

Title: Preliminary Report: Community-based Reports of Co-Morbidity, Co-mortality, and Health-Seeking Behaviors in Four Monrovia Communities During the West African Ebola Epidemic

Authors: Sharon Abramowitz, Kristen McLean, Josephine Monger, Kodjo Tehoungue, Sarah McKune, Mosoka Fallah, Patricia Omidian

A. Introduction and Methodology:

The goal of this study was to collect local data on co-morbidity and co-mortality among urban Liberian populations at a time of highly restricted access to healthcare for both Ebola and other health issues. Particular attention was paid to how local communities defined their symptoms and sicknesses, the patterns of healthcare-seeking that they pursued in a context of highly restricted access, the types of treatment regimens that they deployed to support home-based care within their communities, and their perceptions of the causes of disease.

This study presents data on co-morbidity and co-mortality from 754 individuals in 555 households in the following Monrovia-area communities during the period September 29, 2014 - October 17, 2014: St. Paul's Bridge, Fendell, Gbangay Town, and Saye Town. These communities were selected to highlight the specific characteristics of each community: St. Paul's Bridge and Saye Town Communities are central Monrovia communities that were highly impacted by the spread of the Ebola virus; Gbangay Town community is a central Monrovia community that was not highly impacted by the epidemic, and Fendell is far from central Monrovia – approximately a forty-five minute drive north of the city. All communities shared the following characteristics: they consisted of one or several central slum areas with high concentrations of low-income residents and high poverty, and they had peripheral areas of urban, but more widely spaced middle class settlement patterns and household income levels.

Although random sampling was not possible under extant field research conditions, five research teams consisting of ten researchers¹ (one female, one male per team) systematically sampled households in the communities by engaging in the participatory rural appraisal (PRA) method of drawing multiple transects across the communities, and sampling households at regularly determined intervals as research teams walked along the predetermined transects. Research teams conducted interviews described by the PI as a “verbal autopsy” at each household regarding the symptoms, diagnoses, and healthcare seeking behaviors of sick individuals. No further information was requested of well individuals. Household members were compensated for their time with a nominal payment of \$5 US. (See appendix A for community and household interview frames). Researchers supplemented verbal reports collected through interviews with observations and reports from informal interviews in order to elaborate any non-response issues in a highly stigmatized context for Ebola-related research.

Data were summarized in research notes, and typed up and submitted to the team leader (Omidian) for aggregation and analysis. Data was then transmitted to the UF and Yale-based research group for coding and statistical analysis using SPSS v.21, and for reporting and write-up.

B. Limitations:

Several limitations pertain to the data and findings from this study. First, due to errors in data reporting, the data collected by Research Team 3 was discarded, reducing the initial sample of 922 individuals from 750 households to the aforementioned sample size of 754 individuals in 555 households. Second, the findings from this research study sites are based upon sites that were selected to meet pre-determined qualitative criteria, and no random sampling process was implemented. Therefore, findings cannot be generalized to the broader population. Third, the data on deaths from Ebola was unreliable. Officially, respondents reported nine deaths due to Ebola. But respondent comments and researcher notes suggested that respondents were under-reporting Ebola-related sickness. Fourth,

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there were several inconsistencies in data collection; particularly with regard to how recently an individual within a household had been sick, resulting in a high rate of missing data. The authors have decided to disregard such data to recurring methodological inconsistencies.

C. Findings:

C.1. Sample Characteristics:

Data on sex and age was only collected about individuals who had currently or recently experienced illness or had recently died. Of 754 individuals from four teams of researchers, 45.2% were male, and 54.8% were female. Among individuals who were reported as sick or having died, 26.9% were children under the age of 10; 10% were aged 11-20, 22.2% were 21-30, 12.8% were 31-40, 11.8% were 41-50, and 16.2% were over the age of 50.

C. 2. Mortality:

Data was collected during a period of epidemiologic shift in rates of Ebola reporting across Monrovia, and this shift was born out in our data. Among those who reported recent or current illness (n=599), approximately 10% (n=49) died in the period leading up to the study. In the first week of data collection, rates of mortality were particularly high in most affected communities like St. Paul’s Bridge, with deaths reported for 15% (n=41) of households questioned, with just 9 of those deaths attributed to Ebola. In the other communities studied, just three deaths was reported for Saye Town, and just two deaths were reported in Gbangay Town, with just one death in each of these locations attributed to Ebola. Qualitative data and informal interviews conducted by respondents indicate that two trends were taking place during the three weeks of data collection – individuals became increasingly shy of reporting household deaths in early October, and there appeared to be an empirical shift downwards in the total number of deaths.

