Received: 9 May 2020 | Revised: 3 November 2020 | Accepted: 19 November 2020

DOI: 10.1002/ajpa.24197

RESEARCH ARTICLE

American Journal of PHYSICAL ANTHROPOLOGY WILEY

Association between parity and tooth loss among northern Nigerian Hausa women

Elizabeth O. Oziegbe[1,2] | Lynne A. Schepartz[2,3]

[1]Faculty of Dentistry, Obafemi Awolowo University, Ile-Ife, Nigeria

[2]Human Variation and Identification Unit, School of Anatomical Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

[3]University of Pennsylvania Museum of Archaeology and Anthropology, Physical Anthropology and Mediterranean Sections, Philadelphia, Pennsylvania

Correspondence
Lynne A. Schepartz, School of Anatomical, Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa.
Email: lynne.schepartz@wits.ac.za

Abstract

Background: Female reproduction is associated with physiological, metabolic, and nutritional demands that can negatively affect health and are possibly cumulative when parity is high. While it is probable that maternal oral health is similarly affected, available evidence is based on fairly low parity populations and likely confounders affecting oral health status were not considered.

Aim: To determine the relationship between parity and tooth loss in a population with many high parity women. Contributions of age, reproductive and socioeconomic parameters, and oral health practices were considered.

Materials and methods: This was a cross-sectional study involving 612 Hausa women of all parity levels aged 13–65 years. Women with ≥5 children were considered high parity. Sociodemographic status and oral health practices were collected using a structured interviewer-administered questionnaire. All teeth present, (excluding third molars) and missing teeth were noted, with inquiries regarding tooth loss etiology. Associations with tooth loss were evaluated through correlations, ANOVA, post hoc analyses and Student's *t* tests. Effect sizes were used to interpret the magnitude of differences. Multiple regression (negative binomial model) was used to investigate predictors of tooth loss.

Results: Hausa women had a low prevalence of tooth loss, despite poor oral hygiene, and limited dental care. Older, middle SES, and higher parity women experienced significantly more tooth loss. Additionally, increased duration of reproductively active years was significantly related to fewer remaining teeth.

Conclusion: Higher parity was related to greater tooth loss in Hausa women. Women with ≥5 children experienced more loss than lower parity age mates.

KEYWORDS
Africa, maternal depletion syndrome, parity, tooth loss

1 | INTRODUCTION

Is it possible that the cumulative demands of reproduction may impact negatively on oral health? "Gain a child, lose a tooth," or "for every child, a tooth is lost" are common proverbs in many societies (Christensen et al., 1998), but the biological basis of these beliefs is still questioned. Reproduction in females can be stressful due to the energy demands associated with supporting pregnancy, lactation, and childcare. Pregnancy and lactation are associated with physiological, metabolic, and nutritional changes. These adjustments may cause permanent changes in the mother's response to reproductive stresses, particularly in high parity women (Jasienska et al., 2017).

It has been posited that increased investments in reproduction, combined with short interbirth intervals, may deplete a mother of her

Please note that certain pages of this article have been removed in order to reduce the file size so that the PDF can be uploaded on the system (the system has a limit of 1MB for files and several PDF files are larger than this).

The first and last pages of each paper (with full bibliographic details and affiliations) are included.

If the entire unredacted paper is required, this can be emailed directly to whomever requires them by contacting Prof. Paul R. Manger on Paul.Manger@wits.ac.za

REFERENCES

Adamu, Y. M., & Salihu, H. M. (2002). Barriers to the use of antenatal and obstetric care services in rural Kano, Nigeria. *Journal of Obstetrics and Gynaecology*, *22*(6), 600–603.

al Shammery, A., el Backly, M., & Guile, E. E. (1998). Permanent tooth loss among adults and children in Saudi Arabia. *Community Dental Health*, *15*(4), 277–280.

Amar, S., & Chung, K. M. (1994). Influence of hormonal variation on the periodontium in women. *Periodontology 2000*, *6*(1), 79–87.

Black, A. J., Topping, J., Durham, B., Farquharson, R. G., & Fraser, W. D. (2000). A detailed assessment of alterations in bone turnover, calcium homeostasis, and bone density in normal pregnancy. *Journal of Bone and Mineral Research*, *15*(3), 557–563.

Cahen, P. M., Frank, R. M., & Turlot, J. C. (1985). A survey of the reasons for dental extractions in France. *Journal of Dental Research*, *64*(8), 1087–1093.

