["Integrated Disease Prevention" OR "Integration"] ["Interprofessional relations" AND "Primary health care" AND "Oral health" OR "Patient centered care"] ["Collaborative practice" AND "Interprofessional education" OR "Oral health" AND "Team-based competencies"]

## Results

The search yielded 500 articles identified through electronic database searching and 10 additional articles were identified through reference lists. After removal of duplicates: 410 articles screened based on title and abstract, 100 full text articles were assessed for eligibility, and 30 full text articles were included [Figure 1].

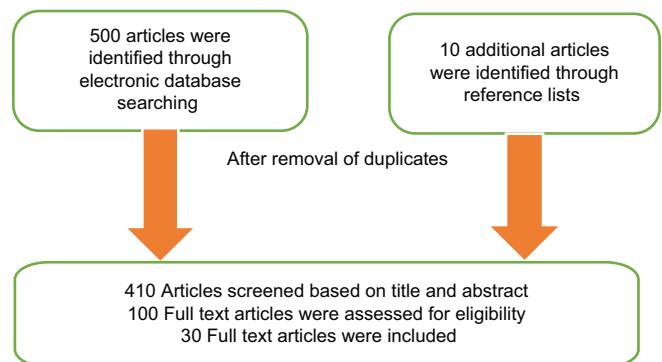
### Definition of integration

The definition we use for integration of primary health care is "a variety of managerial or operational changes to health systems to bring together inputs, delivery, management, and organization of particular service functions." Integration aims to improve the service in relation to efficiency and quality, thereby maximizing the use of resources and opportunities. For example, a primary health care unit is expected to be able to cure people (using staff, procedures and drugs); deliver vaccines (with effective cold chains, immunization schedules and information systems to ensure coverage) and provide reproductive health services (requiring expertise in family planning methods, skills in advising people, treatment of sexually transmitted diseases and provision of effective follow up).<sup>[4]</sup>

### Why Integration of Oral Health Into Primary Health Care?

Table 2 depicts the evidence for Integration of Oral Health into Primary Health Care. Common risk factor approach: It was given by Sheiham and Watt in 2000. The common risk factor approach addresses risk factors common to many chronic conditions within the context of the wider socioenvironmental milieu. Oral health is determined by diet, hygiene, smoking, alcohol use, stress and trauma. As these causes are common to a number of other chronic diseases, adopting a collaborative approach is more rational than one that is disease specific<sup>[5]</sup> [Figure 2].

Bidirectional relationship: The bidirectional relationship among oral health and other diseases and conditions provides a strong rationale for a bidirectional relationship between oral health care and primary care. Example: Diabetes and Periodontitis<sup>[7,8]</sup> [Figure 3].



**Figure 1: Prisma flowchart**

## Ways of Integration of Oral Health Into Primary Health Care

### Care coordination and referrals

Table 3 depicts the ways of Integration. Care coordination (sometimes referred to as “case management”) increasingly is becoming recognized as an important aspect of securing optimal oral health care for vulnerable children. The percentage of US births to mothers on Medicaid is approaching 40% overall and exceeding 40% in 20 states, 18 with nearly 25% of all US births to foreign-born mothers in 2002. These statistics have created a growing awareness of the need for early interventions.<sup>[9]</sup>

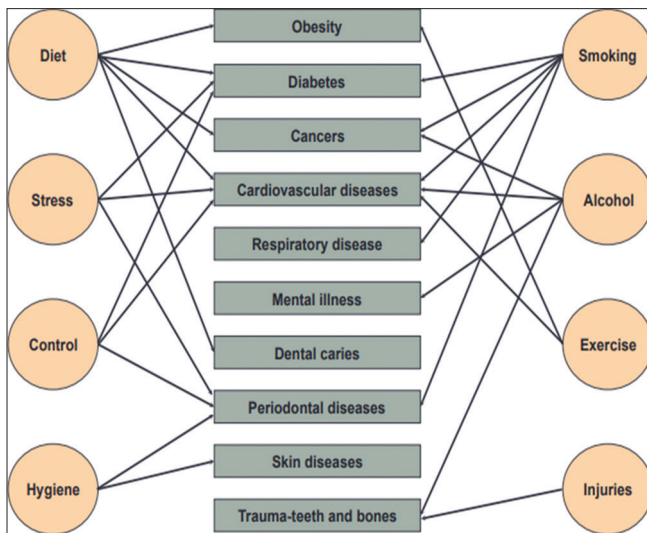


Figure 2: Depicts common risk/health factor approach (Source: Sheiham and Watt<sup>[5]</sup>)

