Quantitative analysis on dental utilisation in culturally and linguistically diverse mothers

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ABSTRACT

Background. Culturally and linguistically diverse (CALD) mothers are influential in children's behaviours, yet little is known about this population. Furthermore, insufficient quantitative and context-based studies are available with CALD mothers and their access to oral health care. To address this gap, the study investigates oral health behaviours, psychological factors and remoteness area with dental utilisation in CALD mothers, within the NSW context. **Methods**. Informed by middle-range theory and a CALD-specific rainbow model, the 2013 and 2015 NSW Adult Population Health Survey was analysed. Variables for CALD mothers included household structure, age and language spoken. Multivariable analysis was conducted with oral health behaviours, psychological and remoteness variables, with dental utilisation as the outcome. **Results**. The sample was weighted ($n = 190,283$). In total, 39.8% did not have a dental visit, and older mothers (aged 36–55 years) sought more dental services than younger mothers (aged 18–35 years). Higher odds for treatment dental care (aOR 2.21, 95% CI 1.12–4.37) than prevention-oriented care were found. Mothers experiencing moderate levels of psychological distress (aOR 0.49, 95% CI 0.31–0.77), or residing in outer regional and remote regions (aOR 0.19, 95% CI 0.04–0.85) were less likely to utilise dental care. **Conclusion**. Findings underline geographical issues in dental care utilisation and the need for integrated care for CALD mothers experiencing psychological distress, and to encourage uptake of preventive oral health care. Addressing cost barriers necessitates for universal health coverage. Multidisciplinary integration of healthcare services with improved primary sector collaboration between governments and healthcare providers, and the expansion to regional services are required for equity in CALD communities.

Keywords: access to primary care, dental health services, health disparities, health inequalities, oral health, population health, primary health care, psychological distress, vulnerable populations.

Background

Inequalities and inequities in oral healthcare are evidenced in culturally and linguistically diverse (CALD) adults, across and within countries globally (Peres *et al.* 2019). The underutilisation of dental healthcare services occur because of multiple barriers within the systems, provider interactions and population-level factors (Patrick *et al.* 2006; Lee and Divaris 2014). For instance, a descriptive systematic review of migrants was undertaken in Europe that reported poor oral health in migrants compared with host populations, with intra-ethnic differences between migrant communities (Pabbla *et al.* 2021). However, this review revealed contrasting dental utilisation patterns, and suggested the need for further rigorous research (Pabbla *et al.* 2021). In 2021, the World Health Organization resolution on oral healthcare was adopted, endorsing the need for Universal Health Coverage (UHC), that is adequate and relevant for all populations, without financially burdening individuals (Mathur *et al.* 2015).

Significant associations between unmet oral healthcare and poor mental health is reported by epidemiologists (Meldrum *et al.* 2018; Tiwari *et al.* 2022). One study with Vietnamese migrants explored psychological–behavioural acculturation; that is, increased

Collection: Access to Primary Health Care

duration of residency and practices in the host country (Mariño *et al.* 2001). After mediating for employment, education, age, immigration and sociodemographic variables, analysis revealed low oral health utilisation associated with low psychological acculturation (Mariño *et al.* 2001). Despite the cultural insights from this study, it did not focus on CALD mothers and, thus, further insights in this population is warranted. In another narrative review, oral healthcare barriers and enablers were explored with mental health factors (Slack-Smith *et al.* 2017). The study recounted complex challenges with the lack of dental utilisation, fear, mistrust with providers and negative experiences (Slack-Smith *et al.* 2017). Insufficient facilitators were identified for populations experiencing psychological distress (Slack-Smith *et al.* 2017). Fear also negatively impacts dental utilisation. For example, Armfield and colleagues substantiated a vicious cycle of dental fear with the avoidance of dental care (Armfield *et al.* 2007). Concerningly, a growing body of evidence suggests mental health issues in the population, yet very few – if any – available studies focus on CALD mothers, and even fewer on psychological distress, as associated with oral healthcare in this population.

