



Oral Infections and Adverse Pregnancy Outcomes: Knowledge and Attitude of Obstetric Healthcare Professionals in Public Hospitals of Niamey

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Abstract

Background: Oral and dental infections during pregnancy have been associated with adverse obstetric outcomes, including preterm birth, pre-eclampsia, low birth weight, and miscarriage. Awareness of this link among obstetric healthcare professionals is crucial to ensure timely referrals for dental care. This study assessed the knowledge and attitudes of obstetric staff in public hospitals in Niamey, Niger. **Methods:** A cross-sectional, descriptive, multicenter survey was conducted from 31 July to 29 September 2023 across nine public health facilities in Niamey. A structured, pre-tested questionnaire collected data on stomatology training, ability to recognize oral infections, awareness of their association with adverse pregnancy outcomes, and referral practices. Data were analyzed using descriptive statistics. **Results:** Among 124 participants, 55% had never received stomatology training, 75% could not clinically identify oral infections, and only 38% were aware of their potential impact on pregnancy outcomes. Regarding referral practices, 60% had never referred a pregnant woman for dental care, 26% referred only when the patient reported oral problems, and 14% systematically referred for antenatal dental evaluation. **Conclusion:** Obstetric healthcare professionals in Niamey demonstrate limited awareness and suboptimal referral practices concerning the relationship between oral infections and pregnancy outcomes. Targeted training, integration of oral health into maternal care protocols, and the establishment of standardized referral pathways are needed to improve perinatal outcomes.

Subject Areas

Dentistry, Public Health

Keywords

Oral Infections, Adverse Pregnancy Outcomes, Obstetric Healthcare Professionals, Knowledge, Niger

1. Introduction

Pregnancy is associated with a number of physiological changes that can increase the risk of oral infections [1]. These infections can subsequently affect the pregnancy and the foetus, leading to complications such as preterm birth, pre-eclampsia, low birth weight, miscarriage [2] or gestational diabetes [3]. The links between these factors are well documented, so much so that in many countries dental consultations are often included in antenatal and even preconception care [4]. The incidence of these adverse pregnancy outcomes is significantly higher in low-income countries [5]. In Niger, a very poor country with the highest fertility rate in the world (6.64 children per woman in 2024) [6], there is a lack of data on oral infections and their association with adverse pregnancy outcomes. This study aimed to assess the level of knowledge of obstetric healthcare professionals in public facilities in Niamey regarding the relationship between oral infections and adverse pregnancy outcomes.

2. Methodology

2.1. Study Design and Setting

This was a cross-sectional, descriptive, multicenter study conducted from 31 July to 29 September 2023 in Niamey, Niger. The survey took place in nine public health facilities providing antenatal care, including tertiary hospitals, regional hospitals, integrated health centers, and the Issaka Gazoby Maternity Hospital, the largest mother-and-child center in the country.

2.2. Study Population

The target population comprised obstetric healthcare professionals directly involved in pregnancy monitoring in the selected facilities.

Inclusion criteria: healthcare professionals working in maternity services (obstetrician-gynecologists, midwives, nurses, medical students, nutritionists, biologists, radiology technicians) who were present during the study period and consented to participate.

Exclusion criteria: dental professionals; questionnaires that were incomplete or could not be processed.

2.3. Sampling

A convenience sampling strategy was used due to the absence of a complete staff

registry and operational constraints in busy maternity wards. All available and consenting obstetric healthcare professionals during investigators' visits were included. Of 341 eligible professionals approached, 217 (64%) declined participation, mainly due to workload. A total of 124 participants completed the questionnaire. While convenience sampling may limit generalizability, it enabled the inclusion of a pragmatic cross-section of staff from nine major public facilities in Niamey.

2.4. Data Collection Instrument

Data were collected using a short, structured questionnaire developed for this study, comprising four closed questions: 1) Receipt of stomatology training; 2) Ability to recognize oral-dental infections; 3) Awareness of the link between oral infections and APOs; and 4) referral practices for pregnant women. The questionnaire was developed after reviewing previous studies on oral health in pregnancy [7]-[12]. Content validity was assessed by two senior dentists and one obstetrician, who reviewed clarity and relevance of each item. A pilot test was conducted with 10 obstetric staff not included in the final sample, leading to minor wording adjustments. Internal consistency was acceptable (Cronbach's alpha = 0.71).

2.5. Data Collection Procedure

Investigators visited each participating facility during working hours and invited eligible staff to complete the questionnaire. Participation was voluntary and anonymous. Completed questionnaires were checked on the spot to minimize missing data.

