



Predictors of Hemophilia Well-being Index Scores Among Patients with Hereditary Factor X Deficiency (HFXD): Insights from the HFXD in America Survey

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INTRODUCTION

Hereditary Factor X Deficiency (HFXD) is a rare genetic coagulation disorder leading to delayed hemostasis that can result in life-threatening bleeding.^{1,2}

Assessing the well-being of patients with HFXD is essential for evaluating treatment effectiveness and understanding the overall disease burden.

Patient well-being was evaluated in the HFXD in America Survey³, using an adaptation of the Hemophilia Well-being Index (HWBI).

The HWBI measures subjective well-being across 8 categories: family, health well-being, work/school, friends/relationships, love life/partnership, economic status, leisure time, and social activities.⁴

- Each category is scored 0–4 with a total summary score of 32, with a higher score indicating better well-being.

AIM

This analysis seeks to identify key patient and clinical factors that predict patient well-being, using data from the HFXD in America Survey.

METHODS

The HFXD in America Survey was a prospective, cross-sectional, online survey of patients with HFXD and patient proxies (caregivers) conducted from October 2021 to June 2022.

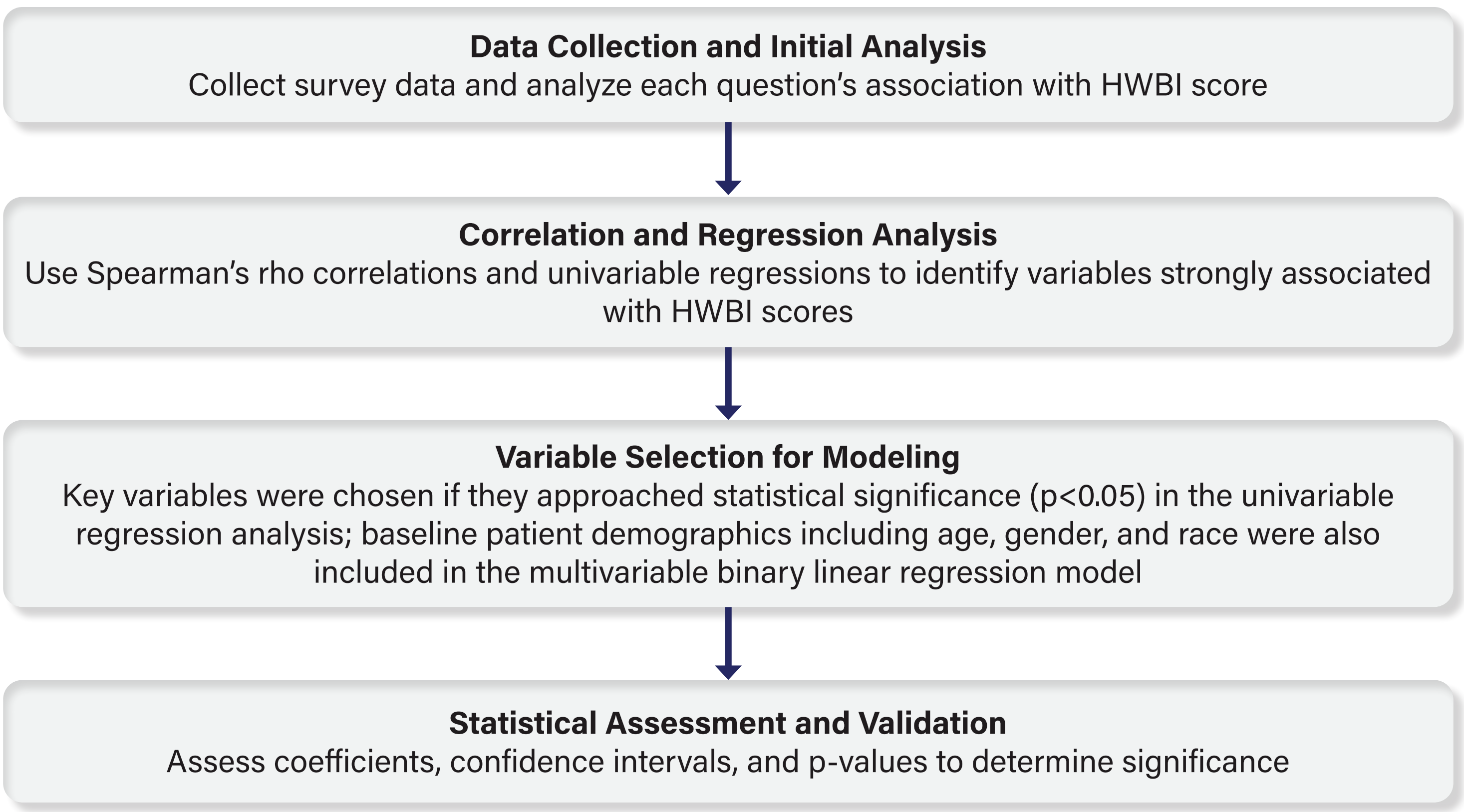
This survey assessed disease burden, quality of life, and treatment patterns.

