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# Process Evaluation of Antenatal Oral Healthcare Programme: A Qualitative Study Among Healthcare Providers in Selangor, Malaysia

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ABSTRACT

This study evaluated the implementation of the Oral Healthcare Program (OHCP) for antenatal mothers in Selangor from the perspectives of antenatal care providers (ANCPs) using a SWOT framework. **Materials and Methods**: A qualitative exploratory design was employed involving six Focus Group Discussions (FGDs) (n = 30) with dental officers and nurses/midwives, and six In-Depth Interviews (IDIs) (n = 6) with dental officers, from three districts in Selangor. Participants were purposively sampled, and interviews were conducted virtually using Zoom platform. Data was thematically analyzed guided by SWOT analysis principles. **Results**: The identified OHCP's strengths included integrating oral health into maternal services, committed healthcare personnel, and accessible services. The program's weaknesses included a limited workforce, inadequate cross-sectoral collaboration, and inconsistent referral mechanisms. The highlighted opportunities included digital innovation and enhanced training, while the threats of the OHCP were the funding constraints, lack of prioritization in maternal health, and sustainability concerns. **Conclusions**: The study identified the need for an improvised level of interprofessional coordination, standardized workflows, and innovative educational strategies, such as digital tools, to improve program coverage and sustainability. Strengthening resource allocation and policy support were deemed crucial for optimizing the impact of antenatal oral healthcare.

## 1. INTRODUCTION

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Maternal oral health is fundamental to the mother's and child's well-being. Numerous studies demonstrate that poor maternal oral health, particularly during pregnancy, can lead to adverse outcomes such as early childhood caries (Folayan et al., 2015; Plutzer et al., 2012; Ramos-Gomez, 2012). Mothers' oral health knowledge and behaviors are crucial determinants of their children's oral health status. Hence, strengthening maternal oral health literacy has become a global health priority.

The Malaysian Ministry of Health has long prioritized maternal and child health services for its broader public health agenda. The OHCP for antenatal mothers was introduced by the Ministry of Health Malaysia (MOH) in the early 1970s, aiming to incorporate oral healthcare into maternal services and improve oral health outcomes for mothers and their children (Oral Health Division, 2004). Key activities of the OHCP include routine antenatal dental screening, personalized oral health education, dietary counselling, and timely referral for treatment.

Despite the longstanding existence of public antenatal care, the utilization rates for antenatal oral healthcare service remain low. The Malaysian Health Informatics Centre reported in 2023 that the national coverage for antenatal mothers receiving oral health services fluctuated between 34.5% and 44.4% from 2018 to 2022, with significant disruptions observed during the COVID-19 pandemic (Health Informatics Centre, 2023).

Selangor, Malaysia's most populous state with approximately 7.1 million residents (Department of Statistics Malaysia, 2022), presents a unique context for evaluating the OHCP. Despite high antenatal attendance, Selangor consistently reported moderate to low oral health service utilization compared to smaller states, highlighting systemic barriers even in urbanized regions. The digital infrastructure and socioeconomic diversity of Selangor offer both opportunities and challenges for program delivery.

The current evaluation mechanisms for the OHCP primarily rely on service coverage and treatment output reports (LP 8 Cards, PG 101, PG 207, PG 302 reporting systems). However, these monitoring systems provide limited insights into operational challenges, healthcare provider experiences, and contextual barriers that influence service delivery outcomes. Preliminary research suggests that provider perspectives are critical to understanding program implementation realities (Saddki et al., 2010). Anecdotal evidence highlights issues such as insufficient interprofessional collaboration, manpower constraints, inconsistent referral pathways, and the need for innovative health promotion strategies.

Process evaluations that integrate qualitative insights from service providers are crucial to complement output-based monitoring, identify gaps, and inform program improvements (Boothroyd, 2018). Given the increasing digitalization of healthcare services, exploring the opportunities for digital health promotion in antenatal oral healthcare is particularly timely (Jacobs et al., 2016; Kayser et al., 2018). Understanding the healthcare frontliner's experiences is essential in refining strategies, optimizing service delivery, and enhancing maternal-child oral health outcomes in Malaysia. This study aims to conduct a process evaluation of the OHCP implementation in Selangor through a qualitative exploration of healthcare providers' perspectives, employing a SWOT (Strengths, Weaknesses, Opportunities, Threats) analytical framework.

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## 2. MATERIALS AND METHODS

### 2.1 Design

This study employed a qualitative and explorative design to understand the operational implementation of the OHCP for antenatal mothers in Selangor. The study utilized Focus Group Discussions (FGDs) aIn-Depth Interviews (IDIs) to gather healthcare providers' perceptions, mapped against a SWOT analytical framework.