2.6. Variables

Primary variables:

- Stomatology training (Yes/No).
- Ability to recognize oral infections (Yes/No).
- Knowledge of the oral health-pregnancy link (Yes/No).
- Referral practices (never/only if patient reports a problem/always).

2.7. Data Management and Analysis

Data were entered into SPSS version 20 and analyzed using Excel 2013. Descriptive statistics (frequencies and percentages) summarized responses. Chi-square tests were used to compare knowledge and referral practices across professional categories (midwives, nurses, doctors). A p-value < 0.05 was considered statistically significant.

2.8. Ethical Considerations

The study protocol was approved by the Ethics Committee of the Military Hospital Center of Niamey. Written informed consent was obtained from all participants. All responses were anonymized and data were stored securely.

3. Results

3.1. Distribution by Workplace

A total of 124 obstetric healthcare professionals were interviewed across nine public health centers in Niamey; 40% were affiliated with Issaka Gazoby Maternity Hospital, the largest mother-and-child center in Niger (**Table 1**).

Table 1. Distribution of obstetric healthcare professionals by workplace.

	Workplace	Practitioners who responded
1	Military Hospital Center	13
2	Regional Hospital of Niamey	3
3	National Hospital Amirou Boubacar	19
4	Integrated Health Center of Karadjé	1
5	Integrated Health Center of Camp Six	20
6	Integrated Health Center of Gamkalley	12
7	Health District of the Commune Niamey IV	1
8	National Hospital of Niamey	2
9	Central Maternity Issaka Gazoby	53
	Total	124

3.2. Respondent Characteristics

The mean age of participants was 33.52 years (range: 18 - 63). Most respondents were nurses (50; 40.32%), followed by midwives (34; 27.42%), medical students (20; 16.13%), and obstetrician-gynecologists (12; 9.68%). Other cadres included biologists (4; 3.23%), nutritionists (2; 1.61%), and radiology technicians (2; 1.61%) (**Table 2**). Median professional experience was nine years.

Table 2. Distribution by function.

Function	Number
Nurses	50 (40.32%)
Obstetricians-gynecologists	12 (9.68%)
Medical students	20 (16.13%)
Midwives	34 (27.42%)
Nutritionists	2 (1.61%)
Biologists	4 (3.23%)
Radiology technicians	2 (1.61%)

3.3. Stomatology Training

Fifty-five percent (n = 68) had never received stomatology training during their education (**Figure 1**).

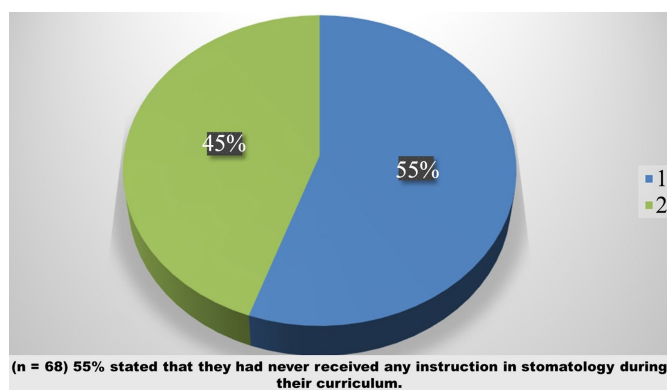


Figure 1. Distribution based on participation or non-participation in a stomatology course during the curriculum?

3.4. Ability to Diagnose Oral Infections

Seventy-five percent (n = 93) reported being unable to identify oral infections clinically (**Figure 2**).

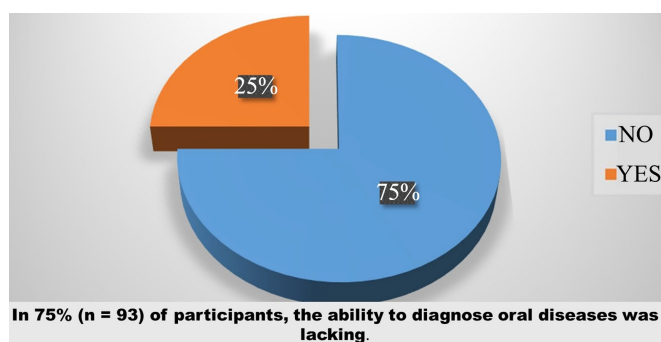


Figure 2. Distribution according to the ability to diagnose oral infections.

3.5. Knowledge of the Oral Health-Pregnancy Link

Sixty-two percent (n = 77) were unaware of the association between oral infections and APOs (**Figure 3**).

