



Universiteit
Leiden
The Netherlands

Illness cognitions associated with health-related quality of life in young adult men with haemophilia

Limperg, P.F.; Maurice-Stam, H.; Heesterbeek, M.R.; Peters, M.; Coppens, M.; Kruij, M.J.H.A.; ... ; Haverman, L.

Citation

Limperg, P. F., Maurice-Stam, H., Heesterbeek, M. R., Peters, M., Coppens, M., Kruij, M. J. H. A., ... Haverman, L. (2020). Illness cognitions associated with health-related quality of life in young adult men with haemophilia. *Haemophilia*, 26(5), 793-799.
doi:10.1111/hae.14120

Version: Publisher's Version
License: [Creative Commons CC BY 4.0 license](#)
Downloaded from: <https://hdl.handle.net/1887/3184913>

Note: To cite this publication please use the final published version (if applicable).

ORIGINAL ARTICLE

Clinical haemophilia

Illness cognitions associated with health-related quality of life in young adult men with haemophilia

Perrine F. Limperg¹  | Heleen Maurice-Stam¹ | Madelief R. Heesterbeek¹ |
 Marjolein Peters² | Michiel Coppens³ | Marieke J. H. A. Kruij⁴  | Jeroen Eikenboom⁵ |
 Martha A. Grootenhuys¹ | Lotte Haverman¹ 

¹Psychosocial Department, Emma Children's Hospital, Amsterdam UMC, University of Amsterdam, Amsterdam, The Netherlands

²Department of Pediatric-Hematology, Emma Children's Hospital and Hemophilia Comprehensive Care Treatment Center, Amsterdam UMC, University of Amsterdam, Amsterdam, The Netherlands

³Department of Vascular Medicine, Amsterdam Cardiovascular Sciences, Amsterdam UMC, University of Amsterdam, Amsterdam, The Netherlands

⁴Department of Hematology, Hemophilia Comprehensive Care Treatment Center, Erasmus University Medical Center, Rotterdam, The Netherlands

⁵Division of Thrombosis and Hemostasis, Department of Internal Medicine, Leiden University Medical Center, Leiden, The Netherlands

Correspondence

Lotte Haverman, Psychosocial Department, Emma Children's Hospital/Amsterdam UMC, G8-136, Post Box 22660, 1100 DD Amsterdam, The Netherlands.
 Email: L.haverman@amc.nl

Abstract

Introduction and Aim: Knowledge on patterns of beliefs about the illness (illness cognitions) can provide insight into individual differences in adjustment to haemophilia. The current study aimed to identify (a) which sociodemographic and disease characteristics were associated with illness cognitions and (b) which illness cognitions were associated with health-related quality of life (HRQOL) in young adult men with haemophilia, besides sociodemographic and disease characteristics.

Methods: Young adult men (18-30 years) with haemophilia in the Netherlands participated in an online multicentre cross-sectional study. Participants completed the Pediatric Quality of Life Inventory Young Adult version (*PedsQL_YA*). Potential sociodemographic determinants were assessed with the Course of Life Questionnaire (*CoLQ*) and illness cognitions with the Illness Cognition Questionnaire (*ICQ*). Multiple linear regression analyses were performed to assess potential determinants of illness cognitions and HRQOL.

Results: Seventy young adult men with haemophilia (mean age 24.7 years, SD 3.5) participated. Born outside the Netherlands (β -0.24) and >1 bleed past 6 months (β -0.32) were associated with less acceptance of the disease. More acceptance was associated with better HRQOL in all domains: β 0.23-0.39. More helplessness was associated with worse total (β -0.30) and physical (β -0.42) HRQOL. Disease benefits, sociodemographic and disease characteristics were not associated with HRQOL.

Conclusion: Illness cognitions are associated with HRQOL in young adult men with haemophilia. Early recognition and identification of illness cognitions are important to facilitate support and psychosocial treatment to optimize young adults' well-being. Extra attention is needed for young adult men with frequent bleeds because they are at risk of lowered levels of acceptance of the disease.

