

Noma: a neglected oro-facial childhood disease

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WHO's World Health Assembly 2021 has recognised the impact of certain oral diseases on general health, and consequently the need to incorporate oral health strategies into universal health care, particularly for remote poor rural communities.^{1, 2}

Noma is an opportunistic, necrotising oro-facial childhood disease prevalent particularly in remote poor rural areas of sub-Saharan Africa, causing gross oral and facial mutilation, and terrible facial disfigurement, requiring complex plastic surgical reconstruction.³ Often even after such treatment, the patient is left with severe psychosocial challenges, such as dealing with stigmatisation, discrimination, altered body image, poor self-esteem and self-confidence, compromised social interactions, social avoidance, and impaired wellbeing and quality of life.⁴

Noma is initiated by complex interactions between largely anaerobic commensal microorganisms within dento-gingival polybacterial plaques accumulated because of neglected mouth and tooth cleaning, and severe risk factors such as malnutrition, immune impairment, viral infections, debility, and other adverse environmental circumstances. Untreated noma runs a fulminating course and is often fatal, but the available evidence suggests that it is not contagious and non-recurrent.^{3, 5}

Noma starts inside the mouth as simple anaerobic bacteria-induced necrotising gingivitis that progresses to necrotising periodontitis, then to necrotising stomatitis. The intraoral necrotising process, in the presence of risk factors, spreads rapidly and aggressively, devouring oral soft tissue, mandibular and maxillary bone including walls of maxillary sinus, floor of orbit, and overlying facial and nasal skin. There is severe disfigurement, psychosocial trauma, and gross functional disability in eating, talking, swallowing, and breathing, often leading to death. Nevertheless, if diagnosed early, in the stage of necrotising gingivitis, the devastating progression to noma can be entirely prevented by the simple, inexpensive means of antibiotics and toothbrushing.^{3, 5, 6}

There is virtually no systematic clinico-pathological, bacteriological, or epidemiological documentation of noma, because most cases are undiagnosed and fatal, as a result of the remoteness, poverty, and ignorance of the communities in which most afflicted children live, the rapid progression and disfigurement of the disease, the related stigma and social discrimination, and the inaccessibility or dysfunctionality of health-care facilities. Sometimes because of misinformed cultural beliefs, mutilated survivors of noma are rejected by their communities and are forced to live the remainder of their lives separated from their communities.^{3, 5}

Owing to the dearth of evidence about noma and the chain of biopathological events that characterise the disease progression, it is not possible to formulate knowledge-based guidelines for its management. Hopefully, if the problem could be brought more sharply to the attention of even the few health-care workers in rural areas where noma is prevalent, a data bank might gradually be established, facilitating teaching, research, the formulation of more evidence-based guidelines for management.⁵ Sub-Saharan African countries should, if possible, establish collaborative registries to archive and classify all data on noma.^{5, 7, 8, 9}

With more information, light might also be shed on as yet unidentified factors in the pathogenesis of noma to explain why, implausibly, most cases of noma have been reported from specific countries in sub-Saharan Africa, but few from other similarly poor, underprivileged, and disadvantaged communities elsewhere in Africa or on any other continent; and why, even in these communities only a small proportion of children with overt necrotising gingivitis and periodontitis actually develop noma.^{5, 6}

Although the health-care community is gradually becoming more aware of noma, its prevention, and treatment, attempts to bring it to the serious attention of governmental and non-governmental organisations have been disappointing for several reasons. The populations at risk for noma are generally uneducated and impoverished, and live in remote rural communities lacking access to health-care facilities, so that it is difficult, if not impossible, to address its prevalence. Furthermore, the populations at risk of noma have neither political nor financial influence, so there is very little perceived urgency for any governmental agency to address either the disease itself or the associated misery. As a result of such official indifference, non-governmental organisations and private philanthropic bodies are the main agencies raising attention to, or practically assisting in, alleviating the suffering from noma and reducing its incidence.^{5, 7, 8, 9}