## WHO “Stewardship” and the Dental Hygienists

Opportunities are being created, through the stewardship of the WHO, for the expansion of “oral disease prevention and health promotion knowledge and practices among the public through community programs and in health care settings.” It includes “implementation of community-based demonstration projects for oral health care,” presents dental hygienists with the opportunity to prevail in their historic role as oral health “prevention specialists.”<sup>[10]</sup>

### Morogoro rotation

The community participation field rotations, famously known as the “Morogoro rotation,” present an interesting environment conducive to learning conducted about 200 km from the main university campus. Activities to be accomplished during the rotation include creating cooperative working relationships with the relevant community, arranging oral health examination exercises in the field for data collection for class use, organizing oral health education sessions, promoting oral health, rendering oral emergency care and providing atraumatic restorative treatment care.<sup>[11]</sup>

Table 2: Studies Depicting the Evidence for Integration Oral Health Into Primary Health Care

Evidence for integration oral health into primary health care	
Author and year	Evidence for integration
Sheiham and Watt 2005 <sup>[5]</sup>	Common risk factor approach.
Hajizamani et al. 2012 <sup>[6]</sup>	Treatment of oral diseases takes lot of family time and expenditure.
Kathryn et al. 2017 <sup>[7]</sup>	Bidirectional relationship.

Table 2 depicts the evidence for Integration of Oral Health into Primary Health Care

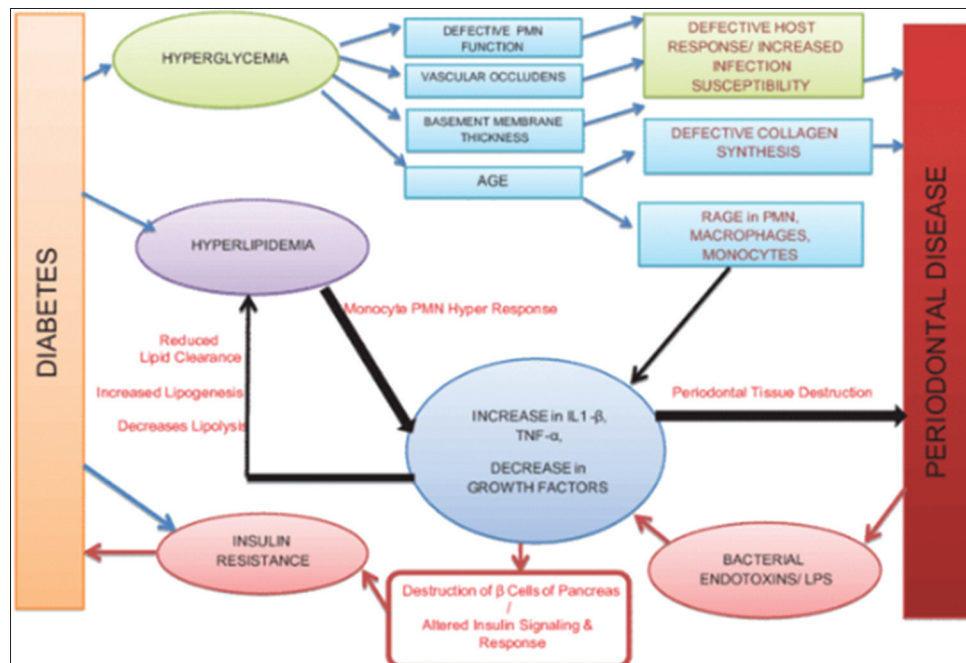


Figure 3: Depicts bidirectional relationship between diabetes and periodontitis (Source: Grover and Luthra<sup>[8]</sup>)

### Workforce mix for oral health care

The most recommended oral health workforce mix includes general dentists, specialist dentists, dental therapists, dental hygienists, dental assistants, dental technologists and more recently, the Community Dental Health Coordinator (CDHC).<sup>[11]</sup>

### Community dental health coordinator

The CDHC is a new category in the workforce—currently being piloted in the USA. The CDHC will work under the dentist and will be responsible for the following: giving oral health education, prevention, oral health promotion, organizing clinical outreach visits and limited preparatory clinical treatment procedures to be completed by the dentist.<sup>[11]</sup>