There was only sufficient data from St. Paul’s Bridge to calculate the numbers of deaths in the preceding three months in the households studied. Out of 26 deaths, ten had died in the ten days leading up to the date the survey was taken. The remaining 16 deaths had occurred between 11-67 days prior to the research teams’ point of contact.

C.2.3. Burial Practices

Respondents shared information about the burial practices for 37 people who had died in or around their households in the preceding weeks and months. See table x.x, below.

Table 1: Burial Practices for Ebola Deaths

Burial Practice	N
Ebola task force/response team took the body	20
Body was buried at the ETU or at the hospital	9
Family buried the body	5
In house, awaiting burial team	1
Body was taken to the village	1
Ebola Response Team approved a normal burial	1
Total	37

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C.3. Co-Morbidity:

Of the 599 households who reported the past or current presence of sick individuals within their households, 53.8% (n=322) households reported at least one household member who was currently sick, and 31% (n=186) households reported having at least one household member who had recently been sick. Most people reporting sick family members identified their sicknesses as malaria, typhoid, hypertension/hypotension/stress, cold or flu, and typhoid. Just 14 cases, or 3.5% of the sample, identified their household members has having a diagnosis of Ebola.

Table 2: Local Diagnosis of Household Sickness

Self-Diagnosis (n=403)	Frequency	Percent
Malaria	148	36.2
Hypertension/Hypotension	37	9.2
Cold or Flu	29	7.2
Typhoid	24	6.0
Unknown	18	4.5
Ebola	14	3.5
Climactic Conditions (heat exposure, rain, pollution and dirt, mosquitos)	11	2.7
Cholera	5	1.2
Ulcer	9	2.2
Diabetes/Blood sugar	9	2.2
Asthma	9	2.2
Back or Body Pains, Rheumatism	8	2.0
Injury	8	2.0
Anxiety/Stress/Depression	7	1.7
Witchcraft	7	1.7
Complications due to pregnancy/childbirth	5	1.2
Stomach ache	5	1.2
Less than 1% - Chicken Pox, Cholera, Infection, Cough, diarrhea, epilepsy, fever, food, alcohol, or other poisoning, gas, hemorrhoid, headache, heart problem, hernia, jaundice, Infection or abscess, old age, open mole, parasites, pneumonia, stroke, toothache, Other, appendicitis		

The eight most frequently reported symptoms account for 72% of all reported symptoms. These include: headaches (13.7%), fever (13.5%), feeling cold (10.8%) bodily pain (9.1%) stomach issues (7.2%), hot skin, chills, and weakness (6.7%), weakness (5.8%), nausea and vomiting (5.3%) – all commonly known symptoms of Ebola, but also commonly recognized symptoms of malaria, cholera, the flu, typhoid, water-borne diarrheal diseases, parasites, and other endemic diseases.

Table 3: Most Frequently Reported Symptoms* (N=1281)

Symptoms	N	%
Headache	176	13.7
Fever	173	13.5
Cold	139	10.8
Body/Back/neck/Joint pains or burning	116	9.1
Stomach issues	92	7.2

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Hot Skin, Chills, and Sweats	86	6.7
Weakness	74	5.8
Vomiting or Nausea	68	5.3
*Less than 5% of cases reported: Appetite issues, Vision Problems, Nasal Drip/Stuffed Nose/Sneezing, Chest or Heart Issues, Coughing, Blood pressure problems, Dizziness, Breathing issues, Swelling, Itching or rash, Mouth sore, Halting, Urination Issues, Hurting teeth, Discrete Illnesses, Bitter mouth, Shaking/trembling/mouth twitch, Ear and hearing issues, Yellow eyes, Body drop, Convulsions, Pelvic pain/vaginal bleeding, Fainting, foaming at the mouth, Insomnia, Pain/burning of feet and palms, Cannot walk, Feeling sick, Feeling strange, Feeling sad/crying, Paralysis, Cannot talk, Pale face, Worrying, Dehydrated, Hiccough, Numbness, Restless, Hallucinating, Bleeding, Hoarse voice, Sore throat, Hemorrhoids, Low speech, Stroke related, Injury, Chewing the tongue		

