Letter to Editor

Conversation with AI (Chat GPT) about counseling a patient with Sickle Cell Disease

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Received: 22 Sep 2024 **Accepted:** 20 Nov 2024 **Published:** 07 Dec 2024

Cite this article as: Niraula S. The mediating role of marital boredom in the relationship between emotional divorce with self-differentiation and Conversation with AI (Chat GPT) about counseling a patient with Sickle Cell Disease. *Soc Determinants Health*. 2024;10(1):1-6. DOI: http://dx.doi.org/10.22037/sdh.v10i1.46268

Dear Editor,

Chat GPT is an AI based chat bot created by San Francisco based AI Company named open AI in November 2022. GPT is an abbreviation for Generative Pre-trained Transformer. It is built to understand and generate human-like text based on the input it receives and involves vast amounts of data from the internet, encompassing a wide array of topics, languages, and styles of communication.(1)

Chat GPT is gaining immense popularity around the world because of its wide range of knowledge and capabilities. These AI model generated texts are often indistinguishable from human written text. It can hold conversations on various topics whether they are creative, educational, and technical or some casual talks. (2) This chat bot has multilingual support and can help assist in writing essays, generating creative content, summarizing articles, providing study tips, answering trivia questions, and more.

Most people in this era are technically aware and have already started using AI in various fields. The days can be seen coming when AI begins to assist human in every field to and that largely includes the medical field, as people are more concerned about their health than any other aspects. There is a 36.1% growth rate of AI in healthcare in the US itself. In a study 65% of adults in the US wanted AI to be used in cancer screening. (3)

Sickle cell disease has a painful course and requires the most hospitalization among other blood related disorders. It is a disease of numberless concern and people seem to always be curious and unaware of it. SCD is the most prevalent disease in sub-Saharan Africa, where it is a major public health concern. The highest burden is in West and Central Africa, where the prevalence of the sickle cell trait (carrying one HbS gene) can be as high as 20-30%. The World Health Organization (WHO) estimates that, 300,000 newborns are born with sickle cell disease (SCD) worldwide annually. Approximately 100,000 people with SCD reside in the US, although the majority of SCD cases are found in sub-Saharan Africa, India, the Mediterranean region, and the Middle East.(4), Between 2000 and 2021 the total number of births with SCD increased to 13.7% globally. (5)

It primarily affects African Americans in the U.S., with approximately one in 365 African American births affected by the disease. The sickle cell trait was found in approximately one in 13 African Americans.

SCD can cause psychological problems in young adolescents and adults because of its nature and related complications. Hence AI based chat bots can help address these issues as smartphones and the Internet are now accessible to almost every individual in the US and the world. In a recent study 33 physicians across 17 specialties generated 284 medical questions. Chat GPT generated largely accurate responses

to diverse medical queries as judged by different physicians and with some important limitations (6). Hence, further research and development are required to improve the accuracy.

In my opinion the Chat GPT can answer all queries quickly and accurately. It can answer almost every query asked by the patient, as it has a huge internet-based research and database; however, it has certain limitations. Most people with Sickle cell disease reside in Africa; where there is a lack of awareness among people therefore AI models could be of great help to them knowing the disease. It cannot understand human emotions and the psychological state of a person; thus, some harsh responses can be expected which can sometimes negatively impact a person's mental being making them anxious and scared about diseases. Emotions and Sentiments play a significant role in patients counseling, especially in chronic conditions. However, information from AI can be understandable to patients. In Addition more advancements and cutting-edge research and technologies should be included in this software, which can provide a person with positive hope in treating chronic conditions.

Table 1. Contains questions and answers provided by the chat bot

1. What is sickle cell disease and How common is it?	Sickle Cell Disease (SCD) is an inherited blood disorder where red blood cells become rigid and sickle-shaped due to abnormal hemoglobin. This causes blockages in blood flow, leading to pain, organ damage, and other severe complications. Globally, SCD affects millions, with the highest prevalence in sub-Saharan Africa, where up to 40% of the population may carry the sickle cell trait. Approximately 300,000 babies are born with SCD each year worldwide. The disease is also common in India, the Middle East, and among populations with African ancestry in the Americas. In the U.S., about 1 in 365 African American births are affected by SCD.
2. What causes this disease? Is it communicable?	Sickle Cell Disease (SCD) is caused by a genetic mutation in the gene responsible for producing hemoglobin, the protein in red blood cells that carries oxygen. Specifically, the mutation leads to the production of an abnormal form of hemoglobin known as hemoglobin S (HbS). When a person inherits two copies of the HbS gene (one from each parent), they develop SCD. If they inherit only one copy, they have the sickle cell trait and are typically carriers without symptoms. SCD is not communicable; it cannot be spread from person to person. It is an inherited condition, passed down genetically from parents to their children.
3. What symptoms should i further expect from sickle cell disease?	Sickle Cell Disease (SCD) can cause several symptoms, including severe pain episodes (pain crises), chronic anemia (fatigue and weakness), and swelling in the hands and feet. Individuals with SCD are also more prone to infections, may experience delayed growth, and can develop vision problems. A serious complication,

