ACTA SCIENTIFIC DENTAL SCIENCES

Volume 8 Issue 9 September 2024

Research Article

Investigating the Role and Contribution of Professional Organizations in Establishing Routine Oral Health Care within Standard Ante-Natal Care in Nepal

Pratiksha Dhungana*

Department of Global Health, Thammasat University, Thailand

***Corresponding Author:** Pratiksha Dhungana, Department of Global Health, Thammasat University, Thailand.

DOI: 10.31080/ASDS.2024.08.1891

Received: July 29, 2024

Published: August 05, 2024

Abstract

Maternal oral health care is a critical yet often neglected component of maternal and neonatal health, with implications for adverse outcomes like preterm birth and low birth weight. This study examines the roles of the NDA, NMA, PESON, GPAN, and the MoHP in integrating oral health care into standard perinatal services in Nepal. Through semi-structured interviews with 14 stakeholders from these organizations, the study identifies key barriers and facilitators to this integration. Findings reveal significant gaps in awareness and practice among healthcare professionals, with limited engagement from professional organizations in advocating for policy changes. Systemic issues, such as insufficient national healthcare policies, inadequate dental health education, and financial constraints exacerbated by the privatization of dental services, hinder effective integration. The study highlights the need for enhanced advocacy, improved collaboration, and systemic reforms, including better financial resource allocation, curriculum updates, and preventive measures. Addressing these issues is crucial for improving maternal oral health care and reducing disparities, particularly in rural areas.

Keywords: Oral Health Care; Maternal Periodontal Disease; Perinatal Oral Health; Maternal; Newborn Health; Professional Organizations; Interprofessional; Antenatal Care

Abbreviations

ANC: Antenatal Care; BPKIHS: B.P. Koirala Institute of Health Sciences; BPOC: Basic Package of Oral Care; CDE: Continuous Dental Education; CME: Continuous Medical Education; EC: Ethics Committee; GoN: Government of Nepal ; GPAN: General Practitioner Association of Nepal; JNMA: Journal of Nepal Medical Association; KII: Key Informant Interview; LIMCs: Low and Middle-Income Countries; MNH: Maternal and Neonatal Health; MPD: Maternal Periodontal Disease; NDA: Nepal Dental Association;; NMA: Nepal Medical Association; NMC: Nepal Medical Council; PESON: Perinatal Society of Nepal; PHC: Primary Health Care Center; SOP: Standard Operation Procedure; SRP: Scaling and Root Planning; WHO: World Health Organization

Introduction

Globally, it is estimated that more than 3.5 billion cases of oral diseases and associated conditions exist, with three-quarters of those affected residing in low and middle-income countries (LMICs). In the last three decades, the combined worldwide prevalence of dental caries (tooth decay), periodontal (gum) disease, and tooth loss have remained constant at 45 percent, exceeding the occurrence of any other non-communicable condition [1]. Among these dental ailments, severe periodontal disease is the 11th most prevalent disease [2]. The surge in oral diseases, especially in LIMCs is largely because of social, and economic changes [3]. Similarly, numerous studies have indicated a widespread occurrence of oral diseases during pregnancy on a global scale [4]. However, there is limited global evidence regarding the prevalence rates of periodontal disease during pregnancy [2] using uniform diagnostic criteria [5].

Oral diseases, which contribute to adverse pregnancy and neonatal outcomes such as preterm delivery, and low birth weight remain neglected in MNH [6]. MNH services refer to the health care of both the child and the mother during pregnancy, childbirth, and the postpartum period. Considering the harmful effects of dental is-

sues during pregnancy on both the mother and the child, maternal oral health care is viewed as a major public health concern around the world. Several studies [7] and guidelines have been published stressing on the importance of oral health care during pregnancy [8]. Recent studies in Nepal revealed that up to 40 percent of pregnant women experienced periodontal disease [9]. Similarly, in another study, Nepalese doctors were observed lacking adequate information on the outcomes due to poor oral health of the mother and her baby, and this problem was rarely raised during prenatal care [10]. Despite efforts to integrate oral health into maternal and neonatal health services at the PHC level, screening for oral health issues and addressing them during routine ANC visits are still overlooked [7]. Neither the WHO nor the GoN has recommended integrating oral health screening and addressing dental issues into routine ANC visits [11]. Due to the absence of policies promoting the integration of oral health into MNH, prenatal oral health remains a neglected risk factor in addressing maternal and neonatal mortality in Nepal.

The GoN has aimed to implement national oral healthcare policies to deliver dental services through PHCs, however, success has not been achieved yet. The reasons remain unclear but as in many countries, this may include reliance on traditional business models for dental care [12], dental colleges not focusing on community-based education [13], and dentists' reluctance to work in rural areas [14]. Despite playing a crucial role in global health, PMOs in low- and middle-income countries often face resource constraints that hinder their ability to fully support their members. Additionally, there is a lack of research on these organizations in LMICs [15].

Global burden and management of maternal periodontal diseases

Oral diseases represent a significant global health challenge, impacting millions despite their preventable nature. The World Health Organization defines oral health as a state enabling individuals to perform essential functions and maintain psychosocial well-being. Oral diseases rank among the most common worldwide and are increasingly prevalent, especially in low- and middle-income countries. Socioeconomic, political, and commercial factors contribute to disparities in oral health, with disadvantaged populations often facing barriers to accessing care [16]. In many high-income countries, such as Canada and the United States, reliance on costly private sector services exacerbates these challenges [17]. MPD, characterized by gum inflammation due to hormonal changes and poor oral hygiene, is prevalent globally, affecting up to 100% of pregnant women in some regions [18]. MPD is linked to increased risks of preterm birth and preeclampsia [19]. While gingivitis and periodontitis are treatable, they are often neglected due to misconceptions about dental care during pregnancy and barriers such as cost and lack of awareness. Effective treatments, such as SRP, have been shown to reduce the risk of adverse outcomes like preterm birth [20]. Despite safety concerns, the second trimester is generally considered the optimal time for dental procedures [21].