Based upon these symptoms and many other illnesses and injuries, individuals made self-diagnoses of their ailments, and engaged in health-seeking behaviors. By far, the most commonly occurring first-time self-diagnosis that Monrovia populations are like to make is Malaria, with respondents (36.2%) nearly four times as likely to assume that they have malaria as any other illness. Following behind malaria, respondents had self-diagnosed themselves or their family/household members with hypertension or hypotension, typhoid, Ebola, cholera, diabetes, ulcers, depression and anxiety, and asthma. Liberians were also reported that they were suffering from feeling cold, low blood sugar, back and body pains, stomachache, injuries, and complications due to pregnancy and childbirth. Finally, when asked what the name of their illness was, respondents often cited an array of climactic and environmental conditions as the causes for their illnesses. These included heat exposure, excessive rain, dirt and pollution, and mosquitos, as well as spending too much time in the sun. While some people did report “traditional” complaints like symptoms caused by witchcraft and sorcery, or Open Mole, this only accounted for a small number of self-diagnoses.

C. 3.1. Variation by Community

There was notable variation in morbidity by community (see Table x.x), In Fendell, 62% of sampled households reported the present of 1-3 sick people, with 81 past or presently sick individuals identified. In Gbangay town, 87% of sampled households reported the present of 1-5 sick people, with 126 sick individuals identified. In Saye Town, 90% of households reported the present of 1-4 sick people, with 204 sick individuals identified. In St. Paul’s Bridge, 81% of sampled households reported the present of 1-6 sick people, with 574 sick individuals (see missing data issue noted in section B.1).

The Ebola crisis has resulted in the closure of many medical facilities. However, a finer-grained analysis of local illness experiences is required in order to illustrate how the local burden of disease is affecting illnesses and health-seeking behaviors in Ebola-affected populations.

C.4. Healthcare-Seeking Behaviors and Treatments Obtained

C.4.1. Healthcare-Seeking Behaviors:

The healthcare-seeking behaviors documented during this study were collected during a period of systemic collapse of the Liberian healthcare sector, resulting in the closure of many hospitals and clinics in Monrovia. This situation created a series of knock-on effects for healthcare seeking behaviors, reflected in table x.x, From table x.x, it is evident that most of the respondents who provided information about healthcare-seeking behaviors either avoided going to clinics and hospitals, or depended upon local drug vendors and medical experts in their local social networks as a “last-resort” for home-based healthcare. 40% of respondents sought medication at a pharmacy or drug vendor, while just 25% sought healthcare at a clinic or hospital. 9.2% called an Ebola team or took a sick person to an Ebola hospital or treatment center. Qualitative data from researchers related that many people in the communities they surveyed were afraid to go to the hospital or clinic because they feared that they would test positive for Ebola, and that they or their family would encounter stigma.

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These concerns were manifested through healthcare seeking behaviors. In addition to seeking medication for common ailments like malaria, diarrheal diseases, and hypertension through local drug vendors and pharmacies, many individuals sought doctors, general practitioners, nurses, and physicians assistants that they knew through their local or family networks (10.8%), who might be trusted with sensitive medical information. According to informants, it wasn't until home-based healthcare failed that sick individuals were taken to the hospitals and clinics that remained open across the city (see Appendix C).

Table 4: First Attempted Healthcare Seeking Behavior

Healthcare Seeking Behavior	%	N
Drug Vendor/Pharmacy	40.4	93
Hospital	20.0	46
Doctor/GP/Nurse/PA	7.8	18
Nothing	7.0	16
Called Ebola team	5.7	13
Clinic	4.8	11
Homecare	4.3	10
Ebola Hospital/ETU	3.5	8
Healthcare provider was in R's social network	3.0	7
Herbalists/traditional healers	1.7	4
Unknown or previously diagnosed	1.7	4
Total	100.0	230

C.4.2. Types of Treatments:

As the previous section indicated, drug vendors and pharmacies were the most highly pursued healthcare seeking behavior for our sample. To elaborate on this issue further, we asked all respondents what types of treatments they had sought for sick members of their household, and their responses were revealing. There was little gender difference in the kinds of treatments sought by men and women, but there was a clear preference in all four communities for first seeking treatment from local drug vendors, pharmacists over all other forms of treatment. (See Table x.x.), with between 65% and 87% of respondents seeking medications on the market. Furthermore, following the failure of an initial drug intervention, approximately one-quarter, or 27% of respondents returned to the market to try to find a different course of medication-driven treatment. (See appendix D for further elaboration).