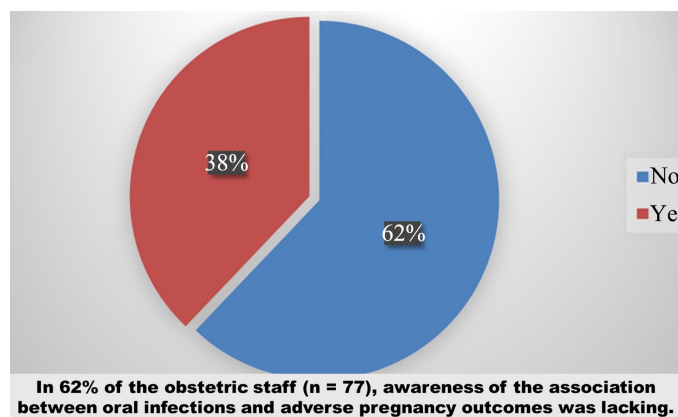


Figure 3. Distribution according to the knowledge of the links between oral infections and adverse pregnancy outcomes.

3.6. Referral Practices

Sixty percent ($n = 74$) had never referred pregnant women for dental consultations; 26% referred only when patients reported oral problems, while 14% always referred for antenatal dental care (Figure 4).

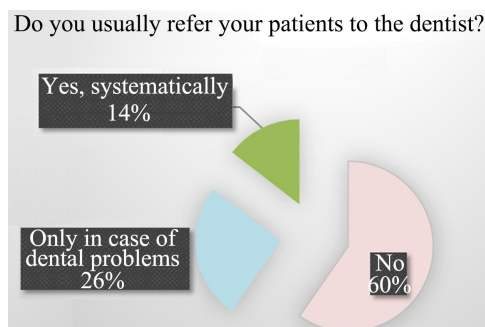


Figure 4. Distribution based on the habit of referring patients for dental consultations.

3.7. Comparative Analysis

Knowledge of the oral health-pregnancy link was significantly higher among doctors (83%) compared to midwives (5%) and nurses (16%) ($\chi^2 = 56.98$, $df = 2$, $p < 0.0001$). Systematic referrals were more frequent among doctors (75%) than among midwives (5%) ($\chi^2 = 30.15$, $df = 1$, $p < 0.0001$).

4. Discussion

4.1. Adverse Pregnancy Outcomes (APOs) Associated with Oral Infections

APOs associated with oral infections are well documented [7]. Periodontal disease—via systemic dissemination of inflammatory mediators and oral pathogens—has been linked to preterm birth, low birth weight, and pre-eclampsia [8]. However, in many low- and middle-income countries, including those in Africa, this evidence remains insufficiently integrated into maternal care protocols [9].

This study—conducted in nine public facilities in Niamey—provides the first national data on obstetric staff knowledge and practices regarding the oral health-pregnancy link in Niger. The results reveal substantial gaps that may adversely affect maternal and neonatal outcomes.

4.2. The Knowledge and Attitudes of Obstetric Healthcare

To date, few studies have explored the knowledge and attitudes of obstetric healthcare professionals regarding the relationship between oral infections and APOs in African countries [9]. In Niger, despite having the highest fertility rate in the world no prior data or studies were found on this topic. This makes our work the first study in Niger to evaluate the knowledge and attitudes of obstetric healthcare professionals toward this critical public health issue. This study provides the first descriptive overview of knowledge, attitudes, and referral practices related to oral infections among obstetric healthcare professionals in Niger. Con-

ducted in nine public health facilities in Niamey, it revealed substantial gaps in awareness and practice that have important implications for maternal and neonatal health.

4.3. Low Awareness of the Oral Health-Pregnancy Link

Only 38% of respondents reported being aware of the association between oral infections and adverse pregnancy outcomes. This proportion is markedly lower than the 78.2% reported by Panchal *et al.* in India [10], and similar to figures from other low- and middle-income countries where oral health is often overlooked in maternal care protocols [9]. The lack of integration of oral health content into obstetric and midwifery curricula in Niger likely contributes to this deficit.

4.4. Diagnostic Limitations

A majority (75%) indicated that they do not know how to clinically recognize oral infections. This limitation reduces the likelihood of early detection and timely referral, and mirrors findings from Boutigny *et al.* in France [11], where only 05% of obstetric healthcare professionals had formal training in oral health. Without adequate diagnostic capacity, opportunities for preventive intervention are frequently missed.