KEYWORDS

haemophilia, health-related quality of life, illness cognitions, young adults

1 | INTRODUCTION

Adolescents and young adults with haemophilia experience impairments in daily life, such as restrictions in physical activity, travelling and school/work participation, despite adequate treatment available.^{1,2} Although most adolescents and young adults growing up with haemophilia adjust well to adult life, others struggle with the impact of their condition on overall well-being.^{2,3} For young adults with haemophilia, the transitional phase from childhood to adulthood, with increased independence and responsibilities, may be challenging.^{2,4} Previous research in young adults with haemophilia in the Netherlands has shown that young adult men with bleeding disorders had lower health-related quality of life (HRQOL) and lower self-esteem than their healthy peers.²

The nature and magnitude of physical, mental and social problems in adult life can vary greatly from patient to patient, even in those with the same chronic illness and illness severity.⁵ Medical parameters appeared to be insufficient to understand the effects of the disease on functioning of patients. This led to the hypothesis that psychosocial factors contribute to health outcomes^{6,7} and to the investigation of psychosocial correlates of adjustment to chronic disease.

Coping strategies are a central element in adjustment to chronic disease.^{8,9} According to the model of stress and coping developed by Lazarus and Folkman¹⁰ coping consists of actions, behaviours and thoughts aimed at dealing with events that are appraised as stressful, such as a chronic illness. Persons growing up with chronic illness generally develop patterns of beliefs about their condition, so-called illness perceptions or cognitions.^{5,11} Illness cognitions determine how patients cope with their chronic illness, such as adherence to treatment and emotional responses to their condition.¹¹⁻¹³ In this way, illness cognitions may attribute to individual differences in physical and psychological functioning of patients.¹¹ Research has shown that patients who emphasize the negative aspects of their illness often generalize their illness cognitions to several facets of daily life and consequently experience worse physical and psychological functioning.^{5,11,14,15} As such, illness cognitions can be seen as factors predicting physical functioning, psychological distress and perhaps even adaptation to society.¹¹

Recently, Pinto et al¹⁶ found that adults with haemophilia who had a heightened perception of detrimental consequences of haemophilia were more likely to suffer from depressive symptoms.¹⁶ As far as we know, illness cognitions of (young) adults with haemophilia have furthermore only been studied in relation to treatment adherence.^{13,17} More knowledge about the relation between illness cognitions and well-being and HRQOL is important, in order to be able to support persons with haemophilia towards successful independence in adulthood. Knowledge on (mal)adaptive cognitions can provide insight into individual differences in adjustment to the haemophilia and facilitate early intervention.¹¹ Therefore, we aimed to study (a) which sociodemographic and disease characteristics were associated with illness cognitions and (b) which illness cognitions

were associated with HRQOL in young adult men with haemophilia, besides sociodemographic and disease characteristics.

2 | MATERIAL AND METHODS

2.1 | Participants

Young adult men aged 18-30 years with haemophilia A or B were eligible for participation in the present study. This study was part of a larger study on HRQOL and psychosocial well-being of young adults with congenital bleeding disorders.² Young adults under treatment in one of the three participating haemophilia treatment centres (HTC's) in the Netherlands (Amsterdam University Medical Centers, Erasmus University Medical Center Rotterdam and Leiden University Medical Center) and members of the Dutch Hemophilia Patient Society Young Adult committee (DHPSYA) were included.

2.2 | Procedure

Between May and October 2015 invitational letters, including login codes for online questionnaires, were sent out to the eligible young adults of the haemophilia treatment centres and to members of the DHPSYA, after approval by the Medical Ethics Committees of the Amsterdam University Medical Centers and Leiden University Medical Center. To recruit additional respondents, the DHPSYA posted an online call for participation on their website and Facebook page. Online informed consent was obtained from all participants by clicking to consent, after signing in on a secured website. After consent, participants could complete the questionnaires anonymously on the secured website. Completion of the questionnaires took 45 minutes.