The Australian Government is committed to the National Oral Health Plan 2015–2024 to improve dental health in conjunction with state and territory governments. In this plan, people who are socially disadvantaged or on a low income are key priority populations. CALD mothers encounter multiple barriers within healthcare systems and are, thus, key priority populations. In Australia, 67 000 preventable dental hospitalisations occurred in 2019–2020 (AIHW 2022), and gender inequalities are evident whereby women had consistently higher rates of preventable dental hospitalisations than men (AIHW 2022). Census data specifies that >300 languages are spoken in New South Wales (ABS 2019), with Mandarin, Arabic, Cantonese and Vietnamese at the forefront. Twenty percent of NSW mothers were born in India, China, UK, the Philippines, New Zealand, Nepal, Vietnam, Pakistan and Iraq in 2020. Some CALD communities with low levels of English proficiency encounter obstacles when accessing healthcare services. For instance, a scoping review with non-English speaking migrant mothers identified the need for healthcare services whereby communication clarity is required, as is cultural sensitivity and interpersonal skills by service providers (Dougherty *et al.* 2020). Further, in 2021, a substantial 71.1% of households in NSW were classified as family households, indicating residences that included families with children (ABS 2022). As CALD populations become highly diverse, the evidence-base in understanding oral healthcare access and outcomes in CALD mothers, within the NSW context, is currently absent.

There is a noticeable lack of national consistency in the definitions of CALD groups (Marcus *et al.* 2022*a*), and at the same time, there is a scarcity of context-specific research involving CALD mothers (Marcus *et al.* 2023). Qualitative anthropologist, Professor Liamputtong, reveals the intersecting

identities of South Asian migrant mothers. These populations are not only immigrant women, but sociocultural motherhood complexities are coupled with low English proficiency and unequal social-power relations (Liamputtong 2006). Specifically, language barriers hinder employment, income and childcare opportunities, which perpetuates inequity for CALD mothers. For example, a qualitative study conducted in Melbourne focused on migrant mothers, identified access issues, emergency hospital presentations, cost and communication barriers (Riggs *et al.* 2014). Furthermore, parents play an influential role in children's dental care (Australian Research Centre for Population Oral Health, The University of Adelaide, South Australia 2012). Hence, implications for improving integrated primary care support to mothers will subsequently translate to benefits for children in CALD families.

Qualitative studies in oral and psychological health within the Australian setting are scant (Meldrum *et al.* 2018), and non-existent in regard to this specific population of CALD mothers. Australian context-based studies are inadequate (Marcus *et al.* 2023) and, thus, building upon the evidence, this study contributes to the field through quantitative analysis to investigate oral and psychological healthcare in CALD mothers within NSW. Specifically, this retrospective data analysis investigates the oral health behaviours, and psychological and remoteness factors associated with dental care in CALD mothers. This in turn will augment the evidence base to enable appropriate solutions for integrated primary health care, fostering access and equity in CALD communities.

Methods

Data source

The NSW Adult Population Health Survey for 2013 and 2015 data was analysed. The Survey utilised a stratified sampling design representative of the NSW population. Local health districts were stratified by area and household phone numbers, for both mobile and landline numbers. Simple random digit sampling was conducted for adults. Telephone questionnaires focused on a comprehensive range of health, behaviours and lifestyle domains. Bilingual interviewers undertook surveys in only five languages – Arabic, Chinese, Greek, Italian and Vietnamese. Sampling weights were applied, and selection probability was adjusted with poststratification weights. The Australian Bureau of Statistics population mid-year estimates were used for weighting procedures. A detailed description of survey sampling was published in a previous paper (Marcus *et al.* 2022*b*).

For this study, we defined CALD mothers as those who speak a non-English language. Computed variables for 'CALD mothers' was sourced from 'household structure' and non-English speaking participants. Participants were asked 'who else in the household lives with you?' (son/daughter). Participants were asked whether they spoke a language

other than English at home (yes/no). Further inclusion criteria were age (18–55 years), female and at least one child living in the household. Dental utilisation (yes/no) in the past year was the key outcome.

