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Resilience, recent complications and preference-based health-related quality of life in specialist ostomy nursing follow-up: a cross-sectional study

Antonio J. García Ruiz

ajgr@uma.es

University of Málaga

Nuria García-Agua Soler

University of Málaga

Grupo de Investigación Puntos de Encuentro Andalucía GIPE-A

Research Article

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Abstract

Background

Adults living with an ostomy may experience persistent physical, psychosocial and self-management problems that require long-term specialist nursing follow-up. Patient-reported outcomes can support person-centred ostomy consultations, but the relationship between resilience, recent complications and preference-based health-related quality of life remains insufficiently quantified. This study examined whether resilience was associated with SF-6D health utility and whether recent complications contributed additional information.

Methods

We conducted a cross-sectional analytical study of 193 adults recruited from specialist ostomy clinics in Andalusia, Spain, between 1 March and 10 July 2026. Resilience was measured with the 10-item Connor-Davidson Resilience Scale (CD-RISC-10). SF-12 v2 responses were mapped to SF-6D health states and valued using a Spanish SF-6D value set developed from SF-12 v1. The primary analysis used multivariable linear regression with heteroscedasticity-robust HC3 standard errors. No values were imputed.

Results

CD-RISC-10 was available for 187 participants and SF-6D utility for 182; 176 had both measures and 168 had complete data for the adjusted model. Mean CD-RISC-10 was 29.53 (SD 7.68) and mean SF-6D utility was 0.611 (SD 0.235). Resilience was moderately associated with utility (Spearman rho = 0.494; $p < 0.001$). In the adjusted model, each 1-point higher CD-RISC-10 score was associated with 0.014 higher SF-6D utility (95% CI 0.009 to 0.019; $p < 0.001$), while complications in the previous month were associated with 0.096 lower utility (95% CI -0.169 to -0.023; $p = 0.010$).

Conclusions

Higher resilience and absence of recent complications were independently associated with better preference-based health status. The findings support prospective evaluation of specialist ostomy nursing follow-up that combines clinical complication review with brief patient-reported measures of adaptation and quality of life. The cross-sectional design does not establish causality or justify fixed screening or triage thresholds.

Background

Creation of an ostomy is a major bodily and functional change that can affect daily life well beyond the surgical episode. Persistent problems involving body image, sexuality, gas, constipation, appliance management, social participation and emotional distress can compromise health-related quality of life (HRQoL) [1, 2]. Stoma and peristomal complications can further affect comfort, self-care, daily functioning and use of health services [3].

Specialist ostomy nurses have a central role in long-term assessment, education, complication prevention and support for self-management [4, 5]. Long-term studies have shown that ostomy-specific concerns and adaptations may persist years after surgery [6, 7]. More recent research has also shown that patient-reported outcomes can be incorporated into stoma-care nurse follow-up to structure consultations, support patient involvement and tailor person-centred care [8, 9]. These developments make it important to identify brief, clinically interpretable measures that capture complementary aspects of adaptation and current health burden.

Resilience, broadly understood as the capacity to cope with and adapt to adversity, is one potentially relevant psychological resource. The Connor-Davidson Resilience Scale and its 10-item form (CD-RISC-10) are established measures of this construct [10, 11]. Previous studies in people living with an ostomy have reported positive relationships between resilience and ostomy adjustment or conventional quality-of-life measures [12–14]. However, the association between resilience and preference-based HRQoL has been less studied.

The SF-6D is a preference-based measure that can generate health-state utility values from SF-12 responses [15]. A Spanish SF-6D value set based on the SF-12 v1 has been published [16]. Utility values summarize health status on a common preference-based scale and may help connect patient-reported outcomes from specialist nursing care with broader health-services evaluation. Because the present study used SF-12 v2 responses, application of the Spanish SF-6D (SF-12 v1) value set was treated as an operational approximation and interpreted cautiously.

The primary aim was to examine the association between continuous CD-RISC-10 score and SF-6D utility among adults living with an ostomy in specialist follow-up. Secondary exploratory analyses examined whether recent complications and comorbidity were associated with utility after adjustment for relevant sociodemographic and clinical variables. The intended contribution was to inform future prospective evaluation of person-centred specialist ostomy nursing pathways rather than to define screening thresholds.

