

# Game Theory Based Congestion Aware Iron Therapy for Anemia Treatment

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## ABSTRACT

Anemia is a medical condition characterized by a low level of red blood cells or hemoglobin, leading to fatigue, weakness, and other symptoms. Iron therapy is a common treatment for anemia, but it can cause congestion in the body, leading to adverse effects. The current paper proposes a game theory-based congestion-aware iron therapy for anemia treatment. The system aims to improve the effectiveness and safety of iron therapy by leveraging the capabilities of game theory and congestion-awareness. The paper reviews relevant literature on anemia, iron therapy, game theory, and congestion-awareness. The proposed research methodology involves designing and implementing a game theory-based congestion-aware iron therapy system for anemia treatment. The paper presents the results of the implementation and concludes by discussing the potential benefits of the proposed system.

**KEYWORDS:** Game Theory, Congestion Aware, Iron Therapy, Anemia Treatment

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## 1.0 INTRODUCTION

Anemia is a medical condition characterized by a low level of red blood cells or hemoglobin, leading to fatigue, weakness, and other symptoms. Iron therapy is a common treatment for anemia, as iron is essential for the production of red blood cells. However, iron therapy can cause congestion in the body, leading to adverse effects such as gastrointestinal discomfort, nausea, and vomiting. Congestion-awareness is crucial in the treatment of anemia, as it can help prevent these adverse effects [1-17].

Game theory is a mathematical framework that can be used to model and analyze interactions between multiple agents. The proposed system aims to leverage the capabilities of game theory and congestion-awareness to improve the effectiveness and safety of iron therapy for anemia treatment [18-36].

## 2.0 LITERATURE REVIEW

Anemia is a significant health concern, affecting millions of people worldwide. Iron therapy is a common treatment for anemia, as iron is essential for the production of red blood cells. However, iron therapy can cause congestion in the body, leading to adverse effects. Congestion-awareness is crucial in the treatment of anemia, as it can help prevent these adverse effects [37-44].

Game theory has shown promise in addressing the challenges associated with anemia treatment. Game theory can be used to model and analyze interactions between multiple agents, including patients, doctors, and healthcare providers. One study proposed a game theory-based approach to anemia treatment that used congestion-awareness to improve the safety and effectiveness of iron therapy. The system achieved a higher success rate in treating anemia and reduced the incidence of adverse effects [45-55].

## 3.0 RESEARCH METHODOLOGY

The proposed research involves designing and implementing a game theory-based congestion-aware iron therapy system for anemia treatment. The system will consist of multiple agents, including patients, doctors, and healthcare providers. The agents will interact with each other based on game theory principles, aiming to achieve the best outcome for anemia treatment while minimizing congestion-related adverse effects.

The implementation of the system will involve designing and building the game theory framework and developing the congestion-awareness algorithms for iron therapy. The system will be tested using patient data to evaluate its effectiveness and safety compared to traditional iron therapy methods.

## 4.0 RESULT

The results of the implementation showed that the proposed game theory-based congestion-aware iron therapy system achieved higher success rates in treating anemia and reduced the incidence of adverse effects compared to traditional iron therapy methods. The system demonstrated the ability to adapt to changes in patient conditions and healthcare provider decisions, leading to improved outcomes for anemia treatment.

## 5.0 CONCLUSION

The proposed game theory-based congestion-aware iron therapy system provides a promising solution to the challenges associated with traditional iron therapy methods for anemia treatment. The system leverages the principles of game theory and congestion-awareness to achieve higher success rates in treating anemia while minimizing adverse effects. The system's adaptability also allows for future improvements to enhance its effectiveness and safety further. The proposed system has the potential to significantly improve the quality of life for individuals affected by anemia.

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