Hopland-Nechita, F.V., Andersen, J.R. & Beisland, C. IPSS “bother question” score predicts health-related quality of life better than total IPSS score. *World J Urol* **40**, 765–772 (2022). https://doi.org/10.1007/s00345-021-03911-2

IPSS «bother question» score predicts health-related quality of life better than total IPSS score

Florin V Hopland-Nechita, MD[1]; John R Andersen, PhD [1,2]; Christian Beisland, MD, PhD[3,4]

[1]Urology Department, Førde Central Hospital, Førde, Norway

[2] Western Norway University of Applied Sciences, Førde, Norway

[3]Department of Clinical Medicine, University of Bergen, Bergen, Norway

[4]Department of Urology, Haukeland University Hospital, Bergen, Norway

Abstract

Objective

To investigate the role of bothersomeness of urinary symptoms on the general health-related quality of life (HRQoL) of patients with benign prostatic hyperplasia. We hypothesized that a higher International Prostate Symptom Score (IPSS) would be associated with a higher score on the IPSS bother question (IPSS-BQ), and a higher IPSS-BQ score would be the dominant factor associated with poorer general HRQoL.

Materials and methods

A case control, cross-sectional study design was used. Patients were selected according to strict inclusion and exclusion criteria and stratified by IPSS severity group (controls: IPSS < 8; moderately symptomatic: IPSS = 8-18; and severely symptomatic: IPSS > 18). The IPSS-BQ was used to analyse bothersomeness of urinary symptoms. A standardised, multidimensional measure of HRQoL (RAND-36) was used. Data were collected on prostate size, uroflowmetry parameters, prostate specific antigen and comorbidities that were quantified using the Charlson Index and the American Association of Anaesthesiologists (ASA) score. Multiple linear regression models were used to assess the impact of bothersomeness of urinary symptoms on physical and mental HRQoL. Cohen's d was used to determine the effect size.

Results

We included 83 patients in the statistical analysis. Linear regression analyses showed that the IPSS was not an independent predictor of HRQoL. Only the highest IPSS-BQ score was associated with both worse physical (P = 0.021) and mental (P = 0.011) HRQoL in the final model. The effect sizes were small to moderate.

Conclusion

The IPSS-BQ score is an important predictor of HRQoL. The IPSS-BQ score as a proxy should be regarded as a standard outcome measure and reported in all LUTS-related research.

Keywords: IPSS "bother question", RAND-36, Health-related quality of life, Bothersomness of LUTS

Introduction

Benign prostatic hyperplasia (BPH) is a progressive disease and the main cause of lower urinary tract symptoms (LUTS) in aging men[1]. The presence of moderate to severe LUTS is associated with decrements in general health related quality of life (QoL)[2], which refers to "how health impacts on an individual's ability to function and his or her perceived well-beeing in physical, mental and social domains of life"[3] The degree to which these symptoms bother patients (bothersomeness) is a key decision point in the diagnosis and treatment algorithm of the European Association of Urology 2020 Guidelines for non-neurogenic male-LUTS[4]. Most of the studies on BPH treatment have used improvement in symptoms, as quantified by the International Prostate Symptom Score (IPSS), as primary or secondary endpoints to evaluate efficacy[5-8]. However, the IPSS alone is not a strong predictor of general health-related quality of life (HRQoL)[9]. Improved HRQoL should be the main endpoint of any proposed treatment modality for BPH. Therefore, comprehending the level of impairment in HRQoL due to LUTS for a unique patient should be valuable adjunct information in all treatment-evaluation research[10]. The IPSS bother question (IPSS-BQ) is the most used measure of disease-specific quality of life QoL in the evaluation of men with BPH[11]. Various studies have demonstrated the reliability and validity of the IPSS-BQ and have reported a strong positive correlation with other disease-specific QoL instruments with more items[12, 13]. However, to our best knowledge, no published studies have investigated the role of the IPSS-BQ as a predictor of general HRQoL. The most widely used questionnaire for assessing general HRQoL is the RAND 36. Although evaluations of the general HRQoL of patients with LUTS using the standardised SF-36/RAND-36 questionnaire have been published, these studies have only addressed the association between symptoms (IPSS= and general HRQoL and not the association between bothersomness og LUTS (IPSS-BQ) and HRQoL [9, 14]. The aim of this study was to investigate the role of bothersomeness of urinary symptoms on the general HRQoL of patients with LUTS, secondary to BPH. We hypothesised that a higher IPPS would be associated with a higher IPSS-BQ, while a higher IPSS-BQ would be the dominant factor associated with a poorer general HRQoL.

Material and Methods

Study design

A cross-sectional design was applied. The study was conducted in the Urologic Outpatient Clinic of Førde Central Hospital. The inclusion period was 20 November 2018 – 17 February 2021.