2.3 | Measures

2.3.1 | Sociodemographic and disease characteristics

Sociodemographics of the participants were assessed with questions from the Course of Life Questionnaire (CoLQ),¹⁸ regarding age, ethnicity, education, employment and marital status. Education was divided into three categories according to the classification of Statistics Netherlands (www.cbs.nl); low (primary education, lower vocational education, lower and middle general secondary education), middle (middle vocational education, higher secondary education, pre-university education), high (higher vocational education, university). Norms of young adults from the general Dutch population are available (data not published), from which we selected the male young adults (N = 321) for the current study.

Respondents were asked medical questions regarding the severity of the disease (severe haemophilia <1% clotting factor present in

blood, non-severe haemophilia 1%-40% clotting factor), treatment (on-demand in case of bleed versus prophylaxis) and number of bleeds in the past six months (more than one versus one or no bleeds).

2.3.2 | Illness Cognitions Questionnaire (ICQ)

Illness cognitions were assessed with the Dutch Illness Cognition Questionnaire (ICQ),¹¹ a self-report instrument which measures generic illness beliefs across various chronic conditions, containing 18 items in three scales: helplessness (6 items, focusing on the negative consequences of the disease and generalizing them to functioning in daily life), acceptance (6 items, the ability to manage negative consequences of the disease and acknowledging being chronically ill) and perceived disease benefits (6 items, perceiving positive, long-term consequences of the disease). Items (cognitions) are scored on a 4-point Likert scale, ranging from 'not at all' (1) to 'completely' (4). Scale scores are calculated by summing up the item scores. Higher scores indicate stronger presence of the illness cognition. The validity and reliability of the ICQ scales are good.^{11,19} Cronbach's alphas in the present study were 0.82 for acceptance, 0.85 for disease benefits and 0.88 for helplessness.

2.3.3 | Pediatric Quality of Life Inventory (PedsQL 4.0) generic core scales young adult version

The Dutch version of the Pediatric Quality of Life Inventory generic core scales young adults version (PedsQL_YA; 18-30 years) was used,^{20,21} a generic self-report HRQOL instrument containing 23 items in four scales; physical health (8 items), emotional functioning (5 items), social functioning (5 items) and work/school functioning (5 items). A psychosocial health scale score (emotional, social and work/school functioning) and a total scale score can be computed. Items (HRQOL problems) are scored on a 5-point Likert scale, ranging from 'never' (0) to 'almost always' (4). Each answer is reversed scored and rescaled to a 0-100 scale, so that higher scores indicate better HRQOL. The validity and reliability of the PedsQL_YA scales are good.²⁰ Cronbach's alphas in the present study ranged from 0.71 (social functioning) to 0.89 (total scale). Norms of young adults from the general Dutch population are available,²⁰ from which we selected the male young adults (N = 317) for the current study.

2.4 | Data analysis

Descriptive analyses were conducted to describe the characteristics of the young adult men with haemophilia and chi-square tests were used to compare them with 321 young adult men from the general population. To characterize the sample in terms of HRQOL, PedsQL_YA scores of young adult men with haemophilia were compared with PedsQL_YA scores of 317 young adult men from the general Dutch population,²⁰ using independent t tests.

Multiple linear regression models were estimated for illness cognitions (ICQ) and HRQOL (PedsQL_YA) in young adult men with haemophilia. Preselection of sociodemographic and disease variables (independent variables) was necessary because the number of independent variables was too large in relation to the sample size. Only the independent variables that correlated significantly ($P < .05$) with at least one of the outcomes were included in the multiple regression models. This resulted in the exclusion of the following variables: educational level, marital status and employment status. Severity of haemophilia was excluded from the regression models because it was too strongly associated with type of treatment. Type of treatment was included in the regression models because it was considered more relevant than severity and also indicative of severity.