Accessing dental care during pregnancy

Various international research found that the use of oral healthcare services during pregnancy ranged from 22.7 percent to 61 percent [22]. One of the many factors influencing the utilization of dental services among women and healthcare professionals was awareness of the potential link between oral health and pregnancy outcomes [23]. Due to a lack of knowledge, only a few women seek dental treatment for swollen and bleeding gums during pregnancy, and antenatal clinics frequently overlook mothers' oral health. As a result, issues often go undetected, leading to complications [24]. Similarly, previous studies indicated that pregnant women facing financial constraints were less likely to attend dental visits [2]. In addition, some studies demonstrated a lack of knowledge and comprehension among health practitioners. For example, in Malaysia, [22] discovered that just 48.9 percent of medical nurses were aware of the link between dental health and preterm labor. Another study conducted in India found that 43.6 percent of general practitioners and 37 percent of gynecologists were unaware of this association [25]. Since both physicians and pregnant women have a lack of understanding about the importance of dental health care during pregnancy [10], there has been a need for action to close this gap [26]. To bridge this gap, prenatal care providers should incorporate preventative dental health check-ups and educational initiatives to enhance overall outcomes for pregnant women [27].

Global initiatives for integrating oral health/MPD into maternal health policies

Many countries recognize the importance of preventive dental care during pregnancy, with guidelines and policies to support it. In the United States, organizations like the American Dental Association and the California Dental Association Foundation have released evidence-based guidelines for maternal oral health care [28]. Germany's maternal health policy includes oral health education and emphasizes the role of gynecologists in promoting oral hygiene [29]. The United Kingdom and Australia also recommend oral health education, screening, and referrals during ANC [30]. In Sri Lanka, antenatal oral health care is compulsory, aiming to improve the quality of life for mothers and children [31]. However, in many developing countries, oral health during pregnancy remains a neglected aspect of maternal care [32]. Studies indicate a lack of

integration of maternal oral health interventions in regions like the Middle East, North Africa, and the Indian subcontinent [33].

Health policies of Nepal

According to the World Health Organization health policy is defined as the decisions, plans, and actions implemented to accomplish specific healthcare objectives within a society [24]. In this study, "policy" refers to the formal guidelines, protocols, and regulatory frameworks adopted by healthcare institutions and governing bodies aimed at integrating oral health care, including the diagnosis, treatment, and prevention of Maternal Periodontal Disease, into routine ANC programs. In particular this study considers common precursors to policy development such as advocacy, building understanding and establishing grass-roots support. These policies are developed in collaboration with professional organizations such as the NDA, and NMA, and supported by the MoHP. The goal is to ensure comprehensive healthcare for pregnant women by addressing both general and specific oral health needs.

Analysis of the national oral health policy of Nepal and delivery dental service's in Nepal

Nepal's National Oral Health Policy 2013 aims to deliver high-quality, affordable oral health care by focusing on prevention, curative services, and collaboration between public and private sectors. Despite adopting the WHO's BPOC, socio-economic disparities and geographical barriers hinder dental care access, particularly in rural areas [35]. While the dental workforce is growing, many dentists prefer urban private practices, leaving rural regions underserved [14]. Addressing this imbalance requires policy reforms, better infrastructure, and incentives for rural practice [12]. Professional organizations, like the Nepal Dental Association, are crucial in advocating for these changes to integrate oral health care into standard antenatal care in Nepal [36].

The magnitude of maternal periodontal disease in Nepal

Periodontitis poses a significant threat to the quality of life for pregnant women in Nepal, impacting their nutrition and overall health. As periodontal disease can lead to eating disorders and nutrient deficiencies, it adversely affects both maternal and fetal health [37]. Although national records on oral health for pregnant women in Nepal are sparse, hospital and district studies highlight a high prevalence of periodontal disease, which is linked to increased risks of adverse pregnancy outcomes [38]. Barriers to integrating oral healthcare into MNH programs include inadequate equipment, decreased national health funding, limited community involvement, and a lack of awareness about dental care among pregnant women [39]. The shortage of trained providers and poor intra-professional collaboration further hinder the effective delivery of oral health services [10].

Purpose of study

The purpose of this study is to comprehensively understand how professional organizations contribute to integrating oral health care into ANC in Nepal by exploring the awareness of Nepalese medical associations on the significance of oral health care during pregnancy, their involvement in promoting MPD in routine ANC programs, and eliciting their opinions and advice on incorporating MPD into these programs.

Significant of study

The study revealed significant gaps in the understanding and practices of oral healthcare during pregnancy among health professionals. Many participants were unaware of the link between pregnancy and oral health until the study, contrasting with recent surveys in Nepal that found high awareness among obstetricians and gynecologists. Despite this, none of the participants had promoted oral healthcare during pregnancy, and some admitted to never addressing it during ANC appointments. Nepal's oral health policy, developed using a top-down approach, is poorly established and does not include prenatal oral healthcare. Dental education also focuses more on theoretical knowledge than practical training, resulting in inadequately prepared dental professionals. The study emphasized the need for interdisciplinary collaboration among healthcare professionals to develop effective policies and promote oral health during pregnancy. Financial challenges were highlighted, stressing the need for funding to support oral healthcare initiatives within ANC programs. Public awareness campaigns are crucial to educate pregnant women about the significance of oral health and dispel myths about dental care during pregnancy. Integrating comprehensive oral health education and screening into routine ANC programs, enhancing training for ANC providers, and fostering interprofessional collaboration are essential steps forward. Revisions to national oral health policies should include prenatal care, ensuring adequate funding and a robust surveillance system. The study's limitations include a focus on policy organizations, potential bias due to the researcher's background as a qualified dentist, and the lack of comparative analysis with other countries. Further research should involve a broader spectrum of stakeholders, including frontline practitioners and community-based oral care, to gain a comprehensive understanding of the challenges and opportunities in this domain.

Materials and Methods

Study design

For this study I performed KIIs with key informants using a semi-structured interview guide to explore the understanding of health professionals affiliated with five different recognized national medical organizations of Nepal and also to explore these associations' involvement in any activity to promote maternal periodontal diseases in routine ANC programs. The key informants were the members who were likely to contribute important information, ideas, and perceptions [40] regarding oral health in the existing MNH programs.