Participants

Patients were referred by their general practitioners (GPs) and selected by the first author if they met the study criteria (Table 1).

We did not impose limits on the inclusion criteria regarding prostate size, prostate specific antigen (PSA) value or maximum flow rate (Q-max) because we wanted our study population to be as representative as possible of the general population. Knowing that different categories of patients have different experiences of LUTS, we needed to have wide variation in our data in order to find weak correlations in our analysis of the link between patients' reports of bothersomeness of LUTS and perceived HRQoL. Reference data for HRQoL were derived for am representative survey of general population of Norwegian adults from 2015. The sample consisted of 947 males who completed the Norwegian version of the RAND-36.

Please see Table 1 for patient selection, workup and data collection.

Measurements

To assess symptom severity, we used the standard 7-item IPSS questionnaire. The eighth question of the IPSS, IPSS-BQ (i.e. 'If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?') was scored on a 6-point scale: 0 (delighted), 1 (pleased), 2 (mostly satisfied), 3 (mixed about equally satisfied and dissatisfied), 4 (mostly dissatisfied) and 5 (unhappy), with higher scores indicating worse QoL. Patients were initially divided in accordance with the scores of the standard IPSS groups: control group (0-7) moderately symptomatic group (8-19) and severely symptomatic group (20-35)[15].

The RAND-36 is a widely used HRQoL survey and a reliable tool for analysing group comparisons based on its internal consistency and test-retest reliability indexes[3, 16]. The instrument consists of 36 items that assess eight health concepts: physical functioning, physical role functioning, physical pain, general health, vitality, social functioning, emotional role functioning and mental health. The RAND-36 is not specific for any population or disease. Each subscale is converted to a 100-point scale, with 100 representing optimal HRQoL. The eight scales of the RAND-36 are calculated to yield overall physical and mental HRQoL summary scores[17].

The presence of comorbidities was assessed using the American Society of Anaesthesiology (ASA) score and the Charlson Index[18].

Sample size

Given a power level of 80%, a two-tailed P-value of 0.05 and N = 83, a Pearson correlation of 0.3 is likely to be statistically significant[19]. An effect-size of 0.3 indicates an thershold for effects that are clinically relevant and potentially powerfull in bothe the short and the long run.[20]

Statistical method

To examine the associations between the different variables, we used analysis of variance (ANOVA) to examine differences between the parameters of the three IPSS groups. Linear regression was used to analyse the relationship between scores on the IPSS, IPSS-BQ and physical and mental domains of the HRQoL based on the RAND-36. We used both an unadjusted and an adjusted model for age and comorbidities as quantified by the ASA score and the Charlson Index. We then stratified the patients according to the degree to which their symptoms were bothersome, as assessed using the IPSS-BQ. Comparisons were analysed between the IPSS severity groups, the IPSS-BQ and an age-matched sample of males from the general population of Norway[16]. To assess differences between the groups, we used Cohen's d effect size calculation model, where a 0.2 difference in the standard deviation is considered a small difference, 0.5 is a medium difference and 0.8 is a large difference[21]. We reported two-tailed P-values and 95% confidence intervals. The IBM SPSS Statistics Version 26 software was used for the statistical analyses.

Results

Among the 169 patients that met the study's criteria, 91 (53%) signed forms indicating their informed consent to participate in the study. Eight patients were excluded (5 with a prostate cancer diagnosis; 1 with an acute leukaemia diagnosis; 1 with a bladder cancer diagnosis; and 1 who withdrew informed consent, all of them within one month of the inclusion date). Thus, 83 patients were considered for the statistical analysis. The general characteristics of the patients are summarised in Table 2. The cohort is typical of patients referred to urologists for LUTS examinations. The control group represents an average representation of typical men between 50 and 80 years of age in Norway. Initial analysis of the IPSS-BQ as an independent predictor of HRQoL revealed that a decrease in mental HRQoL with an increase in bothersomeness of urinary symptoms was not a linear function, but there was a clear reduction in mental HRQoL from the IPSS-BQ score of 2, to an IPSS-BQ score of 3. This reduction was

present but not obvious for physical HRQoL on the RAND-36. Consequently, we divided the patients in two groups: IPSS-BQ = 0-2, n = 35 and IPSS-BQ = 3-5, n = 48 (see Supplementary Tables for details).

The results of the linear regression showed that the IPSS is a strong predictor of the IPSS-BQ in an unadjusted model and that the association was preserved when adjusting for age and comorbidity. However, when the regression model was used to assess the impact of the IPSS on mental and physical HRQoL, the IPSS score had no significant effect on either of these two parameters. When the IPSS-BQ was added to the model, significant effects on the mental and physical HRQoL scores were observed. The details are summarised in Table 3. Cohen's effect sizes for the physical (d = 0.5) and mental (d = 0.7) HRQoL domains were medium and large, respectively. The effect sizes of all the domains of the RAND-36 are presented in the Supplementary Tables.