To assess which of the above selected sociodemographic and disease variables (independent variables) were associated with illness cognitions in young adult men with haemophilia, linear regression models were estimated for the three illness cognitions (ICQ) separately. To assess which illness cognitions, sociodemographic and disease variables were associated with HRQOL (PedsQL_YA) in young adult men with haemophilia, regression models were estimated for all HRQOL outcomes separately.

Standardized regression coefficients (β) were reported, expressing the strength of the association between the outcomes and illness cognitions, sociodemographic and disease variables. Standardized regression coefficients of 0.2, 0.5, and 0.8 were considered small, medium and large respectively for binary-coded variables.²² Standardized regression coefficients of 0.1, 0.3 and 0.5 were considered small, medium and large respectively for continuous variables.²³

3 | RESULTS

3.1 | Characteristics of young adults with haemophilia

A total of 70 young adult men with haemophilia were eligible for the present study. They were participants in a larger study on HRQOL and well-being among 95 young adults with congenital bleeding disorders (response rate 46.9%), including 70 men with haemophilia, 17 women and 8 men with bleeding disorders other than haemophilia.² Table 1 presents the sociodemographic and disease characteristics of the young adult men with haemophilia as well as their scores on HRQOL. The mean age of the 70 men was 24.7 years (SD 3.5). Young adult men with haemophilia had significantly lower HRQOL ($P < .05$) on physical health and on total HRQOL than young adult men from the general population.

3.2 | Illness cognitions and HRQOL

Table 2 shows the results from the multiple regression analyses for young adult men with haemophilia (N = 70). Being born in the Netherlands was associated with more acceptance of the disease

TABLE 1 Characteristics of young adult men with haemophilia

	Haemophilia		Norm		P-value
	N	M (SD)	N	M (SD)	
Sociodemographic characteristics ^a					
Age	70	24.2 (3.5)	321	24.1 (4.0)	.97
	N	%	N	%	
Country of birth (Netherlands) ^b	61	87.1	313	97.5	.00
Education ^c					
High	13	18.6	78	24.3	.58
Middle	40	57.1	167	52.0	
Low	17	24.3	76	23.7	
Marital status (married/living together)	17	24.3	102	31.8	.22
Paid employment (yes) ^b	40	57.1	227	70.7	.03
Haemophilia characteristics					
Type of haemophilia					
Haemophilia A	55	78.6			
Haemophilia B	15	21.4			
Type of treatment haemophilia					
Prophylaxis ^d	35	50.0			
On demand—in case of bleed	35	50.0			
Severity of haemophilia					
Non-severe (>1%)	36	51.4			
Severe (<1%)	34	48.6			
	N	Median (range)			
Number of bleeds past 6 months requiring treatment	70	1.00 (0-20)			
	N	M (SD)	N	M (SD)	
HRQOL ^{e,f}					
Physical ^b	70	86.2 (16.0)	317	90.8 (13.2)	.03
Emotional	70	80.8 (17.2)	317	81.8 (17.4)	.66
Social	70	86.1 (13.9)	317	88.6 (14.1)	.17
Work/school	70	79.4 (15.8)	317	83.2 (15.3)	.06
Psychosocial health	70	82.1 (13.3)	317	84.5 (13.7)	.17
Total ^b	70	83.5 (12.0)	317	86.7 (12.2)	.046

^aNorm group consists of 321 young adult men from the general Dutch population (not published).

^bYoung adult men with haemophilia differed significantly from the norm group.

^cHighest level completed: Low: primary education, lower vocational education, lower and middle general secondary education; Middle: middle vocational education, higher secondary education, pre-university education; High: higher vocational education, university.

^dAll patients with severe form of haemophilia and 1 out of 36 patients with non-severe form were prophylactic treated with clotting factor concentrates.

^eHigher scores indicate better HRQOL.

^fNorm group consists of 317 young adult men from the general Dutch population.²⁰ Four out of the 321 young adult men from the norm group could not be included in the analyses of HRQOL because of too many missing scores.

($\beta = 0.24$, $P < .05$), while more than one bleed in the past six months was associated with less acceptance ($\beta = -0.32$, $P < .01$). No other associations were found between illness cognitions and sociodemographic and disease variables.

