East African Scholars Journal of Medical Sciences
Abbreviated Key Title: East African Scholars J Med Sci
ISSN: 2617-4421 (Print) & ISSN: 2617-7188 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-9 | Issue-8 | Aug-2026 | DOI: https://doi.org/10.36349/easms.2026.v09i08.002

Original Research Article

Perceived Etiologies Responsible for the Increase of Sickle Cell Anemia in Biyem Assi Health District- Centre Region, Cameroon

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Article History
Received: 22.05.2026
Accepted: 09.07.2026
Published: 06.08.2026

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Objective*:** The main objective is to elaborate on the cultural representation and etiological factors responsible for the prevalence of sickle cell anaemia in Yaounde. ***Methods*:** The study design used was qualitative during field work. Data collection techniques used were: Direct observation, in-depth interviews, life histories, case studies, focus group discussions and, documentary research. Content and thematic data analyses were used analyse data collected from the field. Moreover, theories like cultural dynamism, explanatory model and cultural interpretive theories were used. ***Results*:** Our findings revealed that, so many people in Biyem Assi District, are not aware of SCA and they are living in ignorance. They are not interested or do not bother to know their blood genotypes, blood groups and talk less of trying to know the origin of SCA. Most of the time, out of ignorance and unawareness of the disease when their children suffer from it and are diagnosed in the hospital that is when they get to know more about the disease. Moreover, some of the etiological factors responsible for the prevalence of SCA in Yaounde are: ignorance, lack of knowledge, lack of sensitization, endogamous marriages, informal marriages, failure to carry out electrophoresis test before child bearing and marriage, environmental factors, unwanted pregnancies, and incompatibility of couples. ***Discussion*:** Prince (2019) explained that, Sickle cell Anemia (SCA) is a disease or it is a group of blood disorder typically inherited from both parents, mother and father. It also occurs when a person inherits two abnormal copies of the hemoglobin gene, one from each parent. It has been scientifically proven that this gene occurs in chromosome. Based on the data collected from the field and the works of other authors who carried out research in similar domain, Sickle Cell Anemia is a disease which is inherited from both parents who carry the same Sickle Cell traits in them. They bear children who suffer from the disease. ***Conclusion*:** Emerging themes which came up during data analysis were; biomedical significance of SCA: transgenerational disease. There was equally the presentation of the Symptoms of the disease was divided into two group: the internal and external symptoms. By so doing, the etiological factors responsible for the increase prevalence of SCA in the community includes: endogamous marriage, lack of diagnosis of fetus, lack of the practice of modern methods of procreation, selfishness of couples, cost of electrophorese test, failure to carry out electrophoresis test before marriage.

Keywords: Sickle Cell Anemia, Cultural Representation, Treatment, Experiences, Living, Etiology.

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INTRODUCTION

This article describes the perceived etiologies responsible for the increase of SCA in Biyem Assi Health District of Yaounde. According to the Center for Disease Control (2023), sickle cell anemia is biomedically defined as an inherited disease in which the body produces the small block red blood vessels which lead to anaemia (low number of red blood cells); the red blood hemoglobin's, cells disorders that affects the red blood cells, producing a negative impact on the health of patients, have an abnormal, which are usually in the crescent shape like sickles. SCA is a genetic disease which is caused by one or more genes not working correctly, (Genetic and Rare Diseases Information Centre, 2023). It therefore shows that to an extent, there is good acceptable demarcation of the definition of SCA in the communities. SCA is said to be a transgenerational disease, inherited from both parents. This means that father is AS + mother AS = child will obviously be SS or AS. That is the mother and the father are carriers of the SCA genes. In SCA, the hemoglobin is not normal and cannot pass normally through the red blood vessels. SCA affects millions of people throughout the world particularly common among those whose ancestors came from Sub-Saharan Africa; Results show how environmental factors and African ancestry have a role to play in the health of SCA, (Mudhar *et al.,* 2021).

The manifestation of the disease are shortage of blood and bone marrow pains, regular crises, swollen stomach, severe anemia, severe bone marrow problems, and pains in the joints, swollen stomach and yellow eyes. Biomedically, SCA comes from internal and external forces which affects the patients' state of health. These includes; incompatibility of couples, refusal to do electrophorese test, endogamous marriages, a disease inherited from both parents having the sickle cell anemic genes, environmental factors of African Identity, lack of community outreach (community sensitization and educative talks), ignorance, negligence, cost of electrophorese test etc. Members of the community are not educated and sensitized on the causes, consequences and implications of the disease. Much has not been done to educate youths in churches, schools, communities etc. Medical personnel explained that, much attention, financial and material resources are put on HIV/AIDS, tuberculosis, STD's and COVID-19 pandemic health programs. A few members of the community are knowledgeable about the definition of SCA because they have friends, relatives, neighbors and children experiencing this disease. While, others do not know anything about it. A lot of sensitization and educative talk is carried out during days of campaigns and international day of SCA which takes place once a year in Cameroon and Worldwide on the 19th June.

METHODS

Our study took place in Yaoundé, precisely in the Biyem-Assi Health District located in the Center Region in Cameroon. Study periods was from 2016 until 2025, consecrated to the collection of baseline data with patients (men, women, young boys and young girls); medical personnel (nurses, medical doctors (specialists), medical doctors' generalists, laboratory technicians and health information recorders, traditional healers, drug vendors, members of the community and Family member. Concerning spiritual healing, pastors, Priest, exorcist and spiritualist. FGDs took place with women in the health facilities in communities. People from different cultural backgrounds (Bassa, Bulu, Beti, Maka, Fulbes, kom, Bamouns, Bafang, Bayangui, Ewondo, Bafut, etc.) took part in the research in Yaounde.

Literature review permitted to collect the secondary data in the libraries, health magazines, journals, articles, books, participation in seminars, conference preceding, and workshop reports. About the primary data, field work procedure consisted in identifying informants and participants of FGD on the field who were informed about the purpose of the research study. Data were collected through qualitative techniques such as: in-depth interviews, life histories and case studies of some particular patients. An interview guides contained open-ended questions which permitted participants to give their opinion. The language procedure permitted to easily communicate both orally and through writing with those on the field in English language, Pidgin English, French and other mother tongues which were translated into English during transcription. Nvivo software was used for qualitative data management, analysis and interpretation. Citations of informants which had deep meanings were included in the sub themes and themes of the research. Based on the use of anthropological concepts, data interpretation was done with the use Cultural interpretive theory in medical anthropology to elaborate on the cultural representation of SCA, symbolic meaning of SCA in different cultures, taxonomy of SCA and etiological factors responsible for the prevalence of the disease. Since this research took place among people of different ethnic groups and cultural backgrounds in Yaoundé, there are a number of special ethical considerations which were taken note of before the work started. Furthermore, informants and participants of FGD in Yaounde, each signed on the informed consent form meaning that they have given their consent to participate in the research. Informants were protected, that is; by not revealing their identity while using citations for data analysis and interpretation. Rather, pseudonyms were used for the citations of informants. Consequently, we insisted on the fact that we are simply students from the University of Yaoundé I, doing a Ph.D research in Medical Anthropology and it is purely for academic purpose.

RESULTS

According to Young (1983), there are naturalistic factors which are held responsible for the increase spread of a disease. These are never intentional; the disease could be caused by environmental factors

like: heat, dryness, rain, exposure to sunlight, organic causes which could be referred to disequilibrium of constitutive elements in the human body.