	acute chest syndrome, can cause chest pain and breathing difficulties. Regular medical care is essential to manage these symptoms and prevent complications.
4. What are the treatment options?	***Medications*:** Pain relievers for pain crises, hydroxyurea to reduce the frequency of pain episodes, and antibiotics to prevent infections. ***Blood Transfusions*:** To treat severe anemia and reduce the risk of stroke. ***Bone Marrow Transplant*:** The only potential cure for SCD, though it's not suitable for everyone and requires a matched donor. ***Gene Therapy*:** Emerging treatments are being developed, including gene therapy, which shows promise in curing SCD. ***Lifestyle and Supportive Care*:** Staying hydrated, avoiding extreme temperatures, and regular medical check-ups help manage the disease.
5. Can this be completely cured?	Sickle Cell Disease (SCD) currently has no universal cure, but there are potential pathways to a cure: ***1. Bone Marrow Transplant*:** This is the only established cure, but it requires a matched donor and carries significant risks. ***2. Gene Therapy*:** Emerging research and clinical trials are exploring gene therapy as a potential cure by modifying the patient's own cells to produce normal hemoglobin. While promising, this approach is still in development and not yet widely available. For most individuals, treatment focuses on managing symptoms and preventing complications rather than curing the disease.
6. What is the prognosis of this disease?	The prognosis of Sickle Cell Disease (SCD) varies based on factors such as access to healthcare, the severity of symptoms, and the presence of complications. With advances in medical care, the life expectancy of individuals with SCD has significantly improved, especially in high-resource settings. In the U.S. and other high-income countries, life expectancy for people with SCD is in the 40s to 60s, though it remains lower than the general population. In regions with limited healthcare access, SCD can still be associated with high morbidity and mortality, particularly in children. Early diagnosis and comprehensive management can greatly improve quality of life and outcomes for individuals with SCD.

7. How can i manage pain episodes?	***Medications*:** Use prescribed pain relievers, including over-the-counter painkillers (e.g., ibuprofen) and stronger opioids for severe pain. Always follow your healthcare provider's recommendations. ***Hydration*:** Drink plenty of fluids to help prevent sickle cells from blocking blood flow. ***Warm Compresses*:** Apply warm compresses to the painful area to help relax muscles and improve blood flow. ***Rest*:** Rest in a comfortable position and avoid physical exertion during a pain episode. ***Stress Management*:** Practice relaxation techniques, such as deep breathing, meditation, or guided imagery, to help manage stress and pain. ***Regular Check-ups*:** Maintain regular visits with your healthcare provider to manage pain and adjust treatment as needed. ***Avoid Triggers*:** Identify and avoid known pain triggers, such as extreme temperatures or high altitudes
8. What lifestyle and diet changes should i make?	**Lifestyle Changes:** 1. ***Stay Hydrated*:** Drink plenty of water to prevent dehydration. 2. ***Exercise Moderately***: Engage in regular, moderate exercise. 3. ***Avoid Extreme Temperature***s: Protect yourself from extreme heat and cold. 4. ***Manage Stress:*** Use relaxation techniques to reduce stress. 5. ***Regular Check-ups:*** Visit your healthcare provider regularly. **Diet Changes:** 1. ***Balanced Diet*:** Eat a variety of fruits, vegetables, whole grains, and lean proteins. 2. ***Iron and Folate*:** Include iron-rich and folate-rich foods. 3. ***Limit Salt and Sugar*:** Reduce intake of high-sodium and high-sugar foods.
9. What are the complications related to SCD?	***Pain Crises***: Severe pain episodes due to blocked blood flow. ***Anemia*:** Chronic shortage of red blood cells, leading to fatigue and weakness.

	Infection*s*: Increased risk of infections due to spleen damage. ***Acute Chest Syndrome*:** A serious lung condition similar to pneumonia. ***Stroke*:** Blocked blood flow in the brain can cause strokes. ***Organ Damage*:** Damage to organs like the kidneys, liver, and eyes. ***Delayed Growth*:** Children may experience delayed growth and development
10. How can I prevent infections?	To prevent infections with Sickle Cell Disease (SCD), consider these measures: ***1. Vaccinations*:** Stay up-to-date with vaccinations, including pneumococcal and flu shots. ***2. Antibiotics*:** Follow your doctor's advice on taking prophylactic antibiotics to prevent infections. ***3. Good Hygiene*:** Practice regular handwashing and avoid contact with sick individuals. ***4. Prompt Medical Attention*:** Seek medical care immediately if you show signs of infection, such as fever. ***5. Regular Check-ups*:** Have regular health check-ups to monitor and address any potential issues early.
11. Will my child get this disease from me?	Whether your child will inherit Sickle Cell Disease (SCD) depends on both parents' genetic status: • ***If both parents*** are carriers of the sickle cell trait (each having one sickle cell gene), there is a 25% chance with each pregnancy that the child will inherit SCD (two sickle cell genes). • ***If one parent*** has SCD (two sickle cell genes) and the other is a carrier (one sickle cell gene), each child has a 50% chance of inheriting SCD. • ***If only one parent*** is a carrier and the other has normal hemoglobin, the child will inherit the sickle cell trait but not the disease. Genetic counseling can provide more personalized information based on your specific situation.

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