The regression models showed that none of the sociodemographic and disease variables were significantly associated with HRQOL. With regard to the illness cognitions, more

feelings of helplessness were associated with worse total HRQOL ($\beta = -0.30$, $P < .05$) and worse physical health ($\beta = -0.42$, $P < .001$). Helplessness was not associated with the other PedsQL_YA scales. Higher levels of disease acceptance were associated with better HRQOL on all PedsQL_YA scales ($\beta = 0.23$ – 0.39 , $P < .05/.01$). The illness cognition 'disease benefits' was not associated with any outcome.

TABLE 2 Multiple linear regression models of illness cognitions and HRQOL in young adult men with haemophilia (N = 70); regression coefficients β

Illness Cognitions (ICQ)	Helplessness β	Acceptance β	Disease benefits β
Age	0.19	-0.10	0.20
Country of birth (the Netherlands)	-0.20	0.24*	-0.01
Type of treatment (on-demand)	-0.12	-0.08	-0.20
Number of bleeds (>1 past 6 mo)	0.20	-0.32**	-0.01
R ²	0.19	0.18	0.09
F	3.73**	3.67**	1.59

HRQOL (PedsQL_YA)	Total score β	Physical health β	Emotional functioning β	Social functioning β	School/work functioning β	Psychosocial health β
Age	-0.07	-0.12	-0.01	-0.07	0.02	-0.02
Country of birth (the Netherlands)	-0.01	0.03	-0.05	0.03	-0.06	-0.03
Type of treatment (on-demand)	-0.11	0.14	-0.24	-0.15	-0.21	-0.24
Number of bleeds (>1 past 6 mo)	0.01	-0.09	0.17	0.02	-0.02	0.07
Illness Cognition—Helplessness	-0.30*	-0.42***	-0.17	-0.01	-0.19	-0.15
Illness Cognition—Acceptance	0.38**	0.23*	0.30*	0.33*	0.36**	0.39**
Illness Cognition—Disease Benefits	-0.04	-0.07	-0.03	-0.03	0.03	-0.01
R ²	0.35	0.44	0.10	0.04	0.15	0.15
F	4.72***	8.78***	2.04	1.40	2.77*	2.77*

*P < .05.

**P < .01.

***P < .001.

The significant betas were presented in bold.

4 | DISCUSSION AND CONCLUSION

This study aimed to assess potential determinants of illness cognitions, and HRQOL in young adult men with haemophilia. The results demonstrated that *higher* levels of 'acceptance' of haemophilia and *lower* levels of 'helplessness' were associated with better HRQOL, while the illness cognition 'disease benefits' was not associated with HRQOL. Young adult men with more than one bleed in the past 6 months and/or born outside the Netherlands appeared to be at risk of lowered levels of acceptance.

The results indicate that higher levels of acceptance of the haemophilia (learning to live with it) might influence HRQOL positively, while experiencing feelings of helplessness (such as inability to control a particular situation or emphasizing negative aspects of the haemophilia) seemed to influence HRQOL negatively. Previous research showed that young adults with higher levels of feelings of helplessness were more likely to have a negative view of their future, which could be a risk factor for the development of psychological distress over time.¹¹ We did not find perceived disease benefits to be associated with HRQOL. This is in line with previous research in children and young adults with chronic illness, where it was found that higher disease-related burden was strongly associated with worse psychological outcomes (such as HRQOL), while benefit was not, or weakly correlated with psychological outcomes.^{5,24,25}