Methods

Study design and setting

We conducted an observational, cross-sectional, analytical study among adults living with an ostomy in Andalusia, Spain. Recruitment took place in specialist ostomy clinics between 1 March and 10 July 2026.

Reporting was aligned with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations for cross-sectional studies [17].

Participants and study size

Specialist ostomy nurses identified potentially eligible participants during routine consultations. Inclusion criteria were age 18 years or older, an ostomy duration of at least 6 months, agreement to participate and written informed consent. Exclusion criteria were cognitive impairment preventing questionnaire comprehension or decompensated psychiatric disease.

Before recruitment, the approved protocol specified a target of 212 participants. The protocol calculation used a two-sided alpha of 0.05, power greater than 0.80, detection of an absolute difference of 0.10 from a reference proportion of 0.40, and a 10% allowance for incomplete responses. Recruitment ended on the prespecified end date with 193 included participants (91.0% of the protocol target). This original calculation was not designed specifically for the final continuous multivariable association model and is therefore reported as a limitation rather than as evidence of regression-model power.

Measures

Sociodemographic and clinical variables

Variables included age, recorded sex, educational level, income, household composition, time since ostomy, cause of ostomy, type of surgery, complications in the previous month and number of concomitant conditions. Comorbidity burden was summarized as the recorded count of distinct concomitant conditions. The complications variable was available as a binary yes/no indicator for the previous month; complication type and severity were not available in the supplied analytical variables. Recorded sex was available as a binary variable; gender identity was not collected.

Resilience

Resilience was measured with the authorized Spanish CD-RISC-10, a 10-item unidimensional measure derived from the original CD-RISC [10, 11]. Each item is rated from 0 to 4, producing a total score from 0 to 40; higher scores indicate greater resilience. Permission was obtained from the copyright holder to administer the Spanish CD-RISC-10. The primary analyses treated CD-RISC-10 as a continuous measure; no diagnostic or triage threshold was applied.

Preference-based health-related quality of life

HRQoL was expressed as SF-6D utility. SF-12 v2 responses were transformed into the SF-6D descriptive system comprising physical functioning, role limitations, social functioning, pain, mental health and

vitality [15]. Utilities were assigned using the Spanish SF-6D value set based on the SF-12 v1 reported by Martínez-Pérez et al. [16]. Because the study used SF-12 v2 responses, the derivation was treated as an operational approximation rather than as a value set specifically developed for SF-12 v2.

Procedures and ethics

The analytical dataset was created after derivation of the strict CD-RISC-10 score, SF-6D health states, and Spanish utility values. The Provincial Research Ethics Committee of Málaga approved the study on 29 January 2026 (SICEIA-2026-000170; study code RESILENCIA_26), before recruitment began. All participants provided written informed consent prior to their inclusion in the study.

The research was conducted in accordance with internationally accepted ethical principles for research involving human participants, including the principles set out in the Declaration of Helsinki and its subsequent amendments. Participant confidentiality and privacy were maintained throughout the study, and all data were handled in accordance with applicable ethical and data-protection requirements.

Statistical analysis

Analyses were performed using IBM SPSS Statistics version 23 (IBM Corp., Armonk, NY, USA). Continuous variables were summarized using mean, standard deviation (SD), median, interquartile range (IQR) and range; categorical variables were summarized using absolute and relative frequencies. Internal consistency of the CD-RISC-10 was evaluated using Cronbach's alpha. Associations between continuous variables were estimated using Pearson and Spearman correlations. Selected group comparisons used Welch t tests or Mann-Whitney tests for two groups and Welch analysis of variance or Kruskal-Wallis tests for more than two groups, according to distribution and cell size.

The primary multivariable model used SF-6D utility as the continuous outcome and included CD-RISC-10, age, recorded sex, type of surgery, recent complications, number of concomitant conditions and time since ostomy. Covariates were entered simultaneously; no stepwise variable selection was used. Heteroscedasticity-robust HC3 standard errors were used. Because secondary comparisons were exploratory and no multiplicity adjustment was prespecified, exact p values and 95% confidence intervals are reported and interpreted cautiously. Statistical significance was assessed using two-sided $p < 0.05$, but interpretation emphasized effect estimates and precision rather than dichotomous significance alone.