Perceived Etiologies Responsible for the Increase of SCA in Biyem Assi Health District

The term "*etiology*" means the science of causes; from a scientific perspective all disease must have a cause. Taylor (1871) defines culture as that *"complex whole which includes: knowledge, belief, arts, morals, laws, customs, traditions, and other capabilities and habits acquired by man as member of the society.*" In this article, there are cultural behaviors like; beliefs, customs, habits, endogamous and informal marriages, incompatibility of couples, cost of electrophorese test, selfishness of couples, ignorance, negligence, distrust of biomedicine, lack of community sensitization and educative talks, cultural perception and refusals to do test of compatibility which are the etiological factors responsible of increasing prevalence of SCA.

Environment Factors and African Ancestry identity

In the United States, most people who have Sickle Cell disease are of the African Ancestry or identify themselves as blacks. About 1 in every 365 Black African-American babies are born with SCA, (National Heart, Lung and Blood Institute mentioned, 2022). It is a chronic hereditary disease in which many of the red blood cells become rigid in sickle cell or crescent shapes and clog the capillaries. Environmental factors have a role to play in the health of patients.

Findings obtained from the life histories of patients; the genealogical description of family linage has enormously contributed to the high prevalence of SCA. Environmental, climate factors and African ancestry identity are the reasons for the increasing prevalence of SCA. "*We have ancestors who are of the black race and have Sickle cell gene in them. This has enormously led to the high prevalence of SCA in Cameroon as compared to European and American Continents because it is located on the Tropic of Capricorn in Africa where there are a lot of tropical disease (SCA, malaria, yellow fever, and other)".* It is partly because Africans are of the black race and predisposed to this non-communicable disease. This disease has been difficult to eradicate because of our origin and cultural roots. Moreso, blacks are living where there is the high prevalence of tropical diseases like: malaria, onchocerciasis, yellow fever, river blindness, sleeping sickness, leprosy and Sickle Cell Anemia which is most prevalent.

Lack of Community Sensitization and Educative Talks

One of the perceived etiologies of SCA is: lack of community sensitization and educative talks with the younger generation on the causes, consequences and implications of the disease. Not much sensitization and educative talks are carried out in the community and on social medias platforms (Facebook, you tube, internet, WhatsApp groups, SMS through orange and MTN mobile network), telecommunication (radio stations, Television stations, newspapers, magazines, etc.). A lot of sensitization and educative talks is carried out during days of campaigns and international day of SCA which takes place once a year in Cameroon and Worldwide on the 19th June. Much has not been done to educate youths in schools and in the communities etc. This informant explained that, "*People are not educated on the fact that an AS cannot marry another person who is AS. Little is being done so that this disease is not spread in the community*". (FGD with medical personnels, Biyem Assi, 4/10/2021). Little educative talks are carried out in the community about prevention and the importance of knowing their partners blood genotype before engaging into any serious relationship.

Also, medical personnels explained that, "*Much attention, financial and material resources are put on HIV/AIDS, tuberculosis, STDs and COVID-19 pandemic health programs. They considered these programs to be more important than SCA which is a neglected tropical disease"*. (Interview with informant, Biyem Assi, 12/04/2017). Other health programs are prioritized in the domain of sensitization and educative talks. Meanwhile, SCA is considered to be a neglected tropical disease. A lot of awareness is done on the world SCA day 19th June of each year. Due to that, so many youths and adults are not aware about the existence of the disease and its devastating effects on the health of patients in the community. Emphasizing on this, Informant said: "*There is the problem of lack of community outreach with children, adolescents, youths and adults. They are not aware of the disease and the far-reaching consequences on their family and young girls do not border to know their partners blood genotype before getting pregnant. They do the test because they want to fulfill the formalities of the church and to satisfy the pastor".* (FGD with medical personnel 50, Biyem Assi, 23/03/2022).

This means that, adolescents, youths, and adults are not told of the importance of operating the right combination in terms of compatibility and blood genotype before getting married or uncontrolled pregnancies. This has had far reaching consequences on members of the community, and it has greatly contributed to the increase of SCA. These are from the declaration of informant 45: "*If there was serious sensitization and health talks like how they are doing for HIV/AIDS and sexually transmissible diseases, I think the prevalence rate would have drastically dropped just like that of HIV/AIDS and COVID-19 pandemic which has dropped. So many people are not aware of SCA, they are ignorantly getting married and bearing children without doing the required test before marriage. The younger generation are not sensitized on the need for them to do electrophorese test before marriage and before thinking of having children. Sensitization is not properly done as required on social Medias and in the*

community. (Interview with informants, Etoug-Ebe, 13/11/2021).

This declaration means that, one of the etiological factors which has contributed to increase of SCA in the community is, insufficient community sensitization and educative talks in the communities. There is lack of sensitization and educative talks in the primary schools, secondary schools and Universities. In most churches, religious leaders are very strict towards this disease. They always insist on the need for each member of the congregation who planned to get married to do electrophorese and knowing their blood group before marriage. Otherwise, it is impossible for them to get married.

Unawareness and Ignorance about the Existence of SCA

From the studies previously carried out by Sultant *et al.,* (2020), the level of awareness of sickle cell anemia among the Riyadh in Saudi Arabia was low. It was discovered that, only a third of people surveyed knew the mode of transmission of AIDS, and half could not describe any symptoms of the disease. This equally applies to that of lack of sufficient education of SCA in the communities as result of that, people were ignorant about the existence of the disease.

According to the National Center for Biotechnology Information (2018) closed to forty-four-point two percent (44.2%) of respondence do not know the cause of SCA due to ignorance. More than fifty percent (50%) of informants interviewed never knew how the disease is diagnosed. They never knew the chances of having unhealthy babies when both parents are carriers of the SCA genes. This study has consistently demonstrated a significant lack of awareness regarding the difference between the disease and trait status and the trait status increases the chance of having a child with the disease. Since some people do not know their health status, for those who are carriers of the disease (AS), they often have mild symptoms of the disease but due to ignorance and lack of going to the hospital they prefer to live on auto medication. It is only when they discovered that they are AS or SS that is when they become interested in knowing more about the disease. For some informants, it is only after they had put to birth that their children were diagnose of having SCA. After this incident occurred that is when they became aware because they do not read about the disease, they do not listen to health programs on social Medias: SOS Doctors, every Saturday morning on the CRTV and educative health programs on other TV and radio channels.

They spend their time watching films, documentaries, and listening non educative programs. Informant explained. Bekolo (2017) realized that out of ignorance and unawareness about the effects of SCA, some people never knew what the test consisted of and they never saw the need of doing the test. So many had limited ideas of inheriting the disease from both parents who had same blood genotype and probably the risk of giving birth SCA children if both of them are carries of the sickle cell anemic genes. "*I for instance did not have any information on the importance of doing electrophoreses before getting pregnant. Many people were not aware of doing this particular medical examination to know their blood group and blood genotype. I am ignorant about the existence disease because, I have never heard of such a disease in the past. I do not have an idea of how this disease is called in my mother tongue. It is only today, that you are talking that I am even aware of it. The only disease I know much about is HIV/AIDS and other sexually transmitted diseases. It is partly because it is rampant and I know people living with it. Most of my family members are not very much aware of this disease you are talking about".*

People are not aware of the importance of knowing their blood group and gynotype, electrophorese test before marriage and pregnancy. They do not know what SCA is all about, the causes and consequences of SCA on the human health. In addition to that; it is the day we interviewed them that they became aware of the disease. It was common to hear some of them complain. On the contrary, people are aware of diseases like HIV/AIDS and STDs. They are still living in ignorance. Most of the time when sensitization and educational campaigns are organized in the community, not everybody is aware of it, but very few people. Informant explained that: *"It is only when I discovered that my child or a family member was diagnosed of SCA that is when I became informed of the disease. It is from then hence forth; I became very interested in reading documents about the disease.* (FGD with SCA Association, Melen, 11/11/2024). They had these children because of Lack of information about the existence of the disease. Health personnel told us that, "*I for instance did not have any information on the importance of doing electrophoreses before getting married and pregnant, they were not aware of doing some medical examinations to know their blood group and blood genotype".* For that reason, so many people never did electrophorese test before getting married and pregnant. They were very surprised to hear about SCA. They only became aware of SCA when they got pregnant and they were told about the disease in the hospital.

