SUPPLEMENTARY MATERIAL 1

STROBE checklist

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1-2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-4
Objectives	3	State specific objectives, including any prespecified hypotheses	4-5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-9
Bias	9	Describe any efforts to address potential sources of bias	8
Study size	10	Explain how the study size was arrived at	9-10
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	10-11
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	10-11
		(*b*) Describe any methods used to examine subgroups and interactions	NA
		(*c*) Explain how missing data were addressed	NA

		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	11
		(b) Give reasons for non-participation at each stage	11
		(c) Consider use of a flow diagram	11
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	11-12
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	11-12
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	12
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	18-19
Generalisability	21	Discuss the generalisability (external validity) of the study results	19
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	NA

SUPPLEMENTARY MATERIAL 2

Full descriptive statistics.

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max	Kurt.	Skew.
Healthy group									
Age, years	50	36.76	13.362	18	26	44.75	65	2.13	0.66
Height, cm	50	170.6	9.465	153	163	177.75	190	2.09	-0.02
Weight, kg	50	73.916	14.577	47	64.25	82	109	2.60	0.12
BMI, kg/m^2	50	25.234	3.74	18.4	23	27.425	34.8	2.60	0.17
Neck extension, º	50	71.04	12.506	29.333	61.667	80.5	94.667	3.89	-0.57
Neck flexion, º	50	58.147	10.801	34.667	49.5	63.833	82.667	2.80	0.07
Neck protraction, º	50	5.497	1.355	2.5	4.708	6.292	8.667	2.72	-0.09
Neck retraction, º	50	3.436	0.988	1.833	2.708	4.167	5.667	2.27	0.09
Neck lateral flexion, º	50	41.033	9.224	20.667	35.5	47.167	60.667	2.82	0.38
Neck rotation, º	50	71.74	10.029	42.667	66.167	79.333	92.667	3.29	-0.52
Neck flexion strength, kg	50	10.547	5.657	1.9	5.525	15.283	22.233	1.96	0.40
Neck extension strength, kg	50	15.161	6.228	4.667	10.075	19.558	28.4	2.08	0.21
Neck lateral flexion strength, kg	50	12.413	5.932	3.667	7.5	16.733	25.833	2.31	0.39
PPT, kg/cm^2	50	3.444	1.702	1.163	2.155	4.162	8.583	3.77	1.06
PCS (R)	50	3.16	3.888	0	0	5	12	2.59	0.98
PCS (M)	50	3.14	4.262	0	0	5.75	18	6.13	1.76
PCS (H)	50	1.94	2.226	0	0	3.75	7	2.41	0.86
PCS total	50	8.24	9.659	0	0	13.5	35	3.51	1.16
TSK-11	50	19.14	4.417	11	16	22	30	2.35	0.26

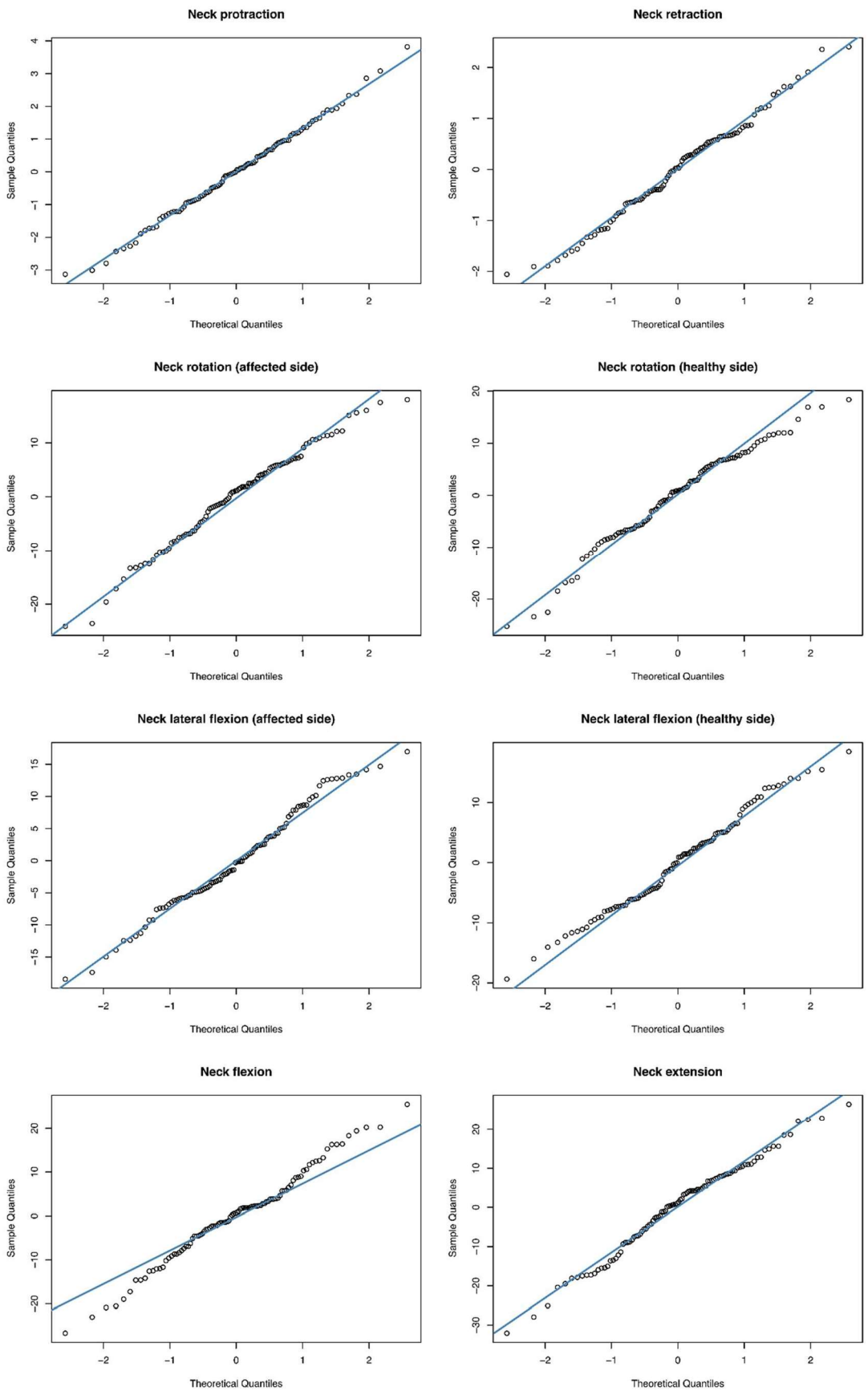
Abbreviations: Std. Dev, standard deviation; Pctl, percentile; Kurt., kurtosis; Skew., skewness; PPT, pressure pain threshold; PCS, Pain Catastrophizing Scale (R = rumination, M, magnification; and H, helplessness); TSK, Tampa Scale for Kinesiophobia.

