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Lilliana Stojic DDS, MAGD, FICOI, LLSR
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DENTAL MISSION CLINICAL VISITS

December 2023

Abstract

Dental Mission December 2023, Clinical visits at the village of: Chou, SSW approximately 180Km west of Ouagadougou city area. Burkina Faso, Africa

Dr. Lilliana Stojic DDS, MAGD, ICOI, LLSR
Mark Gilster CPED, EMT, CPT

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Global Smiles Inc.

Dr. Lilliana Stojic DDS, MAGD, ICOI, LLSR

& Mark Gilster CPED, EMT, CPT

Report clinical mission dates, December 26th-29th – 2023,

Clinical visits at the village of: Thyou, approximately SSW, 180Km west of Ouagadougou City area. Team housing base location: Ouagadougou, Burkina Faso, Africa – (Sub-Saharan).

Mission outreach provided by Feeding Nations Through Education organization (feedingnations.org), a not-for-profit organization 501c3 est. 2010 by Mr. Alfred Koala (Director).

Summary

64 Patients were seen over a 4-day period for dental treatment, examinations, extractions and immediate attention to the oral infection or impactions. Team support - Team of 1 doctor (DDS), 1 assistant medical support, 2 translators, F.N.T.E. board members and 20+ volunteers to assist with organization and support.

General description of the patients encountered.

Patients were dehydrated and malnourished, unknown as to the bacterial or parasitic type infections affecting their physical nature.

Prevalence of general periodontitis could be seen in every patient from lack of mechanical agitation (brushing).^{1,2,3} Mineral deposits at the base of the gums have led to significant build-up of calculus (hardened), leading to carries and additional complications associated with untreated cavities and mouth infections of various degrees. Instructions were given as to proper brushing techniques along with a toothbrush and toothpaste for every patient visiting the clinic. Proper education as to the specific technique in brushing can prevent periodontitis from forming with regular brushing.⁴ Extractions were provided to ensure health of the patient. Patients were informed through the translators speaking English, French and Native Language More (Pron. Moor-Rey). Patients were given the option for fillings if they could afford that option and access to the city. In all cases patients could not afford to travel to the cities or pay for cavity filling option.

Special note: Observed and stated pharmaceutical use among patients.

Amoxicillin had been issued to most patients as a “Pain Relief” remedy and taken prophylactically⁸. This has defeated the purpose of Amoxicillin as an antibiotic for bacterial infections. Stipulation (anecdotal- requires significant more studies on the population), that the use and prescription and improper application of Amoxicillin application to provide pain relief and not help the patient as an antibiotic, would seem to create bacterial resistance in fighting off infection and would defeat the purpose of

the medicine. The significance to the taking of additional street medicine for pain resolve is the technique for delivery for the medication. The patients described that they were instructed to place the medication either on or near the infected tooth or teeth. This led to other significant findings in the extraction of #19 on the lower left side, the first molar of the adult teeth. (Extraction of #19, #18 findings can be seen in the charts below for trend comparison).^{6,7,8}. Further note: that in some cases the opposing upper molars located above the infected molars #19, #18 were also infected and eroding, with extraction subsequently. This additionally can be seen when viewed in the data comp with the extraction # of 14,15,16.

According to the World Health Organization, Amoxicillin is the preferred medication when addressing SAM – Severe Acute Malnutrition and should be prescribed or given to help control G.I. infections and general Sam pain.^{17,18,19} In the case of the villagers and others in Burkina Faso, take the Amoxicillin, Paracetamol or Zibado to eliminate tooth pain (the medications are applied directly to the surface of the tooth). As a result, the pH levels are lower in the mouth than standard body pH, creating a more acidic environment. Acidic environment in the mouth, enamel can be eroded causing further damage to the tooth(teeth) structure(s), increasing the chance for infection, carries, pain and further damage to tooth(s) structures. When no other solutions are available, risk taking by the individual to turn to these street drug solutions is higher (lack of education on drug use and application) to the patient and remedies/resources are limited in rural areas.^{5,9}

Patient Encounter days – Clinical visits and treatment

December 26th, 12 patients encountered.

- **Patient encounter detail:**
 - 13 extractions, noted 2 patients no extractions, of these two 1 Periodontitis causing symptoms, no treatment other than brushing and cleaning maintenance required. 2nd patient Dr. recommended fillings to save the healthy tooth (further noted this may be an impracticality due to the expense and distance to the city to receive said services to accommodate indicated treatment regimen)
- **Note:**
 - No allergies noted for these patients.
- **Blood pressure:**
 - BP range 100/80 – 127/99, average of 108.6/82.3 Systolic/Diastolic

- **Age range:**
 - 21 to 42 yo., with an avg. age of 31.3 with 69% estimated to be estimated ages of the patients with no exact date of birth.
- **Additional note:**
 - Most patients over the age of approximately 20, had taken street drugs (Zibido – an opioid) ⁵, and or paracetamol (aspirin) as a direct analgesic application, all in powder form issued to the patient.⁹

December 27th, 10 patients encountered.