Study sites and participating organizations

This study was conducted in Kathmandu, Nepal, selecting four key medical associations NDA, NMA, PESON, and GPAN due to their significant roles in healthcare. The NDA collaborates with professional bodies like the NMC and NMA to organize dental education campaigns and influence clinical policies. The NMA, comprising medical and dental professionals, enhances healthcare through workshops and policy advocacy, publishing the Journal of Nepal Medical Association. PESON, a non-profit organization of healthcare experts, offers training and health camps for maternal and neonatal care, advising on safety and conducting research. The General Practitioner's Association focuses on rural healthcare, providing continuous education and advocacy, and training practitioners to screen pregnant women for oral disorders. These associations are crucial in shaping maternal and neonatal health policies in Nepal.

Selection and recruitment of participants

Participants were selected from five national health associations in Nepal due to their diverse professional backgrounds, including public health specialists, pediatricians, nurses, and gynecologists, and their focus on multidisciplinary research in child, maternal, and neonatal health. Initially, five participants were purposively chosen from four associations with the help of association members. These included two from the NDA and one each from the NMA, PESON, and GPAN. All agreed to participate after being informed about the study. Using the snowball sampling technique, nine additional participants were recruited, resulting in a total of 14 participants, comprising five from NDA, three from PESON, two from NMA, three from GPAN, and one from the MoHP. The participants included 12 males and two females, with professional experience ranging from five to 35 years.

Data collection and procedure

An interview guide with open-ended semi-structured questions was developed using a conceptual framework from the literature and adapted for this study. The guide, prepared in both Nepali and English, was used to ensure all topics were covered during face-to-face interviews conducted in Nepali. As the principal researcher, I, Pratiksha Dhungana, conducted all interviews, which were audio recorded. Participants received detailed information about the study and a project summary in Nepali before giving informed consent, including consent for audio recording. The interviews lasted between 30 to 60 minutes, and the consent form was translated into Nepali after EC approval of the English version.

Analysis of the data

I transcribed and translated the audio-recorded interviews from Nepali to English, aiming to do so on the same day they were conducted. Thematic analysis was used for coding, involving open coding and multiple readings of the translated data to identify keywords aligned with the study's objectives. The data was categorized into challenges, facilitators, and opinions on integrating oral care into ANC programs and organized in an MS Excel sheet. The phases included familiarization with the data, coding for specific ideas, and organizing phrases under the three study objectives. Table 4 illustrates this process, showing the categorization of challenges, facilitators, and opinions, along with corresponding codes and headings. To create themes, I grouped similar codes together and reviewed them for coherence, combining overlapping ideas into main themes and sub-themes. For data management and confidentiality, all records were labeled with code numbers, and digital copies were stored on a password-protected computer. The documents will be kept securely for five years before deletion. Ethical clearance was obtained from Thammasat University Ethics Sub-Committee on 28 January 2021 and the Nepal Health Research Council on 16 April 2021. Informed written consent for interviews and audio recording was obtained from all participants.

Reliability and validity

In qualitative research, reliability refers to consistency and reproducibility [41]. As a qualified dentist in Nepal, my insider perspective provides valuable insights but may challenge full reproducibility by external researchers. Despite detailed documentation of steps, including sampling, recruitment, and analysis, certain nuances and contextual understandings might be difficult to replicate. Validity concerns the accuracy and trustworthiness of data and interpretations [41]. To ensure validity, I triangulated findings by comparing multiple data sources and cross-checked interpre-

tations with key informants to mitigate biases and enhance credibility. However, my professional background may introduce biases in question formulation and data interpretation, and participants might have altered responses due to my dental profession. To address this limitation, it is recommended that external researchers replicate the study to allow for broader comparisons and validate findings.

Results and Discussion

Awareness of prenatal oral health among health professionals

In this study, almost all participants emphasized the significance of overall oral health. However, out of the fourteen medical professionals interviewed, twelve admitted their unawareness concerning the importance of prenatal and maternal oral health. Furthermore, some participants mentioned that they had never been exposed to the topic of prenatal oral health before this KII meeting. Some interviewed with interviewer participant are mention as

"To be honest, this is the first time I've talked about poor oral health and how it affects pregnancy outcomes. I have never heard of anyone addressing or working on this problem previously." - Physician Internal Medicine

"Aside from being instructed how many teeth are in the oral cavity and how to examine them for black spots which indicate caries, we were never told how important it really is to maintain good dental health during pregnancy." - GPAN 1C

"Oral health is really important for everyone. I must say that before your approach for your thesis KII, I was astonished by my own lack of awareness about the importance of prenatal oral health. Despite being a gynecologist, I have never examined a patient asking her about her oral health at routine ANC visits" - PESON 2A

"Pregnancy is a delicate time characterized by significant biological changes. Yes, we are aware that gingivitis might develop during this period, and we understand the importance of providing proper care to the women."

Ministry Focal person

"We have a good team with pediatricians, gynecologists, public health experts, and nurses. Surprisingly, we've never talked about oral health during pregnancy. We focus on other health issues for pregnant women, but oral health has never come up in our discussions. It's just not something we know much about or prioritize. Since this topic has never been brought up in our discussions, we haven't shared our views in any conferences, workshops, or meetings.' '- PESON 1A

Healthcare professionals, including general physicians and gynecologists, revealed a significant knowledge gap regarding prenatal oral health. Despite acknowledging the importance of oral health issues during pregnancy, their understanding was superficial and primarily focused on basic oral disease identification and treatment. They reported receiving no specific guidance on prenatal oral health, with general instructions applicable to all patients. This lack of detailed instruction and emphasis from medical, nursing, public health, and dental associations has led to a broad neglect of oral health in pregnancy care, highlighting a need for improved education and integration of prenatal oral health into routine practice. The findings from this study reveal a significant gap in awareness of prenatal oral health among health professionals, with twelve out of fourteen participants admitting to their lack of knowledge on the subject. This lack of awareness is attributed to the low prioritization of dental care within healthcare services and the absence of discussions on oral health and pregnancy in professional meetings. This aligns with other studies, such as Anunciacao., *et al*. [42] and Mohammadpour., *et al*. [43], which highlight similar trends due to high dental care costs and limited health budget allocations [44]. To address this, interprofessional collaboration and the implementation of prenatal dental assessment practices are necessary, as demonstrated by a North Carolina university program that successfully integrated dental referrals and education on prenatal oral health [45].