### 2.2 Study Location

Selangor was chosen due to its diverse socioeconomic composition, advanced digital infrastructure (broadband penetration rate of 100.7%), and relatively moderate antenatal oral healthcare utilization (55.9% in 2022) (Department of Statistics Malaysia, 2022). The study was conducted in Klang, Sabak Bernam, and Hulu Selangor districts. Districts were selected through computerized randomization to ensure a mix of urban, semi-urban, and rural representation, considering antenatal oral healthcare utilization rates (Health Informatics Centre, 2023).

### 2.3 Participants and Sampling

Participants included Dental Officers (DOs), Medical Officers involved in Maternal and Child Health (MOs-MCH), and Staff Nurses or Community Nurses working in MCH clinics (SNs-CN-MCH). Purposive sampling was employed, and participants were selected based on their familiarity with the program's operational workflows, challenges, and patient interactions.

### 2.4 Inclusion criteria:

Participants were eligible if they had at least one year of experience in the OHCP, with either direct or indirect involvement in service delivery. In addition, they were required to provide consent to participate in virtual FGDs or IDIs.

### 2.5 Exclusion criteria:

Participants were excluded if they had less than one year of experience in the OHCP.

### 2.6 Pilot Study

Prior to the main data collection, a pilot study was conducted involving participants from the Petaling district. Two FGDs and two IDIs were conducted to refine the interview guides, test technology readiness for virtual interviews, and identify potential procedural challenges. Based on feedback, minor modifications were made to the semi-structured interview guides, including simplification of language and addition of probing questions.

### 2.7 Interview Protocol and Virtual Interview Setup

Given the COVID-19 restrictions and participants' busy clinical schedules, all FGDs and IDIs were conducted virtually using Zoom. The discussions were carried out in a mixed language format, combining *Bahasa Malaysia* and English. Procedures included obtaining informed consent electronically via Google Forms and assessment of device readiness. Mandatory use of cameras during the sessions was emphasized to ensure face-to-face interaction. Each recorded FGD session, which involved only DOs and SNs-CN-MCH, lasted 60–90 minutes, while IDIs, which specifically involved MOs-MCH, lasted 45–60 minutes. All sessions were moderated by the researcher with one notetaker present.

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### 2.8 Data Collection Tools

Semi-structured interview guides were developed based on SWOT analytical principles. The strengths focused on operational successes, key achievements, and service integration. The weaknesses highlighted implementation barriers, resource constraints, and process inefficiencies. The opportunities addressed potential areas for improvement, innovations, and collaborations, while the threats emphasized sustainability risks and external factors affecting program delivery. The guide was subsequently validated by a panel of dental public health specialists and language experts.

### 2.9 Data Analysis

Audio recordings were transcribed verbatim. Data analysis followed thematic analysis principles, employing manual coding initially and NVivo software for theme organization. Data was mapped into SWOT categories. Triangulation across different professional groups ensured the credibility and dependability of findings. Saturation was deemed achieved when no new themes emerged during the later stages of data collection.

### 2.10 Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee University (REC), Universiti Teknologi MARA, along with clearance from the Principal Director of Oral Health, MOH. Additionally, the study received approval from the Medical Review and Ethics Committee (MREC) of the MOH. All participants provided informed consent. Participant confidentiality and data security were maintained throughout the study.

## 3. RESULTS

A total of 6 FGDs, 3 FGDs with DOs (n=18), 3 FGDs with SNs-CN-MCH (n=12) and 6 IDIs with MO-MCH were conducted.

### 3.1 Strengths

*Integration within Maternal Services*

Participants acknowledged that integrating oral healthcare within routine antenatal care services was a major strength of the OHCP. Having dental clinics embedded within maternal and child health (MCH) clinics improved accessibility and convenience for pregnant mothers.

> *"Because we are stationed together in one building, it is easier to refer antenatal mothers immediately for a dental check-up."* (DO-01)

> *"Most mothers will just come for both medical and dental appointments without feeling burdened."* (SN-02)

*Commitment and Knowledge Among Providers*

Healthcare providers demonstrated high levels of commitment to delivering the OHCP, despite resource constraints.

> *"Although there are manpower issues, we try our best to ensure every pregnant mother gets at least one dental screening."* (MO-02)

> *"Even if dental slots are full, we sometimes extend hours or accommodate walk-ins."* (DO-03)

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*Accessibility and Affordability*

The free or highly subsidized cost of dental care services under Malaysia's public health system was another major strength highlighted.

> *"Mothers feel more willing to come because they know it is free. No hidden costs."* (SN-05)

> *"Even scaling and polishing is offered without charges for antenatal mothers, which encourages utilization."* (DO-05)

### 3.2 Weaknesses

*Shortage of Dental Manpower*

A consistent theme across FGDs and IDIs was the shortage of dental personnel, especially in rural clinics and smaller health centers.

