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Inherited Disorder of Hemoglobin: A Descriptive Study in Misan, Iraq, 2024

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Abstract

Background: Inherited hemoglobin disorders represent a critical health challenge worldwide, These disorders encompass a range of genetic conditions affecting the structure or production of hemoglobin. **The study aims** to describe the inherited disorder of hemoglobin patients at the hematological disease center in the Misan Governorate. **Methods:** A descriptive file-based survey on 589 patients with Inherited hemoglobin disorders attended the hematological disease center in the Misan Governorate in 2024. reviewed the patient files and gathered the necessary data. After filling out a unique form with information about the patient's features from their medical records and the patients or caregivers. **Results:** The study found that 54.8% of patients were male while 45.2% were female for thalassemia, Sickler, and spherocytosis patients. Most of the cases in age groups 10-19 years for all types of disease (thalassemia, Sickler, and spherocytosis) and fewer cases in the age group above 40 years, 52.5% of patients for all study sample lived in rural areas while 47.5% was lived in urban area. The most blood group of patients was O and the least was AB. The majority of cases were thalassemia (85%), sickle cell disease (13%), and 2% was spherocytosis. The study result found that 65 patients (11%) were dead (64 of thalassemia, 1 of Sickler).

Conclusions: This study provides a comprehensive overview of hemoglobin disorders in Misan, Iraq. The findings underscore the need for targeted public health strategies, including genetic counseling, early diagnosis, and improved healthcare access, particularly in rural areas.

Keywords: Inherited, hemoglobin thalassemia, Sickler, spherocytosis, Misan

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Introduction

Inherited hemoglobin disorders represent a critical health challenge worldwide, particularly in regions where genetic predispositions and environmental factors intersect to create high prevalence rates (1-3). These disorders encompass a range of genetic conditions affecting the structure or production of hemoglobin, such as thalassemia, sickle cell disease, and hereditary spherocytosis (4-6). The impact of these conditions is profound, often leading to significant morbidity and mortality if not properly diagnosed and managed (6-8). They place a considerable burden on healthcare systems and necessitate a multidisciplinary approach to prevention, diagnosis, and treatment (9). In Iraq, particularly in Misan province, these disorders are of notable public health importance (10). Factors such as high consanguinity rates and limited public awareness amplify the prevalence of hemoglobinopathies in this region (9,10). Moreover,

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the lack of systematic screening programs and constrained healthcare resources further exacerbate the burden of these disorders. This study is a pioneering effort to investigate the epidemiological characteristics of hemoglobin disorders in patients visiting the hematological disease center in Amara City, Misan. (10). By providing an in-depth analysis of demographic, geographic, and clinical variables, it seeks to illuminate the patterns and trends that shape the distribution of these diseases. The study is based on comprehensive data analysis from a sample of 589 patients, examining variables such as gender, age, geographic location, blood group, types of hemoglobin disorders, and patient outcomes. The findings reveal critical disparities in disease prevalence and outcomes across different demographic and clinical categories, offering valuable insights into the challenges faced by healthcare providers in managing these cases. These results aim to serve as a foundational reference for the development of more effective public health strategies and interventions.

Method:

A file-based descriptive study on 589 patients with Inherited hemoglobin disorders attended the hematological disease center in the Misan Governorate in 2024. reviewed the patient files done by the researcher and gathered the necessary data. After filling out a unique form with information about the patient's features from their medical records and the patients or caregivers, data analysis was completed using Microsoft Excel and SPSS version 20.0. then data was presented as figures and tables.

Result

The total study sample was 589 patients who attended the hematological disease center in Amara City. The study found that 54.8% of patients were male while 45.2% of them were female, this distribution was similar for thalassemia, Sickler, and spherocytosis patients as in Figure 1.

The present study found that most of the cases were in age groups 10-19 years for all types of disease (thalassemia, Sickler, and spherocytosis) while fewer cases were in age groups above 40 years and other age groups as shown in Figure 2.

The current study result revealed that 52.5% of patients for all study samples lived in rural areas while 47.5% lived in urban areas as in Figure 3.

The most blood group of patients in the study sample was O and the lowest one was AB which was (221,41 respectively) this result was similar for all types of disease. as shown in figure 4.

