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Quality of life and its determinants among hypertensive patients in an urban field-practice area of South India: a community-based cross-sectional study

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Abstract

Background

Hypertension requires lifelong management, and quality of life (QoL) is an increasingly recognised patient-centred outcome in chronic-disease care. Evidence on QoL and its determinants among hypertensive patients in urban Indian community settings remains limited. We assessed QoL across the four WHOQOL-BREF domains and identified its sociodemographic, clinical and behavioural determinants among hypertensive patients in an urban field-practice area of South India.

Methods

We conducted a community-based cross-sectional survey of 503 adults with diagnosed hypertension in the urban field-practice area of a medical college in Mysuru, Karnataka. QoL was measured using the WHOQOL-BREF, scored per the WHO algorithm with domain scores transformed to a 0–100 scale. Domain scores were analysed against sociodemographic, clinical and behavioural characteristics using t-tests, one-way analysis of variance and Spearman correlation, followed by multivariable linear regression for each domain.

Results

Complete WHOQOL-BREF data were available for 477 participants (mean age 58.1 ± 12.2 years; 68.8% female). Mean transformed domain scores were highest for the environmental domain (77.9 ± 9.3) and lowest for the physical domain (71.6 ± 10.9), with psychological 74.1 ± 9.0 and social 72.7 ± 14.4. Older age was independently associated with lower scores in every domain (overall QoL − 13.1 points per 10 years, 95% CI − 15.6 to − 10.7). Being unmarried (overall − 14.9, 95% CI − 21.6 to − 8.1) and reporting perceived stress (− 10.8, 95% CI − 18.4 to − 3.2) were independently associated with lower QoL, whereas higher income, physical activity and male sex were associated with higher QoL. Education, comorbidity, medication use and facility choice were not independently associated with QoL.

Conclusions

QoL among hypertensive patients was shaped primarily by age, marital status, perceived stress, income and physical activity rather than by clinical or health-system factors. Hypertension care in comparable urban settings may benefit from attention to psychosocial support and physical activity, particularly for older and unmarried patients.

Background

Hypertension is among the leading contributors to the global burden of disease, and its prevalence has risen steadily across low- and middle-income countries over recent decades [1]. In India, a substantial proportion of adults are affected, and the treatment cascade remains incomplete, with sizeable gaps in diagnosis, treatment and control [2, 3]. Because hypertension is largely asymptomatic yet requires sustained pharmacological and lifestyle management, the lived experience of patients — their day-to-day physical, psychological, social and environmental well-being — is central to long-term engagement with care.

The World Health Organization defines quality of life (QoL) as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns [4]. The WHOQOL-BREF, a 26-item abbreviation of the WHOQOL-100, captures this multidimensional construct across four domains — physical health, psychological well-being, social relationships and environment — and has been validated across diverse cultural settings, including India [5, 6]. In chronic conditions such as hypertension, QoL has emerged as an important patient-centred outcome that complements clinical indicators and predicts adherence and health-service use.

A growing body of evidence indicates that hypertension is associated with reduced QoL, and that this reduction is patterned by age, sex, socioeconomic position, comorbidity and psychosocial factors. Community-based studies from India have reported that older age, lower educational and socioeconomic status, and the presence of comorbidities are associated with poorer QoL among hypertensive patients [7, 8]. Psychological factors, including perceived stress, self-esteem and anxiety, have been shown to shape QoL trajectories in hypertension, sometimes more strongly than clinical severity [9, 10]. Environmental and living-condition factors also contribute, particularly to the environmental domain of QoL [11]. However, much of the Indian evidence derives from rural or hospital-based samples, and the determinants of QoL among hypertensive patients living in dense urban neighbourhoods — where social structure, income and access to services differ markedly — remain comparatively underexplored.

Understanding which patient characteristics drive QoL in urban hypertensive populations is important for designing care that extends beyond blood-pressure control to the broader well-being of patients. We therefore assessed QoL across the four WHOQOL-BREF domains among hypertensive patients in an urban field-practice area of South India, and identified the sociodemographic, clinical and behavioural determinants independently associated with each domain and with overall QoL.