Oral health behaviours were measured by dental utilisation for 'prevention' and 'treatment', and smoking patterns. Prevention and treatment variables were grouped for participant responses to the 'reason for last dental visit'. Prevention was classified as check-up, oral health education, fluoride treatment, teeth clean and fissure sealant. Treatment was clustered using responses; dental filling, amalgam, root canal, crown, implant, tooth extraction, gum treatment, teeth straightened, dentures, whitening, repair, surgery and 'other treatment'. Participants responding with both prevention and treatment reasons were only included in the bivariate analysis ($n = 75$). This was done for a couple of reasons. First, the survey inadequately probes oral health care questions and, thus, a participant might have sought a 'dental clean' (prevention), but then required a 'filling' (treatment). Thus, disentangling whether treatment or prevention care was received at the last dental visit is not clear in this case. Therefore, to add reliability to our findings about prevention/treatment, dual answers were removed in the final regression model. Smoking oral health behaviours were coded to 'smoking daily or often', 'sometimes' and 'never smoked'.

Psychological health variables were drawn from the Kessler questionnaire 5-point scale (Andrews and Slade 2001), which focuses on emotional and mental health. This questionnaire was selected by the Australian Bureau of Statistics for ease of administration, brevity and cost effectiveness for routine understanding of the NSW population's health (Andrews and Slade 2001). Kessler-drawn variables (AMH1,2,4,6,7,8,9) included 'are you feeling tired', 'hopeless', 'depressed', 'feel everything was an effort', 'feel so sad that nothing could cheer you up' over the last 4 weeks. These variables were recoded and ranked by the mean total score into distress levels: severe, moderate and none. Three additional psychological distress questions distinct from the Kessler scale variables included 'days unable to do daily activities because of psychological distress', 'number of health professional visits for psychological distress' and 'times physical problems caused psychological distress' over the past 4 weeks. This was recoded and grouped to a binary format: 'one or more visits' and 'none'.

Socioeconomic status was stratified by income, area and employment. This was ranked from least disadvantaged to the most disadvantaged quintiles. The highest level of education completed was grouped as 'University' followed by 'TAFE', 'Year 12' and 'Primary school to year 10'. Remoteness area was provided in the survey as five categories: major cities, inner regional, outer regional, remote and very remote. For this study, remoteness was coded into 'major cities', 'inner regional' and 'outer regional and remote'. Hence, 'remote area' was merged into 'outer regional' due to the lack of

sample size ($n = 2$), whereas 'very remote' had zero participants and was thus removed.

Non-identifiable data was analysed, which was classified by the National Health and Medical Research Council as exempt from ethical approval processes.

Data analysis

The study was informed by middle-range theory, which involves testing empirical data pragmatically (Merton 1968), as well as a CALD specific rainbow model, as devised from a systematic review on mothers and carers (Marcus *et al.* 2023). Population weights were applied. The Australian Bureau of Statistics estimate for family composition of two adults with children in NSW was 887,358 in 2016 (ABS 2017). As CALD family data are not explicitly available, language spoken other than English was reported to be 26.5%. This equates to 235,150 CALD families during this period in NSW (ABS 2017). This population estimate is comparable with our weighted dataset for CALD mothers in this study ($n = 190,283$). Descriptive statistics using complex samples were performed using the Chi-squared test ($P < 0.05$) to assess the distribution of dental utilisation with oral health behaviours, psychological factors and sociodemographics. To further investigate the impact of dental utilisation with predictors, multivariable analysis utilising logistic regression in complex samples was performed. Confounding covariates included socioeconomic status and education completed, which were adjusted in separate models for each oral health behaviour (prevention/treatment) and psychological factor. Confidence intervals were 95%. Accounting for sampling design, SPSS (ver. 27.0.0; IBM Corporation) Complex Sampling Plan was used.

Results

The resultant sample of CALD mothers ($n = 578$) was weighted to the NSW population ($n = 190,283$), with an average age of 38 years. In total, 60.2% of CALD mothers had a dental visit in the past year, of which older mothers (aged 36–55 years) utilised dental services more than younger mothers (aged 18–35 years).