Psychosocial factors such as illness cognitions seemed to contribute to individual differences in psychosocial well-being of men with haemophilia and to the adjustment of young adults with other chronic conditions.⁵ These findings support the notion that disease characteristics, such as type of treatment and number of bleeds, appeared to be insufficient to understand the effects of the disease on functioning of persons with haemophilia. These findings underline the importance of creating awareness in healthcare providers of the contribution of psychosocial factors to the well-being of young adults with haemophilia, and therefore, of the importance of psychosocial care for persons with haemophilia.²⁶ Special focus (eg by psychologists and social workers) should be on the acceptance of the haemophilia. It is recommended to monitor how children and adolescents cope with haemophilia and to support them in an early stage.^{5,26,27} Monitoring is especially needed in young adult men who have more than one bleed in half a year because the level of acceptance of their disease was lower than in the other young adult men with haemophilia. Identifying problems early would provide a chance to support persons with haemophilia at risk for developing unfavourable outcomes later in life, such as emotional problems and difficulties managing their disease, and to optimize their well-being. Also in adult healthcare, attention should be paid to illness cognitions and to the possible consequences of illness cognitions for psychosocial functioning and HRQOL.^{26,28} Cognitive-behavioural

therapy could optimize well-being of persons with haemophilia. It is an evidence-based psychological intervention that focuses on changing unhelpful (illness) cognitions into helpful ones.²⁹ Cognitive-behavioural therapy was proven to be effective in the improvement of physical and emotional functioning, in face-to-face and internet format, and in individual and group format.^{27,30-35}

4.1 | Limitations

Some limitations of this study should be taken into account, such as the moderate response rate. Recruitment was quite difficult, possibly due to the time consuming nature of the completion of the questionnaires. Unfortunately, we did not have information about the non-respondents so that we do not know whether the results are representative for young adult men with haemophilia. Another limitation concerns the cross-sectional study design, which prevents us from drawing conclusions about causality. Caution is warranted in interpreting the associations between HRQOL and illness cognitions. We are not able to conclude with certainty that illness cognitions influence HRQOL; it is also possible that HRQOL influences illness cognitions. For the future, it would be interesting to collect longitudinal data during the transitional phase to adulthood to identify which factors influence psychosocial adaptation in young adults with haemophilia.

5 | CONCLUSION

In conclusion, acceptance and helplessness are illness cognitions that might influence HRQOL in a positive or negative way, respectively. Future research should confirm the role of illness cognitions in the psychosocial adaptation to haemophilia. Both paediatric and adult healthcare providers should be aware of illness cognitions as these constructs are well treatable with the use of cognitive behavioural therapy. Monitoring illness cognitions is recommended to be able to provide support in an early stage. Extra attention is needed for young adult men with frequent bleeds because they are at risk of lowered levels of acceptance of the disease.

ACKNOWLEDGEMENTS

We would like to thank all participating young adults in this study. Also, we are grateful to the Dutch Hemophilia Patient Society for assisting the patient recruitment.

DISCLOSURES

M. Coppens has received consultancy fees from CSL Behring, Sanofi and UniQure, research support from CSL Behring and Bayer and is study investigator for his institution for trials sponsored by Bayer, UniQure and Sanofi. All funds were received by the institution. J. Eikenboom has received research support from CSL Behring and a fee for educational activities from Roche. M.J.H.A. Kruij received research grants from Pfizer, Bayer, Daiichi Sankyo, Boehringer Ingelheim

and speakers fee from Bayer. M. Peters received research grants from Pfizer and CSL Behring. The other authors stated that they had no interests which might be perceived as posing a conflict or bias.

AUTHOR CONTRIBUTIONS

PFL carried out the literature study, organized data collection, led data analysis and drafted the manuscript. HM-S supervised data collection and data analysis and drafted the manuscript. MRH critically revised the manuscript. MP conceived the study, supervised data analysis and critically revised the manuscript. MC, MJHAK and JE contributed in organizing data collection and critically revised the manuscript for intellectual content. MAG conceived the study, supervised data collection and critically revised the manuscript for intellectual content. LH supervised data collection and data analysis, and critically revised the manuscript. All authors read and approved the final manuscript.