Involvement of health associations in promoting MPD in routine ANC programs

The lack of understanding about the importance of oral health during pregnancy highlights a minimal effort in integrating maternal periodontal disease into routine ANC. Many medical experts reported that their associations have not initiated any programs or discussions on pregnancy dental healthcare, with one participant noting a three-decade absence of such initiatives.

"No, none of our core or general members have taken part in promoting oral health during routine ANC. If there had been an emphasis on the importance of involvement, we or I surely would have participated. In my 30 years of work, I've never heard colleagues in dentistry, nursing, or medicine discuss this particular subject."

PESON 3A

A participant from the Nepal Medical Association noted that while different subcommittees focus on specific health areas, neither the oral health nor the gynecological groups have initiated efforts to promote oral healthcare during pregnancy. He also ex-

pressed uncertainty about whether these departments have implemented oral check-ups for pregnant women.

"The organization (Nepal Medical Association) comprises various medical fraternities, each with its sub-committee. The oral health sub-committee primarily handles oral health-related tasks, while the gynecological group focuses on maternal and child health. I have not witnessed either of these two groups promoting the matter. I, at this moment, do not know whether these or other departments have integrated oral healthcare, especially during pregnancy." - NMA 1B.

A participant from the Nepal Medical Association suggested that promoting oral healthcare during pregnancy is the responsibility of either dental or gynecological groups. However, dental professionals noted that their services mainly focus on children, with little effort directed at ANC. An endodontist and a pedodontist both acknowledged that their associations have not prioritized prenatal oral health, instead focusing on general oral hygiene and school-based programs for children.

"We address oral hygiene as a whole, rather than focusing on individual components. While we have worked with other groups on general oral hygiene programs and associated projects, we haven't done much to promote oral health during pregnancy. We believe that good oral health reflects good overall health." - NDA.

3D-Pedodontist

Another dental participant explained that their organization has prioritized issues like combating dental quackery over promoting oral healthcare during pregnancy. Due to these existing priorities, introducing prenatal dental care has been challenging, and he admitted feeling embarrassed about the lack of initiative in this area.

"I'm already embarrassed. The NDA has not taken any initiatives to promote oral health during pregnancy. As the president of NDA, I'm currently focused on tackling dental quackery. How can I introduce a new topic about pregnancy and dental health? It does not seem realistic right now and it might get overlooked." - General

Dental surgeon

This consensus of various opinions from the study participants reflects a collective acknowledgement of the absence of action on the promotion of prenatal oral healthcare. Based on these observations, the two main reasons are identified in lacking the associations' engagement in promoting prenatal dental care. The consensus among health professionals indicates a notable gap in the promotion of MPD during routine ANC programs. Despite evidence suggesting the detrimental impact of poor oral health on pregnancy outcomes, such as preterm birth and low birth weight [19], professional associations in Nepal, including the Nepal Dental Association and Nepal Medical Association, have not integrated oral health into their ANC initiatives. Participants from various medical fields highlighted a lack of awareness and prioritization, with some noting that their efforts have traditionally focused on other public health issues [10]. This neglect mirrors findings from global research indicating that dental health during pregnancy often remains underemphasized, especially in low- and middle-income countries, due to financial constraints, limited knowledge, and inadequate health policy integration [2]. Therefore, to improve maternal and neonatal health outcomes, there is an urgent need for collaborative efforts to incorporate oral health care into routine ANC, emphasizing preventative measures and education [27].

Dental care is a low priority in healthcare

Participants agreed that dental healthcare is consistently given low priority compared to other health concerns, with inadequate policy formulation and strategy development contributing to its neglect. Oral health, including during ANC, is often overlooked due to a general lack of awareness and understanding among healthcare providers and the public. This low priority is compounded by societal beliefs that dental issues are not life-threatening, leading to oral care being sidelined in favor of other health issues.

"Nepal faces healthcare issues, including a widespread lack of awareness of overall health, particularly oral health, which is often disregarded. It is widely believed that losing a tooth does not kill a person. Despite attempts to promote ANC and safe motherhood, dental health during pregnancy has been continuously given less attention, and oral health remained overshadowed in comparison to other health concerns." - NMA 1B.

Participants noted that dental care's low priority is evident in health policies, which are criticized for being inadequate and lacking comprehensiveness. They pointed out that the policy formulation often lacks input from healthcare experts, following a top-down model that marginalizes dental health issues. Consequently, this has led to poor implementation and a significant gap in public understanding of dental health.

"In Nepal, many policies, including those related to oral health, remain unimplemented. While these policies are drafted, they are often known only to their creators or groups that are not from the medical

field, leading them to remain on paper without public awareness." - NMA2B-Physician Internal Medicine.

The lack of a comprehensive oral health strategy in the country exacerbates the neglect of dental care. Despite numerous health initiatives, a targeted approach to oral health is missing. Although the National Dental Association has made progress in developing general treatment guidelines, these efforts have not extended to formulating specific policies for prenatal oral health.

"Okay, let's put pregnancy aside for a while. Even when it comes to overall oral health, no clear guidelines have yet been developed. We have begun to develop standard treatment procedures, which still need to be refined. But it is not easy." - NDA 1D-General Dental Surgeon.

In Nepal, oral health is perceived as insignificant due to general ignorance among healthcare workers and societal views that tooth loss is not critical. This neglect extends to policymaking, where a lack of dental expertise results in ineffective, unimplemented policies. Despite various health initiatives, there is no comprehensive oral health policy, and while the National Dental Association has developed general standards, prenatal oral health remains unaddressed. The findings reveal a consensus that dental care is a low priority in healthcare in Nepal, often overshadowed by other health concerns due to a general lack of awareness and understanding among healthcare providers and the public. Participants pointed out that oral health, including dental care during pregnancy, is not adequately promoted or integrated into routine ANC programs. This neglect is partly attributed to societal perceptions that tooth loss is not life-threatening and thus not a significant health issue [2,10]. Additionally, the formulation of health policies in Nepal often lacks input from medical or healthcare experts, resulting in top-down policies that are unimplemented and ineffective [14]. Despite efforts by the National Dental Association to develop standard treatment guidelines for general oral health, there remains a significant gap in addressing prenatal oral health, highlighting the need for comprehensive oral health strategies and better integration into ANC [46].