### Live learn laugh program

The phase 2 of program was launched in 2010 through a public-private partnership between Fédération Dentaire Internationale and Unilever with a single, focused goal of measurably improving oral health by encouraging twice-daily brushing with fluoride toothpaste. It includes a multisector, international and long-term partnership program over three years and is a development model.<sup>[12]</sup>

### Innovative care models

A spectrum of programs described would bring dental services into medical and/or community settings: 1) coordination where enhanced care by the medical provider includes basic preventive oral health services at the medical visit with a coordinated referral to an outside dentist; 2) colocation of dental hygiene services in the medical practice; 3) integration of dental hygienists within the medical care team with case coordination to a dentist for restorative needs; 4) telehealth supported dental hygiene services are provided in the community.<sup>[13]</sup>

### Basic Preventive Oral Health Care in the Medical Home

The medical providers have numerous opportunities (up to 12, well-child visits from birth to 36 months of age) to see infants, toddlers, and preschoolers at frequent and regular intervals; the medical home is being leveraged to expand access to preventive oral health services for children. Basic preventive oral care includes the following:

1. oral health risk assessment
2. oral health anticipatory guidance
3. fluoride varnish application
4. dental referral
5. prescribing fluoride supplements.<sup>[13]</sup>

### Co-location of Dental Hygienists Into Primary Care

A small contingent of medical practices in Colorado tested an innovative model where a dental hygienist was co-located in the medical practice. Example: The Colorado Dental Hygiene Co-Location Project. The participating practices included federally qualified health center, not-for-profit practices and private pediatric medical practices and were situated in both rural and urban settings across Colorado.<sup>[13]</sup>

### Medical–Dental Integration

In 2014, with renewed support from Delta Dental of Colorado Foundation, the Colorado Medical–Dental Integration Project

Table 3: Studies Depicting the Ways of Integration Oral Health Into Primary Health Care	
Ways of integration oral health into primary health care	
Author and year	Ways of integration
Crall 2005 <sup>[9]</sup>	Care coordination and referrals.
Monajem 2006 <sup>[10]</sup>	WHO “Stewardship” and the dental hygienists.
Hajizamani <i>et al.</i> 2012 <sup>[6]</sup>	Training of auxiliary health worker, health visitor and health technician.
Mumghamba 2014 <sup>[11]</sup>	Workforce mix for OHC, Morogoro rotation.
Bourgeois <i>et al.</i> 2014 <sup>[12]</sup>	Live learn laugh program.
Braun and Cusick 2016 <sup>[13]</sup>	Innovative care models which includes: Coordinated care, co-locating dental hygienists, medical-dental integration and telehealth connected teams/virtual dental home.
Kotumachagi <i>et al.</i> 2016 <sup>[14]</sup>	A close collaboration among members of various health professionals and community support groups (e.g, dentist, physicians, nurses, ANM**, ASHAs*, nutritionists, social workers) are important to ensure appropriate scheduling of presentations and reinforcement of concepts and dental home concept.
Atchison <i>et al.</i> 2017 <sup>[7]</sup>	Interprofessional education, patient care services can be coordinated, closed loop referral process, co-location and closer integration of medical and dental providers as well as alternative integration approaches and accountable care organizations.
Reddy <i>et al.</i> 2017 <sup>[15]</sup>	Basic package oral care.
Harnagea <i>et al.</i> 2018 <sup>[1]</sup>	Integration framework (rainbow model), proposed by Valentijn <i>et al.</i>

\*ASHA=Accredited Social Health Activist; \*\*ANM=Auxiliary Nurse Midwife; OHC=Oral Health Care. Table 3 depicts the ways of Integration

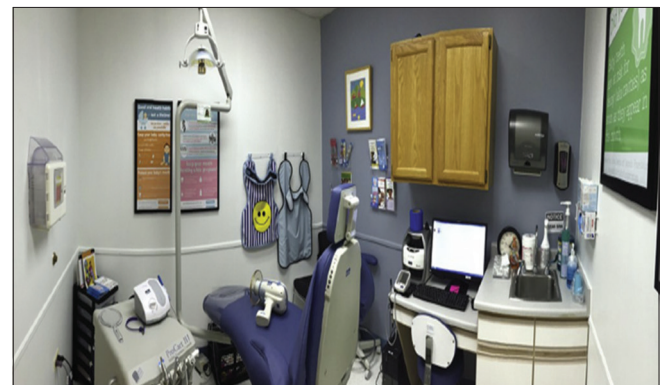


Figure 4: Depicts dental hygiene operator in medical home (Source: Braun and Cusick<sup>[13]</sup>)

was launched. In this review, dental hygiene services were being integrated directly into the medical home to create a “health home,” where both medical and dental health are addressed<sup>[13]</sup> [Figure 4].