- **Patient encounter detail:**
 - 13 extractions (5 of 13 extractions #19, #18), 2 individuals with 3 or more extractions and 1 with 2 and the remainder with 1 extracted.
- **No Extractions:**
 - 4 patients did not require any extractions, 1 Follow-up from previous day extraction, 3 others with either calculus build-up or, periodontitis complications or anatomy issue (Mandibular Tori – left Lingual – a harmless boney anatomical protuberance at times causing pain for the patient, no remedy other than surgery performing a Torectomy). The Tori is prevalent among Africa genome and is commonly found in this region. Genetic factors, gender, environmental and nutritional factors can contribute to the formation of this boney growth. ^{15,16}
- **Age Range:**
 - The age range for this group remained as a an estimated (unknown exact DOB in the majority of recorded ages for patients).
Approx. age 25-75 yo.
- **Blood pressure:**
 - The inclusion of older patients in this group would skew the results so an average is not presented here (later this will be included for the entire patient set). The patients in this set were healthy and within normal limits for BP. The other patients over 40 were considered “high” and may be considered Stage 1 hypertension and are at risk for stroke.^{10,11} (See Blood Pressure Health charts supplemental collected from data set).
- **See “Special Note” section in introduction:**
 - Street medicine taken, Paracetamol, Amoxicillin (not as an antibiotic), Zibido (street drug opioid), taken for pain relief of infected teeth or

swelling. (See reference material for Opioid Use Disorder on Burkina Faso region). ^{5,7,9}

December 28th, 24 patients encountered.

- **Patient encounter detail:**
 - 36 extractions mainly Lower left (Labeled LL in the data set), extractions with three individuals having 3 or more extractions. 1 individual with 7 extractions (older patient with multiple infections and decay from periodontitis), 2 individuals with 4 extractions and 3 patients with 3 extractions. Most of the patients with extractions suffer from periodontitis and decay (noted for long periods of time – see Misc. exp notes in the data set for onset and length of time enduring with no remedy). In some cases, the patient elected to have healthy teeth extracted with minor caries (salvageable), but beyond the patients' expense to have it fixed in the city. Patients with these types of indications had minor decay and were informed as such still elected to have the teeth removed, again due to cost and access to a dentist in the major cities (a distance and expense most could not afford).
- **Follow-up patients:**
 - 2 appointments from the previous day extractions, doctor to check on healing, Ibuprofen 800 limited issued to assist with recovery. No post op infections noted, and patients' general health was well maintained in recovery.
- **Age Range:**
 - for this group was 7-82 yo.
- **Blood Pressure:**
 - The entire group was within acceptable limits (normal, healthy), apart from 4 patients over the age of 50 had high or out of range BP (unhealthy -HTN Stage 1). 20 patients with acceptable BP below the age of 50 (healthy). Also noted for this set with many patients seen were dehydrated and lacking nutrition and proper hygiene.
- **See "Special Note" section in introduction:**
 - Street medicine taken, Paracetamol, Amoxicillin (issued local vendors not as a antibiotic but as a pain remedy), Zibido (street drug opioid) taken for pain relief of infected teeth or swelling. See ^{5,7,9}

December 29th, 17 patients encountered.

- **Patient encounter detail:**
 - 37 extractions, 10 patients with 2 or more, 1 patient with 7 extracted, 1 patient with 5, 1 patient with 4, 1 with 3 extractions, and 6 patients with 2 extracted. 1 patient FU – Follow-up (Amoxicillin and IB issued for infection and post recovery) 5 patients with #19 or #18 extracted, the remainder were upper or lower posterior molars apart from the individuals with more than two teeth removed. (Ref. to introduction section or Ref. ^{5,9})

- **Age range:** 22-77 yo.

- **Blood pressure:**
 - This group was within acceptable limits for the category ages with 4 patients with higher than normal and at risk for Stage 1 hypertension, kidney disorders, Type 1 and 2 Diabetes as well as other associated symptoms and lowered immune system.^{10,11,12}. (1 patient self-reported T2DM see ¹²).

- **See “Special Note” section in introduction:**
 - Street medicine taken, Paracetamol, Amoxicillin (not as an antibiotic), Zibido (street drug opioid) taken for pain relief of infected teeth or swelling. ^{5,7,9}

Overall summary for patients seen during this mission.

Patients’ onset with pain and occurrence of infection for tooth or teeth or other mouth infections ranged from 2-3months to 10 yrs., and in some cases a lifetime of pain and discomfort in dealing with the problems arising from infections, bacteria and periodontitis as previously reported. Special Note: Tolerancing of pain levels can have epigenetic implications for future generations through methylation of gene phenotypes of stressor adaptation that could have indication for tendency to develop cancer and other serious disorders. ^{10,11, 13,14} (See ^{13,14}, for immune health ref.)