Table 5: First Treatment Sought for Sick Member of Household

First Treatment Sought	N	%
Bought Medicine from drug vendor/Drugstore/Pharmacy	186	65.0%
Generic Treatment Purchased or obtained	61	21.3%
Nothing	13	4.5%
Traditional Medicine	9	3.1%
Clinic or Hospital	9	3.1%
Extraordinary Treatment (surgery, blood transfusion)	7	2.4%
Total	286	99.4%

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In short, Liberians are almost twenty times more likely to seek medication from pharmacists, drug vendors, and petty traders than they are likely to seek treatment from a clinic, a hospital, or even from a traditional healer. This data has substantial implications because it demonstrates beyond a doubt that Liberians accept Western medicine, especially pharmaceuticals. Liberians have a very modern and market-driven drug culture (Abramowitz 2010), and their attitude towards pharmaceutical consumption is not just accepting, it is aggressively capitalized. The long list of pharmaceuticals purchased by our respondents in Appendix D shows that Liberians living in urban areas and in urban and rural peripheries like Fendell have a high level of access to drug markets through market vendors, local pharmacies, and petty traders. Furthermore, local drug vendors are likely to be the first point of contact for individuals seeking to resolve a perceived critical healthcare issue.

The implications of this from an Ebola intervention perspective are important, because it suggests that an aggressive investment of resources to educate healthcare workers in local clinics and hospitals or traditional healers may carry less weight than an intervention through the marketplace to educate and network with the highly organized local and regional drug markets across Liberia (Peterson 2014, Patterson 2015).

Fear of Hospitals: A small subset of twenty respondents who had a sick person in their household related that they or their family member was afraid to go to the hospital.

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Appendix A: Interview Frame

Frame 1: Community Characteristics

Community Name:			
Total Estimated # of Households in Community			
Wealth/Poverty:	Slum	Mixed	Few Slums
Ebola Community Task Force	Present/Absent: If present, what are their tasks?		
Community Awareness of Ebola?	Present/Absent: If present, what are they doing to show they know about Ebola?		
Level of Distrust:	Presence of Fear/Stigma? Y/N	Examples from Community	
Research Team Notes:			

Frame 2: Household Characteristics

Number of people in household:
Number of people who are sick:
Number of people who were sick?
Number of deaths in household?
By sick/recently sick/deceased individual within household:
Cause of sickness?
Actions taken to address sickness?
Household diagnosis?
Outcomes? (Recovered, died, still sick?)
In case of death, how were bodies managed?
Research team notes:

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Appendix B: Symptoms as Reported by Respondents