We then compared the study population with Norwegian normed data. The age-adjusted mental HRQoL of the Norwegian population was 81.3 (SD = 15.9), and the physical HRQoL was 76.6 (SD = 20.8). When the study population was stratified by IPSS group there were only small differences, as evaluated using Cohen's d, in mental and physical HRQoL between the three study groups and the normed data. However, there were medium size differences in the vitality domain. The details are illustrated in Figure 1A. When the study population was stratified by IPSS-BQ group, moderate differences were found in mental and physical HRQoL compared to the normed data, and again, a medium size effect was found in the vitality domain (Figure 1B).

Discussion

We explored the role of bothersomeness of urinary symptoms and its relationship with HRQoL and urinary symptom status. The degree to which symptoms become bothersome or worrisome to a patient usually provides the basis for his decision to seek medical treatment. Numerous studies have shown that the "bother question" provides a reproducible valid tool for evaluating changes in the status of LUTS[13, 22, 23]. We have developed a model showing that the objective quantification of symptoms (using the IPSS) may influence the assessment of bothersomeness of urinary symptoms (IPSS-BQ), which in turn, may influence the HRQoL of patients (RAND-36). The IPSS alone showed no significant associations with patients' HRQoL. The IPSS-BQ was the only variable that correlated with patients' mental and physical HRQoL. As the primary goal of LUTS treatment is an improvement in HRQoL, evaluations of new treatment methods based only on an improved IPSS are probably insufficient to conclude that these treatments cause consequent improvement in HRQoL.

Although numerous articles have been published on the bother question's association with LUTS, none has addressed the relationship between that the degree to which it is bothersome to the patient and general HRQoL.

Salinas-Sanches (2001) investigated the HRQoL of patients on the waiting list for BPH surgery using the SF-36, and found they had a poorer HRQoL than the general population of the same age. A major limitation of this study is bias in the selection of patients with indications for surgical treatment. Thus, it could be expected that these patients would be likely to have poorer HRQoL. However, this study is one of the first studies that objectively quantified the HRQoL of the study group using a validated tool (SF-36) and compared the results with normed data from an age-matched national population[14].

Welch (2002) conducted a large survey of United States (US) men participating in the Health Professionals Follow-Up Study. Although they did not use the two composite scores that we used their findings are similar to ours. The patients with severe LUTS had small to moderate differences from the age-matched sample from the general population of the US with regard to vitality/energy and the ability to work and perform daily tasks because of their illness. These findings were consistent when they were adjusted for confounding factors, such as comorbidities However, they did not specifically address the relationship among the scores on the IPSS, IPSS-BQ and SF-36[9].

One possible explanation for our findings is that symptoms, per se, have different meanings for different patients. It is only when the subjective experience of these symptoms becomes bothersome that there is a consequent reduction in HRQoL. This is the main driver for patients to seek medical attention. It is improvement in their HRQoL and resolution of their bothersome urinary symptoms that patients expect from the treatment. Neither improved symptom scores nor urinary flow rate are parameters that are directly acknowledged by the patients.

The strengths of this study include its strict inclusion and exclusion criteria that narrowed down patients' signs and symptoms to BPH as the most probable aetiology of LUTS; the inclusion of a control group; the homogeneity of the groups that allowed for good comparisons; the use of only one investigator to perform transrectal prostate measurements, thereby eliminating observer bias; and the completeness of the data and comparisons of HRQoL between the patients and the age-matched sample from the general population of Norway. The limitations of the study include its cross-sectional design and small sample of patients that were previously referred to a urologist by a GP. This study population mainly included urology patients and might not reflect an accurate picture of patients in the general population. Another drawback is the use of the IPSS because it does not assess the incontinence aspects of LUTS, which are known to be extremely bothersome[24].

Last, as this is a cross-sectional study, it provides only a static picture of IPSS-BQ as a parameter for HRQoL.

Conclusion

The IPSS-BQ is a better predictor of HRQoL than the total IPSS. The IPSS-BQ as a proxy for HRQoL should be regarded as the standard outcome measure and reported in all LUTS-related research. Further longitudinal studies are needed to examine the reliability of this parameter as an instrument for assessing changes over time and responses to treatment.

Author contributions

FHN: Project/Protocol development, Data collection and management, Data analysis, Manuscript writing/editing.

JRA: Project/Protocol development, Data management, Data analysis, Manuscript writing/editing, Supervision

CB: Project/Protocol development, Data analysis, Manuscript writing/editing, Supervision.

All authors have approved the submitted version of the manuscript.

Funding

None, except from the institutions mentioned on the front page

Compliance with ethical standards

Conflicts of interest: None of the authors report conflicts of interest

Ethical approval: The project is approved by the Norwegian South-East Regional Ethics Committee (REC reference number: 2018/114). In accordance with the approval, all participating patients signed an informed consent form prior to inclusion.