The bivariate descriptive analysis between dental utilisation and variables is shown in Table 1. In terms of oral health behaviours, prevention and treatment had a significant Chi-squared relationship with dental utilisation, yet a lack of relationship was found for smoking in this population. Dental visit for prevention was 68.2% and treatment was 52.1% in the non-adjusted model. Using psychological scales, only a small number of CALD mothers reported severe psychological distress, yet underutilisation was evident in those experiencing moderate levels of distress (36.3% compared with 60.6%). CALD mothers who sought more health professional visits for psychological distress or

Table 1. Bivariate complex samples for dental visit in the past year with demographics, behaviours and psychological distress for CALD mothers aged 18–55 years, weighted (*n* = 190,283).

	n (non-weighted)	Dental visit (%)	Pearson's Chi-squared (*P* < 0.05)
Total	578	60.2	
Age (years)			0.077
18–35	217	54.4	
36–55	361	64.0	
Birth country			0.797
Australia	87	58.6	
Other	491	60.4	
Socioeconomic status (SES)			0.316
First SES (least disadvantaged)	130	64.3	
Second SES quintile	126	63.3	
Third SES quintile	110	52.8	
Fourth SES quintile	84	50.4	
Fifth SES (most disadvantaged)	128	63.3	
Highest qualification received			0.318
University	355	62.6	
TAFE	120	57.3	
HSC high school	64	61.2	
Primary school to year 10	39	44.5	
Remoteness area			0.082
Major cities	525	57.2	
Inner regional	34	52.0	
Outer regional and remote	19	26.2	
Oral health behaviours			
Type of dental care at last visit			*<0.001
Prevention	297	68.2	
Treatment	166	52.1	
Prevention and treatment	75	11.8	
None (did not go)	34		
Personal smoking status			0.519
Smoking daily or often	47	50.7	
Smoking sometimes only	102	58.9	
Never smoked	429	61.4	
Psychological distress[A]			*0.029
Severe	16	3.2	
Moderate	243	36.3	

(Continued on next column)

Table 1. (*Continued*).

	n (non-weighted)	Dental visit (%)	Pearson's Chi-squared (*P* < 0.05)
None	319	60.6	
Days unable to do daily activities, number of visits to health professional or times physical problems were caused by psychological distress in past 4 weeks			*0.002
≥1 or more days or visits	223	31.4	
None	355	68.6	

*Significance *P* < 0.05.
[A]Kessler-drawn psychological variables 'are you feeling tired', 'hopeless', 'depressed', 'feel everything was an effort', 'feel so sad that nothing could cheer you up' over the last 4 weeks' were ranked by the mean total score into distress levels: severe, moderate and none.

were unable to perform daily activities in the past month had reduced dental visits (31.4%) than their counterparts. Subjective dental avoidance was predominately 'no need to go' (49.7%), 'too expensive' (24.4%) and 'hard to find time' (19.5%), whereas fear was reported by a small number of CALD mothers (4.6%; Table 2).

Adjusted multivariable logistic regression is presented in Table 3 with confounding variables socioeconomic status and qualification completed. Remoteness area remained a significant predictor only in the third and fourth models. Prevention was only significant in the first model with confounding (Model 1), but no longer significant in the final adjusted model. Dental utilisation for treatment services remained significant and was twofold higher in the final model (aOR 2.21, 95% CI 1.12–4.37). Moderate levels of psychological distress also remained significant in the final model with reduced odds ratio for dental utilisation (aOR 0.49, 95% CI 0.31–0.77). CALD mothers in outer regional and remote areas underutilised dental services (aOR 0.19,

Table 2. Distribution of dental avoidance reasons for CALD mothers, weighted (*n* = 190,283).

Reasons for dental avoidance in the last 12 months	*n*	Weighted %
Hard to find time	233	19.5
Fear/afraid	233	4.6
No need to go	233	49.7
Too expensive	233	24.4
Can't find dentist I like	233	0.9
Too far to go	233	1.1
Long waiting lists	233	2.8
Don't know	233	3.8
Other	233	1.2

Table 3. Multivariable logistic regression models with dental utilisation in the past year, weighted (*n* = 190,283).