4.5. Referral Practices and Misconceptions

Referral rates to dental care were low: only 14% of respondents reported systematic referrals, 26% referred occasionally, and 60% never referred. This pattern aligns with the findings of Turabi *et al.* in Türkiye, where just 15.2% of obstetric healthcare professionals consistently referred patients for dental assessment [12]. Misconceptions—such as the belief that dental treatment is unsafe during pregnancy—persist in many settings and may partly explain these low referral rates. Addressing these misconceptions through evidence-based education could improve referral practices (Table 3). Contextual barriers include the absence of oral health content in midwifery and nursing curricula and cultural beliefs discouraging dental consultations during pregnancy. Comparable barriers have been described in Senegal and Mali [9].

Table 3. Comparison of findings from the present study with other international studies.

Study Location	Awareness of the Link between Oral Infections and Pregnancy	Systematic Referral to Dental Consultation
Niamey, Niger (present study)	38%	14%
India [10]	78.2%	Not specified
Türkiye [12]	Not specified	15.2%

Note: This table summarizes and compares the levels of awareness and referral practices related to oral infections and adverse pregnancy outcomes among obstetric healthcare professionals in different countries. The present study highlights lower awareness and referral rates in Niger compared to findings from India and Türkiye.

4.6. Comparative Analysis

Our findings align with studies from Ghana and Nigeria showing low knowledge levels among nurses and midwives [13] [14]. A qualitative study in Southwestern Nigeria (2025) highlighted structural barriers such as the absence of referral protocols and limited continuing education [15]. A Nigerian scoping review (2024) and a systematic review of sub-Saharan Africa (2025) recommended integrating oral health into antenatal care through staff training, routine education for pregnant women, and functional referral pathways [16] [17]. Together with our results, this evidence supports embedding oral health into maternal health policies in Niger and across West Africa.

4.7. Implications for Public Health

Improving maternal outcomes in Niger will require integrating oral health into routine antenatal care. Practical measures could include:

- Incorporating basic oral health modules into pre-service and in-service training for obstetric healthcare personnel.
- Establishing standardized referral protocols between maternity and dental services.
- Developing simple screening checklists for use during antenatal visits.

4.8. Study Limitations

This study has several limitations. Its cross-sectional and descriptive design does not allow causal inference. The short questionnaire, while quick to administer, captures only basic awareness and practices and does not assess in-depth knowledge or clinical skills. Self-reported data may be subject to recall bias or social desirability bias. Finally, the study was limited to public facilities in Niamey and may not reflect the situation in rural areas or private facilities.

5. Conclusion

Despite these limitations, this study provides essential baseline information on a neglected aspect of maternal healthcare in Niger. The findings highlight the need for targeted training, improved referral pathways, and the integration of oral health into antenatal care to address preventable adverse pregnancy outcomes.

Acknowledgements

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Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval

This study received approval from the Ethics Committee of the Military Hospital Center of Niamey. Informed consent was obtained from all participants prior to the administration of the questionnaire.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