Methods

Study design and setting

We conducted a community-based, cross-sectional survey of diagnosed hypertensive patients residing in the urban field-practice area of a medical college in Mysuru, Karnataka, South India. The field-practice

area comprises six administrative wards and a peri-urban locality served by public primary health centres operated by the municipal corporation and the affiliated medical college, alongside numerous private clinics, nursing homes and hospitals. The present analysis draws on the same community cohort used to examine healthcare-facility choice; here we report the quality-of-life outcomes assessed in that survey. The study is reported in accordance with the STROBE guidelines for cross-sectional studies (Additional file 1).

Study population and sampling

Eligible participants were adults aged 18 years or older, resident in the field-practice area, with a diagnosis of hypertension of at least one year's duration and receiving pharmacological or lifestyle-based management at enrolment. A convenience sampling strategy was used, recruiting patients through public primary health centres and community health-worker referrals during house-to-house visits. People with gestational hypertension, and those who did not consent to participate, were excluded. Of 503 enrolled participants, 477 (94.8%) provided complete responses to all 26 WHOQOL-BREF items and constituted the analytic sample for quality-of-life outcomes.

Ethics approval

The study was approved by the Institutional Ethics Committee of JSS Medical College, Mysuru (ref. no. JSS/MC/PG/91/2022-23, dated 31 March 2023). Written informed consent was obtained from all participants prior to data collection. For participants who were illiterate, consent was obtained from their legal guardian or responsible family member, who signed the consent form on their behalf after the study purpose, procedures, risks and voluntary nature of participation had been explained in their preferred language by the interviewer. All methods were performed in accordance with the Declaration of Helsinki and the CIOMS international ethical guidelines.

Data collection

Data were collected using a semi-structured questionnaire developed specifically for this study, face-validated and pretested for content validity and reliability; the questionnaire incorporated the WHOQOL-BREF for the quality-of-life objective. Interviews were administered face-to-face by trained community health workers in the participant's preferred language. Sociodemographic variables (age, sex, education, occupation, marital status, family type, monthly household income), clinical and behavioural variables (duration of hypertension, family history, antihypertensive medication use, regular follow-up attendance, chronic comorbidity, physical activity, tobacco and alcohol use, perceived stress) and healthcare-utilisation variables (facility sector attended and reported access barriers) were recorded.

Quality-of-life measurement and scoring

Quality of life was measured using the WHOQOL-BREF, comprising 26 items rated on five-point Likert scales. Responses were scored per the WHO (1996) algorithm: items 3, 4 and 26 were reverse-coded, and the four domain scores (physical, 7 items; psychological, 6 items; social relationships, 3 items; environment, 8 items) were computed as the mean of constituent items multiplied by four, then linearly transformed to a 0–100 scale, where higher scores indicate better quality of life. A domain score was computed only when all constituent items were answered. An aggregate overall QoL score was derived as the sum of the four transformed domain scores (range 0–400), consistent with the parent study; the two general items (overall QoL and general health satisfaction) are additionally reported separately.

Statistical analysis

Continuous variables are summarised as mean ± standard deviation (SD) or median (interquartile range, IQR), and categorical variables as counts and percentages. Domain scores were compared across binary groups using Welch's t-test and across multi-category variables using one-way analysis of variance. Associations between domain scores and continuous or ordinal predictors (age, income, education level) were assessed using Spearman rank correlation. Independent determinants of each domain score, and of overall QoL, were examined using multivariable linear regression including age, sex, marital status, education, income, comorbidity, physical activity and perceived stress. Regression coefficients (β) are reported with 95% confidence intervals (CI). Statistical significance was defined as two-tailed $p < 0.05$. Analyses were conducted in Python 3.12 using pandas, SciPy and statsmodels.

Results

Sample characteristics

Complete WHOQOL-BREF data were available for 477 of 503 participants (94.8%). The mean age was 58.1 ± 12.2 years; 328 (68.8%) were female. Most participants were illiterate (300; 62.9%) and married (324; 67.9%), with a median monthly household income of ₹18,000 (IQR ₹10,000–₹25,000). Chronic comorbidity was reported by 281 (58.9%), regular antihypertensive medication use by 450 (94.3%), and regular follow-up by 414 (86.8%). Perceived stress was reported by 385 (80.7%) and physical activity by 308 (64.6%) (Table 1).