Missing data

No values were imputed. Each analysis used available cases for its required variables, and the adjusted model used 168 complete cases. Analysis flow is reported in the Results. Additional descriptive and bivariate results are provided in Additional file 1. Analysis syntax and recoding rules for the reported analyses are supplied as Additional file 2.

Use of generative AI and AI-assisted tools

During manuscript preparation and revision, the authors used ChatGPT (OpenAI) to support English-language editing, structural organization, journal-format adaptation and reference-format checking. No generative AI or AI-assisted technology was used to generate study data or conduct the statistical analyses. All AI-assisted edits were reviewed by the authors, who take full responsibility for the final content.

Results

Participant characteristics and analysis flow

The study included 193 participants. CD-RISC-10 was calculable for 187 participants, SF-6D utility for 182, both measures for 176, and all variables required for the adjusted model for 168. Mean age was 65.93 years (SD 11.10), and 68.1% of participants with valid recorded-sex data were men. The cause of ostomy was oncological in 74.6%, and 43.2% of surgeries with valid data were urgent. Complications in the previous month were recorded in 30.0% of participants with valid complication data. Participant characteristics are shown in Table 1; additional descriptive data are provided in Additional file 1.

Table 1
Baseline sociodemographic and clinical characteristics

Characteristic	Category or statistic	n	% or value
Age, years	Mean (SD); median	191	65.93 (11.10); 66
Recorded sex	Men / women / missing	193	130 (68.1%) / 61 (31.9%) / 2
Cause of ostomy	Oncological / IBD / traumatic / other	193	144 (74.6%) / 24 (12.4%) / 3 (1.6%) / 22 (11.4%)
Type of surgery	Scheduled / urgent / missing	193	109 (56.8%) / 83 (43.2%) / 1
Recent complications	No / yes / missing	193	133 (70.0%) / 57 (30.0%) / 3
Time since ostomy, months	Mean (SD); median	191	32.45 (57.38); 15
Distinct concomitant conditions	Mean (SD); median	193	1.42 (1.26); 1

Note: Percentages for recorded sex, surgery type and recent complications use valid denominators. No values were imputed. IBD inflammatory bowel disease, SD standard deviation.

Resilience and SF-6D utility

Mean CD-RISC-10 was 29.53 (SD 7.68), median 30 and range 7–40. Internal consistency was high (Cronbach's alpha = 0.906). Mean SF-6D utility was 0.611 (SD 0.235), median 0.635 and range 0.034-1.000 (Table 2). Among the 176 participants with both measures available, resilience and utility were moderately positively associated (Spearman rho = 0.494; Pearson r = 0.505; both $p < 0.001$) (Fig. 1:

Observed association between CD-RISC-10 and SF-6D utility. The line represents the fitted linear mean and the shaded region the 95% confidence band).

Table 2
Resilience and preference-based HRQoL

Measure	n	Mean (SD)	Median	IQR	Range
CD-RISC-10 total score (0–40)	187	29.53 (7.68)	30.00	24.00–36.00	7.00–40.00
Spanish SF-6D utility	182	0.611 (0.235)	0.635	0.448–0.787	0.034-1.000
CD-RISC-10 internal consistency	187	alpha = 0.906			

Note: SF-6D utility was estimated using the Spanish SF-6D value set based on SF-12 v1. IQR interquartile range, SD standard deviation.

Bivariate associations

Participants with complications in the previous month had mean SF-6D utility 0.152 points lower than participants without recent complications and mean CD-RISC-10 2.95 points lower. Greater comorbidity was associated with lower CD-RISC-10 and lower SF-6D utility (Table 3). Other exploratory group comparisons are provided in Additional file 1 and should be interpreted in light of multiple testing.