Limitation of dental care service within SOP and education practice

Dental care services and education in Nepal face several limitations, including a lack of SOPs, a preference for urban and private practice, and an educational focus on theory rather than practical experience. The absence of SOPs and limited clinical exposure in medical training contribute to insufficient hands-on experience for dental professionals, impacting the quality of care. Additionally, there is a notable lack of collaboration within the dental association and with other professional groups.

"My peers from the dental department were assigned to various departments including dental for less than a couple of months, excluding the gynecology department. As a result, even after a month and a half in a department, they weren't equipped to make decisions related to issues; however, they were qualified for counseling and referrals. Likewise, nurses and other non-dental professionals might have learned some basics in school, but this limited knowledge isn't practical in real-world situations. A brief rotation doesn't qualify them to make dental-related decisions either." - NMA 2B-Physician Internal Medicine

''*The unfortunate reality was that our training largely focused on basic tasks like handling quadrants and extracting severely mobile teeth. We had only a 15-day rotation in the dental department, with minimal attention given to us during that time. It was as if attendance was optional, and there was no real commitment to our learning. We were taught limited to identifying caries by black spots on teeth and learning about local anesthesia for tooth extraction, either through injection or topical application. These skills weren't part of our formal curriculum but were picked up during these short rotations, and there was no exam to assess our proficiency in these areas.* - GPAN 3C-General Practitioner

"Not every dentist comes from a high-patient flow hospital. Some come from dental schools that have few patients, thus they must pay patients to practice. Given this, you can guess where our dentists stand in terms of knowledge. Some of them simply don't know how to perform extractions or utilize forceps. Some colleges cannot provide enough patients and dummies for students to practice. Instead, they focus on theory only. The only thing they know is that no dental treatment is done during pregnancy. And do you think that they can promote anything including prenatal oral health?" = NDA 2D-Endodontist.

"Our dentists are primarily concentrated in cities, leaving rural communities with limited access to dental care. This has created a significant gap in healthcare practice and knowledge between cities and rural areas, regardless of whether it is public or private healthcare." - Ministry-Focal person.

The absence of comprehensive SOPs and a thorough oral health curriculum in Nepal contributes to inadequate practical experience for dental professionals. Brief and poorly supervised clinical place-

ments, along with a theoretical focus in education, leave graduates poorly prepared for real-world challenges. Additionally, some dental colleges prioritize profit over producing competent professionals, exacerbating these issues. The preference for urban and private practice among dental practitioners leads to unequal access to care, particularly in rural areas, and raises concerns about the lack of national guidelines for private practices.

Interprofessional collaboration

Participants, especially from dentistry, emphasized the significance of interprofessional collaboration in tackling oral health issues, including prenatal and maternal oral care. The dentistry participants stated that a lack of interprofessional collaboration usually resulted in their exclusion from health-related talks, including those on maternal and neonatal health organized by the Nepal Medical Association and other medical groups. This omission prevented them from participating or presenting oral health issues, leading to a lack of awareness on important topics within medical professionals. Furthermore, they held the government responsible for this issue, citing the government's failure to recognize the importance of the NDA. As a result, their efforts have not generated positive outcomes.

"Despite the number of events focusing on maternal, neonatal, and other health issues, the NDA is rarely invited to give presentations by the NMA or other organizations. Even though some associations send invitations, the NDA is generally disregarded. This omission makes it difficult to educate other professionals about crucial dental issues, leading to feelings of unfairness and humiliation. Progress in dental health remains unlikely until the government recognizes the significance of the NDA." - NDA 1D-General Dental Surgeon.

The NDA members emphasized the importance of collaboration with other organizations to fill the gaps in research and data sharing concerning oral health. Participants noted that these subjects are rarely discussed within associations. A participant belonging to the NDA expressed that although some universities conduct research on maternal and child oral health at the grassroots level, the data is not shared with the NDA. This lack of collaboration not only highlights the need for better teamwork but also impedes the timely detection and management of oral diseases among these vulnerable groups.

"Many medical and dental universities, including BPKIHS, are conducting research on maternal and child oral health. They have data but data is not shared with us. Although universities are researching pregnancy and its complications at the grassroots level, our organization cannot access this information. This gap exists primarily due to a lack of sharing and learning culture among these institutions." - NDA 3D-Pedodontist.

In addition to this, a member of the perinatal society shared that their association solely concentrates on maternal and newborn health, so they do not address oral health issues. She further expressed her realization of the absence of a dental specialist within their membership, highlighting the necessity for collaboration between the NDA and the Perinatal Society.

"We, the Perinatal Society prioritize pregnancy and postpartum care, concentrating on maternal and newborn health exclusively. However, society does not address conditions like gingivitis and periodontitis, nor does it engage in related activities. We currently do not have a dental specialist among the association's members. This is a gap that now I recognize as essential to fill." - PESON 1-Paediatrician.

Similarly, there was a consensus on the importance of interprofessional collaboration in strengthening and updating academic curricula and training like CDE and CME with evidence-based practices. The participants opined that including a section on oral health during pregnancy in courses or curricula that cover maternal health, and incorporating supervised practical learning experiences would be highly beneficial. For instance, an NMA representative pointed out the necessity of including oral health in midwifery training. He added that midwives play a crucial role in rural healthcare settings and primary healthcare. Hence, integrating oral health into their curriculum could have a positive impact on underserved communities.

"While we did create guidelines for bachelor's in midwifery, oral health was overlooked. In rural areas, midwives play a crucial role, especially in primary healthcare settings. Therefore, it's essential to incorporate oral health into the midwifery curriculum to better serve these communities." - NMA 1B-Chief Administrative.