Table 1
Characteristics of the analytic sample (n = 477).

Characteristic	n (%) or mean ± SD
Age, years, mean ± SD	58.1 ± 12.2
<50	118 (24.7)
50–59	132 (27.7)
60–69	132 (27.7)
≥70	95 (19.9)
Female sex	328 (68.8)
Illiterate	300 (62.9)
Married	324 (67.9)
Nuclear family	250 (52.4)
Monthly income ₹, median (IQR)	18000 (10000–25000)
Family history of hypertension	230 (48.2)
Regular antihypertensive medication	450 (94.3)
Regular follow-up	414 (86.8)
Any chronic comorbidity	281 (58.9)
Physically active	308 (64.6)
Tobacco use	29 (6.1)
Alcohol use	30 (6.3)
Perceived stress	385 (80.7)
Attends government facility	222 (46.5)
Reported access barrier	168 (35.2)

SD standard deviation, IQR interquartile range. Percentages are of the analytic sample (n = 477).

Quality-of-life domain scores

On the 0–100 transformed scale, the environmental domain recorded the highest mean score (77.9 ± 9.3), followed by the psychological (74.1 ± 9.0), social (72.7 ± 14.4) and physical (71.6 ± 10.9) domains; the aggregate overall QoL score was 296.3 ± 37.2 (range 204.2–379.8) (Table 2). Domain scores correlated inversely and significantly with age (Spearman ρ ranging from − 0.35 for the psychological domain to − 0.48 for the social domain; all $p < 0.001$). Income correlated weakly but significantly with the

environmental (ρ = 0.16, p < 0.001) and social (ρ = 0.10, p = 0.028) domains, whereas educational level showed no significant correlation with any domain (Table 2).

Table 2
WHOQOL-BREF domain scores and their correlation with age, income and education.

Domain	Mean ± SD	ρ (age)	ρ (income)	ρ (education)
Physical	71.6 ± 10.9	−0.43***	0.08	−0.02
Psychological	74.1 ± 9.0	−0.35***	0.03	0.03
Social	72.7 ± 14.4	−0.48***	0.10*	0.02
Environmental	77.9 ± 9.3	−0.40***	0.16***	0.04
Overall (sum, 0–400)	296.3 ± 37.2	−0.47***	0.11*	0.01

*ρ Spearman rank correlation coefficient. *p < 0.05; ***p < 0.001. Domain scores transformed to a 0–100 scale; higher scores indicate better quality of life.*

Bivariate associations

Domain scores declined monotonically across age groups, with participants aged ≥ 70 years scoring substantially lower than those aged < 50 years in every domain (Table 3). Male participants scored higher than female participants across all four domains, and married participants scored higher than unmarried participants, most markedly in the social domain (76.4 vs 64.7). Physically active participants scored higher than inactive participants in every domain (all p ≤ 0.003). Perceived stress was associated with lower psychological (73.6 vs 76.2, p = 0.018) and environmental (77.2 vs 80.8, p = 0.003) scores. Any comorbidity was associated with a lower physical-domain score (70.7 vs 73.0, p = 0.026). Education, family type, family history, medication use, tobacco and alcohol use, facility sector and reported access barriers showed no significant bivariate association with domain scores (Table 3).

Table 3
WHOQOL-BREF domain scores by participant characteristics (mean (SD)).