Treatment Code	Qualitative Details
Sore body/Body pain or Burning/Joint Pain/Bone Pain	Body pain(s), sore in legs, constant pain, leg pain, pain in legs, leg cramps, muscle pain, pain in ankles, burning pain, body burning, back pain, chronic pain in back, upper back pain, pain in upper left body, lower back pain, joint pain, bone pain, pain in bones, joint and bone pain, neck pain, stiff neck, stiff neck with pain, pain in neck, pain behind neck, stretching veins in the neck, waist pain, pain around waist, pain in both sides of the waist, pain(s)
Stomach pain/Abdominal pain	Stomach pain(s), stomachache, severe stomach pain, abdominal pain, burning pain in stomach, chronic pain in stomach, burning stomach after eating, stomach burning, large stomach, sore in stomach, ulcer, stomach turning, upset stomach, stomach upset, bowel issues, dislocating bowels while using toilet, dysentery, diarrhea, running stomach, stomach running, toileting, passing watery stool, constipation, hardly uses the toilet, abdominal pain, gas in abdomen, belching, moving in stomach, 'I feel like it moving up and down and I suspect that it is gas'
Bitter tongue/mouth	Bitter tongue, bitter mouth, bitter feeling in mouth, bitterness in mouth
Bleeding	Bleeding, nose bleeds
Pelvic pain/vaginal bleeding	Bleeding from vagina, prolonged menses, sore between the legs, black fluid leaving the vagina
Blood pressure problems	High blood pressure, low blood pressure, blood pressure problems, low blood, blood low, pressure, pressure not normal
Vision problems	Blurred eyes, blurred vision, eye(s) (were) turning, eyes swinging, fluid leaking from eyes, leak fluid from eyes, eyes swinging when sitting or walking, eye dime, eyes get dim, eyes itching, burning in eyes
Breathing issues/Asthma	Breathing fast, fast breathing, can't breathe, asthma, difficulty breathing, shortness of breath, breathing
Chest and Heart Issues	Burning sensation in chest, chest burning, heart hurting, heart pain, pain in chest, chest pain(s), fast heartbeat, heart palpitations
Urination issues	Burning when peeing, difficult to urinate, urinating much, discolored urine, yellow urine, urinating a lot at night, concentrated urine
Lightheaded/Dizziness	Can fall off, dizziness, dizzy, brain swinging
Pain/burning of Feet/Palms	Burning under the feet, feet and palms burning, pain under feet
Cannot walk	Cannot walk, unable to walk, difficult to walk
Chewing of tongue	Chewing of tongue, sore in the tongue
Hot Skin, Chills and Sweats	Chills, chills and sweats, chill sweats, cold sweats, sweating, profuse sweating, shivering, hot skin, hot skin at night, hot skin at evening, hotness in body, skin feeling hot, burning skin, burning skin especially at night, skin hot, skin hot and cold
Headache	Headache, chronic headache, constant headache, severe headache, strong headache, pain in head, head pain, burning pain on forehead, cut on head
Cold	Feel(s) cold, feels cold in evening, feels chill, feels chill in evening and night, chronic cold, fresh cold, chest cold, feels very cold outside, cold in the bone
Weakness/Fatigue	Fatigue, weakness in body, weakness in entire body, feeling tired, feel weak, feel weak when walking, joint weakness, weak joints, weakness in joints, neck weakness, constant weakness, tiredness
Coughing	Cough, coughing, excessive coughing, coughing at night, dry cough, long coughing
Crying	Crying, cries at night
Yellow eyes	Deep yellow color of the eye, yellow eye, eyes yellow
Ear and Hearing issues	Ear halting, difficulty hearing, fluid from ear, ear pain, pain in both ears
Losing	Fainting, fall off

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consciousness/fainting	
Feeling strange	Feeling strange
Felt sick	Felt sick, he was sick, she was sick, feels miserable
Fever	Fever, high fever, fever at night, light fever, high temperature
Foaming at the mouth	Foam at the mouth, fume at mouth, foaming
Halting	Body halting, head halting, ear halting, heart halting, bone halting, gum halting
He had an accident	He had an accident
Hoarse voice	Hoarse voice
Hurting teeth	Hurting teeth, tooth halting, tooth ache, hole in teeth
Hemorrhoids	Intestine protruding from anus
Itching or Rash	Itching of body, skin itching, rash, skin rash(es)
Sore throat	Sore throat, knot in throat, throat pain
Appetite Issues	No appetite, loss (of) appetite, appetite loss, unable to eat, could not eat because of pain, refused to eat, does not eat, does not want to eat, hungry, feel(s) hungry, got hungry quickly
Low speech	Low speech
Mouth sore	Mouth sore, fever blister on mouth, fever blister, sore in the mouth, sore on mouth
Nasal drip/stuffed nose/ Sneezing	Nose clot, clot nose, nose running, fluid from nose, fluid leak(ing) from nose, running nose, sneezing, chronic sneezing, sinus
Nothing	Nothing, none
Paralysis	Can't move, paralyzed, legs paralyzed, paralysis
Stroke-related	Right hand stiff from stroke, stroke
Signs and symptoms of Ebola	Signs of Ebola, symptoms of Ebola
Swelling	Swelling job, swelling in hand, swollen legs, swollen face, swollen head
Can't talk	Unable to talk, can't talk, lost voice
Vomiting or Nausea	Vomiting, nausea, feels like vomiting
White/pale face	White/pale face, pale skin
Bitter feeling	Bitter feeling
High/Low blood sugar	High blood sugar, low blood sugar
Worrying	Worrying
Body drop	Body drop, weight loss, reduction in body weight, loss weight
Convulsions	Convulsions, jerking
Dehydrated	Dehydrated, always thirsty
Hiccough	Unstoppable hiccough
Insomnia	Sleepless night, difficulty sleeping
Other	Strange feelings, constant spitting, "while he also squeezes," skin, feeling sad
Numbness	Numbness
Thirsty	Thirsty
Discrete illnesses	Chronic infections, infections, typhoid, jaundice, malaria, worms in stomach
Restless	Difficult to sit
Shaking/Trembling/Mouth Twitch	Mouth twitch, shakes, shaking, trembling
Anxiety	External and internal stress, tension due to Ebola, tension from being around grandchildren
Hallucinating	Talking to self, hallucinations