Endogamous Mariages

It shows that, endogamous marriages and attachments to cultural ties has contributed to the increase prevalence of SCA in the communities. Informants explained in this context of the study that, "*endogamous marriages can be explained to be one of the leading factors which has enormously contributed to the high prevalence of SCA*". As explained, marriage within the same ethnic group has led to the birth of many children infected with SCA. In reaction to this, informant said, "*I am a victim of endogamous marriage; my parents forced me to get married to my paternal cousin. We never*

did any blood test to know our blood genotype, blood group and electrophorese test before marriage. Unfortunately for us one of my children has SCA and the rest are carriers of the disease. It is with time we became aware of the consequences of carrying out endogamous marriage without doing blood test". Those within the Biraderi community in Pakistan, majority of marriages are consanguineous and the prevalence varies. It is ranging over 80% to under 60%. In consanguineous unions, first coursing marriages account for 50% in five of the fifteen Biraderi and 40% in six others. Within this marriage and consanguinity, it enhances genetic stratification, thereby increasing rates of genomic homozygosity and the increased expression of recessive genetic disorders, (Neil *et al.,* 2017).

Endogamous marriages have far reached consequences on the health of children. This has led to congenital abnormalities, disabilities and many clinical conditions, often drawing attention to ethnic variations and an increased disease prevalence in the UK on Pakistani children. Sometimes, this endogamous marriage occurs because of cultural belief which forbids families, natives and clans of that given culture from getting married to an outsider who is not of that tribe, (Corry and Hum, 2014). In populations where consanguineous marriage is widely practiced, recessive genetic disorders will continue to gain greater prominence in overall spectrum of ill-health. Endogamic marriage is more within a specific group as required by customs or laws of an ethnic group. Marriage outside one's group may be forbidden or they might likely be a tendency to marry within the group. It is a characteristic of aristocracies, religious and ethnic minorities in industrialized societies. It is also of the caste system in India and class-conscious non-literate societies such as the Masai of Eastern Africa. When people from the same tribe, family/linage, coming from a common cultural background or ethnic group decide to get married among themselves without carrying out any electrophorese test, and blood genotype test; most of the time, they end up having children suffering from SCA and other diseases, (Bittles and Genet, 2002).

This initial perception, proved that endogamous marriages in most cultures have greatly contributed to the prevalence of parents bearing Sickle Cell Anemic patients. It is only when they started bearing children, they realized that one of their children was suffering from SCA and the rest were carriers of the SCA gene. That is when they became aware about the existence of the disease. After counseling by the clinical psychologist and Medical Doctor, they became aware of the consequences of endogamous marriages. Informant elaborating on this said, "*Endogamous marriages and attachment to cultural ties of getting married only to your tribe girl or boy and relatives has enormously led to the high prevalence of SCA. For example, in the Northern culture, people get married to their relatives forgetting that, there might be far reaching consequences. Parents either force the boy or the girl to get married to a particular individual. I know of so many couples who did this type of marriage and today they are facing the consequences of having SCA children. I know of some couples who got married without carrying out any blood test or blood genotype test, and they bore children living with SCA.*

Most endogamous marriages occur because of attachments to cultural ties as a result of the use of force by parents for a girl to get married to a boy of a particular family or same tribe. Most of the time, electrophorese tests are not done by couples and consequently they bear sick children. There are still villages which practice endogamous marriages.

Incompatibility of Couples

Another aspect which came up was that of incompatibility of couples who gave birth to Sickle Cell Anemic children. Generally, when couples have same blood genotype, that is both of them are AS or carriers of the sickle cell trait they are not supposed to get married or not to think of having children because there are high chances of them having sick children which might become a burned to them. Some of the times couples are aware about the existence of SCA and they know very well that they are not compatible, but they stubbornly get married. This usually occurs when couples are so much blinded by love, and they go ahead to get married ignoring the consequences of having sick children. Below is the presentation of a medical personnel, "*Many couples have done the electrophorese test, they discovered that, they were both AS. They know very well that they are not compatible. But because of so much Love for each and they decide to take the risk of getting married and they end up having sick children who become a burden to them. There are so many registered cases of couples who are carriers of the SCA gene having sickle cell children."*

Most couples who are carriers of the Sickle Cell gene end up having children infected with the disease. Some are aware of their blood genotype but they decide to take risk. Sick come as a result of both the man and woman are not compatible and refusal to listen to counsel. A man who is AS, Female AS= Child SS (SCA) or man/woman AS + woman/man SS= child SS/AS. Meaning, when both the woman and man are carriers of the sickle cell gene, they child will likely be sick. They are likely to bear children who are SS (sickle cell anemic patients). This etiological factor of incompatibility of couples is responsible for the high prevalence of SCA in Yaoundé VI.

Marriage Without Electrophorese Test

One of the leading factors responsible for the prevalence of SCA is Marriage without carrying out any electrophorese test. Informant says, "*If partners find out that, they are both carriers of the sickle gene it would not be easy for them to separate after being used to each*

other. And so, for that reason many partners prefer to take the risk of not doing the electrophorese test and they marry". They never bothered to do any electrophorese test before engaging into marriage. In some cultural settings people organize wedding ceremonies without the couple conducting some blood test. Couples just go ahead engaging themselves. They may discover it when it is already too late. Some of the time these couples might be accused of being the cause behind their children poor health conditions. Electrophorese test is not done by partners before marriage and before planning to get pregnant. This is because they do not see any need doing the test and they are not interested in knowing their blood genotype. Therefore, it could be concluded from the works of other researchers and field work carried out in Biyem Assi that; the etiological factors of SCA are: marriage without electrophorese test are responsible for the increase of the disease.

Cost of Electrophoreses Test

Youths, adolescents, adults, those engages and other members of the community who do not know their blood genotype and were interested in doing the test complained of the price. It is really a very big problem for those people who are from very poor family backgrounds. Some of them do not have the financial means to do some of these blood genotype tests because prices range from 10,000 to 15,000 frs Cfa and it depends on some of the hospitals. They suggested that, subventions should be done so that everybody should do this test before getting married or planning to have children.

On the other hand, informants complained that, HIV/AIDS test and other tests are by far cheaper than that of electrophorese test and now a days this test is done free of charge on patients. They said, electrophorese test should be done on them free of charge so that everybody in the community knows their genotype. They suggested that, the Cameroon Government should try to reduce the cost of electrophorese test by; relooking into price and giving affordable prices so that people know their blood genotype so as to prevent the spread of the disease. Based on their opinions of the price for carrying out electrophorese test in the hospital, it is only those who are financially viable and those from the average class who can afford money to do this test. By reexamine the price and making it affordable for people to do the test and to avoid having sickle cell anemic children, it will be of great help. For instance, a message presented by an informant could be read as: "*Paying for this blood genotype tests is very costly for some of us. But as it is said, prevention is better than cure. This test is expensive, subventions should be done so that those who do not have money can afford to do the test. Many of us do not have that financial means to do this test before marriage Those living in the rural areas are very poor, they cannot afford money to do the test because of the price. So, the prices for the test should be relooked into by the government because if people are aware of the devastating effects of SCA, almost everybody will be willing to know their blood genotype and blood group before engaging into any serious relationships".*

They believe that children are given by God who can take them anytime. However, due to the cost of carrying out electrophorese test, people residing in the rural area and those from poor backgrounds lack the means to do this test. But if the government relooks into the cost so many people will want to do the test because of the devastating effects of the disease in the community.