### Telehealth enabled teams/the virtual dental home

Telehealth enabled teams (teledentistry) more commonly refers to a virtual meeting between a dental hygienist and dentist. It uses the latest technology to link dental hygienists in the community with dentists at remote office sites. The goal was to have telehealth-connected dental teams, led by dental hygienists who work in communities, keeping people healthy by providing case management. This model had been tested in California.<sup>[13]</sup>

### Dental home concept

The American Academy of Pediatric Dentistry first issued its support of the dental home concept in 2001 after evaluating the success of the medical home policy put forth by the American Academy of Pediatrics in 1992. The definition states: “The dental home is the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated and family centered way. Establishment of a dental home begins no later than 12 months of age and includes referral to dental specialists when appropriate.”<sup>[14]</sup>

## Interprofessional Education and Interprofessional Collaborative Practice

WHO defines Interprofessional Education as “when 2 or more professions learn with, about and from each other to enable effective collaboration and improve health outcomes” and Interprofessional Collaborative Practice as “when multiple health workers from different professional backgrounds provide comprehensive services by working with patients, their families, careers and communities to deliver the highest quality of care across settings.” Example: The University of North Carolina Craniofacial Centre.<sup>[7]</sup>

### Closed-Loop Referral Process

Most physicians and dentists are in nonintegrated practices, integration can begin using simple agreements regarding referral and acceptance of patients. Example: Into the Mouth of Babes (IMB) program. North Carolina offers an early model of such a practice with the IMB program, which began in 2001. Pediatricians provided preventive oral health services and dental referral for Medicaid-enrolled children up to age 42 months with poor access to dental care.<sup>[7]</sup>

### Alternative integration approaches

Physicians either employ or co-locate dental hygienists in their practice to provide preventive oral health services to children, pregnant women and patients with chronic diseases such as diabetes.<sup>[7]</sup>

### Accountable care organizations: (ACOs)

ACOs have ushered in a new paradigm for health care delivery focused on prevention and efficiency via team-based care and community engagement. The health systems should be organized in a way that optimizes their ability to perform in three dimensions: 1) the “Experience” of the individual, 2) the “Health” of a defined population and 3) per capita “Cost” for the population.<sup>[16]</sup>

### Basic package oral care: (BPOC)

It was given by Helderma and Mikx in 2002.

BPOC includes the following three main components:

1. Oral Urgent Treatment (OUT), for the emergency, refers to management of oral pain, infections, and trauma. This includes services targeted at the emergency relief of oral pain, management of oral infection and dental trauma.
2. Affordable Fluoride Toothpastes is an efficient tool to create a healthy and clean oral environment. The widespread and regular use of fluoride toothpaste in non-EME (nonestablished market economy) countries would have an enormous beneficial effect on the incidence of dental caries and periodontal disease.
3. Atraumatic Restorative Treatment—It can be performed inside and outside a dental clinic, as it uses only hand instruments and a powder–liquid high-viscosity glass-ionomer.<sup>[15,17]</sup>

### Integration framework (Rainbow model)

The dimensions of integrated care are structured around the three levels where integration can take place: the macrolevel (system), the mesolevel (organizational) and the microlevel (clinical).

The macrolevel (system integration): Incorporating vertical and horizontal integration can improve the provision of continuous, comprehensive and coordinated services across the entire care continuum. Vertical integration is related to the idea that diseases are treated at different (vertical) levels of specialization (i.e. disease-focused view). This involves the integration of care across sectors, e.g. integration of primary care services with secondary and tertiary care services. Contrary, horizontal integration is improving the overall health of people and populations (i.e. holistic-focused view) by peer-based and cross-sectoral collaboration.

Mesolevel (organizational integration): Organizational integration refers to the extent that services are produced and delivered in a linked-up fashion. Interorganizational relationships can improve quality, market share and efficiency; for example, by pooling the skills and expertise of the different organizations.

Mesolevel (professional integration): Professional integration refers to partnerships between professionals both within (intra) and between (inter) organizations. These partnerships can be characterized as forms of vertical and/or horizontal integration.