12/52 patients had extractions with # 19 (23%), if including #18 extractions (11/52 = 21%), combined total of 44% of cases. Nearly half of the cases had extractions in the lower left region. This would indicate a pattern in association with the street medicine application to the posterior molars and further increasing decay due to lower the pH levels in the mouth with medication use and specially concentrated on the infected tooth or teeth decay.⁹ Further supportive studies would be needed in different regions/villages and interviews with local pharmacies or “magico” shaman village healers to conclude the methods and applications and associated attributions

of these specific teeth involved.⁷ This seems to have great implications for health education in the region on application of local pain medicine issuance and use.⁵

The larger concern is in the issuance and use of Amoxicillin as a pain medication and not as antibiotic previously mentioned. Improper prophylactic consumption of the medication as a pain remedy versus Amoxicillin medication used as an antibiotic's prescription for bacterial infections in subsequent, contiguous regiment for a finite period typically 7-10 days.^{6,7,8,9}

Many patients' blood pressures were considered healthy and within normal limits (considering they lacked food and water and were malnourished) at 76% of patients encountered. Conversely 23% were considered elevated or high blood pressure zones and as these patients are rated as such contributed by age related and or environment stressors, lack of nutrition, lack of clean water and additional economic factors.^{10,12}

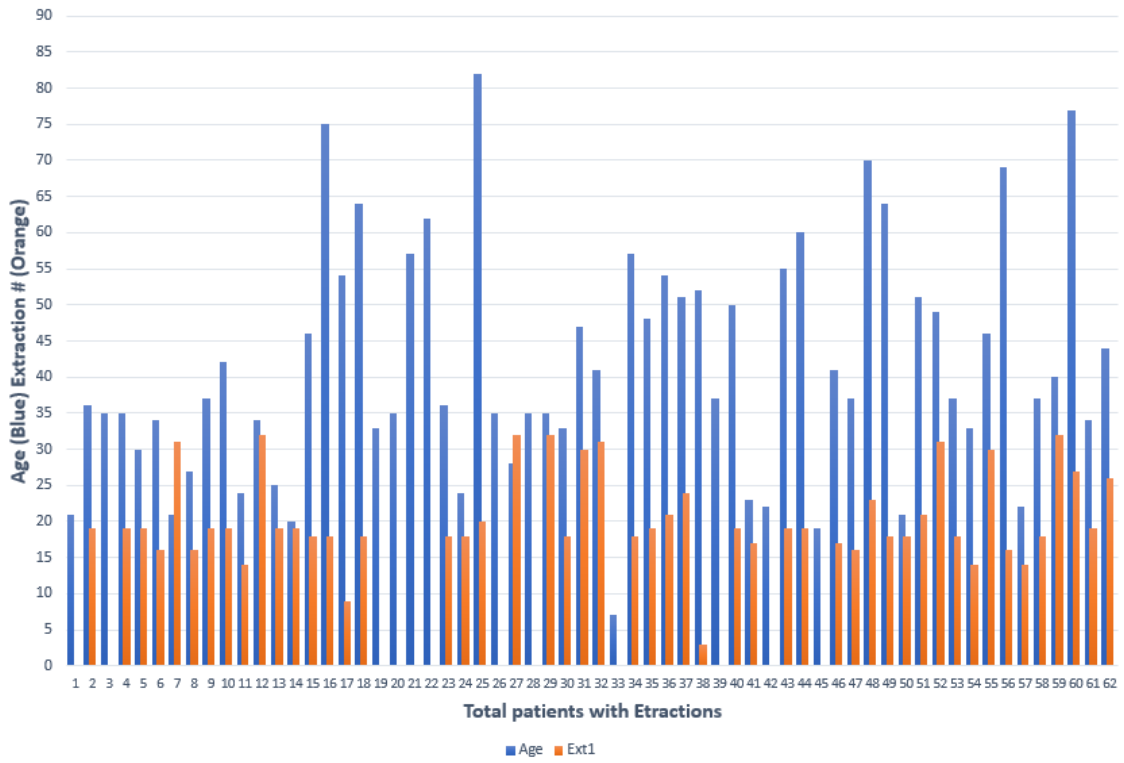
Post operative review (after the dental team and volunteers had departed and clinical visits had ended) and follow-up by local chapter represented for F.N.T.E (Pierre), reported contact with 10 patients and reporting satisfactory or above with no complications in recovery.

The collected objective data, based on these classified clinical visits corresponds to the larger didactic annotated bibliography and body of research previously surveyed for this region, sub-Saharan region Africa and specifically in Burkina Faso. This report serves as a small, related tangent with indications leading back to the referenced research and observations to connect with the larger didactic surveyed work. Established within the refenced text and the collected clinical data it is provided to help the reader and future researchers and clinicians to gain a better understanding as to the social-economic-health picture related to oral health for people of this region. The indicated pathology obviated by leading disease types such as oral infections, aggressive periodontitis, chronic periodontitis, hypertension, kidney disease, diabetes and miss use of prescription drugs, that can lead to more serious susceptibility for micro bacteria, viruses, fungi, and infections due to unsanitary conditions, malnutrition and lack of water and nutritional food.¹⁻¹⁴

