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Assessing the Prevalence of Hemophilia among Visitors to the Central Bank of Kabul, Afghanistan, in 2023

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ABSTRACT

Background: Hemophilia is a rare genetic disorder characterized by excessive bleeding and debilitating joint pain resulting from deficiencies in coagulation factors VIII and IX. This cross-sectional study investigated the prevalence of hemophilia and associated factors in Afghanistan.

Methods: A cross-sectional study was conducted in 2023 involving a set of patients diagnosed with hemophilia in Kabul central blood bank. Demographic information was collected through structured interviews, while coagulation factor levels were determined using a one-step assay.

Results: Overall, 201 patients had hemophilia A, 21 had hemophilia B, mainly classified as severe. Of note, only one patient was diagnosed with HIV, HBV and HCV, emphasizing the need for ongoing surveillance.

Conclusion: The findings indicate a concerning prevalence of hemophilia in Afghanistan, underscoring the urgent need for improved screening, diagnosis, and treatment options. This study emphasizes the necessity for enhanced diagnostic resources and targeted interventions to better support affected individuals and improve overall health outcomes in the country. Additionally, the results will provide a foundation for future research and advocacy efforts in the region.

Keywords: Afghanistan, Hemophilia, Prevalence, Factor VIII inhibitors, Factor IX inhibitors

Introduction

Among the approximately 6,000 diseases associated with mutations in a single gene (1), deficiencies in clotting proteins are of particular importance as they carry a lifelong risk of bleeding, which can lead to severe health complications and increased mortality if not adequately treated (2). Hemophilia is a group of bleeding disorders that are predominantly inherited (3) and are due to mutations in genes responsible for the synthesis of clotting factors. In particular, hemophilia A is associated with mutations in the factor VIII gene, while hemophilia B is associated with mutations in the factor IX gene (4); both genes are located on the X chromosome. This X-linked inheritance pattern mainly affects males (1).

In hemophilia, bleeding frequently occurs in major joints, including the knee, ankle, hip, elbow, wrist, and shoulder. These recurrent and spontaneous bleeding episodes can result in considerable physical pain and psychological distress, negatively impacting overall well-being (5). Recurrent and

spontaneous bleeding and the associated pain affect both the physical and psychological well-being of people with hemophilia. In addition, hemophilia is associated with an increased risk of hepatitis, AIDS, anxiety, depression, and social isolation, all of which can worsen patients' quality of life as they age (6). The extent of bleeding usually correlates with the degree of factor deficiency in plasma (1). Residual factor activity correlates well with clinical features; however, individuals with comparable factor levels may exhibit different bleeding phenotypes (7).

Although hemophilia A and B were considered clinically indistinguishable in the past, this view has been challenged by more recent research. Patients with hemophilia B may have a milder bleeding tendency than hemophilia A patients with the same residual plasma levels (8). Untreated patients with severe hemophilia may experience up to 60 bleeding episodes per year, whereas patients with mild hemophilia usually experience less than one episode per year. Of note, there is often minimal clinical differentiation between moderate and severe hemophilia (9). In children diagnosed with severe hemophilia A, certain risk factors may increase the likelihood of developing inhibitors - antibodies that interfere with the effectiveness of replacement therapy. Factors such as genetic predisposition, age at the start of treatment and the type of factor concentrate used can significantly influence this risk (6).

The incidence of hemophilia A is about 1 in 5,000 male births, while hemophilia B occurs in about 1 in 30,000 male births; however, these figures can vary considerably from country to country (10). Over the decades, Afghanistan has been severely affected by armed conflict and political instability, hindered the development of a functioning health system. Despite some improvements, the country still faces major health challenges due to high population growth, illiteracy, poverty, unemployment, inflation and violence. As a result, there is currently no specific health plan for hemophilia in Afghanistan, and clotting factors are often not available in public facilities, even if patients are willing to pay informal fees. Many patients and their underprivileged families have to buy expensive medicines and care from private providers. Furthermore, inadequate access to treatment is compounded by inadequate diagnostic facilities, which is another major obstacle to effective hemophilia care in the country. The ongoing conflict has also had a profoundly traumatic impact on the mental health of Afghan children and adolescents, particularly those with Hemophilia, whose health is already at risk (6).