> *"In our district, there are only two dental officers covering multiple clinics. It is impossible to cover all antenatal mothers."* (DO-02)

> *"Sometimes dental officers are pulled to other duties, and this interrupts antenatal service delivery."* (SN-04)

*Inconsistent Referral Systems*

Several participants reported that referral pathways between MCH clinics and dental clinics were inconsistent and depended heavily on personal rapport rather than formal systems.

> *"Referral is not automatic. It depends on whether the medical officer remembers to refer or not."* (SN-03)

> *"Some medical staff are still not clear about when or how to refer pregnant mothers to dental."* (MO-01)

*Resource Constraints and Facility Limitations*

Participants expressed concern over limited facilities, such as a shortage of dental chairs or clinics equipped to handle increased antenatal cases.

> *"The main challenges we face are related to human resources and facilities. We are short of adequate facilities and portable chairs for treatments outside our primary location."* (DO-04)

> *"The space for the dental team to provide services is inadequate and lacks the necessary facilities."* (MO-01)

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### 3.3 Opportunities

*Digital Health Education and Outreach*

Participants were enthusiastic about the potential of digital platforms to deliver oral health education more effectively.

> *"Not every mother can attend face-to-face talks, but almost all of them have smartphones."* (DO-06)
>
> *"WhatsApp groups, online videos, or Facebook posts could really help us spread the message better."* (SN-06)

*Strengthening Intersectoral Collaboration*

Healthcare providers suggested that partnerships with educational institutions, religious centers, and NGOs could help promote antenatal oral health awareness.

> *"If we collaborate with mosques or churches where mothers gather, we can easily educate larger groups."* (MO-04)
>
> *"Schools could also be involved to reach young mothers earlier."* (SN-07)

*Training Non-Dental Healthcare Staff*

Participants emphasized that training medical officers and nurses to deliver basic oral health advice could improve early detection and referrals.

> *"If nurses are trained to recognize oral health issues, they can advise and refer mothers properly."* (DO-07)
>
> *"Short workshops or modules on antenatal oral health for non-dental staff would really help."* (SN-08)

*Enhancing Policy Advocacy*

Participants expressed optimism that stronger advocacy at the state and national levels could elevate the priority of oral health in maternal care programs.

> *"If oral health is included as a KPI for medical staff too, referrals will increase naturally."* (MO-05)

### 3.4 Threats

*Competing Healthcare Priorities*

A significant threat identified was the competition with other maternal health priorities, especially during public health crises like the COVID-19 pandemic.

> *"During COVID, everything else was sidelined. Dental services were stopped completely for many months."* (SN9)
>
> *"Even now, dental is not seen as urgent compared to diabetes or hypertension management."* (MO6)

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*Budget Constraints and Funding Challenges*

Participants expressed concern about limited financial resources for expanding antenatal oral healthcare services.

> *"Without specific funding allocations, we are unable to hire more dental officers or buy equipment."* (DO8)

*Resistance to Digital Innovations*

While digital health education was seen as an opportunity, participants also warned that digital literacy disparities could widen inequities.

> *"Some older mothers, especially in rural areas, may not know how to use apps or watch online videos."* (SN10)
>
> *"We cannot assume everyone has stable internet or smartphones."* (MO7)

*Staff Burnout and Retention Issues*

Healthcare providers reported feeling overwhelmed by multiple responsibilities, risking burnout and high turnover.

> *"We are stretched too thin. Adding more program without manpower will just burn us out."* (DO9)
>
> *"Staff retention is difficult if workloads are high, but recognition and incentives are low."* (SN11)

Staff well-being emerged as a key factor influencing program sustainability.

*Limited Oral Health Literacy Among Mothers*

Healthcare providers noted that many pregnant mothers had low awareness of the importance of oral health during pregnancy.

> *"They don't realize that gum problems or untreated caries can affect their pregnancy outcomes."* (DO4)
>
> *"Some mothers think dental treatment is unsafe during pregnancy, so they refuse even basic scaling."* (SN1)

Table 1. SWOT analysis summary for antenatal oral healthcare program (OHCP)

| **Category** | **Themes Identified** |
|---|---|
| Strengths | Integration within maternal services; Staff commitment; Service accessibility |
| Weaknesses | Shortage of human resources; Inconsistent referral systems; Limited maternal oral health literacy; Facility constraints |
| Opportunities | Digital oral health education; Intersectoral collaboration; Training non-dental staff; Policy advocacy |
| Threats | Competing health priorities, Budget constraints, Digital divide, Staff burnout |

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## 4. DISCUSSION

### Strengths

The findings affirm that embedding oral healthcare within routine maternal and child health (MCH) services increases accessibility and utilization among antenatal mothers. This integration reduces the logistical burden on patients and normalizes oral health as part of holistic antenatal care, consistent with WHO recommendations for integrated health service delivery (World Health Organization, 2015).