Data from the patient survey were analyzed to assess the predictive value of survey variables on patient well-being as measured by the HWBI score.

To analyze associations with HWBI scores, Spearman’s rho correlations and univariable regressions were conducted to identify significant variables, which were subsequently included in the binary multivariable linear regression model (Figure 1).

Due to the small sample size, a parsimonious multivariable binary linear regression model was developed that used the fewest amount of variables possible. Key variables were chosen if they approached statistical significance (p<0.05) in the univariable regression analysis; key baseline patient demographics including age, gender, and race were also used as variables in the multivariable binary linear regression model.

Figure 1. Analytical Steps for Identifying Predictors of HWBI Scores



Demographics

Thirty patients completed the survey, with a mean age of 24.7 years (range: 2–65 years). The majority (60.0%) were female and 44.8% identified as White. Most patients (n=27) answered the survey questions for the HWBI, with a mean age of 26.5 years (SD: 15.0).

Table 1. Patient-Reported Demographics for Those Who Answered HWBI Questions

Patient-Reported Demographics for Those Who Answered HWBI Questions (N=27)	
Age in years, at time of survey, mean (SD)	26.5 (15.0)
Range	2-65
Gender, N (%)	27 (100.0)
Female	15 (55.6)
Male	12 (44.4)
Race, N (%)	27 (100.0)
Non-White	15 (55.6)
White	12 (44.4)
Family history of unusual bleeding, N (%)	25 (92.6)
Yes	13 (52.0)
No	12 (48.0)
Most common type of bleed, N (%)	26 (96.3)
Severe ^a	19 (73.1)
Non-severe ^b	7 (26.9)

^aSevere bleeds include the following: bleeding within the digestive tract, bleeding after a surgery, bleeding in the joint, bleeding in the muscles (soft tissue bleeds), bleeding within the skull or brain.

^bNon-severe bleeds include the following: bruising/hematoma, nose bleeds, gum bleeds, and blood in the urine.

Abbreviations: **HFXD** - Hereditary Factor X Deficiency; **SD** - Standard Deviation.

RESULTS

Predictors of HWBI Scores: Univariable Linear Regression Analysis

- Patients who reported at least 1 severe bleed as their most common type were predicted to have HWBI scores 11.41 points lower than those who did not have a severe common bleed.
- Based on the univariable linear regression results (Table 2), two variables were selected for inclusion in the multivariable linear regression analysis if they approached statistical significance of p<0.05:

1 Reporting “one of their most common type of bleeds as severe”

2 Reporting “having a close relative that has a history of unusual bleeding”

- The variables “number of severe bleeds have you had” and “presence of joint bleeding as a common bleed type” were not included separately, as these factors were already accounted for in the variable reporting “one of their most common type of bleeds as severe.”