Also, the participants emphasized the importance of interdisciplinary collaboration to establish a strong reporting and referral system for dental health issues. With Nepal lacking a comprehensive reporting and referral system for dental health, fostering strong interprofessional relationships can expedite the timely identification and treatment of oral health issues, including those related to prenatal care.

"In Nepal, we currently lack an effective referral system. Creating screening questions and referral flowcharts could be a starting point, as currently, there's no clear system in place. For this, interprofessional meetings and CME sessions are crucial. Because many professionals are unsure about the referral process. Building strong interprofessional relationships can enhance referrals and coordination among healthcare teams, ensuring timely care for patients." - PESON 3A- Public Health Officer.

Given the situation, these findings clearly reflect that there is a distinguished need for collaboration among the medical associations for the promotion of maternal and prenatal oral health. The consensus of participants showed that a unified discussion on oral health issues, as well as exchanging research findings and data, promotes an integrated approach. The findings highlight several critical limitations in dental care services and education practices in Nepal, emphasizing the absence of SOPs in hospitals, short clinical postings, and an education system focused heavily on theoretical knowledge with insufficient practical training. This situation is exacerbated by dental professionals favoring urban locations and private practices, leading to unequal access to dental care, particularly in rural areas. Similarly, the literature identifies the lack of comprehensive SOPs and limited practical exposure as significant barriers to effective dental healthcare, noting that graduates often lack the hands-on experience necessary for high-quality patient care [35]. Furthermore, the literature also stresses the importance of interprofessional collaboration, which is often lacking, as essential for addressing oral health issues, including prenatal and maternal care [47]. The gap in collaboration and ineffective educational practices reflects broader systemic issues that need addressing to improve dental health outcomes comprehensively.

Implementation of quality assurance measures

Participants emphasized the importance of integrating oral health into routine ANC programs. However, they also highlighted that merely including oral health is not enough. They stressed the need for a robust mechanism to monitor and ensure the quality of oral health practices within the program. According to them, monitoring and evaluation are crucial to guarantee that the provided oral health care meets the necessary standards and that it is effective for patients.

"Simply integrating an oral health program into ANC programs is insufficient. Following implementation, a strong monitoring and evaluation mechanism is required to ensure the quality and effectiveness of the program." - NMA 2B-Physician Internal Medicine.

Similarly, a few participants highlighted the importance of evaluating the sustainability and practical application of selected strategies after training. The evaluation after training is because they doubt that professionals may attend CMEs and CDEs and then stick to the same old methods which barre improvements. To them, ensuring the sustainability of a program is for maintaining quality because without an ongoing program, there would be no means of monitoring quality, and without quality, the program cannot sustain itself.

"Regular participation in CME and CDE is essential, but it's equally important to integrate the learnings into daily practice. It's also vital to evaluate the sustainability of our chosen strategies post-training to ensure they're effectively put into practice. Because merely attending training and then sticking to traditional methods would not bring about any improvements. Program sustainability is essential for ensuring quality assurance. Without an active program, there is no means to ensure quality, and if a program lacks quality, it fails to sustain itself in the long run." - PESON 2A-Gynaecologist.

Securing adequate funding

All participants emphasized that the key driver for establishing the maternal oral health program is funding. They highlighted the pivotal role finance plays in every aspect of the program, including planning, implementation, monitoring, evaluation, and ensuring its long-term sustainability. Prior to program initiation, participants expressed the necessity of establishing a thorough oral health policy within the nation. Some participants suggested that the necessity for policy formulation should arise from a recognized need and evidence which could be achieved through conducting research or gathering evidence from hospitals. A ministry focal person shared.

"Within our context, funding is crucial for the collection and dissemination of any data. If we have ample evidence and receive demand from the field, from both service providers and consumers, we, at the ministry, can assemble all health professionals to showcase the data. Then, we encourage collective efforts to develop guidelines. Within our ministry, amidst various challenges, we prioritize addressing issues supported by evidence and field demand." - Ministry-Focal person

As participants widely acknowledged the challenge of limited research done and data sharing regarding oral health, they collectively agreed on the importance of conducting nationwide grassroots research, which necessitates investment from the government.

"Research should be conducted at the national, university, or community level, wherever feasible. This will generate substantial evidence indicating the existence of a problem requiring resolution. Emphasizing grassroots research is crucial. Yes, we need money for conducting research. While funding is a major obstacle in advocating for or formulating guidelines and policies for programs, it is crucial to prioritize funding for conducting research, particularly for collecting national data." - *Government Public Health Officer.*

While participants stressed the crucial role of funding in program planning and smooth operation, some expressed skepticism about the government's prioritization and financial support for the program. They attributed this skepticism to the ongoing challenges of underfunding and overextension within the health system. Additionally, another participant highlighted the adverse impact of insufficient financial support from both associations and the government on various programs and plans.

"Our health system is already under budgetary constraints and overextension. So, allocating additional resources for integrating oral health into the MNH program seems challenging to me." - NMA 1B-Chief Administrative

"We have many plans and programs, but our ability to properly implement them is hampered by a lack of financial support from other organizations and government agencies." - NDA 1D-General Dental Surgeon.

Participants identified financing as the key motivator for establishing a maternal oral health program. Before starting the program, they underlined the importance of a comprehensive national oral health policy. They also argued that policy development should be evidence-based and supported by research. Concerns were voiced regarding the lack of research and data sharing in oral health, leading to agreement on the significance of nationwide grassroots research that requires government funding. However, there was skepticism about government prioritizing and financial support due to continued difficulties of underfunding and overextension within the health system, which has hampered the smooth run of numerous programs and strategies.

Public education program

Participants expressed that knowledge and training on maternal periodontal diseases should not be limited to health professionals but should also extend to the general public. They emphasized the need to raise awareness about the risk of dental diseases during pregnancy, particularly among pregnant women and their caregivers. One participant suggested starting educational initiatives for women in city hospitals to pave the way for positive change.