Characteristic	Group	n	Physical	Psychological	Social	Environmental
Age group (years)	< 50	151	76.2 (9.0)	77.0 (7.9)	79.2 (12.8)	81.4 (8.5)
	50–59	139	73.1 (9.6)	75.2 (8.2)	75.4 (13.6)	79.3 (8.1)
	60–69	117	68.9 (10.8)	72.9 (9.0)	67.8 (12.1)	76.1 (8.6)
	≥ 70	70	63.4 (11.3)	67.9 (9.1)	61.4 (13.0)	70.5 (9.3)
Sex	Male	149	73.6 (9.4)	75.7 (7.8)	76.7 (13.7)	79.3 (8.5)
	Female	328	70.8 (11.4)	73.4 (9.3)	70.8 (14.3)	77.3 (9.5)
Marital status	Married	324	73.4 (10.1)	75.5 (8.1)	76.4 (13.3)	79.1 (8.7)
	Not married	153	67.9 (11.6)	71.3 (9.9)	64.7 (13.2)	75.3 (9.8)
Education	Illiterate	300	71.8 (11.6)	73.9 (9.3)	72.5 (15.0)	77.6 (9.7)
	Literate	177	71.3 (9.6)	74.5 (8.3)	72.9 (13.1)	78.4 (8.5)
Family type	Nuclear	250	72.0 (10.0)	74.7 (8.3)	73.3 (14.2)	77.7 (8.9)
	Joint	227	71.2 (11.8)	73.5 (9.6)	72.0 (14.5)	78.2 (9.7)
Any comorbidity	Yes	281	70.7 (10.8)	74.1 (8.8)	72.4 (14.3)	77.8 (8.9)
	No	196	73.0 (11.0)	74.3 (9.2)	73.1 (14.4)	78.1 (9.7)
Regular medication	Yes	450	71.6 (10.9)	74.1 (8.9)	72.8 (14.5)	78.1 (9.2)
	No	27	71.8 (11.0)	74.8 (9.6)	70.7 (12.1)	75.2 (9.3)

SD standard deviation. Group comparisons by Welch's t-test (binary) or one-way ANOVA (age group). Significant domain differences ($p < 0.05$): age group (all domains), sex (all domains), marital status (all domains), physically active (all domains), perceived stress (psychological and environmental), any comorbidity (physical). Education, family type, family history, medication use, follow-up, tobacco use, alcohol use, facility sector and access barrier were not significantly associated with any domain.

Characteristic	Group	n	Physical	Psychological	Social	Environmental
Regular follow-up	Yes	414	71.4 (10.9)	73.7 (8.9)	72.9 (14.6)	78.0 (9.3)
	No	63	73.4 (10.7)	76.9 (8.9)	71.0 (12.5)	77.5 (9.0)
Physically active	Yes	308	73.0 (10.1)	75.1 (8.6)	74.5 (13.5)	79.1 (8.7)
	No	169	69.1 (11.9)	72.5 (9.3)	69.3 (15.2)	75.6 (9.8)
Tobacco use	Yes	29	71.8 (9.0)	73.4 (9.6)	73.0 (12.5)	77.7 (7.9)
	No	448	71.6 (11.0)	74.2 (8.9)	72.7 (14.5)	77.9 (9.3)
Alcohol use	Yes	30	72.9 (8.1)	75.4 (7.9)	73.3 (11.7)	76.7 (8.3)
	No	447	71.5 (11.1)	74.0 (9.0)	72.6 (14.5)	78.0 (9.3)
Perceived stress	Yes	385	71.7 (10.6)	73.6 (8.8)	72.1 (13.9)	77.2 (8.9)
	No	92	71.5 (12.1)	76.2 (9.2)	75.1 (15.9)	80.8 (10.2)
Facility sector	Government	222	71.3 (11.2)	74.1 (9.3)	73.8 (15.0)	77.8 (9.7)
	Private	255	71.9 (10.7)	74.2 (8.6)	71.7 (13.7)	78.0 (8.9)
Access barrier	Yes	168	71.9 (11.8)	74.9 (9.3)	72.6 (14.7)	77.0 (9.3)
	No	309	71.5 (10.4)	73.7 (8.7)	72.7 (14.2)	78.4 (9.2)

SD standard deviation. Group comparisons by Welch's t-test (binary) or one-way ANOVA (age group). Significant domain differences ($p < 0.05$): age group (all domains), sex (all domains), marital status (all domains), physically active (all domains), perceived stress (psychological and environmental), any comorbidity (physical). Education, family type, family history, medication use, follow-up, tobacco use, alcohol use, facility sector and access barrier were not significantly associated with any domain.