ORCID

Perrine F. Limperg  <https://orcid.org/0000-0001-8201-2125>

Marieke J. H. A. Kruij  <https://orcid.org/0000-0002-0265-4871>

Lotte Haverman  <https://orcid.org/0000-0001-7849-0562>

REFERENCES

1. Limperg P, Peters M, Gibbons E, et al. Themes in daily life of adolescents and young adults with congenital bleeding disorders: a qualitative study. *Haemophilia*. 2016;22(4):e330-e333.
2. Limperg PF, Haverman L, Maurice-Stam H, et al. Health-related quality of life, developmental milestones, and self-esteem in young adults with bleeding disorders. *Qual Life Res*. 2018;27(1):159-171.
3. Canclini M, Saviolo-Negrin N, Zanon E, Bertolotti R, Girolami A, Pagnan A. Psychological aspects and coping in haemophilic patients: a case-control study. *Haemophilia*. 2003;9(5):619-624.
4. Geerts E, van de Wiel H, Tamminga R. A pilot study on the effects of the transition of paediatric to adult health care in patients with haemophilia and in their parents: patient and parent worries, parental illness-related distress and health-related Quality of Life. *Haemophilia*. 2008;14(5):1007-1013.
5. Verhoof E, Maurice-Stam H, Heymans H, Evers A, Grootenhuis M. Psychosocial well-being in young adults with chronic illness since childhood: the role of illness cognitions. *Child Adolesc Psychiatry Ment Health*. 2014;8(1):12.
6. Boot CRL, Heijmans M, van der Gulden JWW, Rijken M. The role of illness perceptions in labor participation of the chronically ill. *Int Arch Occup Environ Health*. 2008;82(1):13-20.
7. Engel GL. The need for a new medical model: a challenge for biomedicine. *Science*. 1977;196(4286):129-136.
8. Wallander JL, Varni JW. Effects of pediatric chronic physical disorders on child and family adjustment. *J Child Psychol Psychiatry*. 1998;39(1):29-46.
9. Wallander JL, Varni JW. Adjustment in children with chronic physical disorders: programmatic research on a disability-stress-coping model. In LaGreca A, Siegel L, Wallander J, Walker CE, eds. *Stress and Coping with Pediatric Conditions*. New York, NY: Guilford Press; 1992:279-298.
10. Lazarus RS, Folkman S. *Stress, Appraisal and Coping*. New York, NY: Springer; 1984.
11. Evers AW, Kraaijmaat FW, van Lankveld W, Jongen PJ, Jacobs JW, Bijlsma JW. Beyond unfavorable thinking: the illness cognition questionnaire for chronic diseases. *J Consult Clin Psychol*. 2001;69(6):1026-1036.