In response to the urgent need for diagnosis and treatment of inherited bleeding disorders, a hematology laboratory was established at Esteqlal Hospital in Kabul in 2011. In addition, the Afghanistan hemophilia Patient Association (AHPA) was founded in July 2012, which later became a member of the World Federation of hemophilia (WFH) (11). Research on hemophilia in Afghanistan is remarkably limited. Few studies have been conducted to date, indicating a significant gap in the understanding of this disease in this country.

We aimed to fill this gap by examining the prevalence of hemophilia in 2023 in Afghanistan.

Materials and Methods

Participants

This descriptive cross-sectional study was carried out at the Kabul Central Blood Bank, Afghanistan from Jan to Dec 2023. The primary objective was to include individuals either diagnosed with or suspected of having hemophilia, spanning an age range from birth to 65 years. To ensure a comprehensive representation of the population, both male

and female participants were recruited. Participants were referred from various hematology clinics and hospitals across Afghanistan, with the Central Blood Bank in Kabul serving as one of the main sites for data collection and analysis. This strategic approach allowed for a diverse population that reflects the broader demographic landscape of the country.

Data collection and blood evaluations

Data collection was meticulously carried out by two trained assistants who conducted face-to-face interviews with participants to gather essential demographic and clinical information. To ensure the accuracy and completeness of the data, structured questionnaires were employed alongside the patients' medical records. The questionnaire captured critical details, including age, gender, and ethnicity nationality. In addition to collecting demographic data, blood samples were taken from all participants for serological analysis. These samples were vital for evaluating coagulation factors. To assess coagulation factors, plasma levels of FVIII and FIX were measured using a one-stage assay. The severity of hemophilia was categorized based on FVIII and FIX activity levels as severe (<1%), moderate (1–5%), and mild (>5–30%) (12). Since factor testing is unavailable in Afghanistan, FVIII and FIX activity assessments were conducted in Pakistan. Additionally, ELISA technique was utilized to detect antibodies against infectious diseases, including HIV, HBV, and HCV, using kits from Dia. Pro, Italy.

Ethical Considerations

The ethical guidelines and regulations of the Declaration of Helsinki on Medical Research involving Human Subjects for studies with human subjects were strictly adhered to ensure the protection of the rights, welfare, and privacy of the participants (13). Before participating in the study, all participants were fully informed about the objectives and procedures of the study as well as potential risks and benefits. Informed consent was obtained from each participant confirming their voluntary participation. Strict measures were taken throughout the study to protect the confidentiality and anonymity of participant data. These measures included the use of secure data storage systems, the assignment of unique identifiers rather than personal identification data, and restricted access to the data to authorized personnel only. These practices were designed to maintain the highest ethical standards and protect participants' data throughout the research process.

Statistical analysis

The data analysis was carried out using SPSS (version 24.0) (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the demographic characteristics of the study population, including age distribution, sex ratio, and prevalence of consanguinity between parents. In addition, the overall seroprevalence rates of hemophilia within the population were calculated to gain insight into the impact of the disease on the population.

Results

The analysis of the data revealed significant insights into the demographics and clinical characteristics of individuals with hemophilia A and hemophilia B. In the study population, hemophilia A predominantly affected males, with 192 cases (95.5%), compared to just 9 cases (4.5%) in females. Similarly, for hemophilia B, males account for 20 cases (95.2%) while females constitute 1 case (4.8%). Age distribution indicated that the majority of cases for both types occurred in younger individuals, particularly those under five years old, with 116 cases (57.7%) for hemophilia A and 14 cases (66.7%) for

hemophilia B. The prevalence decreased in older age groups, with fewer cases in the 6-10 age range (43 cases or 21.4% for hemophilia A and 2 cases or 9.5% for hemophilia B) and even fewer in the 11-15 year (28 cases or 13.9% for hemophilia A and 4 cases or 19.0% for hemophilia B) and 16-20 yr (14 cases or 7.0% for hemophilia A and 1 case or 4.8% for hemophilia B). Ethnic distribution showed that the majority of affected individuals were from the Pashtun ethnic group, with 95 cases (47.3%) for hemophilia A and 9 cases (42.9%) for hemophilia B, followed by Tajik individuals with 79 cases (39.3%) for hemophilia A and 11 cases (52.4%) for hemophilia B. Other ethnic groups such as Hazara, Ozbik, Turkman, Baloch, and Arab represent a smaller percentage of cases. In terms of disease severity, the majority of individuals with both types of hemophilia are classified as having severe forms of the disease, with 154 cases (76.6%) in hemophilia A and 15 cases (71.4%) in hemophilia B. Mild cases were less common, accounting for 23 cases (11.4%) in hemophilia A and 4 cases (19.0%) in hemophilia B, while moderate cases are represented by 24 cases (11.9%) for hemophilia A and 2 cases (9.5%) for hemophilia B. Regarding co-infections, the occurrence of HIV, hepatitis B (HBS), and hepatitis C (HCV) is minimal in this population. Only 1 individual (0.5%) with hemophilia A tested positive for HIV, while all individuals with hemophilia B were negative for HIV. The same pattern holds for HBS and HCV, where only one individual with hemophilia A tested positive for these infections, while all individuals with hemophilia B were negative. Overall, this data highlights the demographic and clinical landscape of hemophilia within the studied population, emphasizing the predominance of severe cases and low rates of co-infections (Table 1).