Independent determinants of quality of life

In multivariable linear regression, older age was independently associated with lower scores in every domain and in overall QoL, representing a decrease of 13.1 points in overall QoL per additional 10 years of age (95% CI − 15.6 to − 10.7, $p < 0.001$) (Table 4). Being unmarried was independently associated with lower physical, psychological, social and overall scores, with the largest effect in the social domain (β =

−8.29, 95% CI − 10.90 to − 5.68, p < 0.001). Perceived stress was independently associated with lower psychological (β = −3.04, p = 0.003), social (β = −4.11, p = 0.006), environmental (β = −3.30, p = 0.001) and overall (β = −10.76, p = 0.006) scores. Higher income was independently associated with a higher environmental-domain score (β = +1.42 per ₹10,000, p < 0.001) and higher overall QoL, and physical activity with higher environmental and overall scores. Male sex was independently associated with higher social-domain and overall scores. Education and comorbidity were not independently associated with QoL in any domain. The models explained a modest-to-moderate share of variance, with adjusted R^2 ranging from 0.16 (psychological) to 0.32 (social and overall) (Table 4, Fig. 2).

Table 4
Multivariable linear regression: independent determinants of WHOQOL-BREF domain and overall scores (β [95% CI]).

Predictor	Physical	Psychological	Social	Environmental
Age (per 10 year)	-3.53***	-2.30***	-4.48***	-2.83***
Male sex	+ 1.56	+ 1.13	+ 2.91*	+ 1.17
Not married	-2.63*	-2.41**	-8.29***	-1.55
Education (per level)	-0.55	-0.32	-1.36**	-0.35
Income (per ₹10k)	+ 0.70	+ 0.13	+ 0.86	+ 1.42***
Any comorbidity	-1.73	-0.15	-0.28	-0.68
Physical activity	+ 1.51	+ 1.15	+ 1.96	+ 1.64*
Perceived stress	-0.31	-3.04**	-4.11**	-3.30**
Adjusted R^2	**0.22**	**0.16**	**0.32**	**0.23**

*β unstandardised regression coefficient (points on the 0–100 domain scale). Reference categories: female sex, married, no comorbidity, physically inactive, no perceived stress. *p < 0.05; **p < 0.01; ***p < 0.001. For the overall QoL model (0–400 scale; adjusted R^2 0.32), significant predictors were age (− 13.1 per 10 years), not married (− 14.9), perceived stress (− 10.8), income (+ 3.1 per ₹10k), physical activity (+ 6.3) and male sex (+ 6.8); all n = 471.*

Discussion

In this community-based sample of urban hypertensive patients, quality of life was shaped predominantly by age, marital status, perceived stress, income and physical activity rather than by clinical characteristics or health-system contact. The environmental domain scored highest and the physical domain lowest, and age exerted a pervasive negative influence across all four domains — the single most consistent finding of the study.

The domain profile observed here is broadly consistent with Indian community studies using the WHOQOL-BREF, though the ordering of domains varies by setting. In a community-based study of hypertensive homemakers in Udupi, Karnataka, the physical domain scored highest and the social domain lowest [7]; in our sample the environmental domain led and the physical domain was lowest, but

the social domain again showed the widest dispersion and the strongest sensitivity to marital status and age. These differences likely reflect sampling (our sample included both sexes and a wide age range) and the strong influence of social structure on the social domain. Our finding that older age depresses QoL across every domain aligns closely with rural Indian evidence, where older age, lower socioeconomic status and comorbidity predicted poorer QoL [8], and with international WHOQOL-BREF studies of hypertension in which older age was among the most robust correlates of reduced QoL [12].

The independent association of perceived stress with lower psychological, social and environmental QoL echoes longitudinal evidence that psychological factors shape QoL trajectories in hypertension, sometimes more strongly than clinical severity [9, 10]. Perceived stress is closely linked to the pathophysiology of hypertension and to mental well-being, and its prominence here — reported by 80.7% of participants — suggests that psychosocial support may be an underused lever for improving patient well-being in hypertension care [7]. The salience of marital status, particularly for the social domain, is consistent with the role of partnership and household support in buffering the burden of chronic disease; unmarried (largely widowed) participants, who were also older, reported markedly lower social QoL even after adjustment for age.