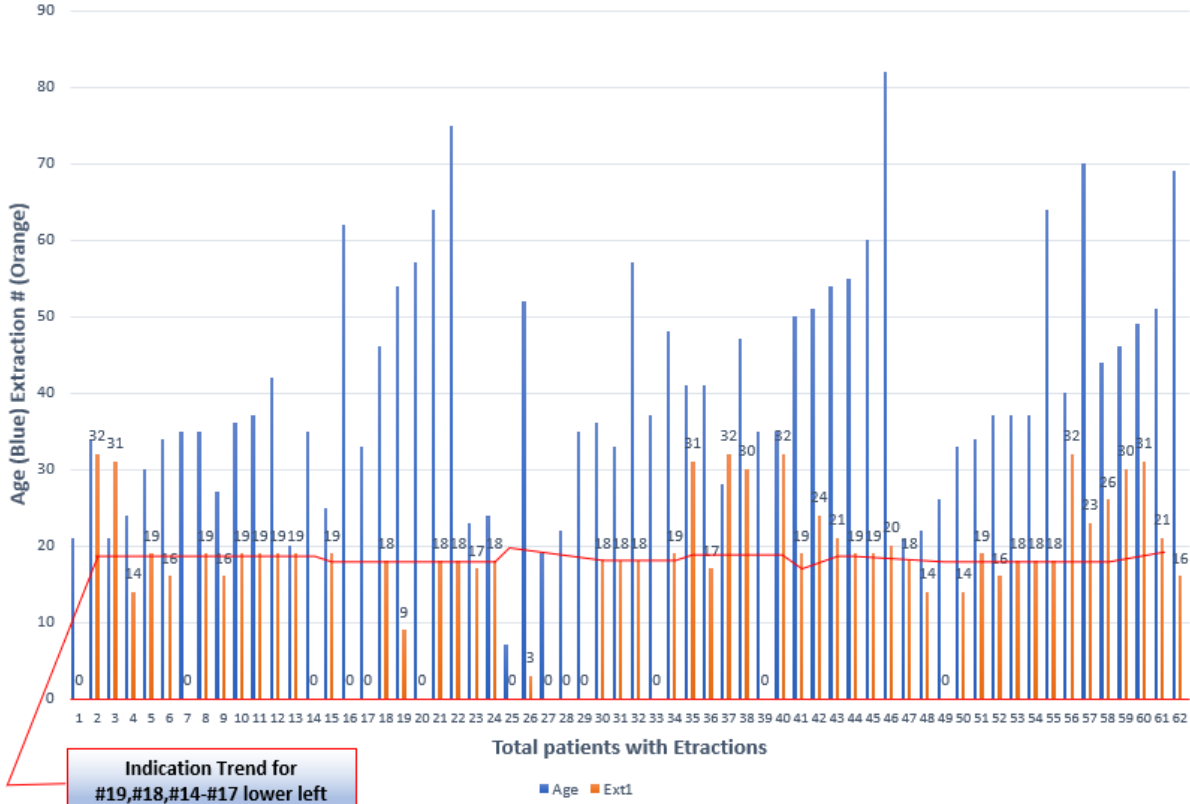
Supplemental references are provided (charts and data comp for this group of patients), for the purpose of the reader to gain insight as to the relationships of previous and recent studies. The intent is to add to the understanding and hopefully help better this region's healthcare status, as it relates to dental disorders and routine care and its importance for treatment and maintenance.

Appendix supplemental Charts

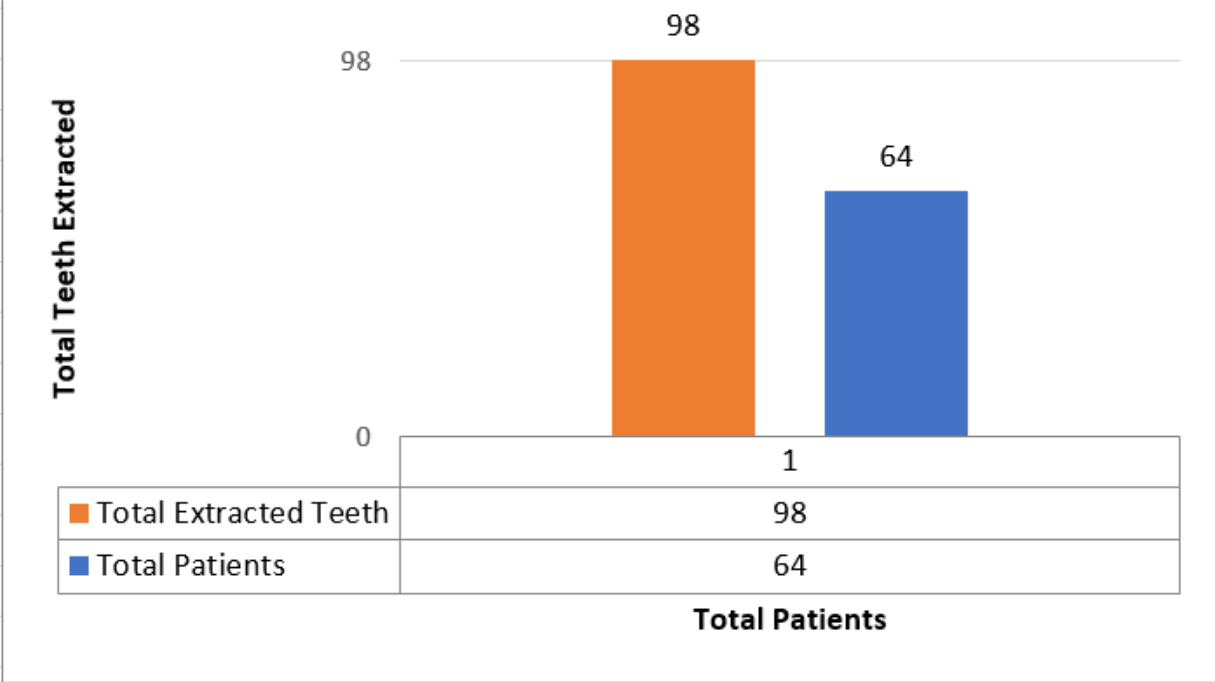
Age Vrs. Extractions (X)/Total number of Pateints with Extractions (Y)



