**Appendix II.** Detailed overview of patient-related factors explored and their association with health-related quality of life (HRQOL).

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| **Factor** | **First Author (Year)** | **Results** |
| Comorbidities | Keshwara (2022) | ↑ in comorbidities via CCI associated with ↓ EORTC QLQ-C30 scores on univariate analysis only (p=0.041) |
| Meixensberger (1996) | Cardiac disease associated with ↓ postoperative KPS (p<0.05) |
| Tanti (2017) | MGM patients with diabetes have ↓ PCS (β=−0.137, p=0.049), MCS (β=−0.149, p=0.036) and FACT (β=−0.147, p=0.024) scoresNo association between the number of comorbidities and HRQOL (p>0.05) |
| Timmer (2019) | ASA Class IV associated with ↓ physical functioning, role-physical functioning, vitality, role-emotional functioning, and general health, and ↑ bodily pain on SF-36 (all p<0.05) |
| Zamanipoor Najafabadi (2021b) | ↑ in comorbidities via CCI associated with ↓ PCS scores (Δ=−3.308 [95% CI: −4.624 to −1.992], p<0.05) |
| Functional status | Ganefianty (2020) | ↓ functional status associated with ↓ postoperative EQ-5D scores (OR=6.728 [95% CI: 1.655 to 27.348], p=0.0001) |
| Keshwara (2022) | ↓ WHO performance status association with ↓ EORTC QLQ-C30 scores on univariate analysis only (p=0.026) |
| Ouyang (2015) | ↑ preoperative KPS associated with ↓ postoperative KPS only on univariate analysis (p=0.006) |
| Pintea (2018) | ↓ KPS score at discharge associated with ↓ vitality score (β=0.514, p<0.000)↑ change in KPS from preoperative status to last follow-up associated with ↓ PCS scores (β=−0.468, p<0.001) |
| Timmer (2019) | ↑ KPS scores generally associated with ↑ SF-36 scores postoperatively↑ ADL scores correlated significantly with improved physical functioning, physical role functioning, bodily pain, emotional role functioning, and general health domains on SF-36 |
| Zamanipoor Najafabadi (2021b) | ↓ KPS score associated with ↓ PCS scores (Δ=0.374 [95% CI: 0.170 to 0.578]) and ↓ MCS scores (Δ=0.388 [95% CI: 0.133 to 0.643]) (both p<0.05) |
| Fatigue | Ganefianty (2020) | ↑ fatigue associated with ↓ postoperative EQ-5D scores (OR=4.373, p=0.001) on univariate analysis only |
| Nassiri (2019) | Across all follow-up points post-surgery (12, 48, 108, 120mo), ↑ fatigue most strongly associated with ↓ global HRQOL via EORTC QLQ-C30 (rs=─0.615, p<0.001) |
| Sleep disturbance | Lin (2021) | ↑ sleep quality associated with ↑ EORTC QLQ-C30/BN20 scores (β=0.80, p=0.02) |
| Nassiri (2019) | At 12mo post-surgery, ↑ sleep disturbance associated with ↓ global HRQOL via EORTC QLQ-C30 (rs=−0.570, p<0.001) |
| Zhang (2022) | Patients with sleep disturbance had ↓ PCS (md=68.75) and MCS (md=78.13) scores, and ↓ scores in role-physical (md=50), bodily pain (md=84), general health (md=60), vitality (md=70), social functioning (md=87.5), role-emotional (md=100), and mental health (md=72) on SF-36 (all p<0.05) |
| Psychological impairment | Kangas (2012) | ↑ PTSS associated with ↓ HRQOL in FACT domains of physical, emotional, and functional well-being (all p<0.005) |
| Tanti (2017) | Depression associated with ↓ FACT (β=−0.152, p<0.019) and MCS (β=−0.172, p<0.017) scores |
| Wagner (2019) | Preoperatively, prior psychiatric therapy and abnormal anxiety or depression scores associated with ↓ EQ-5D-5L and SF-36 scoresAt 3mo post-surgery, ↑ preoperative anxiety, depression, and PTSS scores associated with ↓ EQ-5D-5L and SF-36 values, but only MCS statistically significant (all p<0.05)At 12mo post-surgery, patients with abnormal scores on the STAI-S, STAI-T, and PTSS-10 scales had significantly ↓ EQ-5D-5L VAS scores (all p<0.05)↓ postoperative EQ-5D-5L scores associated with ↑ STAI-T, STAI-S, ADS, PTSS-10 scores in the regression analyses (all p<0.01) |