The environmental domain was distinctive in being the only domain independently associated with income, and one of two associated with physical activity. This accords with evidence that living conditions, financial resources and the physical environment drive the environmental facet of QoL among hypertensive patients [11]. That education showed no independent association with any domain — despite 62.9% of the sample being illiterate — suggests that, in this urban setting, material resources (income) and social structure (marital status) outweigh formal education as determinants of well-being. The absence of an independent association between QoL and either comorbidity or health-system contact (medication use, follow-up, facility sector, access barriers) indicates that, in a population already engaged with care, patient well-being is governed more by life-course and psychosocial circumstances than by the clinical or logistical features of hypertension management.

The findings carry practical implications. Because age, marital status and perceived stress are the dominant determinants, hypertension programmes in comparable urban settings might screen for psychosocial distress and social isolation — especially among older and widowed patients — and incorporate stress-reduction and physical-activity components alongside pharmacological control. Such patient-centred elements are unlikely to be captured by blood-pressure targets alone.

Strengths and limitations

Strengths include a community-based (rather than hospital-based) sample, a relatively large sample size, near-complete WHOQOL-BREF data (94.8%), and rigorous scoring following the WHO algorithm with independent re-computation of domain scores from item-level data. Several limitations apply. The cross-sectional design precludes causal inference and cannot establish the direction of the observed associations. QoL and its correlates were self-reported and susceptible to recall and social-desirability

biases. Perceived stress was captured as a single binary item rather than a validated multi-item scale, which limits its measurement precision. Convenience sampling within a single field-practice area limits generalisability, and blood-pressure control status was not incorporated into the QoL models. Finally, the aggregate overall QoL score (sum of transformed domains) is a study-specific construct and should be interpreted alongside the individual domain scores.

Conclusions

Quality of life among hypertensive patients in this urban South Indian setting was determined chiefly by age, marital status, perceived stress, income and physical activity, and not by education, comorbidity or the features of health-system contact. Older and unmarried patients, and those reporting stress, experienced the poorest quality of life. Integrating psychosocial support and physical-activity promotion into routine hypertension care, with particular attention to older and socially isolated patients, may improve patient well-being beyond what blood-pressure control alone can achieve. Prospective studies incorporating validated stress measures and clinical control status are warranted.

Abbreviations

ANOVA
analysis of variance
CI
confidence interval
CIOMS
Council for International Organizations of Medical Sciences
DBT
Department of Biotechnology
IQR
interquartile range
LMIC
low- and middle-income country
NCD
non-communicable disease
QoL
quality of life
SD
standard deviation
STROBE
Strengthening the Reporting of Observational Studies in Epidemiology
WHO
World Health Organization
WHOQOL-BREF

World Health Organization Quality of Life brief questionnaire.

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Ethics Committee of JSS Medical College, Mysuru (ref. no. JSS/MC/PG/91/2022-23, dated 31 March 2023). Written informed consent was obtained from all participants prior to data collection. For participants who were illiterate, consent was obtained from their legal guardian or responsible family member, who signed the consent form on their behalf after the study had been explained in their preferred language. All methods were performed in accordance with the Declaration of Helsinki and the CIOMS international ethical guidelines.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Tables

Quality of life and its determinants among hypertensive patients in an urban field-practice area of South India: a community-based cross-sectional study.

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Author Contribution

K.L. conducted data collection and formal analysis, and wrote the initial manuscript draft. S.K.D. conceptualised the study, designed the methodology, obtained ethics approval, supervised the work, and contributed to writing and critical revision. S.B.M. contributed to formal analysis, prepared Figs. 1–2, and contributed to writing and revision. All authors read and approved the final manuscript.