Celeste, R. K., Nadanovsky, P., & Fritzell, J. (2011). Trends in socio-economic disparities in the utilization of dental care in Brazil and Sweden. *Scandinavian Journal of Public Health*, *39*(6), 640–648.

Cheng, R. B., Zhang, Y., Cheng, M., Li, Y., & Liu, L. (2009). A sampled investigation on tooth loss of middle-aged and elders in Northeast China. *Shanghai Kou Qiang Yi Xue*, *18*(1), 29–34.

Christensen, K., Gaist, D., Jeune, B., & Vaupel, J. W. (1998). A tooth per child? *The Lancet*, *352*, 204.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. New York, NY: Routledge Academic.

Corraini, P., Baelum, V., Pannuti, C. M., Pustiglioni, A. N., Romito, G. A., & Pustiglioni, F. E. (2009). Tooth loss prevalence and risk indicators in an isolated population of Brazil. *Acta Odontologia Scandinavica*, *67*(3), 297–303.

Cote, S., Geltman, P., Nunn, M., Lituri, K., Henshaw, M., & Garcia, R. I. (2004). Dental caries of refugee children compared with US children. *Pediatrics*, *114*(6), 733–740.

Cruikshank, D. P., & Hays, P. M. (1991). Maternal physiology in pregnancy. In S. C. Gabbe, J. R. Niebyl, & J. L. Simpson (Eds.), *Obstetrics: Normal and problem pregnancies* (2nd ed., pp. 125–146). New York: Churchill Livingstone.

Cruz, G. D., Roldos, I., Puerta, D. I., & Salazar, C. R. (2005). Community-based, culturally appropriate oral health promotion program for immigrant pregnant women in New York City. *New York State Dental Journal*, *71*(7), 34–38.

Cunha-Cruz, J., Hujoel, P. P., & Nadanovsky, P. (2007). Secular trends in socio-economic disparities in edentulism: USA, 1972–2001. *Journal of Dental Research*, *86*(2), 131–136.

Eastman, N. J. (1942). *Expectant motherhood*. Boston: Little, Brown.

Enwonwu, C. O., Phillips, R. S., Ibrahim, C. D., & Danfillo, I. S. (2004). Nutrition and oral health in Africa. *International Dental Journal*, *54*(S6), 344–351.

Esan, T. A., Olusile, A. O., Ojo, M. A., Udoye, C. I., Oziegbe, E. O., & Olasoji, H. O. (2010). Tooth loss among Nigerians treated in teaching hospitals: A national pilot study. *Journal of Contemporary Dental Practice*, *11*(5), 17–24.

Gaffield, M. L., Gilbert, B. J., Malvitz, D. M., & Romaguera, R. (2001). Oral health during pregnancy: An analysis of information collected by the pregnancy risk assessment monitoring system. *Journal of the American Dental Association*, *132*(7), 1009–1016.

Greene, J. C., & Vermillion, J. R. (1964). The simplified oral hygiene index. *Journal of the American Dental Association*, *68*, 7–13.

Güncü, G. N., Tözüm, T. F., & Caglayan, F. (2005). Effects of endogenous sex hormones on the periodontium- -review of literature. *Australian Dental Journal*, *50*(3), 138–145.

Halling, A., & Bengtsson, C. (1989). The number of children, use of oral contraceptives and menopausal status in relation to the number of remaining teeth and the periodontal bone height. A population study of women in Gothenburg, Sweden. *Community Dental Health*, *6*(1), 39–45.

Holst, D. (2008). Oral health equality during 30 years in Norway. *Community Dentistry and Oral Epidemiology*, *36*(4), 326–334.

Izugbara, C. O., & Ezeh, A. C. (2010). Women and high fertility in Islamic northern Nigeria. *Studies in Family Planning*, *41*(3), 193–204.

Jasienska, G., Bribiescas, R. G., Furberg, A. S., Helle, S., & Núñez-de la Mora, A. (2017). Human reproduction and health: An evolutionary perspective. *The Lancet*, *390*(10093), 510–520.

King, J. C. (2003). The risk of maternal nutritional depletion and poor outcomes increases with early closely space pregnancies. *Journal of Nutrition*, *133*(5), 1732S–1736S.

Kornman, K. S., & Löesche, W. J. (1980). The subgingival microflora during pregnancy. *Journal of Periodontal Research*, *15*(2), 111–122.