| Illness perception | Ganefianty (2020) | Negative illness perception associated with ↓ postoperative EORTC QLQ-C30 (OR=5.874 [95% CI: 1.819 to 18.962], p=0.0001) |
| Social support | Ganefianty (2020) | Inadequate social support associated with ↓ postoperative EORTC QLQ-C30 scores (OR=2.043 [95% CI: 0.616 to 6.773], p=0.001) |
| Other PROs | Castle-Kirzbaum (2018) | Headache at presentation associated with ↑ preoperative ASBQ scores (β=25.0, p=0.04) |
| Jones (2016) | No association between preoperative headaches and ASBQ or SNOT-22 scores (p≥0.05) |
| Karsy (2019) | No association between headaches and EQ-5D-5L score (p≥0.05) |
| Ouyang (2015) | No association between preoperative headache and postoperative KPS (p≥0.05) |
| Nassiri (2019) | Across all intervals post-surgery (12, 48, 108, 120mo), ↓ emotional function most strongly associated with ↓ global HRQOL for functional domains of EORTC QLQ-C30 (rs=0.556, p<0.001)Across all intervals, ↓ global HRQOL also associated with ↑ pain (rs=−0.515, p<0.001) and ↓ social function (rs=0.520, p<0.001)At 12mo post-surgery, ↓ global HRQOL associated ↓ cognitive function (rs=0.547, p<0.001) and ↓ physical function (rs=0.613, p<0.001) |
| Age | Castle-Kirszbaum (2022) | No association between age and preoperative HRQOL or HRQOL change at 6 months as per ASBQ (both p≥0.05) |
| Ganefianty (2020) | ↑ age associated with ↓ postoperative EORTC QLQ-C30 scores (OR=0.108, p=0.014) on univariate analysis only |
| Henzel (2013) | No association between age and HRQOL via SF-36 (p>0.05) |
| Jakola (2012) | No association between age and preoperative EQ-5D scores (p=0.507) |
| Jones (2016) | Age <55 years associated with significantly ↑ ASBQ scores in domains of performance and specific symptoms Younger age <55 years associated with ↑ HRQOL (p=0.02) |
| Kalkanis (2000) | ↓ age at time of surgery and interview associated with ↓ FACT-Br scores (both p<0.05) |
| Kangas (2012) | No associations between age and any of FACT-G subscales (p>0.05) |
| Karsy (2019) | No association between age and change in preoperative to follow-up EQ-5D-3L score (p≥0.05) |
| Krupp (2009) | No association between age and general life satisfaction (p≥0.05)Younger patients <55yr reported longer recovery, lower self-esteem, lower life satisfaction in qualitative interview (all p<0.001) |
| Meixensberger (1996) | No significant difference in KPS between younger and older patients (p≥0.05) |
| Ouyang (2015) | No association between age and postoperative KPS (p≥0.05) |
| Timmer (2019) | Age >75 years associated with ↓ physical functioning (75–79 years: x̅=0.79 ± 0.46; 80–84 years: x̅=0.87 ± 0.52) compared with the norm collective, and the 75–79 group had significantly ↓ physical functioning compared to younger age groups via SF-36 (all p<0.05)Only the 75–79 group reported worse current health status than their health status one year prior A steady ↓ in PCS scores were observed from the youngest group of patients aged 55–59 years (x̅=53.61 ± 10.1) to the patients aged 75–79 years (x̅=40.97 ± 12.71)No significant differences in MCS scores among different age groups, or in other SF-36 domains |
| Wirsching (2020) | ↓ age associated with ↓ EORTC QLQ-C30/BN20 scores (OR=2.38 [95% CI: 1.20 to 4.76], p=0.012) |
