

Health-Related Quality of Life and Productivity of Hemophilia Patients with Inhibitors

Won Chan Lee, PhD¹, Michelle Brown, PhD², Ashish V. Joshi, MS, PhD³, Chris L. Pashos, PhD¹
¹Abt Associates Inc., Bethesda, MD, USA; ²Abt Associates Inc., Lexington, MA, USA; ³Novo Nordisk Inc., Princeton, NJ, USA

Background and objectives

- Clotting replacement therapy decreases debilitating physical symptoms and increases life expectancy for hemophilia patients [1,2].
- A fraction of hemophilia patients develop inhibitors, which render clotting replacement therapy much less effective.
- Hemophilia treatment is complicated by the development of inhibitors as it increases risks of bleeding, arthropathy, physical disability and mortality [3].
- Several studies have investigated HRQL and treatment costs among hemophilia patients, yet literature specific to inhibitor patients is limited [4-7].
- The objective of this study was to measure quality of life (QL) among hemophilia patients with inhibitors in the US using an SF-12v2 survey, which allows comparison with the general population and other chronic disease populations. It will improve the understanding of the daily physical and social challenges and repercussions of living with hemophilia with inhibitors.

Methods—Data source and approaches

- Hemophilia patients with inhibitors and their caregivers were identified at several conferences in 2006, of which 90 consented to participate in further research. They were emailed survey packets with the promise of a \$100 honorarium upon completion and return.
- The survey included questions on patient and caregiver demographics, patient clinical information and an SF-12v2 survey.
- The SF-12v2 is a 7-question standard survey that measures physical and mental QL. It is commonly used to identify QL across different diseases and among the general population, making it extremely useful for comparison between different demographic groups.
- The survey measures 8 domains: physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE) and mental health (MH).

Statistical Analysis

- The SF-12v2 mental and physical component summary scores (MCS and PCS) and the 8 domains were calculated using algorithms designed specifically for the SF-12v2 survey.
- Linear regression analyses tested the relationship between the SF-12v2 scales, demographic and clinical characteristics.

Table 1. Sample demographics and clinical characteristics

	All patients (n=53)	Adult (n=21)	Children (n=30)
Gender¹(%)			
Male	96.1	95.2	96.7
Student and employment status (%)			
No work, school, or daycare	32.1	52.4	16.7
Only work	5.7	14.3	0.0
School or daycare	49.1	9.5	76.7
Work and school	13.2	23.8	6.7
Family annual income (\$US) (%)			
<20,000	18.9	19.0	20.0
20,000-49,000	20.8	23.8	13.3
50,000-74,000	28.3	23.8	33.3
75,000-100,000	5.7	0.0	10.0
>100,000	17.0	23.8	13.3
Non-responder	9.4	9.5	10.0
Health insurance (%)			
Medicaid	37.7	33.3	40.0
Medicare	17.0	38.1	3.3
Through employer	58.5	42.9	70.0
Self-pay/Private	5.7	9.5	3.3
None	3.8	4.8	0.0
Treatment mode² (%)			
On demand	77.4	81.0	73.3
Prevention	48.1	28.6	62.1*
Immunotolerance	32.7	10.0	46.7**
On demand only	39.6	61.9	26.7*
Patient surgery in last 12 months (yes) (%)	32.7	23.8	37.9
Patients with no hemorrhages (last 12 months) (%)	14.8	14.3	14.8
# Hemorrhages (last 12 months)			
Mean (SD)	11.6 (12.2)	12.9 (15.3)	10.5 (10.0)
Median (min-max)	8.0 (0.0-50.0)	6.0 (0.0-50.0)	8.0 (0.0-36.0)
Age¹			
Mean (SD)	20.7 (18.8)	37.5 (18.4)	8.9 (5.2)
Median (min-max)	15 (2.0-84.0)	34 (18.0-84.0)	10 (1.5-17.0)

*p < 0.05; **p < 0.01
¹Patient age and gender data were not provided for two patients.
²Multiple current treatment modes were reported.

Results—Demographics

- The sample of hemophilia patients with inhibitors (n=53) was predominantly male (96.1%, 49 out of 51). The mean age was 20.7 years (SD=18.8, n=51), 58.8% of whom were children under the age of 18 years (Table 1).
- Caregivers (70% mothers of patients, 16.7% fathers of patients, and 13.3% others) completed 64.7% of the survey packets on behalf of patients.
- The majority of patients had hemophilia type A (88.5%), while the remaining had type B (11.5%).