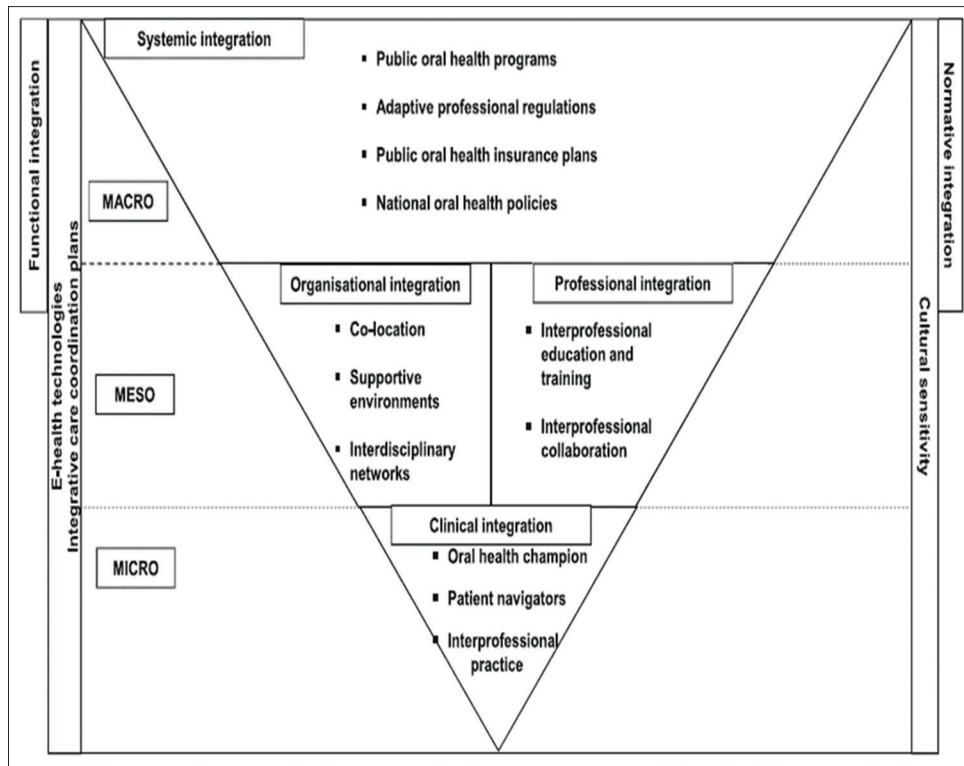


Figure 5: Depicts rainbow model (Source: Harnagea *et al.*<sup>[1]</sup>)

Microlevel (clinical integration): The coordination of person-focused care in a single process across time, place, and discipline.

Functional integration: Linking the micro-, meso-, and macrolevel. Functional integration includes the coordination of key support functions, such as financial management human resources, strategic planning, information management and quality improvement.

Normative integration: Linking the micro-, meso-, and macrolevel. The development and maintenance of a common frame of reference between organisations, professional groups and individuals with respect to shared mission, vision, values and culture [Figure 5].<sup>[1,18]</sup>

### Barriers in integration of oral health into primary health care

There are various barriers in integration oral health into primary health care [Table 4].

## Discussion

This review shows that integration of oral health into primary health care is the demand of the time. W.H.O. has already declared that health is a fundamental right and oral health care cannot be denied. This review included only full text articles so that we can understand innovative approaches of integration of primary health care into oral health care.

When no integration of oral health into primary health care: In this review, an article by Atchison reveals that in areas where there were no integration between medical and dental care providers, the patient were left to manage the challenges of seeking appropriate care. One costly result had been the seeking of dental care in hospital emergency departments (ED). The North Carolina rate increased from 50 to 70 ED visits per population of 10,000, a 40% increase and by 2013, was almost 90 dental ED visits per 10,000. In 2014, US charges for dental ED visits totaled \$1.9 billion. The majority were for nonurgent, nontraumatic dental conditions that, according to Wall and colleagues, could be better treated in community settings.<sup>[7]</sup>