References

[1] Roehrborn CG. BPH progression: concept and key learning from MTOPS, ALTESS, COMBAT, and ALF-ONE. BJU Int. 2008 Mar: **101 Suppl 3**:17-21

[2] Kupelian V, Wei JT, O'Leary MP, et al. Prevalence of lower urinary tract symptoms and effect on quality of life in a racially and ethnically diverse random sample: the Boston Area Community Health (BACH) Survey. Arch Intern Med. 2006 Nov 27: **166**:2381-7
[3] Hays RD, Morales LS. The RAND-36 measure of health-related quality of life. Ann Med. 2001 Jul: **33**:350-7
[4] S. Gravas (Chair) JNC, M. Gacci, C. Gratzke, T.R.W. Herrmann, C. Mamoulakis, M. Rieken, M.J. Speakman, K.A.O. Tikkinen Guidelines Associate: M. Karavitakis, I. Kyriazis, S. Malde, V.I. Sakalis, R. Umbach: . Management of Non-neurogenic Male LUTS: EAU Guidelines. EAU Guidelines 2020 ed, 2020
[5] Gormley GJ, Stoner E, Bruskewitz RC, et al. The effect of finasteride in men with benign prostatic hyperplasia. The Finasteride Study Group. N Engl J Med. 1992 Oct 22: **327**:1185-91
[6] Lepor H, Williford WO, Barry MJ, et al. The efficacy of terazosin, finasteride, or both in benign prostatic hyperplasia. Veterans Affairs Cooperative Studies Benign Prostatic Hyperplasia Study Group. N Engl J Med. 1996 Aug 22: **335**:533-9
[7] McConnell JD, Roehrborn CG, Bautista OM, et al. The long-term effect of doxazosin, finasteride, and combination therapy on the clinical progression of benign prostatic hyperplasia. N Engl J Med. 2003 Dec 18: **349**:2387-98
[8] Roehrborn CG, Siami P, Barkin J, et al. The effects of combination therapy with dutasteride and tamsulosin on clinical outcomes in men with symptomatic benign prostatic hyperplasia: 4-year results from the CombAT study. Eur Urol. 2010 Jan: **57**:123-31
[9] Welch G, Weinger K, Barry MJ. Quality-of-life impact of lower urinary tract symptom severity: results from the Health Professionals Follow-up Study. Urology. 2002 Feb: **59**:245-50
[10] Cam K, Muezzinoglu T, Aydemir O, Buyukalpelli R, Toktas G, Gemalmaz H. Development of a quality of life scale specific for patients with benign prostatic hyperplasia. Int Urol Nephrol. 2013 Apr: **45**:339-46
[11] Batista-Miranda JE, Diez MD, Bertrán PA, Villavicencio H. Quality-of-life assessment in patients with benign prostatic hyperplasia: effects of various interventions. Pharmacoeconomics. 2001: **19**:1079-90
[12] O'Leary M P. Validity of the "bother score" in the evaluation and treatment of symptomatic benign prostatic hyperplasia. Rev Urol. 2005 Winter: **7**:1-10
[13] O'Leary MP, Wei JT, Roehrborn CG, Miner M. Correlation of the International Prostate Symptom Score bother question with the Benign Prostatic Hyperplasia Impact Index in a clinical practice setting. BJU Int. 2008 Jun: **101**:1531-5
[14] Salinas-Sánchez AS, Hernández-Millán I, Lorenzo-Romero JG, Segura-Martin M, Fernández-Olano C, Virseda-Rodriguez JA. Quality of life of patients on the waiting list for benign prostatic hyperplasia surgery. Qual Life Res. 2001: **10**:543-53
[15] Barry MJ, Fowler FJ, Jr., O'Leary MP, et al. The American Urological Association symptom index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association. J Urol. 1992 Nov: **148**:1549-57; discussion 64
[16] Jacobsen EL, Bye A, Aass N, et al. Correction to: Norwegian reference values for the Short-Form Health Survey 36: development over time. Qual Life Res. 2018 May: **27**:1213-5
[17] Hagell P, Westergren A, Årestedt K. Beware of the origin of numbers: Standard scoring of the SF-12 and SF-36 summary measures distorts measurement and score interpretations. Res Nurs Health. 2017 Aug: **40**:378-86
[18] Quan H, Li B, Couris CM, et al. Updating and validating the Charlson comorbidity index and score for risk adjustment in hospital discharge abstracts using data from 6 countries. Am J Epidemiol. 2011 Mar 15: **173**:676-82
[19] Hulley SB CS, Browner WS, Grady D, Newman TB. Designing clinical research : an epidemiologic approach. 4th ed. 2013 [cited; Available from: https://sample-size.net/correlation-sample-size/
[20] Funder DC, Ozer DJ. Evaluating Effect Size in Psychological Research: Sense and Nonsense. Advances in Methods and Practices in Psychological Science. 2019: **2**:156-68