Table 3
Main bivariate associations

Comparison or association	n	Estimate	p value
CD-RISC-10 and SF-6D utility	176	Spearman rho = 0.494	< 0.001
CD-RISC-10 and SF-6D utility	176	Pearson r = 0.505	< 0.001
Recent complications and CD-RISC-10	184	Mean difference=-2.95	0.019
Recent complications and SF-6D utility	179	Mean difference=-0.152	< 0.001
Concomitant conditions and CD-RISC-10	187	Spearman rho=-0.290	< 0.001
Concomitant conditions and SF-6D utility	182	Spearman rho=-0.261	< 0.001

Note: Mean differences compare participants with complications against those without complications in the previous month. Secondary bivariate analyses were exploratory and were not multiplicity-adjusted.

Adjusted analysis

In the adjusted model, each 1-point higher CD-RISC-10 score was associated with 0.014 higher SF-6D utility (95% CI 0.009 to 0.019; p < 0.001). Recent complications were independently associated with 0.096 lower utility (95% CI -0.169 to -0.023; p = 0.010). The estimate for each additional concomitant

condition was − 0.022 (95% CI -0.047 to 0.004; p = 0.093). Age, recorded sex, type of surgery and time since ostomy were not clearly associated with utility after adjustment. The model R-squared was 0.308. Full model estimates are shown in Table 4 and Fig. 2 (Adjusted linear model for SF-6D utility. Positive coefficients indicate higher utility and negative coefficients lower utility; coefficients are unstandardized and retain the original units of each predictor).

Table 4
Adjusted linear regression model for SF-6D utility

Predictor	B	95% CI	p value
CD-RISC-10, per 1 point	0.014	0.009 to 0.019	< 0.001
Age, years	0.002	-0.001 to 0.005	0.195
Male sex	0.008	-0.058 to 0.075	0.805
Urgent surgery	0.014	-0.047 to 0.075	0.655
Recent complications	-0.096	-0.169 to -0.023	0.010
No. concomitant conditions	-0.022	-0.047 to 0.004	0.093
Time since ostomy, months	0.0002	-0.000 to 0.001	0.504
Note: Model used heteroscedasticity-robust HC3 standard errors and 168 complete cases. R-squared = 0.308. Predictors were entered simultaneously. CI confidence interval.			
Additional file 1: Supplementary Tables S1-S3 and Figures S1-S3.			
Additional file 2: SPSS syntax and recoding rules corresponding to the analyses reported in the manuscript.			

Discussion

Principal findings

In this cross-sectional sample of adults living with an ostomy, higher resilience was associated with better preference-based HRQoL after adjustment for sociodemographic and clinical variables. Recent complications were independently associated with lower utility. These findings suggest that psychological adaptation and current clinical burden capture complementary dimensions of health status that may be relevant to specialist ostomy nursing assessment.

Comparison with previous research

Previous studies have linked resilience with ostomy adjustment and conventional quality-of-life outcomes [12–14]. The present study extends that evidence by quantifying the association with a preference-based SF-6D utility measure while maintaining resilience as a continuous construct. The findings do not establish a clinically meaningful change threshold, but they indicate that variation in

resilience is associated with variation in patient-reported health status even after accounting for recent complications and other measured covariates.

The association of recent complications with lower utility is consistent with the broader clinical burden of stoma and peristomal problems [3]. Importantly, complication status and resilience were not interchangeable: both contributed information about health status. This supports a multidimensional assessment approach rather than relying on either technical stoma findings or psychological measures alone.

Implications for nursing practice and research

Recent ostomy-care research has shown that patient-reported outcome feedback can help stoma care nurses structure consultations, identify concerns and tailor person-centred follow-up [8, 9]. BMC Nursing has also highlighted the development of structured nurse-led interventions for complex stoma-related symptoms [18]. Within that evolving practice context, the present quantitative findings support testing whether brief resilience and HRQoL measures add useful information to routine complication assessment.

These results should not be used to create fixed referral rules from CD-RISC-10 scores. A lower resilience score should prompt broader person-centred assessment rather than automatic triage. A prospective nursing pathway could evaluate whether combining complication review, resilience assessment and patient-reported HRQoL improves identification of support needs, consultation efficiency, patient involvement, referral decisions and outcomes. Such studies should also measure feasibility, acceptability, nursing workload, equity, resource use and unintended consequences.