	Model 1 Adjusted OR (95% CI)	Model 2 Adjusted OR (95% CI)	Model 3 Adjusted OR (95% CI)	Model 4 Adjusted OR (95% CI)
Socioeconomic status (SES)				
First and second most advantaged	Ref	Ref	Ref	Ref
Third	0.680 (0.376–1.228)	0.685 (0.371–1.266)	0.695 (0.399–1.210)	0.645 (0.356–1.169)
Fourth and fifth most disadvantaged	0.947 (0.579–1.549)	0.955 (0.565–1.614)	0.914 (0.559–1.492)	0.968 (0.580–1.616)
Highest qualification received				
University	Ref	Ref	Ref	
TAFE	0.886 (0.512–1.535)	0.870 (0.493–1.535)	0.816 (0.475–1.403)	
HSC high school	1.082 (0.553–2.117)	1.135 (0.550–2.344)	1.037 (0.538–1.999)	
Primary school to year 10	0.572 (0.243–1.350)	0.804 (0.324–1.995)	0.553 (0.220–1.390)	
Remoteness area				
Major cities	Ref	Ref	Ref	Ref
Inner regional	0.802 (0.341–1.887)	0.786 (0.302–2.044)	0.752 (0.334–1.693)	0.708 (0.284–1.766)
Outer regional and remote	0.232 (0.061–0.876)	0.261 (0.063–1.097)	0.204* (0.059–0.709)	0.187* (0.041–0.846)
Oral health behaviours				
Prevention				
No	Ref			Ref
Yes	0.488* (0.317–0.751)			1.110 (0.588–2.095)
Treatment				
No		Ref		Ref
Yes		2.002* (1.231–3.257)		2.206* (1.115–4.365)
Psychological distress[A]				
Severe			1.107 (0.346–3.535)	0.890 (2.46–3.218)
Moderate			0.556* (0.361–0.855)	0.485* (0.307–0.766)
None			Ref	Ref
Days unable to do daily activities/number of health visits or times physical problems were caused by psychological distress				
≥1 or more days or visits			0.533 (0.248–1.148)	
None			Ref	

Model 1–3 adjusted OR for SES and highest qualification received.
Model 4 adjusted OR for SES.
*Significance was measured at *P* < 0.05, the Goodness of Fit model is utilised (Pearson and Deviance – not significant).
[A]Kessler-drawn psychological variables 'are you feeling tired', 'hopeless', 'depressed', 'feel everything was an effort', 'feel so sad that nothing could cheer you up' over the last 4 weeks' were ranked by the mean total score into distress levels: severe, moderate and none.

95% CI 0.04–0.85), and surprisingly, socioeconomic status was not significant in this study.

Discussion

Findings from this NSW quantitative study illustrate the oral health treatment-oriented behaviours, impact of psychological distress and remoteness disparities in dental utilisation for CALD mothers. Dental avoidance was attributed to three key reasons, in order of frequency: no need, too expensive and time challenges. These findings are consistent with the literature that affirms that sociocultural beliefs and values upheld by CALD mothers from specific historical, cultural, financial and educational backgrounds influence oral health care behaviours and outcomes (Marcus *et al.* 2023). Significantly, CALD mothers experiencing moderate levels of psychological distress were less likely to utilise dental services. Behaviour changes to encourage preventive dental care will inevitably fail without multilevel collaboration, and necessary system, government and provider interventions, with a specific focus on policy and primary sector facilitators (Marcus *et al.* 2023). Remarkably, there was no significant difference in dental utilisation and socioeconomic status between the most advantaged and disadvantaged groups. This suggests two potential scenarios: (1) CALD mothers

may be effectively accessing government support, subsidies or dental treatment services, or (2) there might be a lower utilisation rate among the more advantaged socioeconomic groups in NSW, possibly influenced by cultural attitudes of perceiving dental care as unnecessary. Some of this variation could be attributed to cultural beliefs, as affirmed in our findings ('no need'). To address this disparity, a more integrated primary sector, emphasising the benefits of preventive oral healthcare, could enhance access and advocate person-centred opportunities, as suggested by Mathur *et al.* (2015). Furthermore, dental avoidance and insufficient preventive dental care findings underscore the pressing need for oral health promotion tailored to culturally diverse communities, as well as universal health coverage to address financial barriers. Some caution, however, is required, as CALD populations are heterogenous, and further studies focused on dialects and country of birth could verify these findings. In addition, the survey design could be improved to incorporate culturally relevant terminology, such as 'ethnicity' and additional questions for dental avoidance, including 'language/communication' issues or 'negative provider experiences'.