Selfishness of Couples/Greed

According to the exchanges with informants, it was very evident that most of the time, some couples are aware of their blood genotypes but due to selfishness they prefer to get married and they take the risk of bearing SCA children. This usually occurs when couples are very selfish and they completely refuse to separate. An informant interviewed said, "*Before my cousin got married to his wife, both of them knew very well that they were carriers. The husband AS and Wife AS, but out of selfishness or love I do not know what else to say, they decided to take the risk of getting married. Consequently, almost all their children are dying from SCA. Meanwhile, all the other children he had out of marriage are living and they are not SS. Couples are so selfish that, they do not have any feelings about the wellbeing of their future children's".* Couples end up having sickle cell anemic children who become a liability to them and the community. This factor has greatly contributed to the high prevalence of the SCA. The medical personnel continued again in the following words; "*Most of the time couples are very selfish. Today, because of Love you see couples suffer with their children. Couples who are sickle cell carriers can still decide to adopt children without necessarily having children who are all sick and die from the disease. I had to counsel and follow-up some couples who were both AS before they started bearing children. We made mention to them about birth control and they need to adopt children. But they never listened to the counsel in the hospital, since they thought they were wise and they said it is a must for them to procreate their own children".* They take the risk of continuously having children, even after they have known the first, second, third and so on are patients, they do not bother. Couples refused listening to counseling about child bearing, but they keep on bearing children hoping that they will have a normal child. Parents are not obliged, to imitate others in the domain of procreation and having their own biological children who are Sickler's.

Negligence About the Existence of SCA

There is a lot of negligence about the existence of the SCA by some people who already know their blood genotype in the community. It was realized that, some people knew that, they were carriers of the disease but the neglected it and they never took it seriously. They never bothered to know their partners blood genotype

because they were eager to have their children. As a result of that, they had sick children. In our research, informant explained: "*I started hearing about this disease at a very young age. My father used to talk about this disease which was ravaging my family. I had brothers and sisters who died from this disease. While growing up, I neglected it, I never did the test, I got pregnant and had sick children".* Findings showed that, negligence has a role to play when electrophorese test has not been done by women and young girls because of neglect. So many people are anxious and wanting to get a baby at all cost without trying to know their blood genotype. They neglect the importance of doing some of these medical examinations. Speaking through the interpretation of a patient, she said: "*I regrated why I never did the test today, I neglected doing the test and today I am having sick children. I knew about the test very well; I do not have any reason for not doing the test. Most people neglected doing the electrophorese test because they felt that it was useless doing".* It was clear that some people knew the importance of doing the test but they deliberately neglected doing the test. Therefore, negligence to do electrophoreses test is one of the factors which has greatly contributed to the high prevalence of SCA in our country.

Distrust of Biomedicine

One of the reasons which has contributed the prevalence of sickle anemia in Biyem Assi Health District is that of the lack of distrust of biomedicine. Informants revealed cases of some family members who were wrongly diagnosed of SCA where as they were AS and not SS. Their patient frequently fell sick. It is only after they had moved from one hospital to another that, later on it was discovered in the hospital that wrong diagnoses were done. The patient was a carrier of Sickle cell trait which manifested. For that reason, they do not trust biomedicine because of wrong diagnoses done on patients. People have that notion that, some of these diseases are invented by the doctors and nurses.

Mystical Forces

Data collected from the field revealed that Africans believe that, SCA is a disease is caused by mystical forces and that, it cannot be diagnosed in the hospital neither can it be treated at all. Biomedical treatment is more inferior to ethnomedicine and faith-healing. Patients believe that diseases cannot be treated biomedically but could be treated traditionally by the spiritualist, diviner or traditional healer. Due to their religious attachments, some of them were forced to abandon their drugs and for some they completely refuse blood transfusion to be done on them. They based themselves on the fact that, God will cure them miraculously without the help of any medications. Some mentioned that, their religion forbids them from taking. There is the slogan which states that, "*true and committed Christians must abandon their drugs and believe that, they have been completely healed*". For some patients, they ended up receiving blood and taking their drugs after much counseling had taken place. Informant said, "*The issue of SCA is in the head. That is, if an individual puts it in the head, there is likely going to be a high probability that the child suffers from SCA. I believe so much in traditional medicine which has cure for all types of diseases. By the way, my cultural and traditional belief does not allow me to believe in such diseases which are fake".* People have no trust in biomedical diagnosis and so express a lot of skepticism with regards to biomedicine. There is a lot of manipulation of people's results. Further in traditional medicine his cultural does not permit him to believe in this disease which has no biomedical cure. The existence of some cultural barriers makes it difficult to sensitize members of the communities or to transmit messages about the importance of carrying out electrophorese test before marriage. This is the effect of the low rate of education. Due to ignorance and refusal to heed to advice, they believe that their tradition is so perfect. On the other hand, there is no disease which is simple and that all diseases have cultural causes in each community. This makes it difficult to convince some people in the communities about the causes of SCA. Informant argued: "*Because of my cultural belief systems, I do not see any need we should do any electrophorese test before marriage or before engaging into any sexual relationship. Also, I believe so much in the traditional way of detecting a disease and the traditional way of curing a disease".* There is the influence of cultural beliefs systems. They believe so much in the traditional diagnosis and treatment. Below is a presentation of the life history of a patient, informant; "*When I was taken for traditional medicine, it was realized that the disease I was suffering from was caused by mystical forces which was never diagnosed in the hospital. So, I see no reason for me to trust biomedicine because there have been lots of wrong results and misleading from the hospital because of wrong diagnosis".*

During traditional treatment it was discovered that, there are mystical forces which are held responsible for the main cause of SCA. This disease had never been diagnosed biomedically. It is believed that, wrong results are given to patients in the hospital. For that reason, there is no trust for biomedicine. Another informant affirmed that, "*I do not so much believe and trust in Biomedicine. So, you will hardly find me in the hospital for any medical diagnosis or treatment. I am a traditionalist and I so much have trust in traditional medicine. Some of these diseases you call SCA are just invented by white men. SCA is a spiritual disease".* SCA cannot be treated biomedically but only traditionally. Due to that, they do not believe on the biomedical aspect of SCA. We shall move further by presenting below a statement made by an informant. "*Most of the time, those who refused to take these drugs are often referred to as; 'people who are faithless" or "people who do not believe in the healing hands of God' and 'people who are playing" or "people who are not serious" or "people who have a problem in their lives" or "people who are being controlled by*

devilish forces. For the fear of what their pastors will say so many patients abandon their drugs. Some of them experience severe crises and even with the crises they refused taking their drugs. Some are taken to the hospital in an unconscious state". Some of them are taken to the hospital in an unconscious state. They were told by their religious leaders to stop taking these medications and that if they continue taking these drugs it means they do not have faith, that nothing good comes easily. So many of them believed in this doctrine and they fell into this trap. Unfortunately, those who stop taking their drugs, experienced severe crises and died. But there are some of them who experienced supernatural healing. Therefore, cultural perception is a barrier to electrophorese test before marriage or mutual/consensual sexual relations.

Pre-Marital Pregnancies

The etiological factors responsible for the prevalence of SCA is pre-marital pregnancy. This is so common among youths in some communities like the Beti, Bulu, Bassa, Ewondo. For the women or young ladies, it is to proof their fertility. They ought to prove that they are ready to and can have a child. But today, so many girls of different ethnic groups deliberately get pregnant for their partners without being aware of their blood genotype.