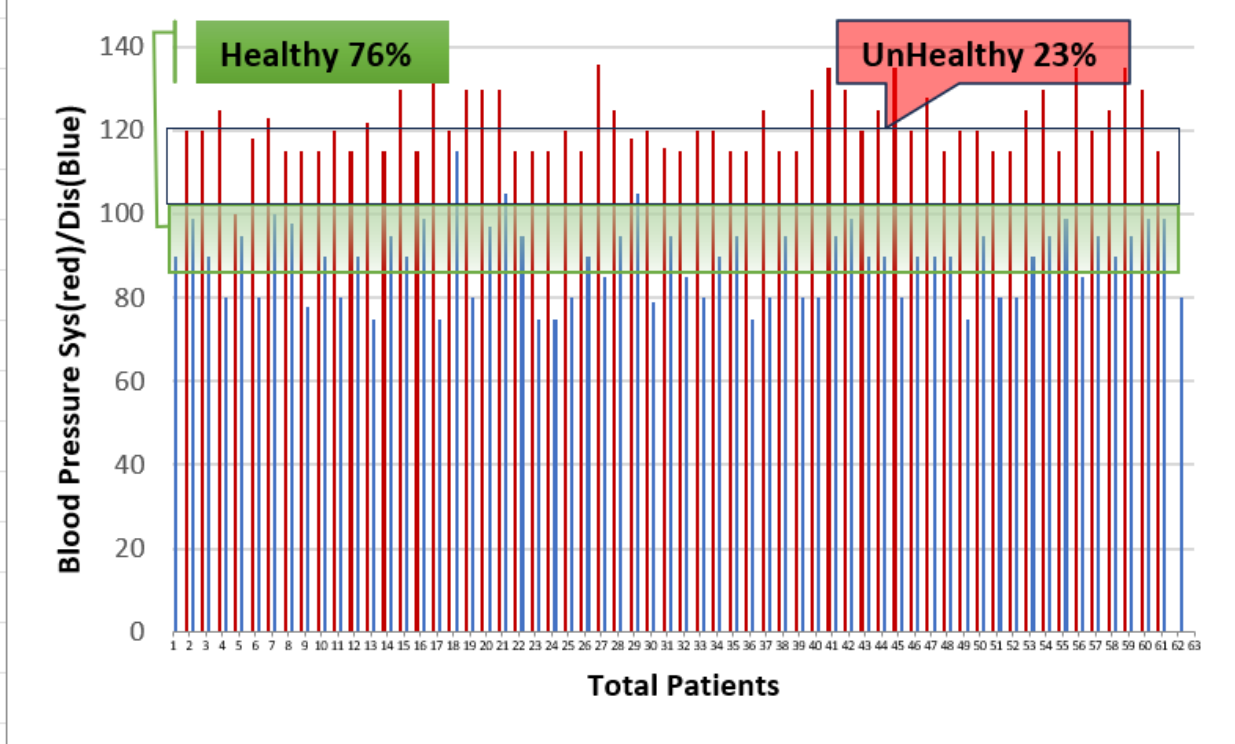
Age Vrs. Extractions (X)/Total number of Pateints with Extractions (Y)



Total Teeth Extracted Vrs Total Number of Patients



Blood Pressure Sys/Dia vs. Total Number of Patients



Annotated Bibliography

1. Yoshida, Akihiro et al. "Etiology of aggressive periodontitis in individuals of African descent." *The Japanese dental science review* vol. 57 (2021): 20-26.
doi:10.1016/j.jdsr.2020.12.001

Investigator in this case were looking at the total comprehensive etiology genetic predispositions using for Aggressive periodontitis (AgP), utilizing leukotoxins (LtxA) markers. It was noted that the most significant prevalence in was found in adolescents to be of African descent. The AgP has been linked to specific bacteria strains associated with familial aggregation. The markers indicated genetic predisposition among other factors for susceptibility to AgP. Lifestyle, diet, hormone levels may play a role in the onset of the AgP progression leading to chronic periodontitis. Eventually due to oral ulcers/infections as a condition of chronic periodontal disease, loss of all adult teeth.

2. Chikte, Usuf et al. "Periodontal Disease Status among Adults from South Africa- Prevalence and Effect of Smoking." *International journal of environmental research and public health* vol. 16,19 3662. 29 Sep. 2019, doi:10.3390/ijerph16193662

The indications in this report compared global meta-analysis of periodontal disease progression both male and females due to use of tobacco and associated complications, gingival bleeding, deep pocketing, and loss of attachment (of teeth). This report suggest that periodontal disease and smoking are a burden for this South African population and that cessation of smoking tobacco products should be a part of regular health public messaging as this plays a major role in health of the people as well as contributing to an overall morbidities and negative social-economic trends.

3. Paul, Jaishree. "Gastrointestinal Tract Infections." *Disease Causing Microbes*. Cham: Springer International Publishing, 2024. 149-215.