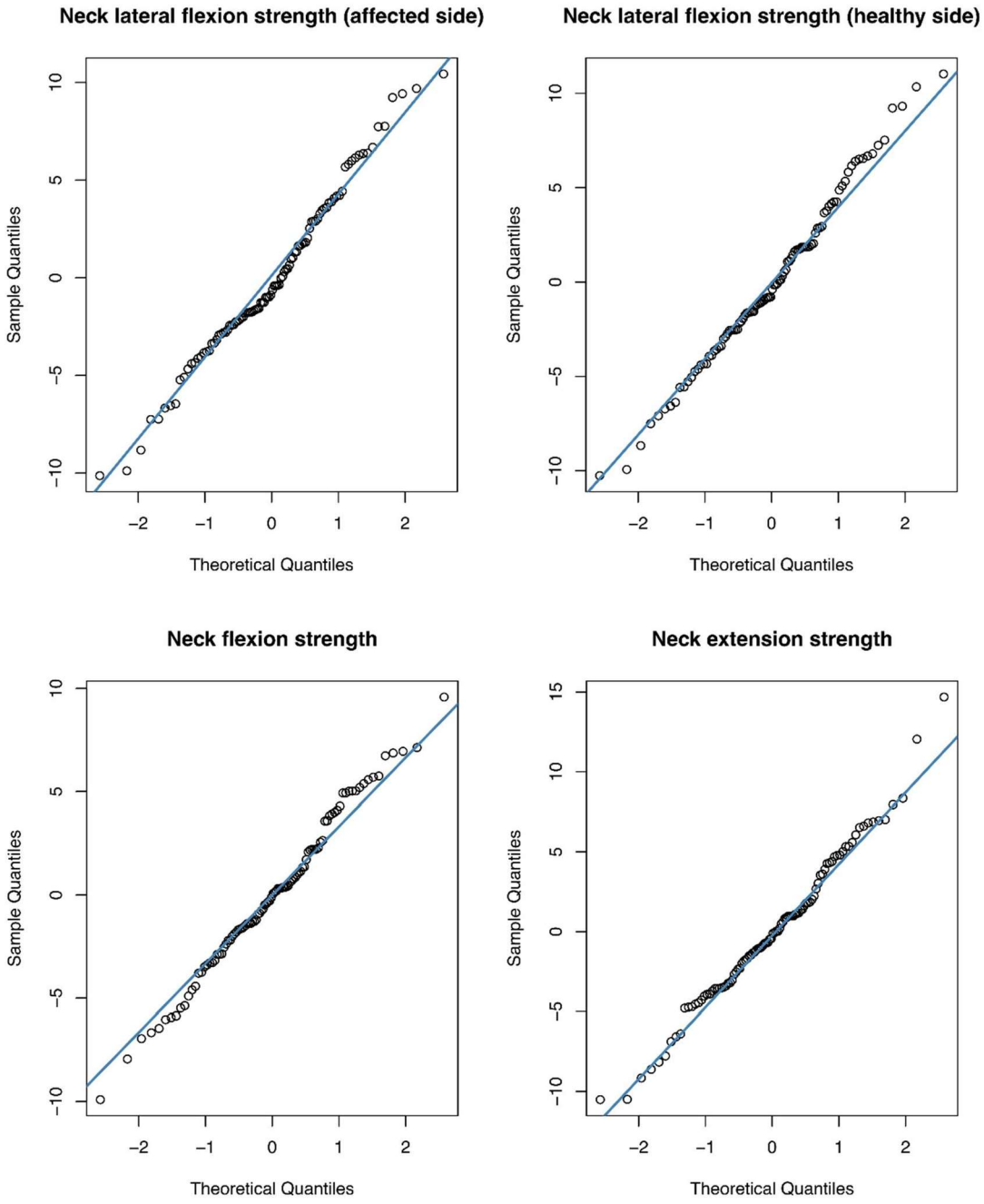
Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 50	Pctl. 75	Max	Kurt.	Skew.
Shoulder pain group										
Age, years	50	41.1	13.804	19	28	41.5	52	65	1.87	-0.09
Height, cm	50	169.98	9.548	151	163.25	169	175	193	2.74	0.38
Weight, kg	50	71.316	14.564	46	60	69.6	80	107.6	2.63	0.45
BMI, kg/m^2	36	24.99	3.28	16.71	22.998	25.55	27.1	31	2.52	-0.24
Time with pain, days	50	469	647.763	90	120	182.5	501.876	3285	11.99	2.91
Neck extension, º	50	66.199	15.53	28	56	68.5	79.142	89.333	2.52	-0.52
Neck flexion, º	50	56.593	11.527	29.333	50.083	58.017	62.667	81.3	3.01	-0.27
Neck protraction, º	50	4.941	1.789	1.167	3.908	4.92	6.155	9.167	2.62	0.04
Neck retraction, º	50	3.572	1.134	1	2.91	3.55	4.145	6	2.75	0.04
Neck flexion strength, kg	50	9.515	5.555	2.23	4.467	9.033	12.625	24.25	3.04	0.77
Neck extension strength, kg	50	14.468	6.833	4.467	9.25	13.033	19.188	35.15	3.06	0.68
PPT (affected side), kg/cm^2	50	1.897	1.013	0.453	1.332	1.702	2.242	6.03	7.73	1.82
PPT (unaffected side), kg/cm^2	50	1.972	1.159	0.58	1.322	1.775	2.292	6.82	9.45	2.30
Neck lateral flexion (affected side), º	50	40.603	9.378	18	34.75	40.333	49.333	61.333	2.69	-0.17
Neck lateral flexion (unaffected side), º	50	39.89	9.204	23.667	32.308	39.517	47.833	62	2.17	0.04
Neck rotation (affected side), º	50	64.947	10.569	42.667	59	66.5	71.167	86.667	2.62	-0.23
Neck rotation (unaffected side), º	50	67.126	11.518	40.667	60	67.167	75	90	2.66	-0.31
Neck lateral flexion strength (affected side), kg	50	12.341	6.411	2.4	7.358	11.517	16.325	30.3	3.35	0.85
Neck lateral flexion strength (unaffected side), kg	50	12.416	6.752	3.267	6.475	11.667	16.033	30.2	2.63	0.63
Pain (actual)	50	3.948	2.55	0	2	3	5.95	10	2.31	0.55
Pain (last week)	50	4.848	1.858	2.5	3.125	4.2	6.375	9	2.04	0.62
PCS (R)	50	3.28	3.447	0	0.25	2	5	13	3.53	1.13
PCS (M)	50	3.78	4.087	0	1	2	5	18	4.99	1.51
PCS (H)	50	2.62	2.355	0	1	2	4	10	4.18	1.33
PCS total	50	9.68	9.056	0	3	7	13	38	4.41	1.36
TSK-11	50	23.42	6.783	12	18	23	27	40	2.76	0.59
SPADI (Pain)	50	46.16	22.63	10	26.5	43	63.5	100	2.41	0.32
SPADI (Disability)	50	26.8	21.9	0	9.375	24.375	37.188	93.75	4.64	1.27
SPADI (Total)	50	32.738	19.361	3.846	16.346	32.308	41.731	86.154	3.70	0.85