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Data Availability

The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

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Figures

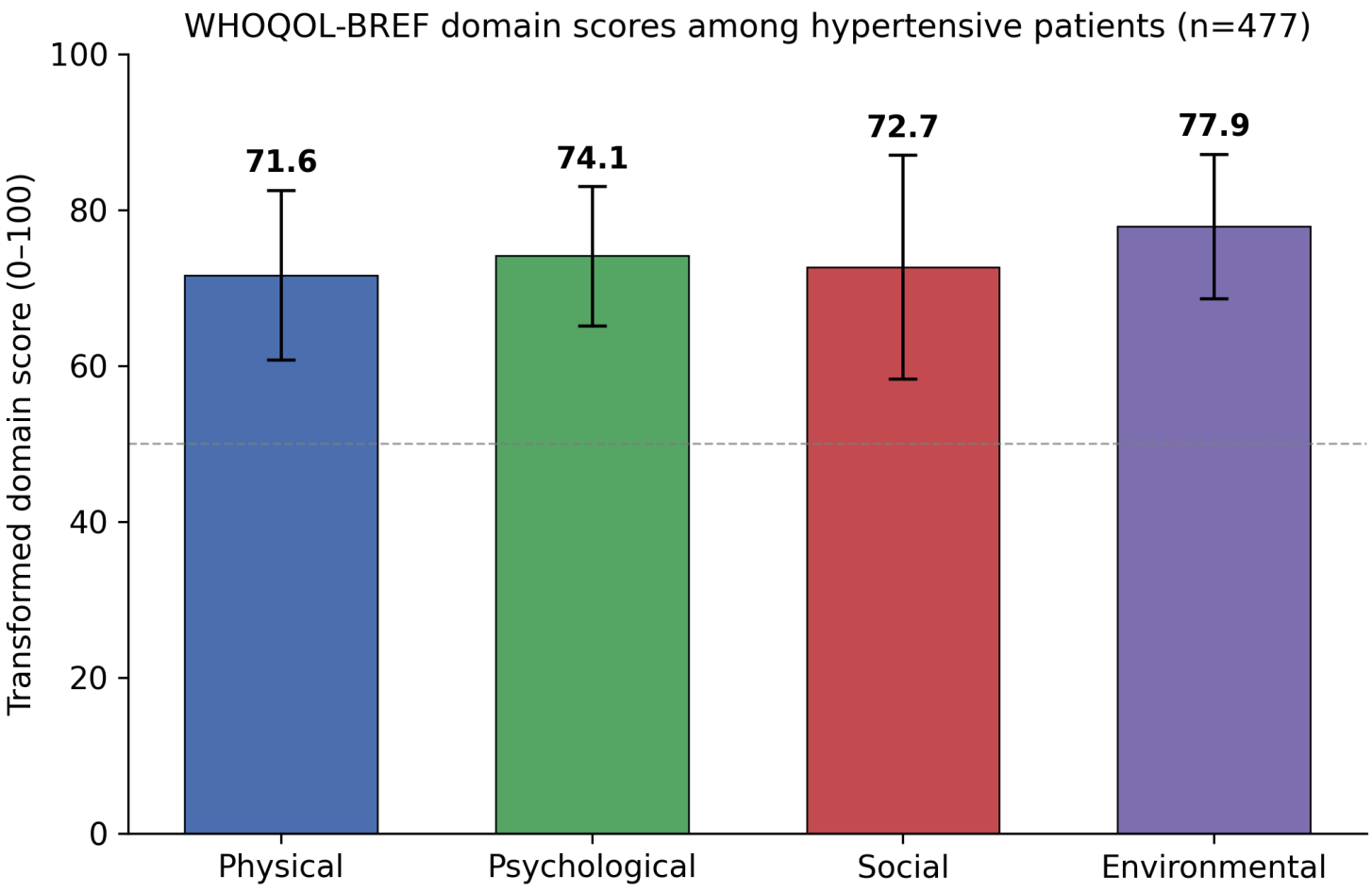


Figure 1

Mean WHOQOL-BREF domain scores among hypertensive patients (n = 477). Bars show the mean transformed domain score (0–100 scale); error bars show one standard deviation. The dashed line

marks the scale mid-point (50). Higher scores indicate better quality of life.