[21] Cohen J. Statistical Power Analysis for the Behavioral Science: Routledge, 1988
[22] Roehrborn CG, Van Kerrebroeck P, Nordling J. Safety and efficacy of alfuzosin 10 mg once-daily in the treatment of lower urinary tract symptoms and clinical benign prostatic hyperplasia: a pooled analysis of three double-blind, placebo-controlled studies. BJU Int. 2003 Aug: **92**:257-61
[23] Kirby RS, Andersen M, Gratzke P, Dahlstrand C, Høye K. A combined analysis of double-blind trials of the efficacy and tolerability of doxazosin-gastrointestinal therapeutic system, doxazosin standard and placebo in patients with benign prostatic hyperplasia. BJU Int. 2001 Feb: **87**:192-200
[24] Agarwal A, Eryuzlu LN, Cartwright R, et al. What is the most bothersome lower urinary tract symptom? Individual- and population-level perspectives for both men and women. Eur Urol. 2014 Jun: **65**:1211-7

Table 1. Patient Selection, Workup and Collected Data

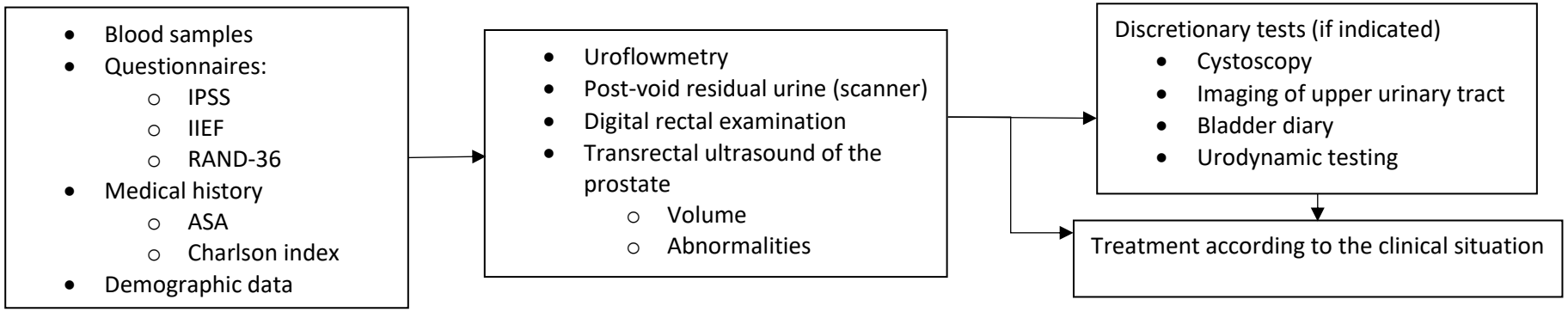
Inclusion Criteria

- Male age between 50 and 80 years
- Willingness to sign the informed consent form
- IIEF-5 score >5
- ECOG performance status 0-1

Exclusion Criteria

- Unwilling to sign the informed consent form
- Drug treatment for LUTS or sexual dysfunction
- Any additional drug treatment with a known effect on BPH symptoms (diuretics, antihistamines, calcium channel blockers, phytotherapy or tricyclic antidepressants) for any length of time in the four weeks prior to inclusion
- Presence of other urinary disorders – chronic pelvic pain, urethral strictures, bladder cancer, previous TUR-P or laser procedure, pelvic radiation or surgery, urinary tract infection
- Any known cancer diagnosis except non-malignant melanoma of the skin within the last 5 years
- Severe cardiac comorbidities – ASA score >3
- Presence of neurodegenerative disorders (i.e. Parkinson's disease, Alzheimer's disease, etc.)
- Unwilling to report sexual function
- Penile conditions that prevent sexual act (i.e. penis cancer)
- ECOG performance status > 1

Workup and Collected data



Note: ASA = American Society of Anaesthesiologists; ECOG = Eastern Cooperative Oncology Group; LUTS = lower urinary tract symptoms; TUR-P = Transurethral resection of the prostate; BPH = benign prostatic hyperplasia; IPSS = International Prostate Symptom Score; IIEF-5 = International Index of Erectile Function 5-item version; RAND-36 = RAND 36-Item Health Survey