Regarding the type of hemoglobulin disorder type, the majority of cases were thalassemia (85%), then sickle cell disease (13%) and 2% were spherocytosis. As shown in figure 5

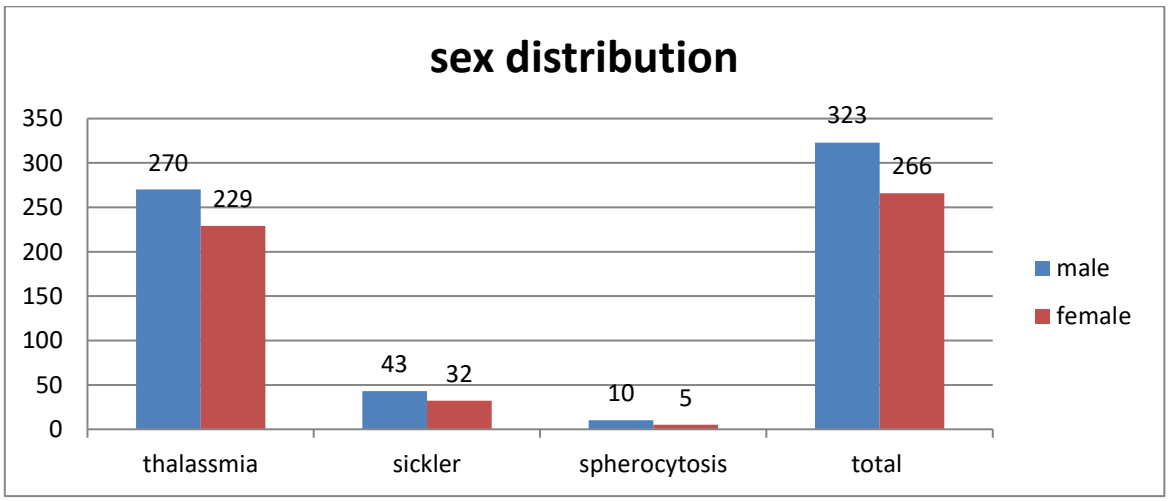

Figure 1: sex distribution of patients.

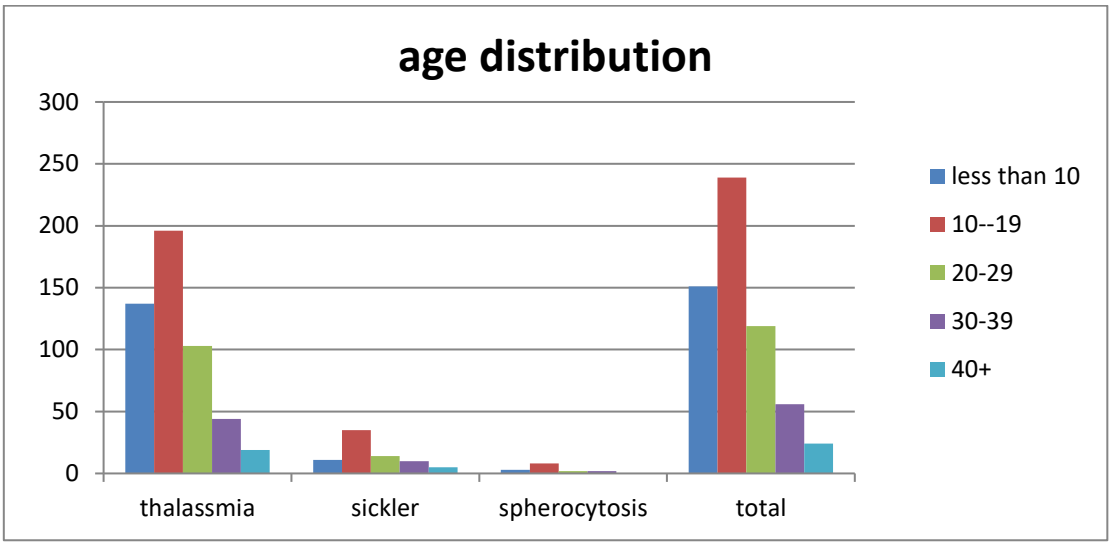

Figure 2: age group distribution of sample study.