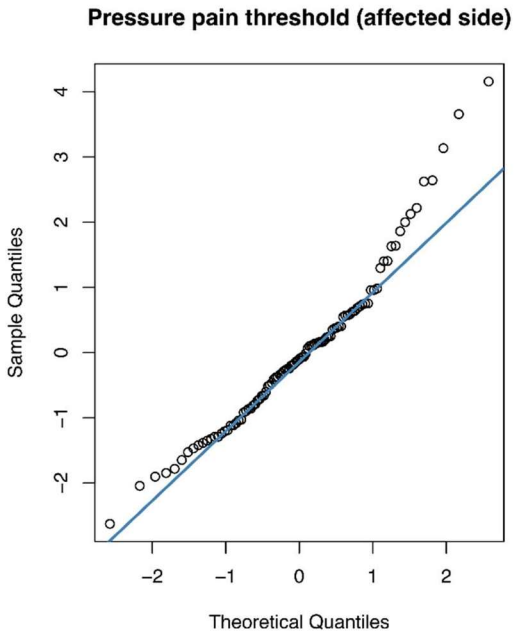
Abbreviations: Std. Dev, standard deviation; Pctl, percentile; Kurt., kurtosis; Skew., skewness; PPT, pressure pain threshold; PCS, Pain Catastrophizing Scale (R = rumination, M, magnification; and H, helplessness); TSK, Tampa Scale for Kinesiophobia; SPADI, Shoulder Pain and Disability Index.