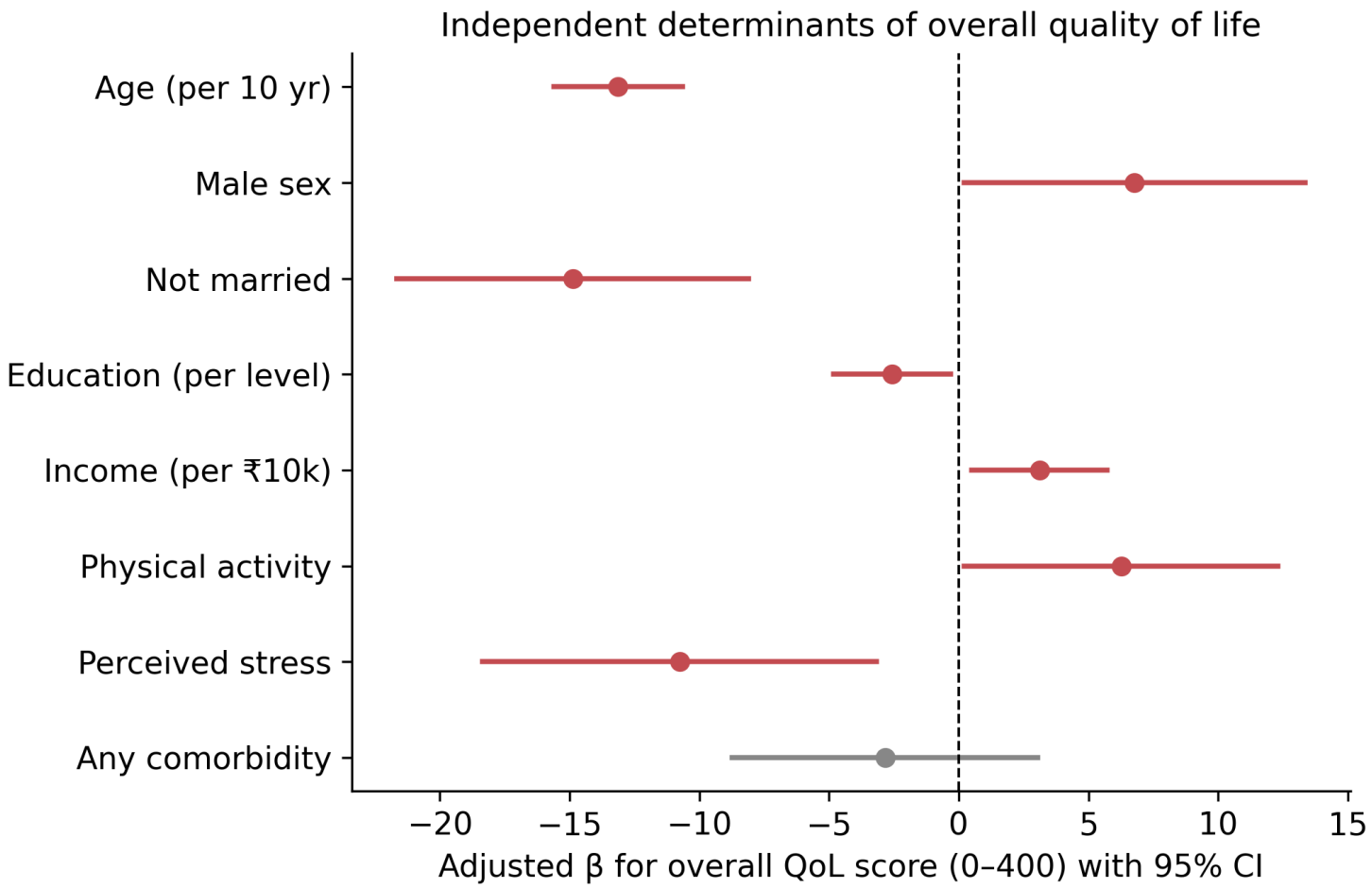


Figure 2

Independent determinants of overall quality of life. Points show adjusted regression coefficients (β) from the multivariable linear model for overall QoL (0–400 scale), with horizontal lines showing 95% confidence intervals. Coefficients whose confidence interval excludes zero (dashed line) are statistically significant.

Supplementary Files

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