Table 2. Patients' Characteristics

Variables	Control Group (IPSS <8) n = 20 Mean (SD)*	Moderately Symptomatic (IPSS 8-18) n = 35 Mean (SD) *	Severely Symptomatic (IPSS>18) n = 28 Mean (SD) *	P-value
Age (years)	63.4 (7.1)	65.2 (5.9)	63.4 (6.8)	0.458
IPSS-BQ	1.1 (0.9)	2.7 (1.1)	3.6 (0.9)	**<0.001**
ASA Classification	1: 14 (70%) 2: 5 (25%) 3: 1 (5%)	1: 11 (31.4%) 2: 21 (60%) 3: 3 (8.6%)	1: 10 (35.7%) 2: 18 (64.3%)	**0.031**
Charlson Index	0: 13 (65%) 1: 6 (30%) 2: 1 (5%)	0: 23 (65.7%) 1: 7 (20%) 2: 5 (14.3%)	0: 20 (71.4%) 1: 6 (21.4%) 2: 2 (7.1%)	0.742
Prostate Volume (cm^3)	56.7 (28.4)	53.9 (23.4)	50.0 (21.9)	0.629
Residual Urine (ml)	81.6 (36.2)	95.5 (122.3)	121.8 (144.7)	0.614
Q-max (ml/sec)	21.3 (11.4)	16.8 (10.3)	14.0 (7.3)	0.134
PSA (µg/L)	3.5 (3.4)	3.1 (3)	3.2 (3.2)	0.877
Body Mass Index (kg/m^2)	26.9 (3.2)	27.5 (4.4)	26.9 (3.6)	0.768
Rand 36 domains				
Physical Function	92.0 (13.2)	91.6 (8.1)	88.0 (18.4)	0.503
Role Physical	83.8 (32.7)	79.3 (32.4)	74.1 (38.8)	0.632
Bodily Pain	73.6 (21.8)	66.6 (20.3)	70.8 (27.4)	0.534
General Health	75.8 (17.9)	67.1 (16.1)	67.3 (20.7)	0.195
Vitality	74.0 (19.2)	69.6 (14.5)	58.8 (20.1)	**0.009**
Social Function	88.8 (15.7)	87.1 (16.7)	84.4 (21.7)	0.699
Role Emotional	91.7 (26.2)	86.7 (28.2)	85.7 (32)	0.763
Mental Health	86.2 (13.8)	84.2 (10)	82.7 (12)	0.597
Physical HRQoL	81.3 (18.6)	76.1 (15.3)	75.1 (23.4)	0.511
Mental HRQoL	85.2 (16.7)	81.9 (14.5)	77.9 (16.5)	0.282

Note: P-values are for the ANOVA results; *The ASA Classification, Charlson Index,reports the number of patients in each category not mean and standard deviation; IPSS-BQ = Bothersomeness of urinary symptoms as reported in question 8 of the IPSS; IIEF = International Index of Erectile Function; Q-Max = peak urinary flow ; HRQoL = health related quality of life .