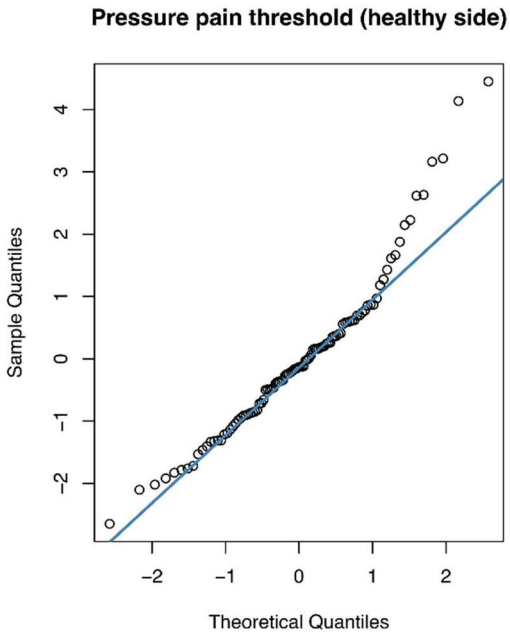
SUPPLEMENTARY MATERIAL 3

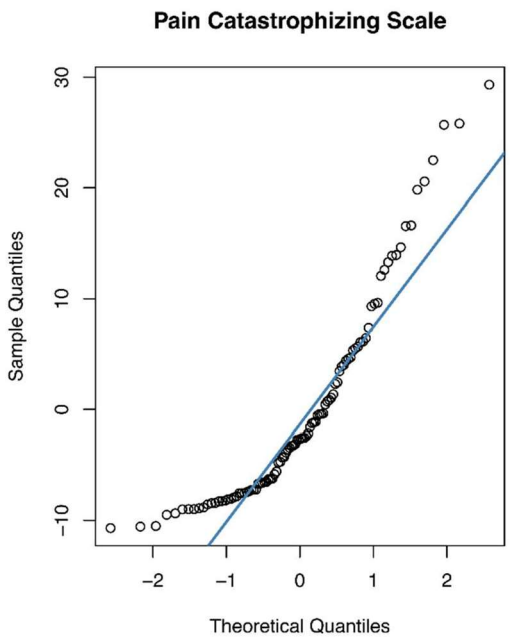
QQ plots.

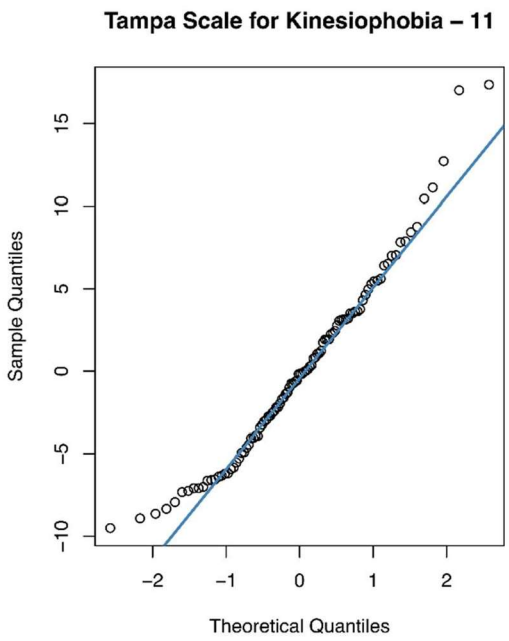

Neck protraction
Neck retraction
Neck rotation (affected side)
Neck rotation (healthy side)
Neck lateral flexion (affected side)
Neck lateral flexion (healthy side)
Neck flexion
Neck extension
Sample Quantiles
Theoretical Quantiles


Neck lateral flexion strength (affected side)
Neck lateral flexion strength (healthy side)
Neck flexion strength
Neck extension strength
Sample Quantiles
Theoretical Quantiles


Pressure pain threshold (affected side)
Sample Quantiles
Theoretical Quantiles
−2
−1
0
1
2
3
4