Participants' commitment to delivering oral healthcare services, despite limited resources, echoes earlier Malaysian studies emphasizing healthcare providers' intrinsic motivation as a key enabler for public health program (Saddki et al., 2010). The availability of structured guidelines (Oral Health Division, 2023) further strengthens service standardization, ensuring a degree of consistency across facilities. The affordability of public dental services for antenatal mothers eliminates major financial barriers, aligning with global evidence that cost is a significant determinant of healthcare-seeking behavior (Folayan et al., 2015).

### Weaknesses

Manpower shortages, particularly of dental officers, were a recurring theme. Limited human resources constrained service delivery capacity, especially in rural clinics, mirroring findings from other Malaysian public health studies (Che Musa et al., 2020; Khokhar et al., 2022). Inconsistent referral mechanisms between MCH and dental clinics weakened service integration. This finding supports Saddki et al. (2010)'s assertion that lack of structured communication pathways impedes efficient maternal oral healthcare delivery. Referral inconsistencies often arose from unclear roles, insufficient training among medical staff, and reliance on personal relationships rather than institutionalized processes (Ahmed et al., 2025).

Facility limitations, such as insufficient dental chairs and overloaded appointment systems, further exacerbated access issues, particularly in semi-urban and rural districts (Tan et al., 2023).

### Opportunities

Healthcare providers identified digital health education as a major opportunity to improve maternal oral health literacy. Mobile health interventions (mHealth) have proven effective globally in expanding health education reach (Chen et al., 2018; Lee et al., 2018; Marcolino et al., 2018). In Malaysia, smartphone penetration is remarkably high, with usage reaching approximately 98.7% in 2021, up slightly from 98.2% in 2020 (Department of Statistics Malaysia, 2022). This widespread access, including among low-income populations, provides a strong foundation for the implementation of digital health interventions. Intersectoral collaboration presents another strategic opportunity. Engaging educational institutions, religious organizations, and NGOs could broaden oral health outreach, particularly among hard-to-reach communities. This is consistent with WHO's emphasis on intersectoral action for health promotion (World Health Organization, 2018).

Training non-dental healthcare staff to deliver basic oral health education could bridge immediate workforce gaps. Short modular training or integration of oral health content into existing maternal training packages could equip nurses and medical officers with essential competencies, echoing successful task-shifting models in maternal-child healthcare (Petersen, 2008). Policy advocacy to institutionalize oral health as a key performance indicator (KPI) for maternal care providers could elevate program priority and improve referral compliance.

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**Threats**

Participants expressed concerns that antenatal oral healthcare often competes with other maternal health priorities such as gestational diabetes, hypertension, and anemia management. During the COVID-19 pandemic, oral healthcare services were severely disrupted, reinforcing perceptions that dental care is non-essential compared to other medical services (Health Informatics Centre, 2023). Budgetary constraints further limit the ability to expand services, invest in infrastructure, or recruit additional personnel. Similar funding challenges have been documented globally in public health dental services (Watt, 2012).

Although digital health innovations offer promising avenues, digital literacy disparities risk widening existing inequities (Jacobs et al., 2016). Rural mothers, older mothers, and socioeconomically disadvantaged groups may have limited access to or comfort with digital health tools (Girmay, 2024). Lastly, staff burnout and retention challenges, exacerbated by workload increases without proportional resource expansion, threaten program sustainability (Singh et al., 2019). High turnover among dental officers and nurses' risks undermining program continuity and institutional memory.

Poor maternal oral health literacy, including misconceptions about the safety of dental treatments during pregnancy, was another critical barrier. This is consistent with Plutzer et al. (2012), who noted that inadequate maternal knowledge contributes significantly to the underutilization of antenatal dental services.

## 5. CONCLUSION

This qualitative study evaluated the implementation of the OHCP for antenatal mothers in Selangor from the perspectives of healthcare providers. Integration within maternal services, committed providers, and accessible services were identified as key strengths, while manpower shortages, referral inconsistencies, and facility and resource constraints were major barriers. Opportunities for digital oral health education and intersectoral collaborations were highlighted, although threats such as funding limitations, competing health priorities and limited maternal oral health literacy persist. Strengthening workforce capacity, enhancing interprofessional collaboration, and innovating health promotion strategies are crucial to ensure the sustainability and effectiveness of antenatal oral healthcare in Malaysia.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

 

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