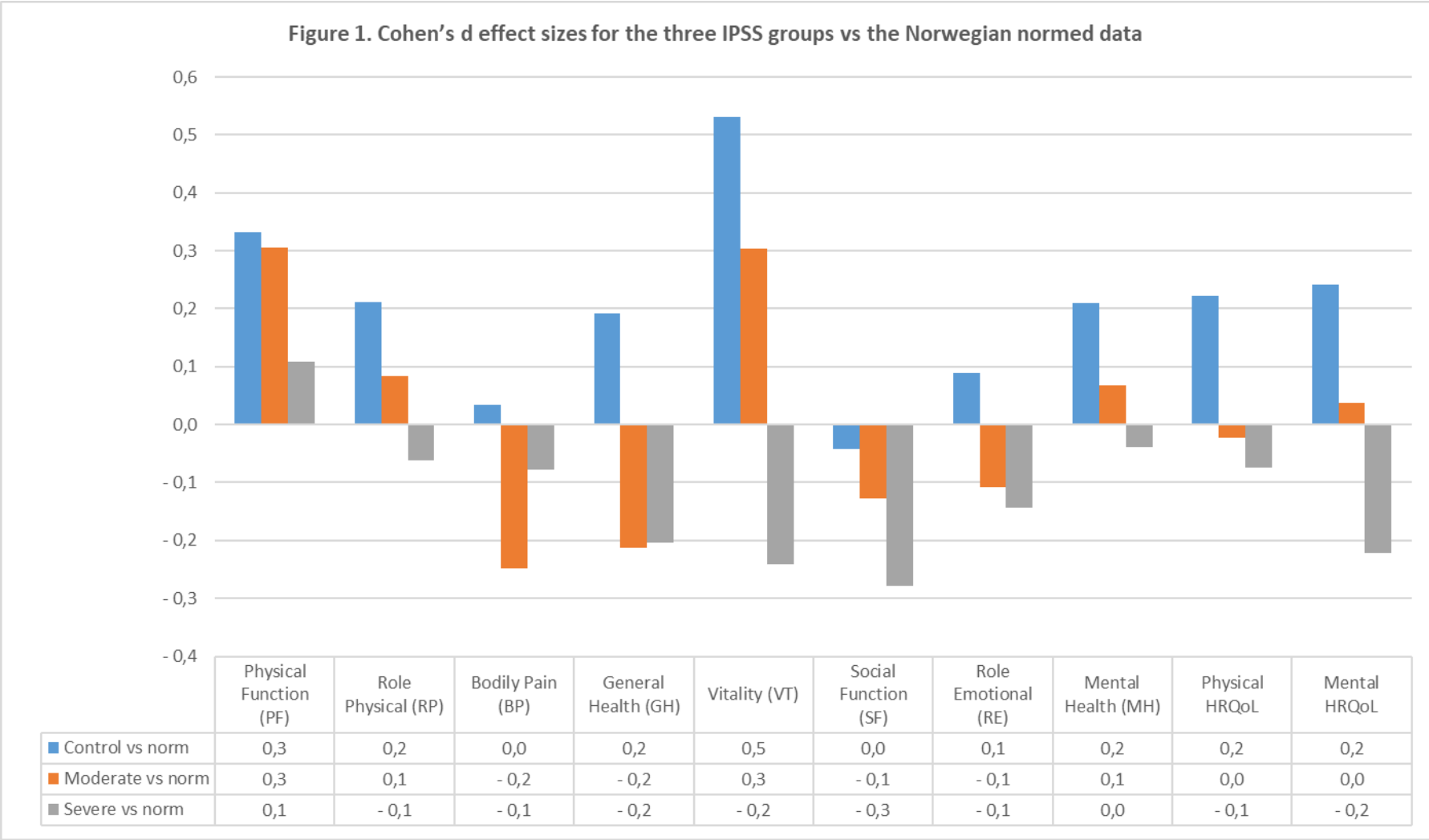
Table 3. Linear Regression Models

	Unadjusted			Adjusted		
Variables	B (95% CI)	Beta	P-value	B (95% CI)	Beta	P-value
Model 1: IPSS-BQ (IV)						
IPSS	0.13 (0.10 – 0.15)	0.72	**<0.001**	0.13 (0.10 – 0.15)	0.73	**<0.001**
Age	-0.03 (-0.08 – 0.02)	-0.14	0.196	-0.03 (-0-07 – 0.00)	-0.16	0.060
Charlson Index	0.06 (-0.39 – 0.52)	0.03	0.778	0.13 (-0.24 – 0.50)	0.06	0.496
ASA	0.16 (-0.36 – 0.68)	0.07	0.550	0.00 (-0.46 – 0.46)	0.00	0.991
Model 2: Physical HRQoL (IV)						
IPSS	-0.24 (-078 – 0.29)	-0.10	0.369	0.40 (-0.33 – 1.13)	0.17	0.275
IPSS-BQ	-10.22 (-18.40 – -2.03)	-0.27	**0.015**	-13.61 (-25.07 – -2.15)	-0.35	**0.021**
Age	0.24 (-0.40 – 0.89)	0.08	0.458	0.28 (-0.41 – 0.98)	0.10	0.418
Charlson Index	-4.02 (-10.30 – 2.26)	-0.14	0.206	-0.52 (-7.84 – 6.80)	-0.02	0.888
ASA	-5.88 (-13.05 – 1.30)	-0.18	0.107	-6.88 (-15.88 – 2.12)	-0.21	0.132
Model 3: Mental HRQoL (IV)						
IPSS	-0.40 (-0.83 – 0.04)	-0.20	0.075	0.19 (-0.41 – 0.78)	0.09	0.537
IPSS-BQ	-10.64 (-17.26 – -4.03)	-0.34	**0.002**	-12.27 (-21.66 – -2.88)	-0.39	**0.011**
Age	0.06 (-0.48 – 0.60)	0.03	0.821	0.08(-0.49 – 0.64)	0.03	0.792
Charlson Index	-1.71 (-6.94 – 3.53)	-0.07	0.518	1.01 (-4.98 – 7.01)	0.04	0.737
ASA	-4.59 (-10.54 – 1.36)	-0.17	0.129	-5.37 (-12.74 – (2.00)	-0.20	0.151

Note: IPSS-BQ = Bothersome urinary symptoms, as assessed using question 8 of the IPSS; IV = independent variable. Age and IPSS were treated as continuous independent variables and IPSS-BQ was treated as a binary variable (score ≤ 2 = 0 and > 2 = 1).