Kasonde *et al.,* (2022), realized that, so many young girls get pregnant without knowing their partners blood genotype. To proof their fertility, these young girls are more interested in getting unwanted pregnancy. Many couples engage into serious premarital sex and they find it very difficult to do electrophorese test. It is only when they started bearing children that, they noticed that most of the children they had were sickle cell anemic patients that is when they regretted about it. Most young girls, to prove their fertility, they will want to get pregnant at every cost. This has contributed to the prevalence of the disease. Speaking through the interpretation of health personnel, they said, "*There are so many young girls who have had unwanted pregnancies from their boyfriends or from a man they met for their first time. They are aware of contraceptives but, for them to prove their fertility before marriage in the Beti, Bulu, Bassa and Ewondo culture. They do not bother to do electrophorese test to know their blood genotype. It is only after they put to birth that they realized in the hospital that the baby is suffering from sickle cell anemia".* It is a culture for the girls to keep children before marriage in some communities. They need children to prove their fertility to potential suitors. Sometimes, when they put to birth, children are often diagnosed of SCA. Some of these youths do not bother to know about their boyfriends or girlfriend blood genotype. This is because their priority is having children for future marital security. This has greatly contributed to the high prevalence of SCA in the community.

Pre-Marital Relations and Sexual Misconduct

Pre-marital relations and sexual misconduct before marriage by men and women of all age groups has contributed to increase the prevalence of SCA. It was discovered in the field that, most of these patients experiencing SCA, their parents never knew their blood genotype and blood groups before engaging into the relationship. As a result of that, they bore sick children. So many members of the community interviewed, explained that, they engaged into sexual relationship without knowing their partner's HIV/AIDS, Hepatitis B, blood group and blood genotype status etc. There are cases of women who have been victims of rape after that incidence they got pregnant and no induced abortion was carried out. Parents of this girl decided to keep the pregnancy because they fear carrying out abortion.

According to Bekolo (2017), there is the African Proverb of the Yemekak people of the Center Region which states that: "*incest always pollutes the blood of the family that is from one generation to another generation if no rituals of sanitations are carried.*" This researcher goes further by saying that, it is mostly in the patricha community of some villages that, there was great number of *bera minkokoan* (greatest sickling's) who always decided on the days of ceremonies for cleansing. Informant said, "*If this present generation is not very careful, in future to come there will be so many SCA patients. That makes it a big problem today".* From the above opinion, nowadays so many things have changed. They go right to the extent of bearing children. Most of the time these children suffer from SCA.

Informal Mariages

Long *et al.,* (2011) explained that, there is low perceived susceptibility of giving birth to a child with the disease. Attachments linked to cultural ties and traditional belief systems of informal marriages has contributed to increase spread of SCA. Cultural aspects like that induced marriage, is a cultural practice which had existed several decades. Couples never did any electrophorese test before marriage and children were healthy. For that reason, they do not see why they had to do the test before marriage. They explained that, they inherited this cultural aspect of not doing electrophorese test before marriage, there was the study of the genealogy trees of families. Many people are so much attached to their cultural beliefs that do not want any test to be done before marriage. Getting married either to their cousin or only from their ethnic group.

In addition to that, the quest for linage in some cultural milieu and religious settings in Cameroon in the West Region, North West Region and Northern Region of Cameroon has greatly contributed to the increasing prevalence of SCA. Informant explained: "*Informal marriages are one of the major causes of couples bearing SCA children. I accepted to married to my wife who was chosen for me in the village by parents. I am a victim of such marriage; my parents forced me to get*

married to my paternal cousin. We never did any blood test to know our blood genotype, blood group and other test before marriage. Unfortunate for us two of my children are suffering from SCA and the rest are carriers of the disease. It is with time we became aware of the consequences of carrying such marriage without doing blood test". (Interview with informant. Etoug-Ebe, 12/09/2024).

It proved that informal (forceful and arrangement marriages) marriages in most cultures have greatly contributed to the prevalence of parents bearing SCA. This informant is a victim of forceful marriage whereby he got married to his wife that is paternal cousin who was chosen by his parents in the village. It is only when they started bearing children, they realized that two of their children were suffering from SCA and the rest were carriers of the SCA gene. After counseling by the genetic counselor, they became aware of the consequences of such marriages and the existence of the disease.

The practice of endogamous marriages by people of the same tribe like the Bamoun's, Fulbe's, Nso, Bangwa's, Arab's, Hausa's, and the Bamileke's. Also, there is the practice of marriage among blood relatives in the community. The case of a man not getting married to a woman who is not of the same tribe or ethnic group like him, most of the time when this lady is not of the man's tribe, she is not considered by her in-laws. Herrick (2001); Savitt and Goldberg (1989) mentioned a case in west Africa where there is evidence that suggests that many families in Africa were able to trace the disease through their family genealogy and gave the disease tribal names based on the symptoms of sickle cell disease. In the southern part of Nigeria, sickle cell disease was called "*arun romolegungun"* which actually means "a disease which aches the child's bones" which in essence is a description of sickle cell crisis pains experienced by patients.

Informal marriages (early marriages, arrangement marriages, induced marriage, and concubinage and cohabitation marriage) have contributed to the high prevalence of SCA in some communities. These are common among the Northerners: Fulbes, Toupuris, Arabs etc. those from the Western Region: Bamilekes, Bamouns etc. North Westerners: Nso, Batibo, Bafut, Mankon, etc. Now a days, there are so many induced marriages which are done behind closed- doors in some families or religious setting in Biyem Assi Health Districts. The girl is compelled into the marriage. Sometimes, either the man who plans to marry the girl is abroad or he comes from a wealthy family. Some of these induced marriages are done without the couples knowing their blood group, HIV/AIDS status, blood genotypes and other medical examinations are not done. This is important because it helps to know if both are compatible. In addition to that, this is very much practiced in some religious (Muslims and Christians) and cultural settings in the community. As a result of this, it has led to sick children who are a burden to the entire family. This is a common practice within some religious groups and local cultures where such marriages are organized by third parties, independent of the mutual consent of the parties/couples concerned.

Due to ignorance of the child, no pre-nuptial test is being carried out before marriage. Foster and Anderson (1978) talked about the personalistic approach of illness and disease causation which mostly talks about the causation of an illness or a disease. They mentioned the fact that, people give meaning to the cause of their ill-health based on supernatural and natural belief systems (environments, bacterial, virus, etc.).

DISCUSSION

In the study carried out by For the National Center for Biotechnology Information (2018), fifty percent (50%) of respondents did not know how SCA is diagnosed, eighty-three-point four percent (83.4%) of people interviewed had never been tested for SCA. Moreso, ninety-point two percent (90.2%) of the respondent did not know their partners' blood genotype. A greater proportion of the population never knew their status and they had never been screened for SCA. The cost of carrying out electrophorese has greatly contributed in the nonconductor of this test. Bekolo (2017), the author said there are unions of couples who got married which could be dissolved because of incompatibility of blood genotype. This was meant to avoid bearing SCA children. But some of these partners stubbornly decided to get married and consequently, they gave birth to sick children, demonstration was made for the case of a couple who never knew their partners electrophorese status.