Where and why integration was successful: In this review, an article by Atchison reveals that in United States, integration was successful because of interprofessional collaborative practice.<sup>[7]</sup> Similarly in an article by Kaufman *et al* it was seen that interprofessional collaboration opportunities regarding geriatric medical domains. Example: Boston Medical Center Geriatric.<sup>[26]</sup> In the article by Atchison revealed that in North Carolina States integration was successful because of closed-loop referral process. Alternative integration approaches were also found to be as one of the integration approaches in rural states of New Mexico and Colorado. It was seen that integration through closer integration of medical and dental providers was supported by accountable care organizations like Kaiser Permanente Northwest through Electronic Health Records (HER).<sup>[7]</sup>

Why integration was a failure: In this review, it was seen that integration fails in some places of North Carolina and California

**Table 4: Studies Depicting the Barriers of Integration Oral Health Into Primary Health Care**

Barriers in integration of oral health into primary health care	
Author and year	Barriers in integration
Petersen 2009 <sup>[19]</sup>	Services are mostly oriented towards relief of pain. Oral health care is generally provided by hospitals located in urban center. Limited care in rural area.
Jatrana 2009 <sup>[20]</sup>	Oral health policies and programs should be an integral part of national primary health care. Most of primary health care strategies do not meet primary health care principles. Biomedical approach followed. Do not follow common risk factor approach. Cost of oral health services is high. Publically funded oral health care largely oriented toward select population. Insufficient emphasis on primary prevention of oral diseases.
Osazuwa-Peters 2011 <sup>[21]</sup>	Focus only on emergency dental treatment.
Hajizamani <i>et al.</i> 2012 <sup>[6]</sup>	Auxiliary health worker not aware of oral health of people and do not consider as a felt need.
Mumghamba 2014 <sup>[11]</sup>	Lack of resource.
Petersen 2014 <sup>[22]</sup>	Limited cost sharing mechanism makes oral health political issue.
Batra 2014 <sup>[23]</sup>	Oral health care remains largely the domain of dentists in private clinic hospitals in urban areas. No training programs in basic package oral care.
Joskow 2016 <sup>[24]</sup>	70 years have passed and oral health, dental education and dental care delivery remain disconnected and separate from the medical system. This disconnect and view of the mouth as a separate from the body is perpetuated by segmented models of care and delivery and payment systems that have not substantially integrated oral health in overall health.
Suresh 2016 <sup>[14]</sup>	Traditionally medical care and dental care have been two separate streams of health care services. Most of the treatment for lower strata in government hospital. No close collaboration among members of various health professionals and community support groups. Health and family welfare department of India do not have trained clinicians to staff the dental home model. Current training programs do not educate young physicians, dentists and paramedical staff in the fundamental precepts of dental home.
Filho 2017 <sup>[25]</sup>	Need for critical thinking about health care practices in primary health care to promote the community values and ensure proper implementation of the principles of the unified health system in Brazil. Lack of family health strategy based on multidisciplinary practice.
Atchison <i>et al.</i> 2017 <sup>[7]</sup>	Lack of integrated electronic health record prevents all health care providers from seeing a patient's common care plan and treatment status. Multidisciplinary care team Lack of communication, coordination and integration between medical and dental practice.

because of lack of integrated HER that prevents all health care providers from seeing a patient's common care plan and treatment status.<sup>[14]</sup> In an article by Filho, critical thinking was required to ensure proper implementation of the principles of unified health system in Brazil.<sup>[25]</sup> In an article by Joskow, models of care and delivery and payment systems have not substantially integrated oral health in overall health.<sup>[24]</sup> In an article by Batra, there are no training programs in BPOC.<sup>[23]</sup>

With respect to India there are many barriers such as: health gap in urban and rural areas, no oral health policies and programs, shortage of resources, people doesn't consider it as their own need, and BPOC which can be easily afforded lacks a training programs.

## Conclusion

Thus, the primary oral health care needs to be developed as an integral part of primary health care. Consequently, there is a need to increase finance, health care workforce, government support and public-private partnership to achieve the goal of affordable and accessible health care, i.e. health for all.

## Recommendations for Effective Integration of Oral Health Into Primary Health Care in India

1. Health gap in urban and rural areas—public and private partnership.
2. Lack of oral health policies and programs—should be incorporated in national primary health care. Example: It can be included in Janani Sureksha Yojana scheme.
3. Lack of resource—Multi disciplinary practice, closed loop referral system, cost sharing mechanism.
4. Not considered as a felt need only emergency dental care approach is there—Oral health education booklets for allied health professionals and concept of dental home.
5. No training programs in BPOC included in training manual of health care workers.

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## Conflicts of interest

There are no conflicts of interest.

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