"*When training our fellow health professionals, I propose that we also educate pregnant women. Starting this approach in city hospitals could result in a considerable positive impact. By educating pregnant mothers and their caregivers, particularly healthcare professionals, about oral health, we can pave the way for integrated healthcare and increased demand for such services*." - PESON 2A-Gynaecologist.

Additionally, participants emphasized the importance of counseling on maintaining oral hygiene and understanding the long-term effects of poor oral care during and after pregnancy, especially in rural areas. Since women in villages typically visit local health facilities primarily for ANC, integrating oral healthcare into ANC ensures that these women receive crucial education, assisting in the identification and management of diseases.

"Integrating oral health into ANC and maternal-neonatal health programs is critical, especially in rural areas where hospital visits are scarce. This integration guarantees that women receive critical counseling on oral hygiene or health and advice accordingly during one of their few encounters with healthcare practitioners." -NDA 2D-Endodontist.

Some participants also pointed out that to bridge the knowledge gap on oral healthcare for those who need counseling but face challenges in accessing healthcare services, various media should be utilized. They recommended creating radio and TV programs, printing posters, leaflets, and pamphlets, and organizing health camps to emphasize the importance of oral healthcare during pregnancy.

"Raising awareness and sharing information through health camps or public health campaigns can effectively reach communities. These efforts might include distributing leaflets and creating videos or radio programs". -NMA 1B-Chief Administrative.

"To address gaps, it's important to note that some areas in Nepal are hard to reach. In such cases, radio programs on the topic, along with leaflets or TV videos, could be particularly helpful." - PESON 3A-Government Public Health Officer.

Participants stressed the crucial need to educate both health professionals and the general public on maternal periodontal diseases, as well as counseling pregnant women and their caregivers

on oral hygiene. This teaching is especially important in rural regions, where women frequently visit health facilities just for ANC. Integrating oral healthcare into ANC ensures that these women obtain critical information for disease management and prevention. Raising awareness about the risks of dental problems during and after pregnancy is critical through various sources such as health campaigns, camps, radio, and TV programs along with leaflets, posters, and pamphlets.

Conclusion

This investigation into prenatal oral health within Nepal's healthcare system highlights critical gaps and systemic issues. Findings reveal significant awareness deficits among healthcare professionals regarding prenatal oral care and expose inadequacies in the national oral health policy, compounded by financial constraints and educational deficiencies. To address these challenges, the study recommends enhancing interprofessional collaboration to integrate comprehensive prenatal oral healthcare into primary settings. Updating dental education curricula to include extensive training on prenatal care and community-focused learning is crucial. Financial support for oral health initiatives should be increased, alongside incentives for dentists to serve rural areas. Policy reform must prioritize integrating oral health into national policies, engaging stakeholders to ensure comprehensive care for pregnant women. Lastly, future research should focus on evaluating the effectiveness of these strategies, identifying barriers, and improving interdisciplinary collaboration. Effective implementation will necessitate a collaborative approach across healthcare, education, and policy sectors.

Acknowledgements

I am deeply grateful to my advisor, Associate Prof. Roy W. Batterham, for his unwavering support and guidance, and to Professor Fabio Saini for his assistance with the concept paper. My heartfelt thanks go to Khun Beau and Khun May for their invaluable patience and help, and to the Department of Global Health at Thammasat University for the opportunity to pursue my MPH. I appreciate my classmates, friends, and the health professionals in Nepal who participated in my study. I am especially thankful to my parents, sister, husband, and daughter for their constant love, care, and support, and to all who have supported me throughout my studies.

Conflict of Interest

Authors Declare this work has no conflict of interest.

Bibliography

1. Bernabe E., *et al*. "Global, Regional, and National Levels and Trends in Burden of Oral Conditions from 1990 to 2017: A Systematic Analysis for the Global Burden of Disease 2017 Study". *Journal of Dental Research* 99 (2020): 362-373.

2. Nazir M., *et al*. "Global Prevalence of Periodontal Disease and Lack of Its Surveillance". *Scientific World Journal* 2020 (2020): 2146160.

3. Peres M. A., *et al*. "Oral Diseases: A Global Public Health Challenge". *The Lancet* 394 (2019): 249-260.

4. Nannan M., *et al*. "Periodontal Disease in Pregnancy and Adverse Pregnancy Outcomes: Progress in Related Mechanisms and Management Strategies". *Frontiers in Medicine* 9 (2022): 963956.

5. Chen P., *et al*. "Prevalence of Periodontal Disease in Pregnancy: A Systematic Review and Meta-Analysis". *Journal of Dentistry* 125 (2022): 104253.

6. Hartnett E., *et al*. "Oral Health in Pregnancy". *Journal of Obstetric, Gynecologic and Neonatal Nursing* 45 (2016): 565-573.

7. Erchick DJ., *et al*. "Oral Hygiene, Prevalence of Gingivitis, and Associated Risk Factors Among Pregnant Women in Sarlahi District, Nepal". *BMC Oral Health* 19 (2019): 1-2.

8. Homer C., *et al*. "Updated Clinical Practice Guidelines on Pregnancy Care". *The Medical Journal of Australia* 209 (2018): 409.

9. Wazir SS., *et al*. "Influence of Maternal Periodontal Health as a Risk Factor for Low-Birth-Weight Infants in Terai Population of Nepal". *Journal of Education and Health Promotion* 8 (2019): 233.

10. Gupta S., *et al*. "Periodontal Health Status and Pregnancy Outcomes: A Survey in Medical Doctors". *JNMA Journal of the Nepal Medical Association* 56 (2018): 565.

11. Government of Nepal, Ministry of Health and Population. "Safe Motherhood Programme". (2019).

12. Citrin D., *et al*. "NGOs, Partnerships, and Public-Private Discontent in Nepal's Healthcare Sector". *Medicine Anthropology Theory* 5 (2018): 2-3.

13. Deogade S and Naitam D. "Reflective Learning in Community-Based Dental Education". *Education for Health* 29 (2016): 119.

14. Shrestha RM., *et al*. "Dentists in Nepal: A Situation Analysis". *Journal of Nepal Health Research Council* 15 (2017): 187.

15. Azimova A., *et al*. "Professional Medical Associations in Low-Income and Middle-Income Countries". *The Lancet Global Health* 4 (2016): e606-e607.