Acute dehydration and compromised immune systems as well as the elderly have comorbidities and mortality associated with the conditions. This report emphasizes the relationship of Both upper and lower alimentary tract infections. Upper alimentary tract infections involve oral bacteria, infections such as dental plaque, periodontitis/gingivitis. Viral diseases of the mouth, and salivary glands caused by herpes simplex virus, mumps virus. Infection of the stomach (lack of water and proper nutrition), that leads to serious complications in lower alimentary tract infections include microbes involved in food poisoning due to fecal-oral contamination. The organisms involved are bacteria, viruses, and fungal species, and other evolving species.

4. Srivastava, Vinay Kumar, et al. "Visually impaired population from low socioeconomic strata and their oral health status: an observational study." *J Clin Pediatr Dent* 48.1 (2024): 138-143.

This research was conducted to observe elderly with visual impairments and oral health status of a low social-economic strata. Individuals with acquired blindness are more likely to suffer from dental trauma than those with congenital blindness, so such individuals need to be properly trained in carrying out day-to-day activities.

5. Kurth, Ann E et al. "The Opioid Epidemic in Africa and Its Impact." *Current addiction reports* vol. 5,4 (2018): 428-453. doi:10.1007/s40429-018-0232-9

Opioid Use Disorder (OUD) is Epidemic and a worldwide issue. The purpose of this study was to demonstrate the rise of and shift of trends in Africa from production transportation to internal consumption. Contrasts within the study focusing on access to opioids for clinical pain management in Africa are least available. Patients choose opioid solution based on availability to resolve pain issues leading to drug addictions. Opioid misuse is common and education and counseling by healthcare workers availability remain in short supply. The date of publishing of this article countries in sub-Saharan Africa as well as many other nations remains the highest in HIV and HCV associated with OUD. Social and clinical cost remain as major driving impact factors in improving world social economic status. Evidence-based policies and health system resources are needed to promote OUD prevention and management and infectious disease transmission reduction.

6. Sawadogo, Abdallah, et al. "Knowledge, attitudes, and practices related to antibiotic use and antibiotic resistance among poultry farmers in urban and peri-urban areas of Ouagadougou, Burkina Faso." *Antibiotics* 12.1 (2023): 133.

This survey emphasizes the overuse of antibiotics in livestock is a public health concern, as it poses risks of antibiotic residues and antibiotic-resistant pathogens entering the food chains and infecting humans. The survey found that farmers lacked education in the antibiotic use and its application of such without seeking a veterinary prescription. Without rational consideration of the antibiotic use and in chickens. Antimicrobial Resistance (AMR) – is a world health challenge in educating livestock farmers about the spread of diseased livestock contamination and overuse of and illegal use of antibiotics to treat the infected livestock and infected food entering the human food chain leading to human AMR. Therefore, the objective of our study was to evaluate knowledge, attitudes, and practices of poultry farmers on the use of veterinary drugs with a focus on antibiotics in urban and peri-urban poultry farmers in Ouagadougou, Burkina Faso.

7. Valia, Daniel, et al. "Healthcare seeking outside healthcare facilities and antibiotic dispensing patterns in rural Burkina Faso: A mixed methods study." *Tropical Medicine & International Health* 28.5 (2023): 391-400.

Objective Optimizing antibiotic use is important to limit increasing antibiotic resistance. In rural Burkina Faso, over-the-counter dispensing of antibiotics in community pharmacies and non-licensed medicine retail outlets facilitates self-medication. Dispensing patterns and the extent of overuse were further investigated. Education about the subject matter was also investigated as to the general population's understanding within this region. Participants distinguished between natural and magico-religious illnesses, according to origins. For illnesses considered to be 'natural', healthcare was mainly sought at healthcare facilities, private pharmacies, and informal drug outlets. For illnesses considered as magico-religious, traditional healers were mainly visited. Antibiotics were perceived in the community as medicines like painkillers. The conclusion of the study supported the concept that Universal healthcare programs are warranted. A communal embrace of a patient-centered healthcare programs and universal access approach could reduce the improper use of antibiotics (through traditional methods of magico-religious affiliations and or traditional healer methods and casual dispensaries/vendors) and thus reduce possible antimicrobial resistance and insure proper healing of the patients in cases of infection control. Community-level antibiotic stewardship programs should include community pharmacies and informal vendors.

Participants continued to confuse their function with pain medication:

"Well, I will try! Antibiotics are medicines to fight against pain when wounded. (FGD, women 30–40 years, Poessi)"

"Amoxicillin can be used for joints pain, as well, when you get wounded you can take it orally as medication. (FGD, men 20–35 years, Nazoanga)"

8. Oldenburg, Catherine E et al. "Gut Resistome after Antibiotics among Children with Uncomplicated Severe Acute Malnutrition: A Randomized Controlled Trial." *The American journal of tropical medicine and hygiene* vol. 107,1 59-64. 13 Jun. 2022, doi:10.4269/ajtmh.22-0007

A broad-spectrum antibiotic, typically amoxicillin, is included in many country guidelines as part of the management of uncomplicated severe acute malnutrition (SAM) in children without overt clinical symptoms of infection. Alternative antibiotics may be beneficial for children with SAM. A randomized controlled trial of single dose azithromycin versus a 7-day course of amoxicillin for SAM. For the study Children 6–59 months of age with uncomplicated SAM were enrolled in Boromo District, Burkina Faso. Mixed evidence in the study suggested Antibiotic use selects for antibiotic resistance and

unnecessary antibiotic use as part of uncomplicated SAM management could be contributing to rising antibiotic resistance in regions where SAM is common. The study produced as a final result showing no evidence of a difference in the gut resistome among children with uncomplicated SAM receiving azithromycin compared with amoxicillin.