Sadly, as long as there is little education, no economic development, and a low standard of living where noma is prevalent, realistically one cannot expect any significant reduction in its incidence. Therefore, reducing the incidence of and the suffering from noma would have to be part of a campaign to promote economic empowerment, education, and public health in affected rural communities, based on a humanistic approach to the suffering of patients, their human values, and their worth as individuals.^{3, 7, 8, 9}

Malnutrition is an important risk factor for noma, so the relatively widespread programmes and projects designated to address malnutrition should be used also to teach those involved how to screen the mouths of malnourished children for the possible existence of necrotising gingivitis and periodontitis. These programmes should also alert, inform, and educate caregivers of small children about the importance of regularly removing dento-gingival bacterial plaque by toothbrushing (brushes would also need to be provided), about how to recognise early signs and symptoms of necrotising gingivitis and periodontitis, and if recognised, where urgently to seek care.^{7, 8, 9}

Since in most parts of Africa where noma is prevalent, traditional healers are usually the first to be consulted for health problems, efforts should be made to integrate traditional healers into mainstream health-care systems. They should therefore be educated on how to recognise the signs and symptoms of all the clinical stages of noma, perhaps even to manage the earliest necrotising papillary gingivitis stage, and how and to whom to refer more advanced cases.^{7, 10}

Noma should certainly be added to the WHO's list of neglected tropical diseases, for several reasons. First, it causes devastating facial disfigurement, severe physical dysfunction, and psychosocial impairment, and principally affects children who will bear terrible consequences of this disease for the rest of their lives. Second, there are great voids in the formal documentation of the clinical, pathological, bacteriological, and epidemiological characteristics of noma, and no serious efforts to improve professional awareness about it have been undertaken. Third, although prevention and successful treatment at the earliest stage of the disease can be achieved with simple personal or public health measures, and the effects of advanced noma could often be ameliorated were any accessible organised medical services available, regrettably, no substantial governmental resources are allocated to this end. And finally, were noma to be defined by the WHO as a neglected tropical disease, it might be included in the dental, medical, and nursing curricula in countries where noma is prevalent, in continuing education courses and conferences.^{7, 8, 9} These actions could increase awareness and knowledge about noma among frontline health-care personnel, and subsequently reduce the incidence and prevalence of this terrible disease.

References

1. FDI World Dental Federation. WHO World Health Assembly approves 'historic' resolution on oral health. 2021. <https://www.fdiworlddental.org/who-world-health-assembly-approves-historic-resolution-oral-health>. Date accessed: July 21, 2021
2. WHO. Oral health Executive board resolution EB148/R1. 2021. World Health Organization, Geneva, 2021
3. Srour ML, Marck K, Baratti-Mayer D. Noma: overview of a neglected disease and human rights violation. *Am J Trop Med Hyg*. 2017; 96: 268-274
4. Rifkin WJ, Kantar RS, Ali-Khan S, et al. Facial disfigurement and identity: a review of the literature and implications for facial transplantation. *AMA J Ethics*. 2018; 20: 309-323
5. Feller L, Khammissa RAG, Altini M, Lemmer J. Noma (cancrum oris): an unresolved global challenge. *Periodontol 2000*. 2019; 80: 189-199
6. Marck KW. Noma: a neglected enigma. *Lancet Glob Health*. 2013; 1: e58-e59
7. Royal Society of Tropical Medicine and Hygiene. Noma: a preventable but neglected disease. 2021. <https://rstmh.org/news-blog/blog/noma-a-preventable-but-neglected-disease> Date accessed: July 21, 2021
8. Srour ML, Baratti-Mayer D. Why is noma a neglected-neglected tropical disease? *PLoS Negl Trop Dis*. 2020; 14e0008435
9. Farley E, Ariti C, Amirtharajah M et al. Noma, a neglected disease: a viewpoint article. *PLoS Negl Trop Dis*. 2021; 15e0009437
10. Farley E, Lenglet A, Abubakar A. et al. Language and beliefs in relation to noma: a qualitative study, northwest Nigeria. *PLoS Negl Trop Dis*. 2020; 14e0007972