Laine, M. A. (2002). Effect of pregnancy on periodontal and dental health. *Acta Odontologia Scandinavica*, *60*(5), 257–264.

Last, M. (2004). Hausa. In C. R. Ember & M. Ember (Eds.), *Encyclopedia of medical anthropology: Health and illness in the world's cultures* (pp. 718–729). New York: Kluwer Academic.

López, R., & Baelum, V. (2006). Gender differences in tooth loss among Chilean adolescents: Socio-economic and behavioral correlates. *Acta Odontologia Scandinavica*, *64*(3), 169–176.

Lukacs, J. R. (2011a). Sex differences in dental caries experience: Clinical evidence and complex etiology. *Clinical Oral Investigations*, *15*(5), 649–656.

Lukacs, J. R. (2011b). Gender differences in oral health in South Asia: Metadata imply multifactorial biological and cultural causes. *American Journal of Human Biology*, *23*(3), 398–411.

Lukacs, J. R., & Largaespada, L. L. (2006). Explaining sex differences in dental caries prevalence: Saliva, hormones and 'life history' etiologies. *American Journal of Human Biology*, *18*(4), 540–555.

Madauci, I., Isa, Y., & Daura, B. (1968). *Hausa custom*. Zaria: Northern Nigeria Publication Company.

McCaul, L. K., Jenkins, W. M. M., & Kay, E. J. (2001). The reasons for extraction of permanent teeth in Scotland: A 15-year follow-up study. *British Dental Journal*, *190*(12), 658–662.

Merchant, K. M. (1994). Maternal nutritional depletion. In maternal and child nutrition (UNSSCH). *SCN News*, *11*, 30–33.

Monteiro da Silva, A. M., Newman, H. N., Oakley, D. A., & O'Leary, R. (1998). Psychosocial factors, dental plaque levels and smoking in periodontitis patients. *Journal of Clinical Periodontology*, *25*(6), 517–523.

Morelli, E. L., Broadbent, J. M., Leichter, J. W., & Thomson, W. M. (2018). Pregnancy, parity and periodontal disease. *Australian Dental Journal*, *63*(3), 270–278.

Nalçacı, R., Erdemir, E. O., & Baran, I. (2007). Evaluation of the oral health status of the people aged 65 years and over living near rural district of middle Anatolia, Turkey. *Archives of Gerontology and Geriatrics*, *45*(1), 55–64.

National Population Commission (NPC) [Nigeria], & ICF Macro. (2009). *Nigeria demographic and health survey 2008*. Abuja, Nigeria: NPC and ICF Macro, National Population Commission.

National Population Commission of Nigeria (NPC). (2006). *Nigeria population and housing census 2006*. Abuja, Nigeria: National Population Commission of Nigeria.

Office of the Population Census and Surveys (OPCS). (1991). *Standard occupational classification* (Vol. 3). London: HMSO.

Oziegbe, E. O. (2020). *Maternal and child oral health status: Investigation of the effect of parity and socio-behavioral factors*. (PhD dissertation). The University of Witwatersrand, Johannesburg, South Africa.

Oziegbe, E. O., & Schepartz, L. A. (2019a). Is parity a cause of tooth loss? Perceptions of northern Nigerian Hausa women. *PLoS One*, *14*(12), e0226158. https://doi.org/10.1371/Journal.pone.0226158.eCollection.

Oziegbe, E. O., & Schepartz, L. A. (2019b). Archive of Hausa parity and tooth loss data. In *Human variation and identification research unit*. School of Anatomical Sciences: University of the Witwatersrand.

Quteish Taani, D. S. (2003). Periodontal reasons for tooth extraction in an adult population in Jordan. *Journal of Oral Rehabilitation*, *30*(1), 110–112.

Rehan, N., & Abashiya, A. K. (1981). Breastfeeding and abstinence among Hausa women. *Studies in Family Planning*, *12*(5), 233–237.

Renne, E. P. (1996). Perceptions of population policy, development, and family planning programs in northern Nigeria. *Studies in Family Planning*, *27*(3), 127–136.

Richards, W., Ameen, J., Coll, A. M., & Higgs, G. (2005). Reasons for tooth extraction in four general dental practices in South Wales. *British Dental Journal*, *198*(5), 275–278.

Russell, S. L., Gordon, S., Lukacs, J. R., & Kaste, L. M. (2013). Sex/gender differences in tooth loss and edentulism: Historical perspectives, biological factors, and sociologic reasons. *Dental Clinics of North America*, *57*(2), 317–337.