Strengths and limitations

Strengths include the combined assessment of resilience and preference-based HRQoL, use of a continuous primary analysis, transparent handling of missing data, reporting of full adjusted estimates and use of HC3 robust standard errors. The use of internationally recognized patient-reported measures also supports comparison with research outside a single service context.

Several limitations should be considered. The cross-sectional design precludes causal inference. Participants were recruited through specialist ostomy clinics in one Spanish region, which may introduce selection bias and limit generalizability to people not engaged in specialist follow-up or to other healthcare systems. The protocol target was 212 participants, whereas 193 were recruited; the original sample-size calculation was proportion based and was not designed specifically for the final regression model. Pre-inclusion screening, exclusion and refusal counts were not available in the supplied source records, limiting full reporting of recruitment flow. The principal association was estimated with 176 paired observations and the adjusted model used 168 complete cases, so missingness may have introduced selection bias.

The recent-complications variable was binary and did not capture complication type or severity. SF-6D utility was estimated by applying a Spanish value set developed from SF-12 v1 to SF-12 v2 responses and should therefore be regarded as an operational approximation. Gender identity was not collected. Finally, the study was not designed to test a nursing intervention, diagnostic threshold or triage rule; prospective implementation studies are required before clinical adoption of any structured pathway.

Conclusions

Greater resilience was independently associated with better preference-based HRQoL among adults living with an ostomy, while recent complications were independently associated with lower utility. For specialist ostomy nursing, these results support prospective evaluation of person-centred follow-up models that integrate clinical complication assessment with brief measures of resilience and patient-reported HRQoL. The present cross-sectional findings do not establish causality or justify fixed screening or referral thresholds.

Abbreviations

CD-RISC-10
10-item Connor-Davidson Resilience Scale
CI
confidence interval
HRQoL
health-related quality of life
IBD
inflammatory bowel disease
IQR
interquartile range
PRO
patient-reported outcome
SD
standard deviation
SF-12
12-item Short Form Health Survey
SF-6D
Short Form-6 Dimension
STROBE
Strengthening the Reporting of Observational Studies in Epidemiology.

Declarations

Ethics approval and consent to participate

The Provincial Research Ethics Committee of Málaga approved the study on 29 January 2026 (SICEIA-2026-000170; study code RESILENCIA_26) before recruitment began. Written informed consent was obtained from all participants included in the study.

The research was conducted in accordance with internationally accepted ethical principles for research involving human participants, including the principles set out in the Declaration of Helsinki and its subsequent amendments. Participant confidentiality and privacy were maintained throughout the study, and all data were handled in accordance with applicable ethical and data-protection requirements.

Consent for publication

Not applicable. The manuscript contains no identifiable individual participant information.

Competing interests

The authors declare that they have no competing interests.

Grupo de Investigación Puntos de Encuentro – Andalucía (GIPE-A)

The following advanced practice nurses specializing in ostomy care have been part of the Meeting Points Research Group in Andalusia (in alphabetic order): Alfaro Romero, M; Barrero Rojo, S; Benítez García, R; Diaz García-Valenciano, E; Elorza Maza, M; García Martín, VE.; García Pascual, S; Gonzalez Peral, M; Hervas García, M; Jurado Millán, L; López Fernández, R; López Megías, P; Molina Navarrete, E; Pérez Fernández, AJ; Pérez Jiménez, CN; Sánchez García, R; Sánchez Juarez, MJ; Valenzuela Mateos, ME; Valero Montero, R.

Authors' information

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Author Contribution

AJGR contributed to conceptualization, formal analysis, and writing-review and editing. NGAS contributed to investigation, data curation, formal analysis, writing-original draft, and writing-review and editing. Grupo de Investigación Puntos de Encuentro-Andalucía (GIPE-A) contributed to conceptualization and design the research question, participated in developing the study protocol, collected the data, and writing-review and editing (Alfaro Romero, M; Barrero Rojo, S; Benítez García, R; Diaz García-Valenciano, E; Elorza Maza, M; García Martín, VE; García Pascual, S; Gonzalez Peral, M; Hervas García, M; Jurado Millán, L; López Fernández, R; López Megías, P; Molina Navarrete, E; Pérez Fernández, AJ ; Pérez Jiménez, C; Sánchez García, R; Sánchez Juarez, MJ; Valenzuela Mateos, ME; Valero Montero, R). All authors read and approved the final manuscript and agree to be accountable for the work.