Table 1: Prevalence and severity of different types of hemophilia among participants

Variable		***hemophilia A***		***hemophilia B***	
		Number	%	Number	%
Gender	Male	192	95.5	20	95.2
	Female	9	4.5	1	4.8
Age	<5	116	57.7	14	66.7
	6-10	43	21.4	2	9.5
	11-15	28	13.9	4	19.0
	16-20	14	7.0	1	4.8
Ethnicity	Hazara	9	4.5	1	4.8
	Tajik	79	39.3	11	52.4
	Pashtun	95	47.3	9	42.9
	Ozbik	12	6.0	0	0
	Turkman	4	2.0	0	0
	Baloch	1	0.5	0	0
	Arab	1	0.5	0	0
Severity	Mild	23	11.4	4	19.0
	Moderate	24	11.9	2	9.5
	Sever	154	76.6	15	71.4
HIV	Positive	1	0.5	0	0
	Negative	200	99.5	21	100
HBS	Positive	1	0.5	0	0
	Negative	200	99.5	21	100
HCV	Positive	1	0.5	0	0
	Negative	200	99.5	21	100

Discussion

Hemophilia is an uncommon X-linked bleeding disorder characterized by a deficiency or dysfunction of clotting factors. This disorder can lead to spontaneous bleeding, pain, joint problems (arthropathy), reduced mobility, disability, and potentially life-threatening intracranial hemorrhage (14). To reduce the negative impact of hemophilia on patients' physical health and quality of life, it is crucial to provide lifelong care and ensure a continuous infusion of clotting factors (15). To improve patient care, it is also important to collect real-world data on demographics, disease characteristics, treatments and health status to gain a comprehensive understanding. Data from Kabul Central Blood Bank and WFH show that the number of identified hemophilia patients in the country has increased from 87 in 2012 (16), 273 in 2014 (11), 288 in 2016 (16) 350 in 2019 (6) and 384 in 2021 (17).

The results of the current study showed a decline in the hemophilia population in Afghanistan, with the total number of patients reaching 222 in 2023. This decline is consistent with the lack of diagnostic centers in the country, limited to the in-country facility, and does not indicate a true decline in the prevalence of the disease. The predominance of males in the study population (95.5%) is consistent with the existing literature (14, 18-20), which suggests that hemophilia mainly affects males due to its X-linked pattern of inheritance (17). The age distribution is particularly remarkable: a significant proportion of participants (58.6%) are under five years old. This finding emphasizes the need for early diagnosis and intervention, as younger patients can present particular challenges in terms of treatment and management (21). Indeed, hemophilia presents significant challenges for children, particularly during adolescence, a critical period when teenagers struggle with the physical and emotional changes of puberty. This disorder hinders their ability to engage with environmental stimuli and affects their interactions with peers and their environment. Because adolescents are often dependent on others for help, this dependence can lead to frustration and impatience and even contribute to depression and anxiety (6).