Increased levels of primary sector integration between general health and oral healthcare are corroborated with our study findings. Associations between CALD mothers experiencing moderate levels of psychological distress and lack of dental utilisation were found, in comparison to counterparts. This is line with previous studies (Slack-Smith *et al.* 2017; Tiwari *et al.* 2022); for example, Gibson and colleagues examined psychosocial factors linked with regular dental visits. This qualitative study affirmed that dental attendance patterns were in similarity to chronical illness behaviour (Gibson *et al.* 2000). Over a decade ago, the Australian National Survey of Mental Health and Wellbeing reported adverse psychological distress in women compared with men (Slade *et al.* 2011). Hence, the integration of oral health, general and mental health care coordination with federal and state governments is required (Banfield *et al.* 2012). Drawing from multidisciplinary models can help inform better integrated care. Further, our data reveals dental avoidance due to 'fear' in a small number of CALD mothers (only 4.6%), which suggests system, logistical and sociocultural barriers to oral healthcare. Strengthening primary sector integration with the oral healthcare system, and promoting the value of prevention is beneficial to improve oral healthcare equity and access in CALD communities.

Oral healthcare inequalities due to remoteness are apparent in the literature (Kruger and Tennant 2005). Attracting and retaining oral health workers, and supporting dental programs in outer regional and remote communities is evidenced from the underutilisation of dental services in our findings (Kruger and Tennant 2005). Table 1 reveals that CALD mothers in the fifth quintile of most disadvantage utilised dental services at a comparable rate with those in the most advantaged socioeconomic quintile. Consequently,

there is a need for the promotion of preventive oral health care for CALD mothers at the third and fourth levels of socioeconomic disadvantage. The Australian Institute of Health and Welfare reported that females avoided dental care due to cost, and had difficulties paying for basic preventive care compared with men across the lifespan (AIHW 2022). This report confirmed that financial barriers led women aged 35–54 years to be the most prone to avoiding or delaying dental treatment, closely followed by those aged 15–34 years (AIHW 2022). Furthermore, CALD mothers encounter additional barriers, including navigating a disconnected public–private healthcare system, language and communication complexity, among other factors (Marcus *et al.* 2023). Therefore, integrated primary care and the expansion of UHC in oral healthcare, especially in non-metropolitan areas, is one piece of the puzzle that would enable greater population equity.

Conceptually, this study was informed by middle-range theory (Merton 1968), and aligned with the CALD-specific rainbow model (Marcus *et al.* 2023). This model supplements study findings, given that health care utilisation is family centred for CALD mothers, who are generally primary carers in the home. Hence, access to services is not an individually based decision. Further, this model posits multilayered and interrelating components, specifically in relation to accessing oral healthcare (Marcus *et al.* 2023). Accordingly, this is evidenced within our data, whereby CALD mothers accessed treatment-based dental services instead of preventive dental care. Individual modifying factors, 'hard to find time', and cultural and language domains, encompass CALD mother-specific factors to dental utilisation (Marcus *et al.* 2023). Thus, the model aligns with quantitative findings from this study; consequently, augmenting evidence within the field of oral healthcare access and equity.

This study is not without limitations. Undersampling CALD populations in survey designs is an ongoing challenge. Unintended duplication of responses from CALD mothers might have occurred through combining years 2013 and 2015. Fifty-three languages were collected, but the granular nature of focusing on a separate ethnicity was not possible due to limited sample sizes in each. The study utilised 'language' as a key variable to group CALD mothers, and, thus, country of birth was excluded due to low sample numbers. The Kessler Psychological Distress tool helps identify psychological health concerns in the population, as used in the NSW Population Survey (Andrews and Slade 2001). Further measures may help strengthen future research in psychological health as linked to general health outcomes. Dental utilisation was the only available oral healthcare measure on the Survey and, unfortunately, dental assessments were not conducted. Refugee or asylum seekers were not identified and, thus, findings may differ with humanitarian migrants due to the complex needs of these populations. Indigenous groups also experience several inequalities; however, they were not the focus of this study. Further

research is required across CALD populations with low literacy and the elderly, for culturally appropriate oral healthcare services that meet population needs.

Conclusion

Findings underline geographical access issues in the utilisation of dental care, as well as the need for psychological and oral healthcare support for prevention-oriented services among CALD mothers. Implications from this study endorse the multidisciplinary integration of oral and mental healthcare services, in collaboration with governments, primary sector health providers and CALD communities. Affordability remains a barrier and, thus, the expansion of UHC to support prevention in oral healthcare is encouraged. The study findings further align to the World Health Organization policy resolution in oral health, and establishe the necessary expansion for UHC in CALD communities in NSW and across Australia.

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