9. Rocha, Cristiane Tomaz, et al. "Erosive Effect of Analgesics on Primary Tooth Enamel-An in Vitro Study." *Pesquisa Brasileira em Odontopediatria e Clínica Integrada* 22 (2023): e210149.

Paracetamol used as a topic analgesic for pain management in primary teeth was studied as part of the focused research. The pH and the titratable acidity measurements of the medicines were performed in triplicate using a digital pH meter. Enamel slabs of primary teeth flat and polished were selected by initial surface microhardness analysis. The conclusion of evidenced showed the indeed the paracetamol demonstrated morphological changes in primary tooth enamel with lowered pH levels. Meaning that the tooth structure had changed and showed erosion.

10. Arisco, Nicholas J., et al. "The effect of extreme temperature and precipitation on cause-specific deaths in rural Burkina Faso: a longitudinal study." *The Lancet Planetary Health* 7.6 (2023): e478-e489.

Extreme weather is becoming more common due to climate change and threatens human health through climate-sensitive diseases, with very uneven effects around the globe. Low-income, rural populations in the Sahel region of west Africa are projected to be severely affected by climate change. Climate-sensitive disease burdens have been linked to weather conditions in areas of the Sahel, although comprehensive, disease-specific empirical evidence on these relationships is scarce. In this study, we aim to provide an analysis of the associations between weather conditions and cause-specific deaths over a 16-year period in Nouna, Burkina Faso. The results indicate a high burden of death related to extreme weather in the Sahel region of west Africa. This burden is likely to increase with climate change. Climate preparedness programs such as extreme weather alerts, passive cooling architecture, and rainwater drainage should be tested and implemented to prevent deaths from climate-sensitive diseases in vulnerable communities in Burkina Faso and the wider Sahel region.

11. Le Bec, Enora, et al. "Using Clinical Vignettes to Understand the Complexity of Diagnosing Type 1 Diabetes in Sub-Saharan Africa." *Research and Reports in Tropical Medicine* (2023): 111-120.

Lack of awareness, access to insulin and diabetes care can result in high levels of morbidity and mortality for children with type 1 diabetes (T1DM) in sub-Saharan Africa (SSA). Improvements in access to insulin and diabetes management have improved

outcomes in some settings. However, many people still present in diabetic ketoacidosis (DKA) in parallel to misdiagnosis of children with T1DM in contexts with high rates of communicable diseases.

12. ANJANA, RANJIT MOHAN, and RAJENDRA PRADEEPA. "CHAPTER THREE DIAGNOSIS, COMPLICATIONS AND MANAGEMENT OF HYPERTENSION IN THE GERIATRIC POPULATION IN DEVELOPING COUNTRIES." *Cardiovascular and Kidney Disease within the Geriatric Population in Developing Countries* (2023): 36.

Globally, hypertension (HTN) or raised blood pressure has emerged as a major medical and public health issue and is an important modifiable risk factor for all-cause morbidity and mortality¹. HTN is associated with cardiovascular disease (CVD) including coronary artery disease (CAD), heart failure, cerebrovascular disease, and chronic kidney disease (CKD). According to the World Health Organization (WHO), it is estimated that globally, 1.13 billion people have HTN, two-thirds of whom reside in low- and middle-income countries. The comprehensive comparative study found the greatest risk for HTN/High BP in low income developing countries to include South Asia and sub-Saharan Africa verse high income countries had comparatively lower or normal rates. Additionally notable, central and eastern Europe remained consistently high over the period's studied from 1975-2015 (comparative systolic/diastolic over years).

13. Tiffon, Céline. "The impact of nutrition and environmental epigenetics on human health and disease." *International journal of molecular sciences* 19.11 (2018): 3425.

Environmental epigenetics describes how environmental factors affect cellular epigenetics and, hence, human health. Epigenetic marks alter the spatial conformation of chromatin to regulate gene expression. Environmental factors with epigenetic effects include behaviors, nutrition, chemicals, and industrial pollutants. Epigenetic mechanisms are also implicated during development in utero and at the cellular level, so environmental exposures may harm the fetus by impairing the epigenome of the developing organism to modify disease risk later in life. Variations in gene expression are influenced by epigenetics, which depends on our life experiences and habits including nutrition, behavior, and environmental toxin exposures. Chronic environmental exposures are thought to be partly responsible for the increased rates of all cancers, not only for those directly exposed, but also for the fetus. The conclusion of this report shows that the main take-a-ways are transmission of epigenetic changes showing indications for cancer, and long-term multigenerational changes that impact immune health.

14. Trosko, James E. "Pre-natal Epigenetic influences on acute and chronic diseases later in life, such as cancer: Global health crises resulting from a collision of biological and

cultural evolution." *Preventive Nutrition and Food Science* 16.4 (2011): 394-407.