16. O'Brien KJ., *et al*. "Global Status of Oral Health Provision: Identifying the Root of the Problem". *Public Health Challenges* 1 (2022): e6.

17. Atchison KA., *et al*. "Integration of Oral Health and Primary Care: Communication, Coordination, and Referral". *National Academy of Medicine* (2018).

18. Gare J., *et al*. "Prevalence, Severity of Extension, and Risk Factors of Gingivitis in a 3-Month Pregnant Population: A Multicenter Cross-Sectional Study". *Journal of Clinical Medicine,* 12 (2023): 2-4.

19. Crowder L. "Is There Evidence of a Relationship Between Pre-Eclampsia and Periodontitis?" *Evidence-Based Dentistry* 24 (2023): 37-38.

20. Kim AJ., *et al*. "Scaling and Root Planing Treatment for Periodontitis to Reduce Preterm Birth and Low Birth Weight: A Systematic Review and Meta-Analysis of Randomized Controlled Trials". *Journal of Periodontology,* 83 (2012): 1508-1519.

21. Favero V., *et al*. "Pregnancy and Dentistry: A Literature Review on Risk Management During Dental Surgical Procedures". *Dentistry Journal* 9 (2021): 46.

22. Sharif S., *et al*. "Knowledge and Attitude of Medical Nurses Toward Oral Health and Oral Health Care of Pregnant Women". *The Malaysian Journal of Medical Sciences* 23 (2016): 63.

23. Gonik B., *et al*. "Pregnant Patient Knowledge and Behavior Regarding Perinatal Oral Health". *American Journal of Perinatology* 34 (2017): 663-667.

24. George A., *et al*. "Knowledge, Attitude, and Practices of Dentists Towards Oral Health Care During Pregnancy: A Cross-Sectional Survey in New South Wales, Australia". *Australian Dental Journal* 62 (2017): 301-310.

25. Tarannum F., *et al*. "Awareness of the Association Between Periodontal Disease and Pre-Term Births Among General Dentists, General Medical Practitioners and Gynecologists". *Indian Journal of Public Health* 57 (2013): 92.

26. Mamata S., *et al*. "Knowledge and Practice Regarding Maintaining Oral Hygiene Among Pregnant Women in Lalitpur, Nepal". *Journal of Medical Case Reports and Reviews* 3 (2020).

27. Bansal K., *et al*. "Effectiveness of an Integrated Perinatal Oral Health Assessment and Promotion Program on the Knowledge in Indian Pregnant Women". *Journal of Indian Society of Pedodontics and Preventive Dentistry* 37 (2019): 383-391.

28. National Institute for Health Care Management. "Improving Access to Perinatal Oral Health Care: Strategies and Considerations for Health Plans" (2010).

29. Wagner Y and Heinrich-Weltzien R "Midwives' Oral Health Recommendations for Pregnant Women, Infants and Young Children: Results of a Nationwide Survey in Germany". *BMC Oral Health* 16 (2016): 2-5.

30. NHS Inform. "Looking After Your Teeth and Gums in Pregnancy". NHS Health Scotland (2019).

31. Ranasinghe N., *et al*. "Evaluation of the Oral Healthcare Programme During Pregnancy in Reducing Dental Caries in Young Children in the District of Gampaha, Sri Lanka". *Asian Pacific Journal of Health Sciences* 3 (2016): 256-264.

32. Khalaf SA., *et al*. "Knowledge, Attitude and Practice of Oral Healthcare Among Pregnant Women in Assiut, Egypt". *International Journal of Community Medicine and Public Health* 5 (2018): 890-900.

33. Ngedup S., *et al*. "Maternal Oral Health: An Examination Survey Conducted in Three Referral Hospitals in Bhutan". *Bhutan Health Journal* 4 (2018): 23-32.

34. World Health Organization. "Health System Governance".

35. Karki S., *et al*. "Adaptation and Validation of a Nepali Version of the Child-Oral Impacts on Daily Performances Index (C-OIDP)". *Community Dental Health* 35 (2018): 119-126.

36. Watt RG., *et al*. "Ending the Neglect of Global Oral Health: Time for Radical Action". *The Lancet* 394 (2019): 261-272.

37. Geevarghese A., *et al*. "Oral Health-Related Quality of Life and Periodontal Status of Pregnant Women". *Maternal and Child Health Journal* 21 (2017): 1634-1642.

38. Marla V., *et al*. "The Importance of Oral Health During Pregnancy: A Review". *Medical Express* 5 (2018): 2-6.

39. Lubon A., *et al*. "Oral Health Knowledge, Behavior, and Care Seeking Among Pregnant and Recently Delivered Women in Rural Nepal: A Qualitative Study". *BMC Oral Health* 18 (2018): 2-5.

40. Kumar K. "Conducting Key Informant Interviews in Developing Countries". *Agency for International Development* (1989).

41. Brink H. "Validity and Reliability in Qualitative Research". *Curationis* 16 (1993): 35-38.

42. Anunciacao BH., *et al*. "Knowledge, Attitudes, and Practices of Prenatal Care Practitioners Regarding Oral Health in Pregnancy-A Systematic Review". *International Journal of Gynecology and Obstetrics* 162 (2023): 449-461.

43. Mohammadpour M., *et al*. "Oral Health Policymaking Challenges in Iran: A Qualitative Approach". *BMC Oral Health* 20 (2020): 1-12.

44. Jiang CM., *et al*. "Global Perspectives of Oral Health Policies and Oral Healthcare Schemes for Older Adult Populations". *Frontiers in Oral Health* 2 (2021): 703526.

45. Jackson JT., *et al*. "Implementing a Prenatal Oral Health Program Through Interprofessional Collaboration". *Journal of Dental Education* 79 (2015): 241-248.

46. Yenen Z and Ataçağ T. "Oral Care in Pregnancy". *Journal of Turkish German Gynecological Association* 20 (2019): 264-268.

47. Borrell LN and Crawford ND. "Socioeconomic Position Indicators and Periodontitis: Examining the Evidence". *Periodontology* 58 (2012): 69-83.