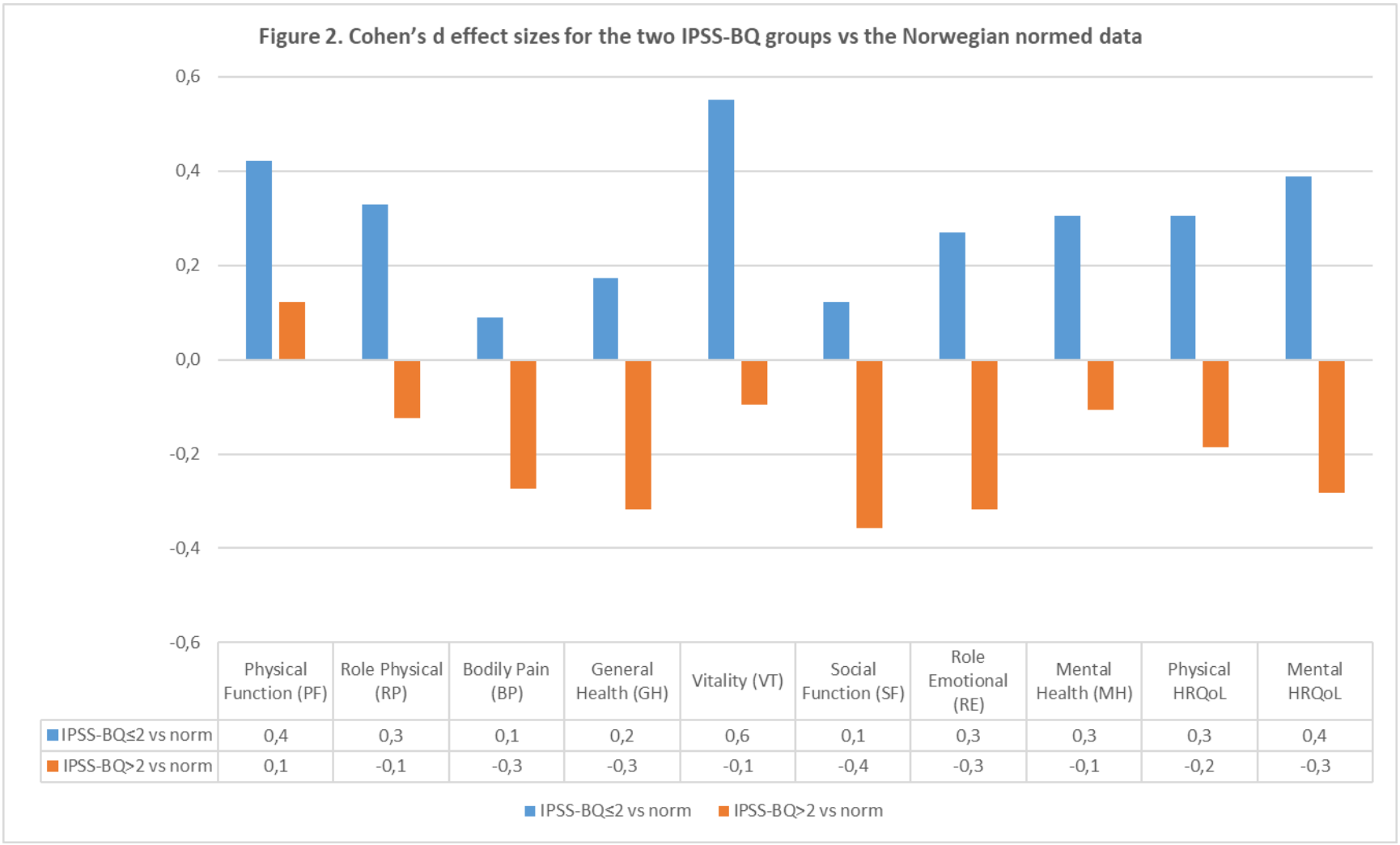
The variance explained by the adjusted models are as follows: Model 1 = 52.7%, Model 2 = 6.9% and Model 3 = 8.7%.

Figure 1. Cohen's d effect sizes for the three IPSS groups vs the Norwegian normed data



	Physical Function (PF)	Role Physical (RP)	Bodily Pain (BP)	General Health (GH)	Vitality (VT)	Social Function (SF)	Role Emotional (RE)	Mental Health (MH)	Physical HRQoL	Mental HRQoL
Control vs norm	0,3	0,2	0,0	0,2	0,5	0,0	0,1	0,2	0,2	0,2
Moderate vs norm	0,3	0,1	- 0,2	- 0,2	0,3	- 0,1	- 0,1	0,1	0,0	0,0
Severe vs norm	0,1	- 0,1	- 0,1	- 0,2	- 0,2	- 0,3	- 0,1	0,0	- 0,1	- 0,2

Figure 2. Cohen's d effect sizes for the two IPSS-BQ groups vs the Norwegian normed data



	Physical Function (PF)	Role Physical (RP)	Bodily Pain (BP)	General Health (GH)	Vitality (VT)	Social Function (SF)	Role Emotional (RE)	Mental Health (MH)	Physical HRQoL	Mental HRQoL
IPSS-BQ≤2 vs norm	0,4	0,3	0,1	0,2	0,6	0,1	0,3	0,3	0,3	0,4
IPSS-BQ>2 vs norm	0,1	-0,1	-0,3	-0,3	-0,1	-0,4	-0,3	-0,1	-0,2	-0,3