Our research revealed the fact that, the reason for the increasing prevalence of SCA is the lack of carrying out electrophorese test before marriage. Those aware and not aware of the disease refuse any form of diagnosis to be done so as to know their blood group and blood genotype. Below is a brief explanation of informant. "*There are some cultures that they just plan wedding ceremonies without knowing they have to do a number of blood test for the couple. Pre-marital counseling is not usually done with couples in some communities. For couples who are aware of SCA, some deliberately refuse to do electrophorese test and other blood test before marriage… It is only in the future they start noticing that, they have sick children".* (Interview with informant, Melen, 10/06/2024). So, there is the lack of pre-marital counseling in most communities. Also, some couples deliberately refuse conducting some blood test before marriage. Couples just go ahead engaging themselves. Furthermore, one of the etiological factors responsible for the increasing prevalence of sickle cell is the refusal for couples to do medical examination like electrophorese test before marriage. So many couples

refuse taking advice to do pre-marital counseling before marriage. The members of the communities expressed the fact that, the reason for the increasing prevalence of SCA is the lack of carrying out electrophorese test before marriage. Those aware and not aware of the disease refuse any form of diagnosis to be done so as to know their blood group and blood genotype. Some couples deliberately refuse conducting some blood test before marriage. Couples just go ahead engaging themselves. Furthermore, one of the etiological factors responsible for the increasing prevalence of sickle cell is the refusal for couples to do medical examination like electrophorese test before marriage. So many couples refuse taking advice to do pre-marital counseling before marriage.

In contrast, Annie *et al*., (2016) explained that couples at risk of having children with SCA are prevented from marrying in the Christian churches in Ghana. Stern (2012) and LeRoy (2006) expressed the fact that, genetic counseling focuses on giving fundamentals, balanced information's, and non-directive assistance in decision making process. It was discovered in the field that; so many people in the community do not have adequate information about SCA and its effects on the health of patients. It is because they do not read books and listen to health documentaries, educative SCA health programs on social media, SOS Doctors, radio and television and listen. For some informants, they only became interested in getting information (by reading books about the origin, causes, effects, treatment and prevention of the disease) when their relative was diagnose of SCA and every Saturday morning on the CRTV. This was a summary of how, they started struggling to get informed about the disease when their child was diagnosed of SCA. It is only then parents, became interested in reading documents which concerns. Health personnel told us that, Ashish and Roshan (2015) explained that, as well as lack of adequate centers, with expertise in prenatal diagnosis in peripheries, there are no population screening program strategies or poor implementation of screening methods. There is lack of well calibrated hematology cell centers. For effective diagnosis to be carried out, there must be effective management of infections which obviously depends on the availability of functional microbiology laboratories in Cameroon. Lack of these laboratories' analyzer in health units, is one of the major challenges at stake.

From discussion with informants, some health centers in Biyem Assi Health District and health areas are not well equipped in terms of material and human resources. Prenatal diagnosis is another area of challenged experience by SCA patients in most of these health centers which are lacking in this domain of health. Also, appropriate diagnoses are not done on children right from the early stage especially in the rural areas in Cameroon. In some health centers here in Biyem Assi, some of these apparatuses used in diagnosing SCA children from birth are found only in big hospitals in town like the Chantal Biya Foundation, CNPS hospital and other referral hospitals. But in some of the health districts, health areas and private clinics, no appropriate measures and apparatus are put in place to detect this disease on children. Also, some of them do not have qualified medical personnels for SCA. Consequently, some children are discovered with this disease some few days or months after they have been discharged from the hospital. Parents only discovered after discharged from the hospital that newborn is SCA. They complained that, after birth, no appropriate diagnoses were carried out on the child. From information provided by informant, with the advent of DNA diagnostics, it has become very possible to make definitive diagnosis of different sickling disorders during the first trimester of pregnancy. When discovered at the early stage of pregnancy, pregnancy could be aborted. The major reasons for lack of this implementation of diagnosis is because of scarcity of specialists in this domain.

Among the three children his parents had, he is the only one who inherited the disease from them and is suffering from it in their home. This was after they were instructed to run some medical tests. The cultural representation of SCA is that, if the parents have this disease, it actually means that they inherited it from their grandparents. It is clear that SCA is a genetic disease which is transmitted to children, if preventive measures are not taken into consideration. It is a genetic and inherited disease which many Africans suffer from. It is partly because they live in endemic zones and tropical areas where they suffer a lot from malaria, onchocerciasis, and other tropical diseases. One main observation made on the field is the absence of good health care facilities in some health districts, Yaoundé, and its periphery live in remote areas where accessibility to good medical health services is a very difficult situation for them. For some of these patients, they find it very difficult to go to hospitals specialized in the treatment and care of these Sickle Cell Anemic patients (Chantal Biya Foundation, Baptist Health Centers, CNPS hospital in Yaoundé). It was observed in the health District that some of these patients preferred to live on ameliorated traditional medicine, auto-medications, ethno-medicine (divination, incantations and rituals), faith-healing (exorcism and prayers) because it is cheaper for them. Those from very poor family backgrounds and from the average class family face serious difficulties in accessing health care services because of the cost. Also, some of them mentioned financial difficulties which are often experienced and it makes it difficult for some of them to go to the hospital for consultation, to buy drugs, for medical follow up and blood transfusions.

Patients in remote areas find it difficult to access medical facilities in the town, given the distances and eventual cost of transportation. Coupled with cost of treatment in these specialized hospitals, they prefer to go for auto medications. Some of these patients have

previous prescription which had been given to them by their medical Doctor. When these patients do not have the means to transport themselves to the hospital and to pay for consultations, they will prefer to use this prescription to buy drugs. If they do not have any drugs at home, they will prefer to get drugs from drug sellers (auto medications) or other forms of concoctions from traditional healers. SCA medications are very costly and not all patients can afford money to buy these drugs from the pharmacy. It is because some of these drugs are extremely expensive and some of these patients come from very poor family backgrounds. Moreover, they added that SCA is an expensive disease to take care of, given the cost of drugs and consultation of specialists. Meeting each specialist requires much money because these patients pay for consultation fees for each medical specialist who prescribes medical examinations which have to be carried out and each prescribes drugs which have to be taken. This is really very costly for patients. Some families cannot afford such expensive drugs for their patients. This situation obliges patients to go in for auto-medication because of the cheapness of these drugs and their availability. Patients complained that, most of their drugs are not subsidized by the government. A lot of money is spent on patients monthly, to administer drugs on them and for the buying of drugs like; vitamins, supplement's, calcium's, spirulina and other forms of drugs are very costly for them. In order to avoid surprises, care givers should do their best to be proactive, save money and prepare for any eventuality if their children are already diagnosed of the diseases.

With the increasing prevalence of SCA in the community, there not efficient diagnosis for fetus in the pregnant women womb. Due lack of medical equipment to carry out some of this test in the hospitals in Biyem Assi Health District, many of these children are still born with malformation and SCA. Couples whose blood genotype is AS still give birth to sickle cell anemic children in the community. They do not border to go for prenatal diagnosis to check if the fetus is SS and for it to be evacuated. Whereas if early diagnosis were done, and it was discovered that the fetus has SCA, with the consent of the parents induced abortion will be carried out on mother. Consequently, this will prevent expenditure on the child's health when born and the child will not be a burden to the parents, family members and members of the community. A Medical personnels mentioned that, under normal circumstances the Cameroon government should put in place a law or policies that each woman who is pregnant and goes for prenatal care, their fetus should be diagnose while in the womb before three months. But because of the absence of this method of diagnosing fetus at the early stage of pregnancy, most women just do their normal echography and follow up by their doctor without any checks in that domain.