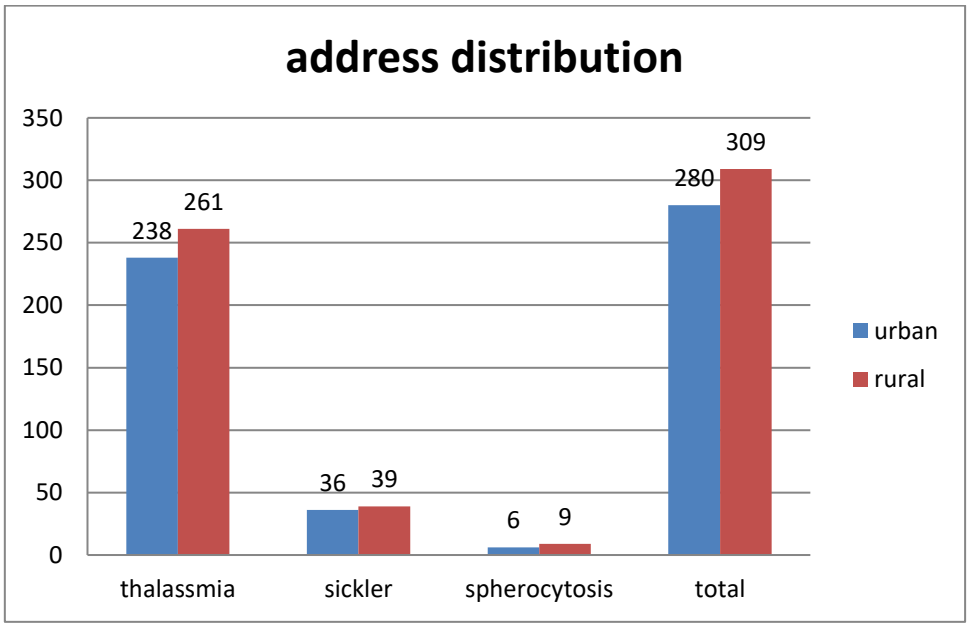

Figure 3: address distribution of sample study.

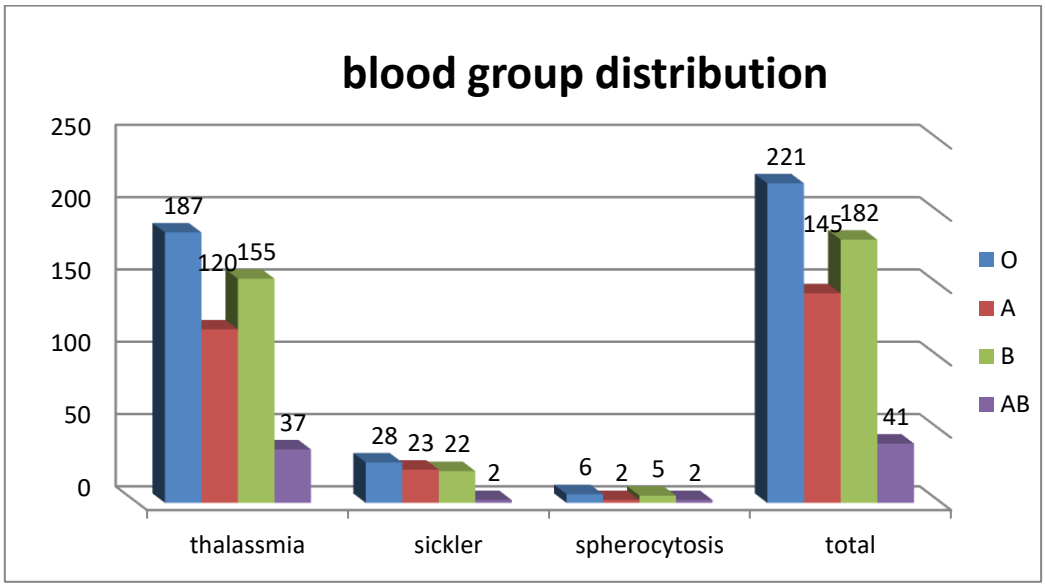

Figure 4: blood group distribution of sample study.