Table 2. Predictive Factors for HWBI Score in HFXD Patients through Univariable Linear Regression

Survey Question	Variable	B Coefficient (95% CI)	P-value
What type of bleeding events are the most common?	Severe ^a or non-severe ^b	-11.14 (-17.53, -4.74)	0.001
Do you have any close relatives that have a history of unusual bleeding?	Family history of unusual bleeding or no family history of unusual bleeding	-6.36 (-13.16, 0.44)	0.065
On average, how many bleeding episodes do you experience over a typical month?	Each additional bleeding episode over a typical month	-4.83 (-11.03, 1.37)	0.121
How many most common severe bleeds have you had?	Each additional severe bleed	-4.60 (-8.35, -0.84)	0.019
How many bleeding episodes did you experience in the previous 4 weeks?	Each additional bleed in the past 4 weeks	-3.79 (-8.81, 1.22)	0.131
On what type of schedule are you currently receiving treatments?	Episodic or not episodic	6.89 (-0.60, 14.38)	0.070
Have you ever experienced bleeding in the joints?	Bleeding in the joints or no bleeding in the joints	-7.11 (-13.96, -0.27)	0.042
Have you ever experienced bleeding in the muscles or soft tissue?	Bleeding in the muscles, soft tissue or no bleeding in the muscles, soft tissue	-5.92 (-12.64, 0.80)	0.081
Have you ever experienced bleeding within the digestive tract?	Bleeding in the digestive tract or no bleeding in the digestive tract	-6.48 (-14.49, 1.54)	0.108
Is bleeding in the joints one of your most common bleeds?	Bleeding in the joints or no bleeding in the joints	-6.22 (-12.80, 0.37)	0.063
In the previous 12 months: How many different medications do you currently take for your HFXD?	Number of current medications in the previous 12 months	-5.95 (-14.92, 3.01)	0.184
In the previous 12 months: How many different medications have you ever taken for your HFXD?	Number of medications ever taken in the previous 12 months	-3.91 (-12.19, 4.38)	0.341
Are you Black or African American?	Black or African American or not Black or African American	-7.54 (-18.27, 3.19)	0.160

^aSevere bleeds include the following: bleeding within the digestive tract, bleeding after a surgery, bleeding in the joint, bleeding in the muscles (soft tissue bleeds), bleeding within the skull or brain.

^bNon-severe bleeds include the following: bruising/hematoma, nose bleeds, gum bleeds, and blood in the urine.

Abbreviations: **CI** - Confidence Interval; **HFXD** - Hereditary Factor X Deficiency; **HWBI** - Hemophilia Well-being Index.

Predictors of HWBI Scores: Multivariable Linear Regression Analysis

- After adjusting for covariables, a family history of unusual bleeding and identifying severe bleeds as one of their most common bleed types significantly predicted lower well-being based on HWBI scores (Table 3).
- Patients with a family history of unusual bleeding are predicted to score 7.59 points lower on the HWBI vs those without such a family history, where a lower score indicates worse well-being.
- Patients who reported at least one severe bleeding event as a most common bleed type were predicted to have HWBI scores that were 9.41 points lower compared to those who did not report severe bleeds as one of their most common bleed types.

Table 3. Predictive Factors for HWBI Score in Patients with HFXD through Multivariable Linear Regression

Survey Question	Variable ^a	B Coefficient (95% CI)	P-value
What is your age in years?	Years	-0.14 (-0.39, 0.11)	0.266
Which gender do you identify as?	Female or Male	1.67 (-4.91, 8.24)	0.601
What is your race?	Non-White or White	-1.49 (-7.71, 4.73)	0.621
Do you have any close relatives that have a history of unusual bleeding?	Yes or No	-7.59 (-14.2, -0.99)	0.027
What type of bleeding events are the most common?	Severe or non-severe	-9.41 (-17.28, -1.54)	0.022

^aReference groups based on survey questions: age (years), gender (male), race (white), family history of unusual bleeding (no family history of unusual bleeding) and most common bleeding type (non-severe)

Abbreviations: **CI** - Confidence Interval; **HFXD** - Hereditary Factor X Deficiency; **HWBI** - Hemophilia Well-being Index.

CONCLUSION

This analysis contributes to a better understanding of patient and clinical factors that may influence well-being of patients with HFXD

It is important for clinicians and caregivers to understand a patient’s family history and the severity of their most common bleeds, as these factors may serve as predictors of their overall well-being

These results highlight the importance of managing bleeding severity to offset its effect on well-being

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