In recent years, awareness of racial and ethnic disparities in health care and their profound impact has grown significantly. Some studies have highlighted disparities in both access to health care and quality of care in various disease areas, including diabetes, obstetrics, and oncology (22). The current study showed considerable ethnic diversity, with most cases occurring in the Pashtun (46.8%) and Tajik (40.5%) populations. In addition, the majority of patients with hemophilia A were of Tajik descent, accounting for 41% of the 167 cases, closely followed by Pashtun patients, accounting for 37% of the same cohort (12). This highlights the need for culturally sensitive health care that takes into account the unique genetic and socio-cultural factors that influence hemophilia in these communities. This high prevalence of severe cases underscores the urgent need for accessible treatment and management options, as severe hemophilia is associated with an increased risk of bleeding complications and associated morbidity. Furthermore, 55% of the 167 cases of hemophilia A are also classified as severe, reflecting a worrying upward trend in the severity of the disease (12). Transfusion-transmitted infections (TTIs) pose a significant risk to hemophilia patients receiving factor VIII and IX concentrates (23). Hemophilia CS who undergo multiple transfusions are at increased risk of viral hepatitis and other infections (24-27). In the current study, the detection of a single case of HIV, HBV and HCV in a patient raises significant concerns about the safety of blood

products and the need for stringent screening protocols. This finding highlights the importance of continuous surveillance and preventive measures, especially in regions with limited access to medical resources. Educational initiatives targeting both patients and healthcare providers to inform them about the risks of blood-borne infections in hemophilia patients are essential.

The study has some limitations that need to be considered. First, the availability of data on hemophilia in Afghanistan is severely limited, as there is hardly any comprehensive epidemiological information. This limitation is compounded by the fact that many cases are likely to go unreported due to a lack of awareness of the disease, inadequate healthcare infrastructure and limited access to diagnostic services. In addition, diagnostic problems have a significant impact on outcomes. Many healthcare providers may not have the necessary training or resources to perform reliable tests, resulting in cases being missed. The study also did not include genetic analysis to identify specific mutations associated with hemophilia in the Afghan population, further limiting its reach. Importantly, only a fraction of patients with bleeding disorders who could travel to Kabul were included. In many provinces that are far from the capital, either no patients or only a limited number of patients were registered. Finally, the study may overlook potential confounding variables such as socioeconomic status, access to health care, environmental factors, and comorbidities, confound the results and make it difficult to draw firm conclusions about prevalence and its determinants. To improve future research in this area, subsequent studies prioritize the establishment of a robust health surveillance system to collect comprehensive epidemiological data. Researchers should also advocate for training programs for healthcare providers to improve diagnostic capabilities. The inclusion of genetic studies would be beneficial to better understand the inheritance patterns of hemophilia in the Afghan population. In addition, future research should aim to control for confounding variables through the use of more sophisticated statistical methods or longitudinal designs, which could provide a clearer picture of the factors influencing hemophilia prevalence in Afghanistan.

Conclusion

This study highlights the complexity of hemophilia management in a diverse patient population. It highlights the need for targeted interventions that take into account demographic, genetic and public health factors. Continued research into the genetic basis of haemophilia, along with improved screening and treatment protocols, is critical to improving patient outcomes and quality of life.

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Conflict of interest

The authors declare that there is no conflict of interests.

References

1. Jackson M, Marks L, May GH, Wilson JB. The genetic basis of disease. Essays Biochem. 2018;62(5):643-723.
2. Khosla N, Valdez R. A compilation of national plans, policies and government