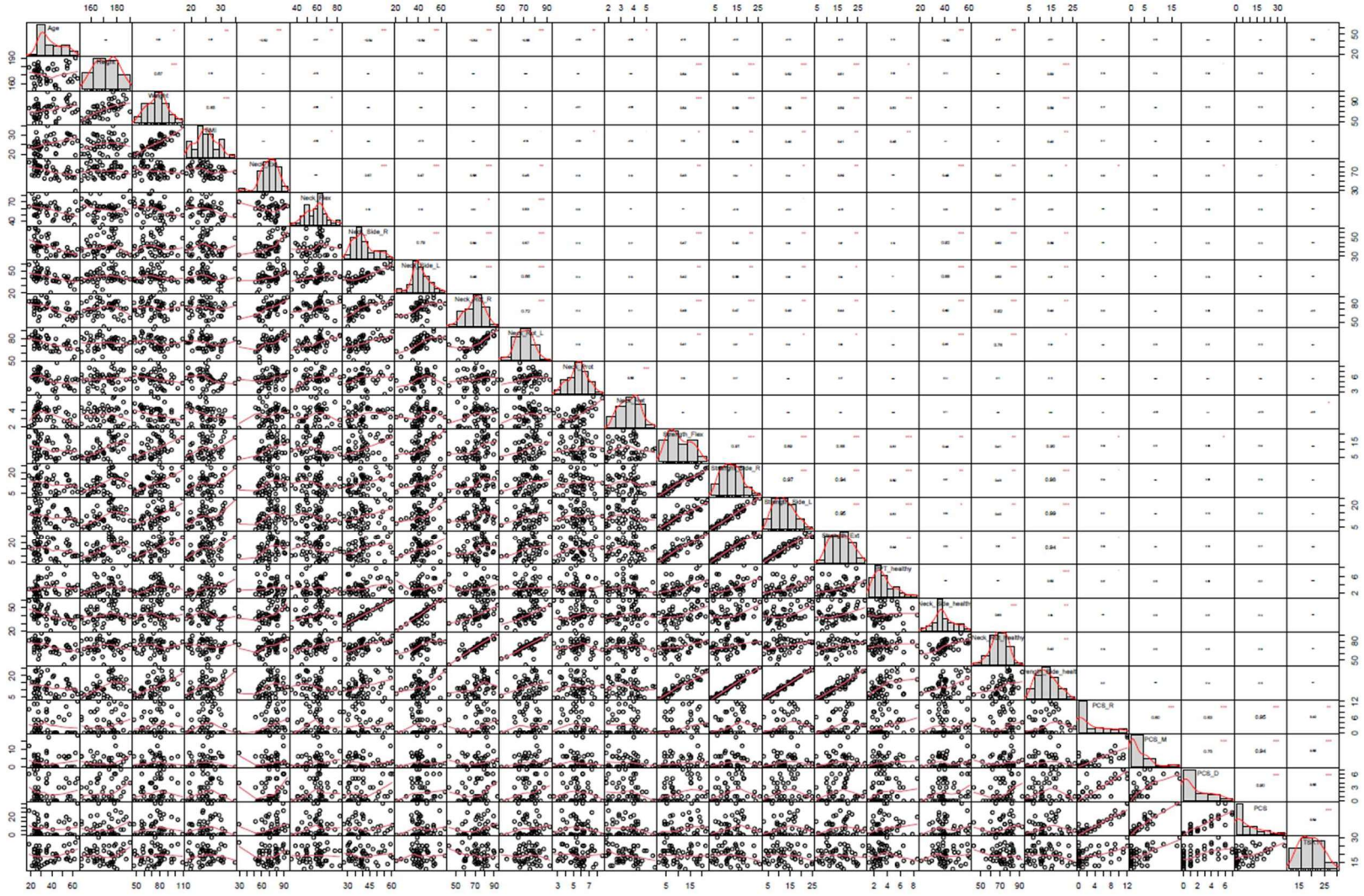

Pressure pain threshold (healthy side)
Sample Quantiles
Theoretical Quantiles
−2
−1
0
1
2
3
4


Pain Catastrophizing Scale
Sample Quantiles
Theoretical Quantiles
−10
0
10
20
30
−2
−1
0
1
2