- [1] Saadaoui, M., Singh, P. and Al Khodor, S. (2021) Oral Microbiome and Pregnancy: A Bidirectional Relationship. *Journal of Reproductive Immunology*, **145**, Article 103293. <https://doi.org/10.1016/j.jri.2021.103293>
- [2] Choudhury, P., Rao, R., Prabhu, S., Srirangarajan, S. and Rudresh, V. (2022) Microorganisms of Maternal Periodontitis Cause Adverse Pregnancy Outcomes in Gestational Diabetic Individuals: A Preliminary Observational Report. *Quintessence International*, **53**, 850-857.
- [3] Daalderop, L.A., Wieland, B.V., Tomsin, K., Reyes, L., Kramer, B.W., Vanterpool, S.F., *et al.* (2017) Periodontal Disease and Pregnancy Outcomes: Overview of Systematic Reviews. *JDR Clinical & Translational Research*, **3**, 10-27. <https://doi.org/10.1177/2380084417731097>
- [4] Thomas, C., Timofeeva, I., Bouchoucha, E., Canceill, T., Champion, C., Groussolles, M., *et al.* (2023) Oral and Periodontal Assessment at the First Trimester of Pregnancy: The Periscope Longitudinal Study. *Acta Obstetrica et Gynecologica Scandinavica*, **102**, 669-680. <https://doi.org/10.1111/aogs.14529>
- [5] Hasan, M., Tabassum, S., Rafi, K. and Bukhari, S.F. (2024) Perspectives and Practices of Gynecologist's about Prenatal Oral Health and Association between Periodontal Disease and Adverse Birth Outcomes. *Journal of the Pakistan Dental Association*, **32**, 79-84. <https://doi.org/10.25301/jpda.323.79>
- [6] <https://www.statista.com/statistics/264704/ranking-of-the-20-countries-with-the-highest-birth-rate/>
- [7] Offenbacher, S., Katz, V., Fertik, G., Collins, J., Boyd, D., Maynor, G., *et al.* (1996) Periodontal Infection as a Possible Risk Factor for Preterm Low Birth Weight. *Journal of Periodontology*, **67**, 1103-1113. <https://doi.org/10.1902/jop.1996.67.10.1103>
- [8] Ide, M. and Papapanou, P.N. (2013) Epidemiology of Association between Maternal Periodontal Disease and Adverse Pregnancy Outcomes—Systematic Review. *Journal of Clinical Periodontology*, **40**. <https://doi.org/10.1111/jcpe.12063>
- [9] Dieng, S.N., Dieng, A., Diop, M., Kanouté, A., Diouf, M., Lô, M.C.M., *et al.* (2022) Relation entre les maladies parodontales et les issues défavorables de la grossesse en Afrique: Scoping review. *Journal Africain des Cas Clinique et Revues*, **6**, 17-25.
- [10] Panchal, K., Chauhan, Y., Patel, H., Panchal, A., Motwani, D. and Katta, S.C. (2023) A Study to Assess the Knowledge and Attitude about the Association between Maternal Periodontitis and Its Adverse Obstetric Outcomes in Mothers. *International Journal of Medical and Oral Research*, **8**, 41-44. https://doi.org/10.4103/ijmo.ijmo_7_23
- [11] Boutigny, H., De Moegen, M.-L., Egea, L., *et al.* (2016) Oral Infections and Pregnancy: Knowledge of Gynecologists/Obstetric Healthcare Personnel, Mid-Wives and Dentists. *Oral Health & Preventive Dentistry*, **14**, 41-47.
- [12] Turabi, R., Agrali, Ö.B. and Doğan, B. (2022) Awareness, Knowledge and Attitude

- toward the Relationship between Periodontal Health and Pregnancy Outcomes among Obstetrician-Gynecologist Healthcare Professionals in Türkiye: Results of 11th Turkish-German Gynecological Association Congress Based Survey. *Journal of the Turkish-German Gynecological Association*, **23**, 275-286.
<https://doi.org/10.4274/jtgga.galenos.2022.2021-9-13>
- [13] Goka, R.Y., Nyako, E.A., Sackeyfio, J., Hewlett, S., Ndanu, T.A., Konadu, A.B., *et al.* (2022) Periodontal Health Status of Pregnant Women Attending Three Ante-Natal Clinics in Accra, Ghana. *Postgraduate Medical Journal of Ghana*, **11**, 63-68.
<https://doi.org/10.60014/pmjg.v11i1.280>
- [14] Kanmodi, K.K., Amoo, B.A., Nwafor, J.N., Nnyanzi, L.A., Ogebeide, M.E., Hundeki, A.A., *et al.* (2023) Knowledge and Practices Regarding Oral Hygiene, Cariogenic Diet Intake, and Dental Check-Ups among Registered Nurses in Nigeria: A Pilot Study. *Journal of Health and Allied Sciences NU*, **13**, 543-550.
<https://doi.org/10.1055/s-0042-1760439>
- [15] Ayamolowo, L.B., Ibitoye, O.S., Esan, A.O., Akinsolu, F.T., Eleje, G.U., Salako, A.O., *et al.* (2025) Healthcare Workers' Perspectives on Integrated Oral and Antenatal Health Care at Public Health Facilities in Southwestern Nigeria: A Qualitative Study. *BMC Health Services Research*, **25**, Article No. 1091.
<https://doi.org/10.1186/s12913-025-13308-1>
- [16] Ayamolowo, L.B., Esan, A.O., Ibitoye, O.S., Eleje, G.U., Akinsolu, F.T., Salako, A.O., *et al.* (2024) Oral Health Behavior of Pregnant Women in Nigeria: A Scoping Review. *BMC Oral Health*, **24**, page. <https://doi.org/10.1186/s12903-024-04728-2>
- [17] Williams, T.M., Babalola, A.E., Bolarinwa, O., Somoye, V.A., Azeez, O.A., Onasanya, O.J., *et al.* (2025) Oral Health Knowledge, Perceptions and Attitudes of Pregnant Women in Sub-Saharan Africa: A Systematic Review. *BMC Oral Health*, **25**, Article No. 937. <https://doi.org/10.1186/s12903-025-06249-y>