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Data Availability

The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request. Data are located in controlled access data storage at Pharmacology Dept School of Medicine. University of Malaga.

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Figures

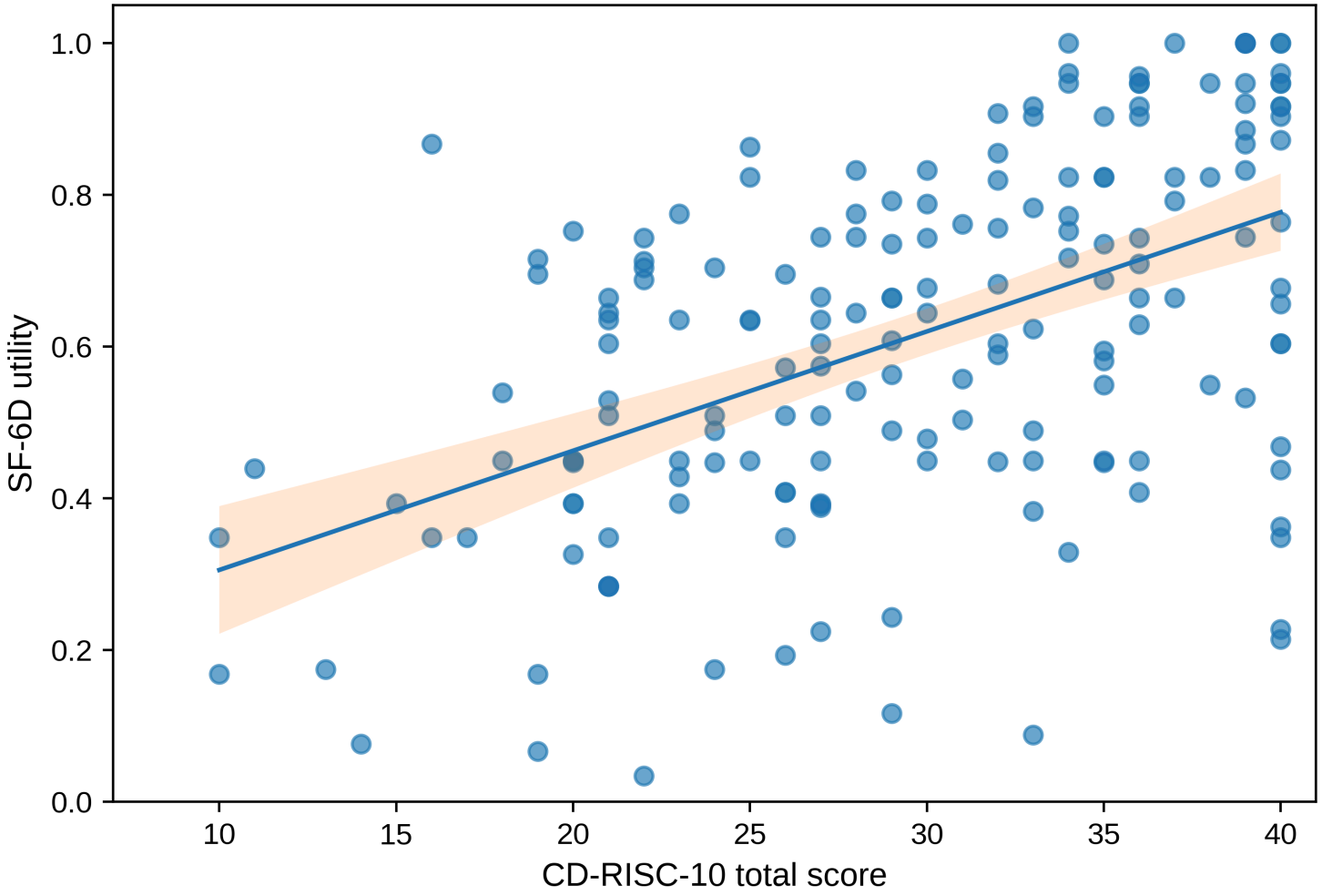


Figure 1

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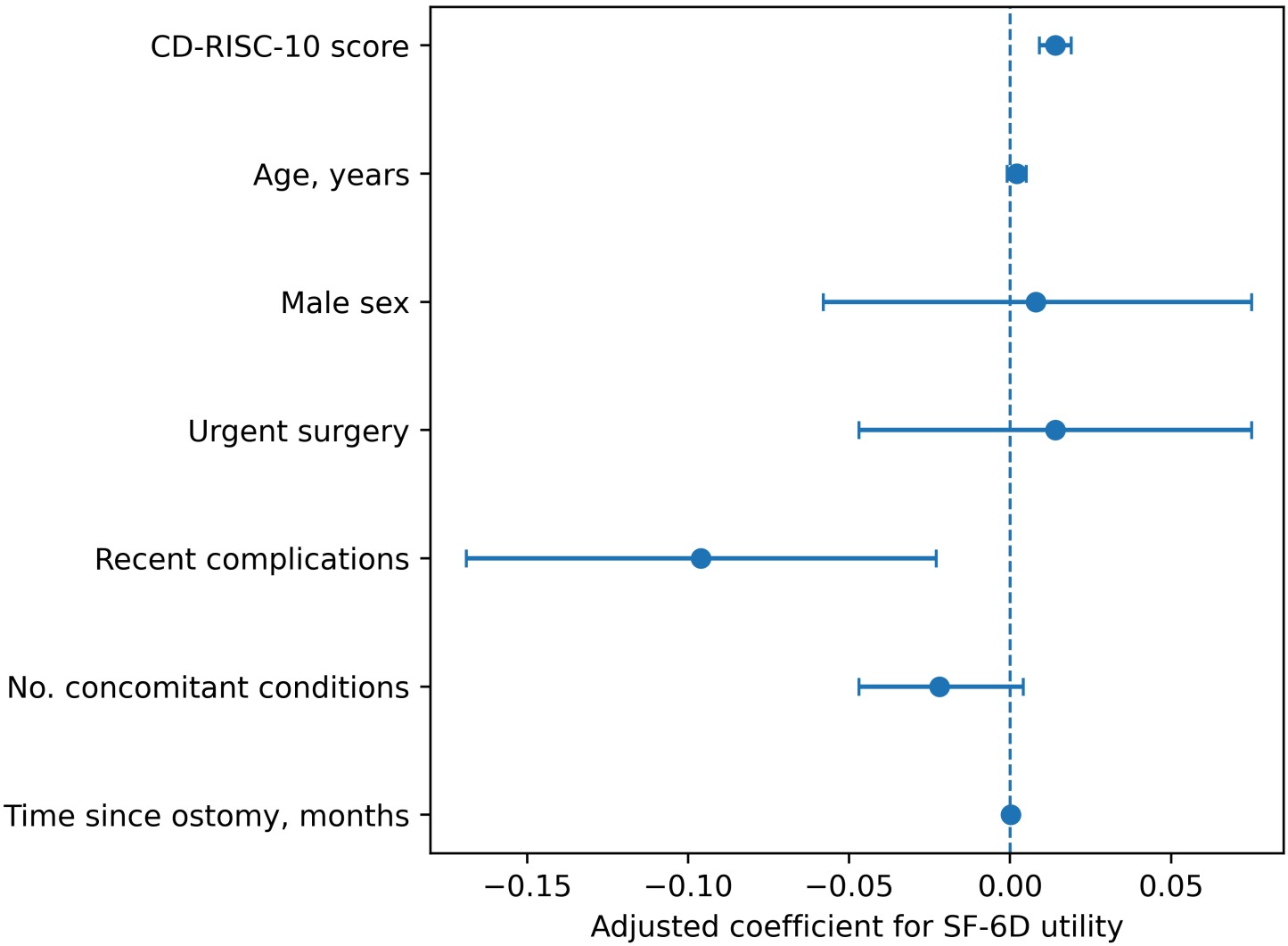


Figure 2

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Supplementary Files

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