Some informant mentioned that, one of the reasons for increasing prevalence of SCA, it is of the absence of abortion of affected fetus. When electrophorese test is not done on the fetus and it becomes very difficult to carry out any abortion on the fetus diagnosed of SCA. It is really difficult to know if the child is affected by SCA and has to be aborted or kept. It is a test which is costly and most parents do not have money to do such test. In Cameroon, abortion is not something which is not legal, unless it is the case of malformation of the fetus or the life of the mother is at risk or that of the child is a thread to the life of the mother. In that case abortion could be carried out with the consent of the mother and the medical council. It is really difficult to hear a fetus was evacuated because it was diagnosed of SCA. Couples who are carriers of SCA genes still keep putting to birth, they are not interested in abortion and some have that faith that, they will not have any sick child. Even when the fetus has been diagnosed of having SCA and they are told of the implication of having such children, some of them still refuse carrying out such acts. Therefore, the absence of abortion to evacuate fetus affected by SCA is responsible for the increase prevalence of the disease in the community.

Parents who are carriers of the sickle cell anemic gene, are forced to bear sickle cell anemic children. It is because they are unable to practice modern method of procreation like Invitro Fertilization and adoption of children. Parents lack financial means to adopt children from the orphanage and family members. There is a legal procedure which has to be followed and they find it difficult to go through the various stages of adoption. On the other hand, they lack financial means to go in for modern methods of conception in hospital specialized for the conception non-sickle cell anemic children. Not all the couples who are carriers of the sickle cell anemic trait are financially viable to go for invitro fertilization in the hospital specialized for this domain of health. With this type of advanced method of procreation, it will help to prevent the birth of Sickle cell anemic children in the community. This method is carried by specialists who do insemination of the fetus into the mother's worm, they collect sperms from the father and the mother's egg is collected, fertilization is done out of the womb. Specialists do fertilization using the sperm and the egg, when it gets mature, they test each of the fetus outside the one which does not have any SCA or is free, and it is inseminated into the mother's womb. By so doing couples who are carriers of SCA, if they decide not to have children, it is but normal because they fear having sick children or children who will become a burden to them both financially and materially. Going in for invitro fertilization by couples having same blood genotype will reduce the risk of having sick children within their family and community. From the above explanation, one of the reasons for the increase prevalence of SCA, it is the inability of carrying out modern methods of procreation by couples.

Based on the studies carry out, one of the etiological factors responsible for the increase of SCA is rape and incest. Medical personels interviewed in the

hospitals, made mentioned that, there have been few reported cases of women who came to put to birth in the hospital. In the course of asking them some questions about the father of their child, blood gynotye, blood groups and hospital they go for prenatal care etc. That is when they discovered that, they were victim of rape (abusive and forceful sex without the consent of the lady) and incest (sexual relationship with their family member) who gave birth to sick children. Informants mentioned that, some of these rapists or those who commit incest are carriers of the sickle cell anemic genes. Since they have sexual urge and they are scared or knowing if the lady is a carrier of the gene or has an infectious disease, they go in for sexual intercourse without the use of preservatives for protection. For some of them who never went to the hospital after the rape incident to take antiretroviral drugs before 24 hours and drugs to prevent pregnancy. It was mostly because of shame and stigmatization. For some of them, some few months later that, they discovered that they were pregnant and they ignorantly kept the pregnancy, without knowing there are some tests had to be done. It is only when they put to birth that they discovered that, their children were SS. Reported cases of rape and incest consequently led to the birth of sick children. Since the ladies were carriers of the sickle cell anemic gene and they were abused by carriers of this gene and they ended up having to care and spend a lot of money of these sick children.

Bekolo (2017) explained that, matrimonial union between parents of the clan and sub-clan, same family, same village there is high probability of bearing Sickle Cell Anemic children based on the genealogy descendance pillars. By so doing, some families, ethnic groups have taken it as a habit to perform informal marriages. This arrangement is generally done by parents. It is believed that, by so doing it is for the conservation of cultural heritage, economy and to preserve some cultural secular values which they are very much attached to and which they share. From research carried out by this researcher, there are so many cases of Sickle Cell Anemic children born from these informal marriages and endogamous marriages.

Center for Disease Control and Prevention (2022) mentioned that, people who have this form of SCA inherited this hemoglobin 'S' gene from one parent and 'A' from other parents. They also, inherit SCA from a gene which is of different type of the abnormal hemoglobin called 'C' from the other parent, which is usually a milder form of SCA. For some of them after putting to birth, they discovered that the child was constantly sick and never knew that the child was sickle cell anemic. So, when they went to the hospital for consultation and medical check up that is when the child was diagnosed of having SCA. In corroboration with the statement, reported cases of rape (sexual abuse) rapist AS and the rape victim AS have contributed to the birth of sick children and the increase prevalence of SCA in the community. From the information mentioned above, there was the illustration of a case, victim of incest who ended up having a sick child because they both had a history of the disease in their family. Pregnancy was only discovered very late and nothing could be done to abort the pregnancy. This shows that, incest which results to pregnancy and partners having same blood gynotype will obviously give birth to sick children. It is one of the reasons responsible for the increase of the prevalence of SCA in the Biyem Assi Health District of Yaounde and in other communities in Cameroon. Therefore, it could be said that rape and incest have contributed to spread of SCA in most communities.

Neil *et al.,* (2017) illustrated that, those Within the Biraderi community in Pakistan, majority of marriages are consanguineous and the prevalence is high. It ranges over 80% to under 60%. In consanguineous unions, first cousin marriages account for 50% in five of the fifteen Biraderi and 40% in six others. They went further by explaining that: within the Biraderi marriage and consanguinity enhances genetic stratification, thereby increasing the rates of genomic homozygosity and increase expression of recessive genetic disorders. Consanguineous marriage is characterized to be 56% of couples in Saudi Arabia and 24.1% of married couples. Epidemiological studies of the effects of parental consanguinity on infant's health are often based on approximation of consanguinity rates. He observed that some doctors tried to teach patients that cousin marriage is a dangerous practice and it was discovered that 7% of newborns are affected by a genetic disorder and a quarter of these cases is due to consanguinity. Cousin marriage and blood disorders are inherited from parents. There was the illustration of cases of grand-parents and parent's (matrimonial choice of union) choice of their married partner who never bordered to do electrophorese test and this consequently affected the health of their generation, (Beaudevin, 2015). From the information collected from the field, informal marriages like; marriage with relatives and choice of marriage partner without any medical test are the risk factors responsible for the prevalence of SCA.

Moreover, Bittles and Genet (2002) in populations where consanguineous marriage is widely practiced, recessive genetic disorders will continue to gain greater prominence in overall spectrum of ill-health. Endogamous marriages occur because of selfishness of couples. Most of the time it is as a result of informal marriages, forceful marriage, lack of studying couple's genealogy trees and generally there is incompatibility of couples in terms of blood groups. Endogamous marriage is marriage within a specific group as required by customs or law. In endogamous groups, marriage outside one's group may be forbidden or they might likely be a tendency to marry within the group. Endogamy is a characteristic of aristocracies, religious and ethnic minorities in industrialized societies. It is also of the caste system in India and class-conscious non-literate societies such as the Masai of Eastern Africa. When

people who are from the same tribe, the same family/linage, common cultural background or ethnic group decides to get married without carrying out any electrophorese or blood test most of the time they end up having sick children.

It shows that informal marriages (early, arranged, and induced marriages, concubinage and cohabitation) are often linked to their cultural belief systems of kinship. There are many induced marriages which are done behind closed doors in some families in Biyem Assi Health District. The girl is compelled into to the marriage and some of these marriages are done without the couples knowing their blood genotype and other medical examinations are not done Sometimes.