| Zweckberger (2019) | No association between age and preoperative or postoperative HRQOL via EORTC QLQ-C30 (p≥0.05) |
| Sex | Castle-Kirszbaum (2022) | No association between sex and preoperative HRQOL or HRQOL change at 6 months as per ASBQ (both p≥0.05) |
| Henzel (2013) | No association between sex and SF-36 scores (p>0.05) |
| Kalkanis (2000)  | No association between gender and FACT-Br scores (p=0.81) |
| Karsy (2019) | Females associated with ↑ EQ-5D scores at 1 year (p<0.05) |
| Keshwara (2022) | Male sex associated with ↑ EORTC QLQ-C30 scores (β=6.5 [95% CI: 0.5 to 12.4], p=0.033) |
| Krupp (2009) | Single men associated with ↓ life satisfaction compared to single women (p<0.05) |
| Ouyang (2015) | No association between sex and postoperative KPS (p≥0.05) |
| Pettersson-Segerlind (2021) | Females had ↓ EQ-5D in all domains but only significant in mobility domain (p=0.048) |
| Pintea (2018) | Females had ↑ scores in the pain domain of SF-36 (β=─0.410, p<0.026) |
| Tanti (2017) | No association between sex and SF-36 or FACT-Br scores (p>0.05) |
| Wirsching (2020) | No association between sex and EORTC QLQ-C30/BN20 scores (p=0.22) |
| Zamanipoor Najafabadi (2021b) | Females had ↓ PCS scores (Δ=─2.521 [95% CI: −6.393 to −1.351], p<0.05) |
| Other socio-demographics | Krupp (2009) | Single status associated with ↓ life satisfaction vs. married/having a partner (p<0.05) |
| Wirsching (2020) | ↓ subjective work ability associated with ↓ EORTC QLQ-C30/BN20 scores (OR=0.37 [95% CI: 0.15 to 0.92], p=0.033)No association between low income, workload, or social deprivation and HRQOL (all p≥0.05) |
| Employment status | Keshwara (2022) | Employment associated with ↑ HRQOL via EORTC-QLQ-C30 (β=7.7 [95% CI: 2.2 to 13.1], p=0.006) |
| Tanti (2017) | Unemployment associated with ↓ PCS (β=−0.286), MCS (β =−0.286), and FACT (β =−0.312) scores (all p<0.001) |
| Wirsching (2020) | Preoperative unemployment associated with ↓ HRQOL via EORTC-QLQ-C30/BN20 (OR=0.41 [95% CI: 0.17 to 0.98], p=0.049) |
| Education level | Keshwara (2022) | ↑ education level associated with ↑ HRQOL via EORTC-QLQ-C30 (β=2.9 [95% CI: 0.9 to 4.9], p=0.004) |
| Wirsching (2020) | No association between level of education and HRQOL via EORTC-QLQ-C30/BN20 (p=0.95) |
| Zamanipoor Najafabadi (2021b) | ↓ education level associated with ↓ PCS scores (Δ=2.703 [95% CI: 0.540 to 4.867], p<0.05) |

***Notes:*** *ADL=activity of daily living; ASA=American Society of Anesthesiologists; ASBQ=Anterior Skull Base Questionnaire; BL=baseline; CCI=Charlson comorbidity index; CI=confidence interval;* *EORTC QLQ BN20=European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Brain Neoplasm 20; EORTC QLQ C30=European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30; EQ-5D=EuroQOL-5 Dimensions; EXP(β)=exponentiated regression coefficient; FACT-Br=Functional Assessment of Cancer Therapy-Brain; FACT-G=Functional Assessment of Cancer Therapy-General; HRQOL=health-related quality of life; KPS=Karnofsky performance scale; MCS=mental component scale (from SF-36); md=median; MGM=meningioma; OR=odds ratio; p=p-value; PCS=physical component scale (from SF-36); PROs=patient-reported outcomes; RR=relative risk; SF-36=36-item Short Form Survey; SNOT-22=Sino-nasal Outcome Test-22; β=regression coefficient; D̅=difference between means; r=correlation coefficient; rs=Spearman’s Rho; χ2=chi-square; x̅=mean ± standard deviation; ↑=increase(d); ↓=decrease(d); Δ=change in score*

*\*margin of error not reported*