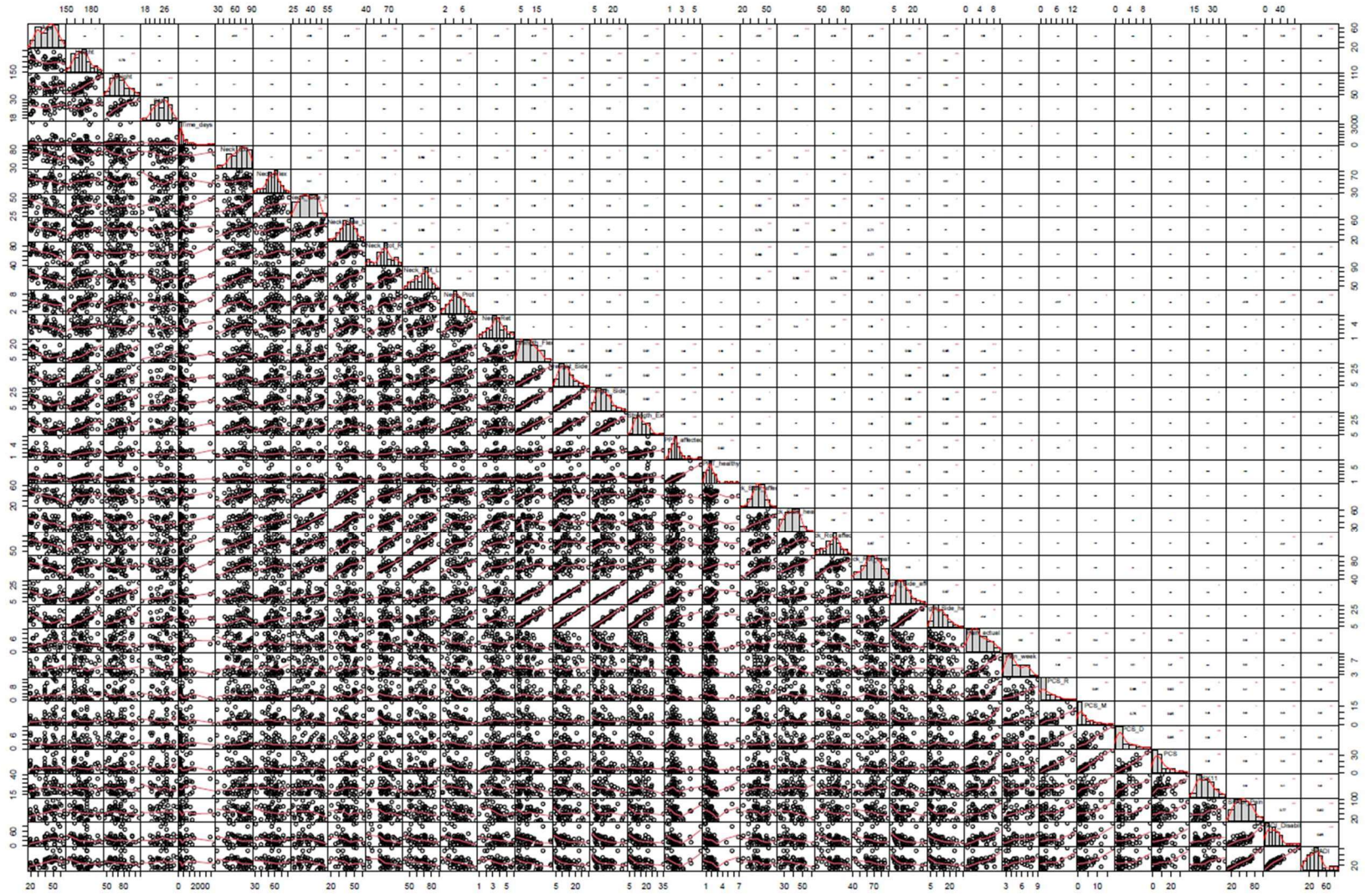

Tampa Scale for Kinesiophobia – 11
Sample Quantiles
Theoretical Quantiles
−10
−5
0
5
10
15
−2
−1
0
1
2