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Appendix C: Healthcare Seeking Behaviors

Table 6: Healthcare-Seeking Behaviors

Healthcare Seeking Behavior	
Drug Vendor/Pharmacy	Bought medicines, drug vendor, pharmacy, drugstore, local medicine store, pharmacist, taken to pharmacy
Hospital	Bensenville Hospital, ELWA Hospital, JFK Hospital, Redemption Hospital, Renne Hospital, tests and x-rays
Doctor/GP/Nurse/PA	Doctor gave medicines for R to take at home, doctor, GP, health worker, family doctor, nurse, physician's assistant, routine doctor's checkup
Nothing	Left alone, nothing, none, no medication (financial constraints), rest
Called Ebola team	Ebola team, Ebola Response Team
Clinic	Carried to nearby clinic, Mahwah clinic, New Hope Clinic SPB, SAM Clinic (Fendell)
Homecare	Taken care of by: mother, niece, cousin, uncle, daughter; went to mother's home, took medicines at home, self-medicated with paracetamol
Ebola Hospital/ETU	Ebola center, Ebola treatment center, JFK ETU
Healthcare provider was in R's social network	Father is a nurse, daughter-in-law is a nurse, mother is a nurse, self-treated (a doctor)
Herbalists/traditional healers	Herbalist, traditional medicine, traditional treatment, Drinking herbs
Unknown or previously diagnosed	Previously diagnosed with a chronic infection but can't seek care due to ongoing crisis, diagnosed of typhoid before crisis
Total	

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Appendix D: Treatments Sought

Table 7: Qualitative Data on Treatments Sought

Treatment Code	Qualitative Details
Bought Medicine from drug vendor/drugstore /pharmacy	Aminofin, amoxicillin, amodiaquine, antacid, antibiotic, antusinate, artimeter, asthma pump, atenolol, b-complex, b-2, chloramphenicol, chloramphenamine, chloroquine, ciproflaxin, cough syrup, diclofenac, doxycycline, erythromycin, eye drops, ferrous, foliate acid, folic acid, gas syrup, glucose, levoflaxin, logma (antimalarial intravenous and tablets), metformin, metronidazole, multivitamin, glycogen, omeprazole, oral rehydration solution, pain killer tablet, paracetamol (PCM pills and syrup), quinine, reserpine, rifampin, salbutamol, seprine, spectrum, ventolin, vermoz (parasites), zantac
Generic treatment purchased or obtained	Medicines, generic treatment, unknown drug, pills from drugstore, ointment, mosquito net, medicines previously prescribed by doctor, medications given by hospital, malaria medicines, injection, drugs, drip (iv fluids)
Nothing	Nothing, rest, water, nothing due to financial reasons, no drugs due to financial problems
Traditional medicine	Dried rattlesnake, hair cutting, herbs, traditional medicine, traditional healing rubbing of cheeks, Nigerian rock, herbal treatment, herbal leaves, fruits
Clinic or hospital	Generic treatment at hospital, hospitalized, generic treatment at ETU, doctor treated him
Extraordinary treatment (surgery, blood transfusion)	Blood transfusion, blood tonic, prostate operation, surgery, operation, antibodies