Ethnicity and Genetic Family History

Informants explained that, ethnicity is one of the factors responsible for increase spread of SCA. There are some ethnic groups which are known to have a history of the disease. It includes, African, they are known to be carriers of the sickle cell genes. They carry a copy of sickle gene and they transmit it to their children. People from Sub-Sahara Africa, South Asia, Middle East, African-Americans are highly at risk of sickle cell anemia. This disease affects us Africans. Also, there are some families and ethnic groups which are known to have a history of SCA within in Biyem Assi Health District. "*Our fore-fathers suffered a lot from SCA and they transmitted it to us their generation and even us, we are still transmitting it to the future generation because presently many of us found in Cameroon are carriers of the sickle Cell gene. It is a disease which cannot be easily eradicated in Africa and those having African origin, amongst the black race. Given the nature of the environment, it causes so many patients to experience painful crises".*

Based on the data collected from informants, SCA is belief to be a genetic and hereditary disease which is inherited from both parents who have similar blood genotype. Consequently, this Sickle cell trait is transmitted to the child. On the other, Genetic and Rare Diseases Information Centre (2023) affirms that, SCA is a genetic disease which is caused by one or more genes not working correctly. Thus, it makes the affected patients to suffer from sickle cell anemia, meaning they becomes SS. According to the American Society of Hematology (2020) SCA is an autosomal recessive genetic disorder of the red blood cell which is transferable from parents (AS father) and (AS mother) to their offspring. Njifon *et al.,* (2019) affirms that, Sickle Cell Anemia is a genetic disease that confronts families with interactive, intense and unpredictable crises associated with physical manifestation on the sick child. From the information's gathered from informants when the father is AS and mother AS, there are high chances for both parents to bear children who will inherit SCA. Consequently, the child will be SS. It is the more reason it is said to be a genetic disease which is inherited. Also, informants went further by illustrating that, if the father of the child is AS + Mother AS= the Child will be obviously SS. From the case study of sickle cell anemic patients who had been living with the disease for a very long period of time. They explained that, the reason for their suffering from this disease, it is because both their mother and father were carriers of the sickle cell anemic gene. This means SCA is a genetic disease which is inherited from both parents.

On the other hand, Corry and Hum (2014) affirmed that endogamous marriages have far-reaching consequences on the health of children. This has led to congenital abnormalities, disabilities and many clinical conditions of children. It is often drawing attention to ethnic variations and an increased disease prevalence in the UK on Pakistani children. Informants gave their reason for the increasing prevalence of SCA which was mostly based on cultural perception. It affects people ways of reasoning towards the disease and some even refuse to accept the existence of this disease. Based on the different languages and culture of patients, most often, when the members of the community suffer from the symptoms of SCA, they sometimes attribute it to be caused by totems, demonic and mysterious forces etc. which affects the health of patients. Therefore, it means that each object in every community or culture has a meaning.

However, Awah (2005) explained that, each ethnic group gives particular names to a disease in their mother tongue and they each have a meaning in their culture. Curative and preventive treatment for this disease is traditional medicine and faith-healing. They are so much attached to their cultural practices. When laws and traditions are not respected by individual it is inherited. SCA is culturally defined to be a disease which is inherited from ancestors and abnormal disease. SCA is known to be is a generational disease, which is transmitted right from birth to children from both parents who are carriers of the SCA genes and it affects the health of individuals. Moreso, if preventive measures are not taken into consideration before marriage and child birth, it will consequently lead to SCA. Normal red blood cells are round and can move through small blood vessels in the body to deliver oxygen. SCA there is chemical changes in hemoglobin which causes the formation of long rods. These rigid rods change the shape of the red blood cells into a Sickle-shaped cells which does not pass easily through the blood vessels. They can clog or break apart which also leads to decreased red blood cell life. Sickle cell does not live as long normal red blood cells, (Cleveland Clinic, 2023). One informant mentioned that SCA is a disease which is transmitted from one generation to another most especially when both parents are carriers of the SCA genes. Also, if preventive measures are not taken before marriage and child birth, couples are likely to bear SCA children. Such a situation will consequently lead to the birth of children who suffer from this disease.

These children carry the Sickle Cell Anemic genes from both parents who are carriers of the gene. Informant affirms this by making the following statement: *"It is transmitted from one generation to another. SCA caused by both parents who have same blood genotype, this means that, the father is AS + mother AS= child will obviously be SS meaning they have sickle cell anemia or AS meaning they are carriers of the genes. Or one partner is SS and the other partner is AS, they will obviously bear a sickle cell anemic child."* (Informant 16 of SCA Association, Biyem Assi, 30/03/2022). When the Patient blood genotype is SS it means they inherited SCA from both parents who were AS and carriers of the sickle cell anemic genes. It could also be that, the child inherited SCA from one parent who is SS and gets in contact with the partner who is AS. Center for Disease Control and Prevention (2022) mentioned that, people who have this form of SCA inherited hemoglobin "S" gene from one parent and "A" from other parents. They also, inherit SCA from a gene which is of different type of the abnormal hemoglobin called 'C' from the other parent, which is usually a milder form of SCA. It is believed to be a generational genetic disease which is present at birth. It is inherited when a child receives two genes, one from each parent-that code for abnormal hemoglobin. SCA is known to be a transmissible generational disease inherited from both parents who carry the Sickle Cell Anemic genes. SCA is a trans-generational disease, inherited from both parents who are carriers of the SCA genes. This means that, the father is AS + mother AS = child will obviously be SS. Or, when the father is SS + mother AS= the child will be SS, meaning the child will experience Sickle Cell Anemia.

CONCLUSION

Emerging themes which came up during data analysis were; biomedical significance of SCA: transgenerational disease. There was equally the presentation of the Symptoms of the disease was divided into two group: the internal and external symptoms. By so doing, the etiological factors responsible for the increase prevalence of SCA in the community includes: endogamous marriage, lack of diagnosis of fetus, lack of the practice of modern methods of procreation, selfishness of couples, cost of electrophorese test, failure to carry out electrophoresis test before marriage. Other factors are: rape and incest, ignorance, negligence, premarital pregnancies and sexual misconducts, lack of sensitization and educative talks. In addition to that, there are environmental factors, cultural perception, informal marriage, incompatibility of couples, and distrust of biomedicine, ethnicity and genetic family history. Based on the opinions of informants SCA is a genetic and hereditary disease gotten from both parents who have similar blood genotype. It is a disease which is inherited from both parents of the sickle cell patients who are carriers of the sickle cell gene. Consequently, this Sickle cell trait is transmitted to their off-spring. Thus, it makes the child to suffer from sickle cell. Informants gave this common example; when the father is AS and the mother AS, there are high chances for these parents to have children who will inherit their genes and suffer from SCA. While on the field, we had a case study of a patient who had been living with SCA for a very long time. He belief that, the disease he is suffering from, it is because he inherited it from both his mother and father who were carriers of the sickle cell anemic gene. Sexual misconduct is believed to be one of the factors responsible for the prevalence of SCA in the community. This includes sexual cohabitation, and sexual misconduct. Data collected from the field showed that, the etiological factors responsible for the prevalence of SCA in Biyem Assi Health Districts are; sexual misconduct, and negligence. SCA is a neglected tropical disease. Little sensitization and educative talk are carried out on social medias platforms like; radio stations, newspapers, magazines, facebook, youtubes, Television stations, internet, WhatsApp groups, SMS through orange and MTN mobile network etc.

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Cite This Article: Andoseh Christelle, Njikam Savage Olayinka Margarate, Kum Awah, Mbah Evaristus Anye, Aziamin Norah, Nsangou Moustapha Mohammed, Afu Kunock, Deli Teri Tize, Kouanang Ottou Stéphanie Reine, Che Bonuh (2026). Perceived Etiologies Responsible for the Increase of Sickle Cell Anemia in Biyem Assi Health District- Centre Region, Cameroon. *East African Scholars J Med Sci, 9*(8), 375-390.