SUPPLEMENTARY MATERIAL 4

Correlation matrix and histograms for quantitative variables within each group



HEALTHY GROUP

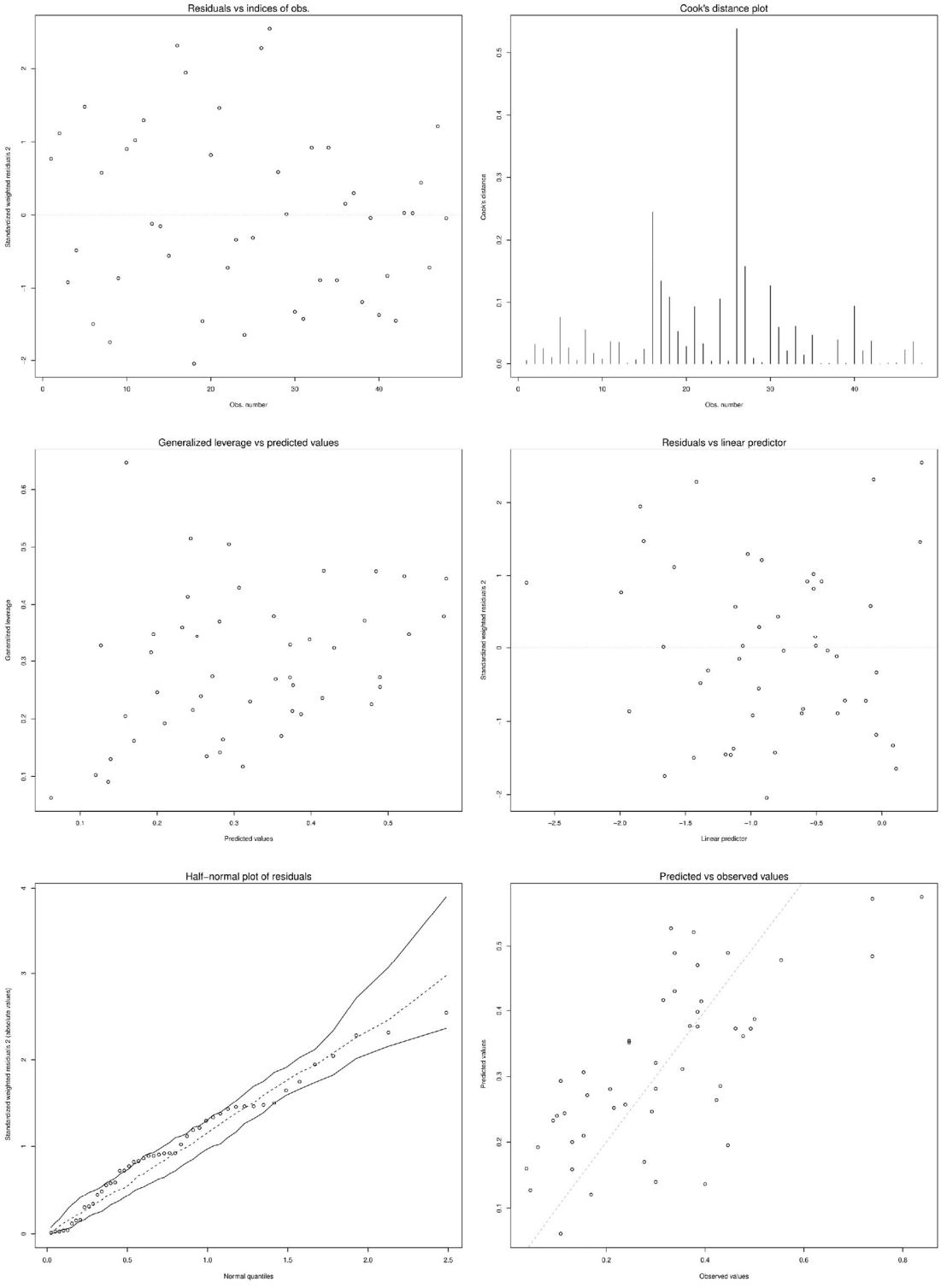


SHOULDER PAIN GROUP

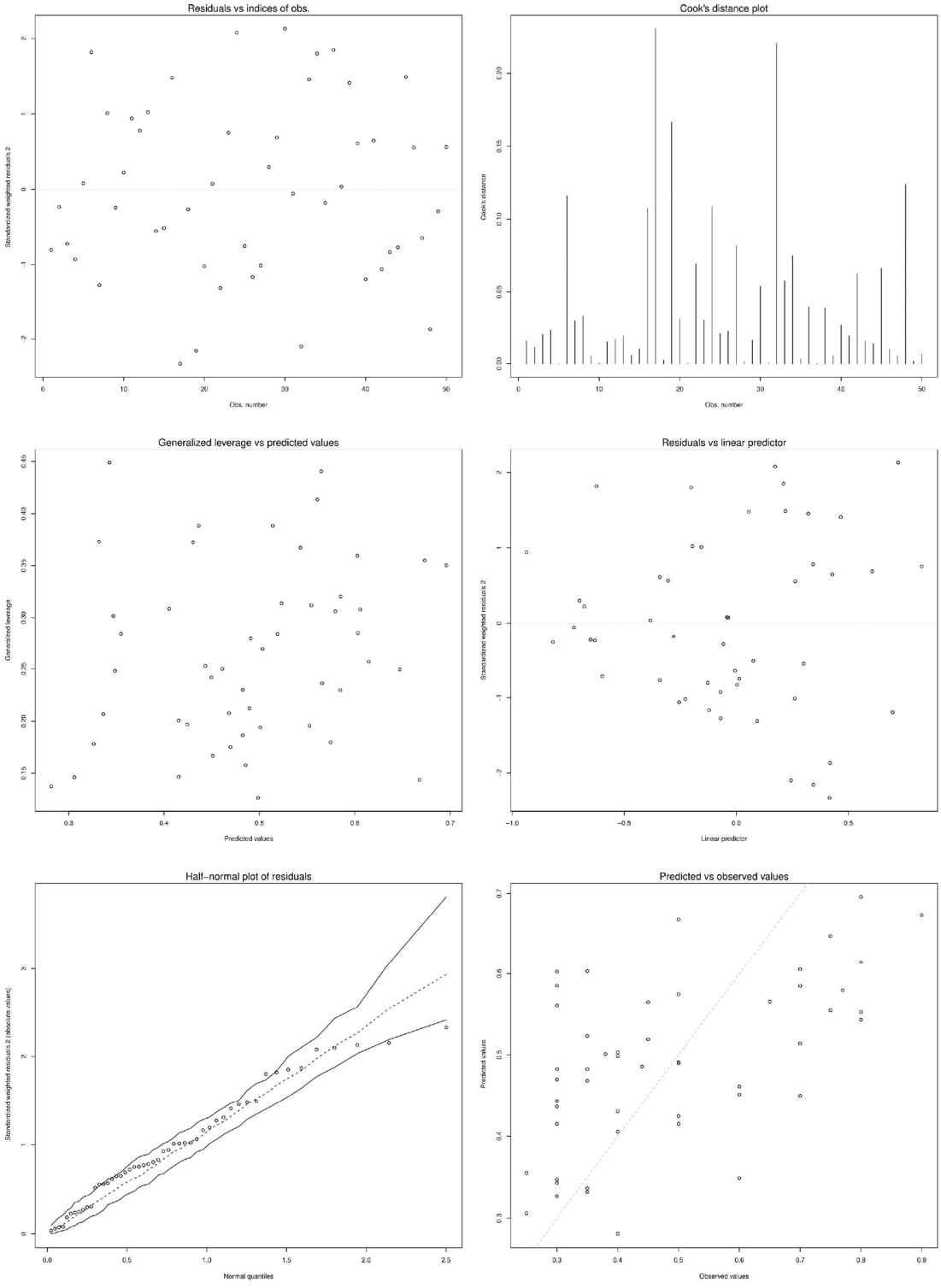
SUPPLEMENTARY MATERIAL 5.