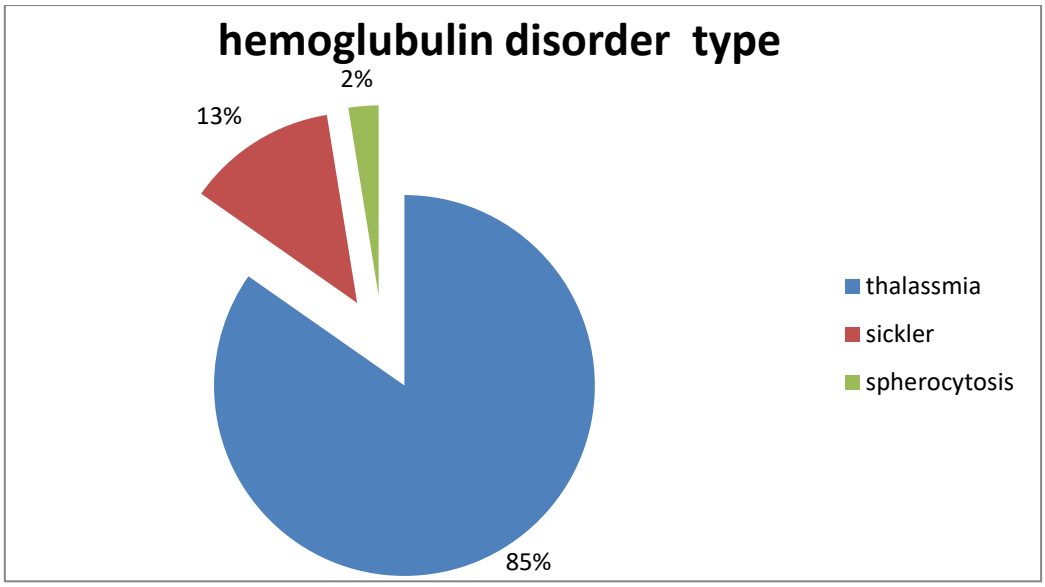

Figure 5: hemoglobulin disorder type distribution

The study result found that 65 patients (11%) were dead (64 of thalassemia, 1 of Sickler, and no death in spherocytosis). as shown in Table 1.

Table 1: the fate of patients in the study sample.

term		**Type of Disease**							
		thalassemia		Sickle cell disease		spherocytosis		**Total**	
		N	%	N	%	N	%	N	**%**
fate	a live	435	87.2	74	98.7	15	100.	524	**89**
	dead	64	12.8	1	1.3	0	0	65	**11**
		499	**100**	**75**	**100**	**15**	**100**	**589**	**100**

Discussion

The current study, based on a sample size of 589 patients, provides a detailed exploration of hemoglobin disorders in Misan, Iraq. Several key findings emerge from the data, highlighting the demographic and clinical patterns associated with these diseases.

The study reveals a slight male predominance (54.8%) among patients, with similar distributions observed across specific hemoglobin disorders, such as thalassemia, sickle cell disease, and spherocytosis. Age analysis shows a concentration of cases in the 10–19-year age group, suggesting that these disorders significantly impact adolescents. This age-based clustering could be linked to diagnostic advancements and heightened disease manifestation during adolescence, as supported by comparable studies in similar populations (11).

The study notes a marginally higher prevalence of cases in rural areas (52.5%) compared to urban centers (47.5%). This finding underscores the potential influence of socioeconomic and environmental factors, such as limited access to healthcare and higher rates of consanguinity in rural communities (12).

An intriguing observation is the predominance of blood group O among patients, with the least common being group AB. Such trends may provide valuable insights into potential genetic linkages or population-specific distributions, as corroborated by studies on blood group and disease susceptibility (13).

Thalassemia emerges as the most prevalent hemoglobin disorder (85%), followed by sickle cell disease (13%) and spherocytosis (2%). This distribution aligns with regional genetic patterns and highlights thalassemia as a critical public health issue. The high prevalence may reflect a combination of genetic drift, founder effects, and cultural factors influencing marriage patterns (14).

The study reports a mortality rate of 11%, predominantly among thalassemia patients (12.8%). This finding underscores the severe clinical burden of thalassemia, necessitating enhanced medical interventions and supportive care strategies. The single mortality in sickle cell disease and absence of deaths in spherocytosis patients could reflect differences in disease severity and management protocols, consistent with global observations (15-17).

Conclusion

This study provides a comprehensive overview of hemoglobin disorders in Misan, Iraq, emphasizing the significant clinical and demographic challenges posed by these conditions. The findings underscore the need for targeted public health strategies, including genetic counseling, early diagnosis, and improved healthcare access, particularly in rural areas. Future research should focus on longitudinal studies and molecular analyses to deepen understanding and enhance management approaches for these inherited disorders.

Recommendations

Based on the findings of the study, the following recommendations are proposed to address the burden of inherited hemoglobin disorders in Misan, Iraq, and similar regions:

1. Implement Comprehensive Genetic Screening Programs
2. Strengthen Public Health Awareness
3. Enhance Access to Healthcare Services
4. Develop Patient Support Systems
5. Invest in Healthcare Infrastructure and Training
6. Promote Research and Data Collection
7. Advocate for Regional and Global Collaboration
8. Improve Public Policy

Author Contributions

The study design and performed experiments were done by Alaa Shamikh Hassan and Thaer Saleh Sabor Al-Omary In addition, all authors analyzed the data and wrote the manuscript.

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Ethics:

The study protocol was reviewed by the Human Ethics Committee of the College of Medicine, University of Misan, Iraq.

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Conflict of interest:

There is no conflict of interest.

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