Russell, S. L., Ickovics, J. R., & Yaffe, R. A. (2008). Exploring potential pathways between parity and tooth loss among American women. *American Journal of Public Health*, *98*(7), 1263–1270.

Russell, S. L., & Mayberry, L. J. (2008). Pregnancy and oral health: A review and recommendations to reduce gaps in practice and research. *The American Journal of Maternal Child Nursing*, *33*(1), 32–37.

Salvolini, E., Di Giorgio, R., Curatola, A., Mazzanti, L., & Fratto, G. (1998). Biochemical modifications of human whole saliva induced by pregnancy. *British Journal of Obstetrics and Gynaecology*, *195*, 656–660.

Scheutz, F., Baelum, V., Matee, M. I., & Mwangosi, I. (2002). Motherhood and dental disease. *Community Dental Health*, *19*(2), 67–72.

Shigli, K., Hebbal, M., & Angadi, G. S. (2009). Relative contribution of caries and periodontal disease in adult tooth loss among patients reporting to the Institute of Dental Sciences, Belgaum, India. *Gerodontology*, *26*(3), 214–218.

Simonsen, S. M. E., Lyon, J. L., Alder, S. C., & Varner, M. W. (2005). Effect of grand multiparity on intrapartum and newborn complications in young women. *Obstetrics and Gynecology*, *106*(3), 454–460.

Smith, M. G. (1965). The Hausa of northern Nigeria. In J. L. Gibbs, Jr. (Ed.), *Peoples of Africa* (pp. 121–155). New York: Holt, Rinehart & Winston.

Steinberg, B. J. (1999). Women's oral health issues. *Journal of Dental Education*, *63*(3), 271–275.

Tahzib, F. (1985). Vesicovaginal fistula in Nigerian children. *The Lancet*, *326*(8467), 1291–1293.

Timothé, P., Eke, P. I., Presson, S. M., & Malvitz, D. M. (2002). Dental care use among pregnant women in the United States reported in 1999 and 2002. *Preventing Chronic Disease*, *2*(1), 1–11.

Ulrich, U., Miller, P. B., Eyre, D. R., Chesnut, C. H., Schiebusch, H., & Soules, M. R. (2003). Bone remodeling and bone mineral density during pregnancy. *Archives of Gynecology and Obstetrics*, *268*(4), 309–316.

Varenne, B., Petersen, P. E., Fournet, F., Msellati, P., Gary, J., Ouattara, S., Harang, M., & Salem, G. (2006). Illness-related behavior and utilization of oral health services among adult city-dwellers in Burkina Faso: Evidence from a household survey. *BMC Health Services Research*, *6*, 1–11.

Walker, A. R., Dison, E., & Walker, B. F. (1983). Dental caries in south African rural Black women who had large families and long lactations. *The Journal of Tropical Medicine and Hygiene*, *86*(6), 201–205.

Wandera, M., Engebretsen, I. M., Okullo, I., Tumwine, J. K., & Astrøm, A. N. (2009). Socio-demographic factors related to periodontal status and tooth loss of pregnant women in Mbale district, Uganda. *BMC Oral Health*, *9*, 1–11.

Wennström, A., Ahlqwist, M., Stenman, U., Björkelund, C., & Hakeberg, M. (2013). Trends in tooth loss in relation to socio-economic status among Swedish women aged 38 and 50 years: Repeated cross-sectional surveys 1968-2004. *BMC Oral Health*, *13*, 1–8.

Westaway, M. S., Viljoen, E., & Rudolph, M. J. (1999). Utilisation of oral health services, oral health needs and oral health status in a peri-urban informal settlement. *South African Dental Journal*, *54*(4), 149–152.

Winikoff, B., & Castle, M. A. (1987). The maternal depletion syndrome: Clinical diagnosis or ecodemographic condition? Paper presented for the International Conference on Better Health for Women and Children through Family Planning, held in Nairobi, Kenya, October September 5, 1987.

Zachariasen, R. D. (1989). Ovarian hormones and oral health: Pregnancy gingivitis. *Compendium*, *10*, 508–512.

How to cite this article: Oziegbe EO, Schepartz LA. Association between parity and tooth loss among northern Nigerian Hausa women. *Am J Phys Anthropol*. 2021;174: 451–462. https://doi.org/10.1002/ajpa.24197