Diagnostic plots for beta regression models

Shoulder Pain and Disability Index Model



Pain intensity within last week model

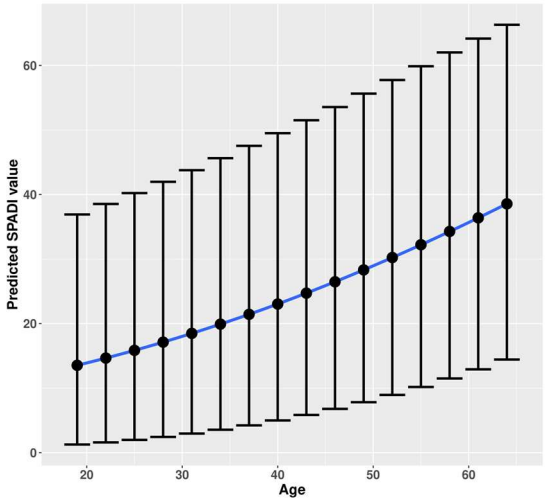


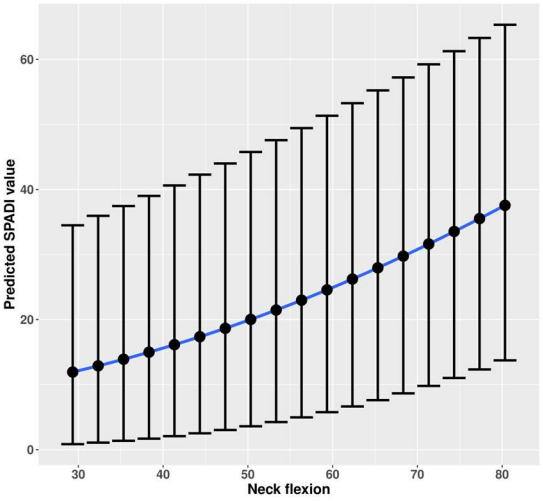
SUPPLEMENTARY MATERIAL 6

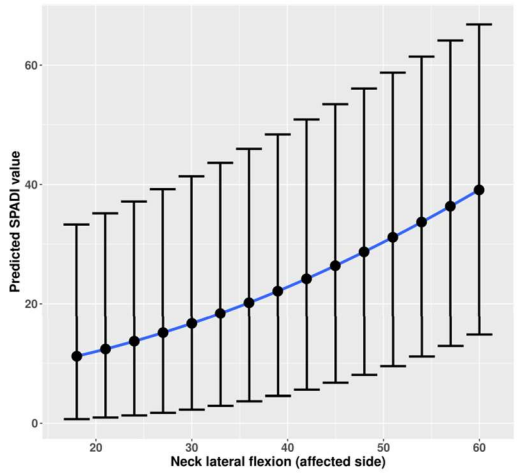
Predictor versus fitted values plots for beta regression models

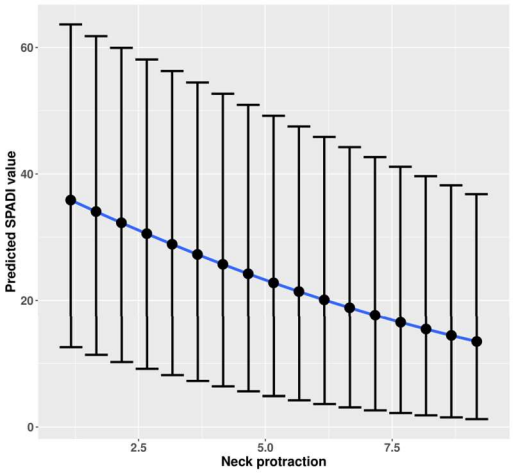
Plots for Shoulder Pain and Disability Index

Data in plots represents mean predicted value (black dots) with 95% prediction intervals based on 0.25 and 97.5 quantiles. Plots are only presented for significant predictors in multivariable beta regression models, with all other predictors set constant at the mean, and the sex factor set as female.









Plots for pain intensity within last week

Data in plots represents mean predicted value (black dots) with 95% prediction intervals based on 0.25 and 97.5 quantiles. Plots are only presented for significant predictors in multivariable beta regression models, with all other predictors set constant at the mean, and the sex factor set as female.