The underlying causes, leading to a global health crisis in both acute and chronic diseases, include finite global health care resources for sustained healthy human survival, the population explosion, increased environmental pollution, decreased clean air, water, food distribution, diminishing opportunities for human self-esteem, increased median life span, and the interconnection of infectious and chronic diseases. Aside from environmental toxins, exposures, stressors, and nutrition are not the main cause but are contributors to the primary cause via "epigenetic", or altered gene expression, modifications. A new concept, the Barker hypothesis, has emerged that indicates pre-natal maternal dietary exposures can now affect diseases later in life.

15. Loukas, Marios, et al. "The tori of the mouth and ear: a review." *Clinical Anatomy* 26.8 (2013): 953-960.

Although Tori anatomical, Torus mandibularis or a Torus, are common, it is often common thought that only genes contributed to the boney growths, the growths can grow in the mandibular bone or in the ear. Environmental and functional factors have been postulated that may account for a more complex etiology than simply genetics.

16. Ihunwo, Amadi O., and P. Phukubye. "The frequency and anatomical features of torus mandibularis in a Black South African population." *Homo* 57.4 (2006): 253-262.

This study was done to establish frequency of Torus mandibularis frequency and global comparisons. The study was published in 2006, since that time the environments have continued to evolve as well as population size and potentially more negative environmental factors exposure of the people in Africa that may cause the formation(s).

Author (Year)	Living sample	Number	Percent
Moorrees et al. (1952)	Western Aleuts	35	25.7
	Eastern Aleuts	44	61.4
Kolas et al. (1953)	USA whites	247	7.9
Summers (1968)	USA whites females	300	16.0
Mayhall et al. (1970)	Alaska Eskimos	86	20.0
Schaumann et al. (1970)	USA blacks	557	10.0
Mayhall and Mayhall (1972)	Canadian Eskimos	208	64.0
Alvesalo and Kari (1972)	Finns, Hailuoto	400	14.0
Axelsson and Hedegard, (1981)	Icelanders, children	976	27.0
Yaacob et al. (1983)	Chinese	600	1.0
Reichart et al. (1988)	Germans	1317	5.2
	Thai	947	9.2
Eggen and Natvig (1991)	North Norway	1181	12.7
	Inland Norway	829	27.5
Haugen (1992)	Norway	5000	7.3
Kerdpon and Sirirungrojying (1999)	Southern Thai	609	29.9
	Skeletal sample		
Hrdlička (1940)	Indians	2000	13.6
	American whites	766	6.1
	Negroes	53	11.3
Sawyer et al. (1979)	Precolumbian	1000	8.5
	Peruvians		
Sellevold (1980)	Norsemen	53	100.0
	Greenland Eskimos	93	100.0
Yaacob et al. (1983)	Indian	710	2.0
	Malaysian	1044	3.0
Rouas and Midy (1997)	South-western France	80	1.2
Sonnier et al. (1999)	Modern USA	74	33.8
	Blacks		
	Modern USA	254	24.8
	Whites		
	South African Populations		
Shaw (1931)	Bantu	132	0.0
de Villiers (1968)	South African Negros	648	0.0
Rightmire (1972)	Six South African tribes	287	0.0
Volchansky (1986)	White South Africans (Living)	436	16.0
Ihunwo and Phukubye ^b (2006)	Black South Africans	284	21.5

17. Isanaka, Sheila, et al. "Routine amoxicillin for uncomplicated severe acute malnutrition in children." *New England Journal of Medicine* 374.5 (2016): 444-453.

High-quality evidence supporting a community-based treatment protocol for children with severe acute malnutrition, including routine antibiotic use at admission to a nutritional treatment program, remains limited. In view of the costs and consequences of emerging resistance associated with routine antibiotic use, more evidence is required to support this practice. The study found no benefit of routine antibiotic use with respect to nutritional recovery from uncomplicated severe acute malnutrition in Niger (Studied area for USAM). In regions with adequate infrastructure for surveillance and management of complications, health care facilities could consider eliminating the

routine use of antibiotics in protocols for the treatment of uncomplicated severe acute malnutrition.

18. Williams, P., and James A. Berkley. "Severe Acute Malnutrition Update: Current Whoguidelines and the Whoessential Medicine List for Children." World Health Organization, Geneva, Switzerland (2016).

This document was prepared in response to a need to review and potentially update the current recommendations for the antibiotic treatment of both inpatient and outpatient management of severe acute malnutrition (SAM).

Condition	Recommendation	Evidence base ^a	Year updated
Uncomplicated SAM ⁴	Oral Amoxicillin Dosage and time frame not specified	Conditional recommendation, low quality evidence	2013
Complicated SAM ^{3,4}	IV Benzylpenicillin 50,000U/kg IM/IV every 6 hours for two days OR IV Ampicillin 50mg/kg IM/IV every 6 hours for two days THEN Oral Amoxicillin <u>25-40mg/kg/dose every 8 hours</u> for 5 days (total 7 day course) AND IV/IM Gentamicin 7.5mg/kg IM/IV once daily for 7 days	Weak recommendation, low quality evidence	2012
Complicated SAM ^{3,4}	*Oral Metronidazole 7.5 mg/kg every 8 h for 7 days may be given in addition to broad-spectrum antibiotics; however, the efficacy of this treatment has not been established in clinical trials".	None	2013

^a at the time of the recommendation

Table 1: Current WHO inpatient and outpatient management guidelines for SAM