actions for rare diseases in 23 countries. Intractable Rare Dis Res. 2018;7(4):213-22.
3. Kizilocak H, Young G. Diagnosis and treatment of hemophilia. Clin Adv Hematol Oncol. 2019;17(6):344-51.
4. Weyand AC, Pipe SW. New therapies for hemophilia. Blood. 2019 Jan 31;133(5):389-398.
5. Vasava R, Shastri M, Rathod VM, Laha G, Vaishnovi V, Patel NJ, et al. A Study of Clinical Profile and Treatment in Adult Hemophilia Patients with Special Reference to the Inhibitor Levels. Cureus. 2024 Feb;16(2):e54663.
6. Mousavi SH, Dayer MS, Pourhaji F, Delshad M-H, Mesbah-Namin SA. Determinants of quality of life in children and adolescents with hemophilia in Kabul, Afghanistan. Arch Iran Med. 2019;22(7):384-9.
7. Santagostino E, Mancuso M, Tripodi A, Chantarangkul V, Clerici M, Garagiola I, et al. Severe hemophilia with mild bleeding phenotype: molecular characterization and global coagulation profile. J Thromb Haemost. 2010;8(4):737-43.
8. Castaman G, Matino D. Hemophilia A and B: molecular and clinical similarities and differences. Haematologica. 2019 Sep;104(9):1702-9.
9. Miesbach W, Schwäble J, Müller MM, Seifried E. Treatment Options in Hemophilia. Deutsches Dtsch Arztebl Int. 2019 Nov 22;116(47):791-8.
10. Mousavi SH, Khairkhah N, Bahri TD, Anvar A, Saraji AA, Behnava B, et al. First Report of Prevalence of Blood-Borne Viruses (HBV, HCV, HIV, HTLV-1 and Parvovirus B19) Among Hemophilia Patients in Afghanistan. Sci Rep. 2019 May 13;9(1):7259.
11. Mousavi SH, Mesbah-Namin SA, Rezaie N, Jazebi M, Zeinali S. Prevalence of factor VIII inhibitors among Afghan patients with hemophilia A: a first report. Blood Coagul Fibrinolysis. 2018;29(8):697-700.
12. Mousavi SH, Tabibian S, Motlagh H, Dorgalaleh A. Hemophilia A in Afghanistan, the first report. Blood Coagul Fibrinolysis. 2019 Oct;30(7):357-60.
13. Shrestha B, Dunn L. The declaration of Helsinki on medical research involving human subjects: a review of seventh revision. J Nepal Health Res Counc. 2019. Jan 21;17(4):548-552
14. Zhang L, Zhang P, Chen W. Overview of Patients with Hemophilia in China: Demographics, Diseases, Treatment, and Health Status. Patient Prefer Adherence. 2024 Jan 13;18:101-109.
15. Oldenburg J. Optimal treatment strategies for hemophilia: achievements and limitations of current prophylactic regimens. Blood. 2015 Mar 26;125(13):2038-44.
16. Mousavi SH, Qaderi S, Ahmadi A, Madadi S, Arif S, Essar MY, et al. Inherited bleeding disorders in Afghanistan: The current situation amid COVID-19. Haemophilia. 2021 Jul;27(4):e579-e580.
17. Mousavi SH, Arif S, Madadi S, Mansouritorghabeh H. Determining causes of death among individuals with haemophilia in Afghanistan. Haemophilia. 2022 Jan;28(1):86-90.
18. Asghar MS, Asghar A, Asghar F, Akram M. Spectrum of Bleeding Disorders In Pakistan: A Cross-Sectional Study. Fort J Hea Scie. 2020;3(2):110-21.
19. Kumar S, Sinha S, Bharti A, Meena LP, Gupta V, Shukla J. A study to determine the prevalence, clinical profile and incidence of formation of inhibitors in patients of hemophilia in North Eastern part of India. J Family Med Prim Care. 2019 Jul;8(7):2463-2467.
20. Huang Y, Wan C, Guan T, Xi X. Current status of treatment and disease burden of a cohort of hemophilia B in China. Front Public Health. 2024;11:1303787.
21. Srivastava A, Brewer AK, Mauser-Bunschoten EP, Key N, Kitchen S, Llinas A, et al. Guidelines for the management of hemophilia. Srivastava A, Brewer AK, Mauser-Bunschoten EP, Key N, Kitchen S, Llinas A, et al. Guidelines for the management of hemophilia. Haemophilia. 2013;19(1):e1-e47.
22. Manuel JI. Racial/ethnic and gender disparities in health care use and access. Health Serv Res. 2018 Jun;53(3):1407-1429.
23. Goedert JJ, Eyster ME, Lederman MM, Mandalaki T, De Moerloose P, White GC, et

al. End-stage liver disease in persons with hemophilia and transfusion-associated infections. Blood. 2002;100(5):1584-9.
24. Mannucci PM, Gdovin S, Gringeri A, Colombo M, Mele A, Schinaia N, et al. Transmission of hepatitis A to patients with hemophilia by factor VIII concentrates treated with organic solvent and detergent to inactivate viruses. Ann Intern Med. 1994 Jan 1;120(1):1-7.
25. Rumi M, Colombo M, Romeo R, Colucci G, Gringeri A, Mannucci P. Serum hepatitis B virus DNA detects cryptic hepatitis B virus infections in multitransfused hemophilic patients. Blood. 1990 Apr 15;75(8):1654-8. PMID: 2328316.
26. Brettler DB, Alter HJ, Dienstag JL, Forsberg AD, Levine PH. Prevalence of hepatitis C virus antibody in a cohort of hemophilia patients. Blood. 1990 Jul 1;76(1):254-6. PMID: 2114186.
27. Giangrande PL, Giangrande PL. Hepatitis in haemophilia. Br J Haematol. 1998 Oct;103(1):1-9.