Table 2. SF-12v2 scores compared to the general US population norms

	All patients	General US population	Children	Adults
Scale Scores	Mean (SD) Min-Max (n)	Mean (SD) Min-Max (n)	Mean (SD) Min-Max (n)	Mean (SD) Min-Max (n)
Physical Functioning (PF)	42.6 (13.5)** 22.1-56.5 (50)	50.0 (10.0) 22.1-56.5 (7018)	44.8 (12.6) 22.1-56.5 (28)	39.7 (14.7) 22.1-56.5 (21)
Role Physical (RP)	41.2 (11.6)** 20.3-57.2 (50)	50.0 (10.0) 20.3-57.2 (6998)	42.2 (10.7) 20.3-57.2 (28)	40.1 (13.1) 20.3-57.2 (21)
Bodily Pain (BP)	42.0 (12.7)** 16.7-57.4 (50)	50.0 (10.0) 16.7-57.4 (6949)	42.9 (11.6) 16.7-57.4 (28)	41.9 (13.5) 16.7-57.4 (21)
General Health (GH)	46.5 (11.6)* 18.9-62.0 (47)	50.0 (10.0) 18.9-62.0 (6956)	47.9 (8.9) 29.7-62.0 (27)	44.5 (14.8) 18.9-62.0 (19)
Vitality (VT)	51.7 (10.9) 27.6-67.9 (48)	50.0 (10.0) 27.6-67.9 (6859)	54.1 (10.9) 27.6-67.9 (27)	48.8 (10.8) 27.6-67.9 (20)
Social Functioning (SF)	43.6 (12.7)** 16.2-56.6 (49)	50.0 (10.0) 16.2-56.6 (6894)	45.3 (11.0) 16.2-56.6 (27)	41.7 (14.8) 16.2-56.6 (21)
Role Emotional (RE)	46.0 (12.5)** 11.3-56.1 (50)	50.0 (10.0) 11.4-56.1 (6985)	46.1 (11.5) 11.4-56.1 (28)	46.5 (14.1) 11.3-56.1 (21)
Mental Health (MH)	49.9 (10.4) 21.9-64.5 (48)	50.0 (10.0) 15.8-64.5 (7000)	51.2 (9.9) 21.9-64.5 (27)	49.3 (10.4) 28.0-58.4 (20)
Physical Component Summary (PCS)	39.9 (12.5)** 12.9-57.8 (45)	49.6 (9.9) 4.9-69.2 (6917)	42.5 (11.4) 19.1-57.4 (26)	36.3 (13.8) 12.9-57.8 (18)
Mental Component Summary (MCS)	49.9 (12.1) 19.7-65.4 (45)	49.4 (9.8) 8.1-73.2 (6924)	51.0 (12.0) 19.7-65.4 (26)	49.2 (12.3) 27.1-64.2 (18)

Results—Mental and physical component summary scores

- Mean PCS of the patient respondents was significantly worse than that of the general US population (39.9 vs. 49.6, p<0.01). Mean MCS was comparable, 49.9 vs. 49.4 (Table 2).
- Five SF-12v2 scale scores were significantly lower (p<0.01) among respondents compared to the US general population: PF, RP, BP, SF, and RE. General health (GH) was also lower than the US general population (p<0.05).
- Mean PCS among respondents (39.3) was comparable to other chronic diseases among adults, such as diabetes (41.5), rheumatoid arthritis (40.6), and kidney disease (37.9). Mean MCS for respondents (49.9) was comparable to norm groups with diabetes (47.3) and rheumatoid arthritis (47.2), and higher than norms for kidney disease (45.2, p<0.05).
- GH and VT scale scores were higher among respondents than the chronic disease norms (p<0.01): GH, 46.5 vs. diabetes, 41.3; rheumatoid arthritis, 42.4; and kidney disease, 36.9; and VT, 51.7 vs. diabetes, 46.0; rheumatoid arthritis, 45.2; and kidney disease, 43.1. No other scale score differences were observed except for PF and RE between respondents and kidney disease norms (p<0.05).
- The results show that number of hemorrhages, PF and BP were all significant predictors of PCS (p<0.01). On demand treatment was also a significant predictor (p<0.05) (Table 3).

Table 3. Regression analyses predicting SF-12v2 scales

Dependent Variables	Independent variables			
	Hemorrhage	Surgery	On demand	Year
Physical Functioning (PF)	-0.404*	-0.063	-0.196	-0.171
Role Physical (RP)	-0.277	-0.135	-0.128	-0.064
Bodily Pain (BP)	-0.396**	-0.097	-0.303	0.096
General Health (GH)	-0.007	-0.163	-0.304	-0.115
Vitality (VT)	-0.169	-0.079	0.007	-0.212
Social Functioning (SF)	-0.163	-0.198	-0.140	0.005
Role Emotional (RE)	-0.085	-0.004	0.195	-0.105
Mental Health (MH)	-0.209	-0.040	0.173	-0.119
Physical Component Summary (PCS)	-0.380*	-0.124	-0.336*	-0.090
Mental Component Summary (MCS)	-0.002	-0.030	0.254	-0.088

*p < 0.05; **p < 0.01

Discussion

- The SF-12v2 scores suggest that the areas most affected were related to the physical domain (PCS, PF and RP).
- The resilience of mental functioning among these patients, despite physical and social deficits which impair daily activities, is notable and suggests the psychological strength of this population.
- The number of hemorrhages and on demand treatment were significant determinants of PCS, where more hemorrhages in the past 12 months and receiving only on demand therapy, vs. receiving preventive or immunotolerance treatments, were associated with lower PCS (p<0.05). The number of hemorrhages was also negatively associated with PF (p<0.05) and BP (p<0.01).

Conclusions

- The results showed that hemophilia patients with inhibitors have a significantly lower physical quality of life than the general U.S. population; however, despite physical pain and limitation, patients have a comparable mental quality of life. Continued research into effective treatments is extremely important in order to improve the physical quality of life among hemophilia patients with inhibitors.

References
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