12. Hoving JL, van der Meer M, Volkova AY, Frings-Dresen MHW. Illness perceptions and work participation: a systematic review. *Int Arch Occup Environ Health*. 2010;83(6):595-605.
13. Llewellyn CD, Miners AH, Lee CA, Harrington C, Weinman J. The illness perceptions and treatment beliefs of individuals with severe haemophilia and their role in adherence to home treatment. *Psychol Health*. 2003;18(2):185-200.
14. Vriezেকolk J, Eijsbouts A, Evers A, Stenger A, Van Den Hoogen F, van Lankveld W. Poor psychological health status among patients with inflammatory rheumatic diseases and osteoarthritis in multidisciplinary rehabilitation: need for a routine psychological assessment. *Disabil Rehabil*. 2010;32(10):836-844.
15. Voerman GE, Erren-Wolters CV, Fleuren JF, Hermens HJ, Geurts AC. Perceived spasticity in chronic spinal cord injured patients: associations with psychological factors. *Disabil Rehabil*. 2010;32(9):775-780.
16. Pinto PR, Paredes AC, Moreira P, et al. Emotional distress in haemophilia: factors associated with the presence of anxiety and depression symptoms among adults. *Haemophilia*. 2018;24(5):e344-e353.
17. Lamiani G, Strada I, Mancuso ME, et al. Factors influencing illness representations and perceived adherence in haemophilic patients: a pilot study. *Haemophilia*. 2015;21(5):598-604.
18. Grootenhuis MA, Stam H, Destree-Vonk A, Heymans HS, Last BF. Levensloop vragenlijst voor jong-volwassenen. [Course of life questionnaire for young adults]. *Gedrag en Gezondheid*. 2003;31(1):336-350.
19. Lauwerier E, Crombez G, Van Damme S, Goubert L, Vogelaers D, Evers AW. The construct validity of the illness cognition questionnaire: the robustness of the three-factor structure across patients with chronic pain and chronic fatigue. *Int J Behav Med*. 2010;17(2):90-96.
20. Limperg PF, Haverman L, van Oers HA, Van Rossum MA, Maurice-Stam H, Grootenhuis MA. Health related quality of life in Dutch young adults: psychometric properties of the PedsQL generic core scales young adult version. *Health Qual Life Outcomes*. 2014;12(1):9.
21. Varni JW, Limbers CA. The PedsQL 4.0 Generic Core Scales Young Adult Version: feasibility, reliability and validity in a university student population. *J Health Psychol*. 2009;14(4):611-622.
22. Cohen J. The statistical power of abnormal-social psychological research: a review. *J Abnorm Soc Psychol*. 1962;65:145-153.
23. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
24. Maurice-Stam H, Broek A, Kolk AM, et al. Measuring perceived benefit and disease-related burden in young cancer survivors: validation of the Benefit and Burden Scale for Children (BBSC) in the Netherlands. *Support Care Cancer*. 2011;19(8):1249-1253.
25. Currier JM, Hermes S, Phipps S. Brief report: Children's response to serious illness: perceptions of benefit and burden in a pediatric cancer population. *J Pediatr Psychol*. 2009;34(10):1129-1134.
26. Limperg PF, Haverman L, Beijlevelt M, et al. Psychosocial care for children with haemophilia and their parents in the Netherlands. *Haemophilia*. 2017;23(3):362-369.
27. Haverman L, van Rossum MAJ, van Veenendaal M, et al. Effectiveness of a web-based application to monitor health-related quality of life. *Pediatrics*. 2013;131(2):e533-e543.
28. van Staa AL, Jedeloo S, van Meeteren J, Latour JM. Crossing the transition chasm: experiences and recommendations for improving transitional care of young adults, parents and providers. *Child Care Health Dev*. 2011;37(6):821-832.
29. Thompson RD, Delaney P, Flores I, Szigethy E. Cognitive-behavioral therapy for children with comorbid physical illness. *Child Adolesc Psychiatr Clin North Am*. 2011;20(2):329-348.
30. Scholten L, Willemsen A, Last B, et al. Efficacy of psychosocial group intervention for children with chronic illness and their parents. *Pediatrics*. 2013;131(4):1196-1203.
31. Last BF, Stam H, Onland-van Nieuwenhuizen AM, Grootenhuis MA. Positive effects of a psycho-educational group intervention for children with a chronic disease: first results. *Patient Educ Couns*. 2007;65(1):101-112.
32. Andersson G, Cuijpers P, Carlbring P, Riper H, Hedman E. Guided Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: a systematic review and meta-analysis. *World Psychiatry*. 2014;13(3):288-295.
33. van Beugen S, Ferwerda M, Hoeve D, et al. Internet-based cognitive behavioral therapy for patients with chronic somatic conditions: a meta-analytic review. *J Med Internet Res*. 2014;16(3):e88.
34. Hofmann SG, Asnaani A, Vonk IJ, Sawyer AT, Fang A. The efficacy of cognitive behavioral therapy: a review of meta-analyses. *Cogn Ther Res*. 2012;36(5):427-440.
35. Butler AC, Chapman JE, Forman EM, Beck AT. The empirical status of cognitive-behavioral therapy: a review of meta-analyses. *Clin Psychol Rev*. 2006;26(1):17-31.

How to cite this article: Limperg PF, Maurice-Stam H, Heesterbeek MR, et al. Illness cognitions associated with health-related quality of life in young adult men with haemophilia. *Haemophilia*. 2020;26:793-799. <https://doi.org/10.1111/hae.14120>