

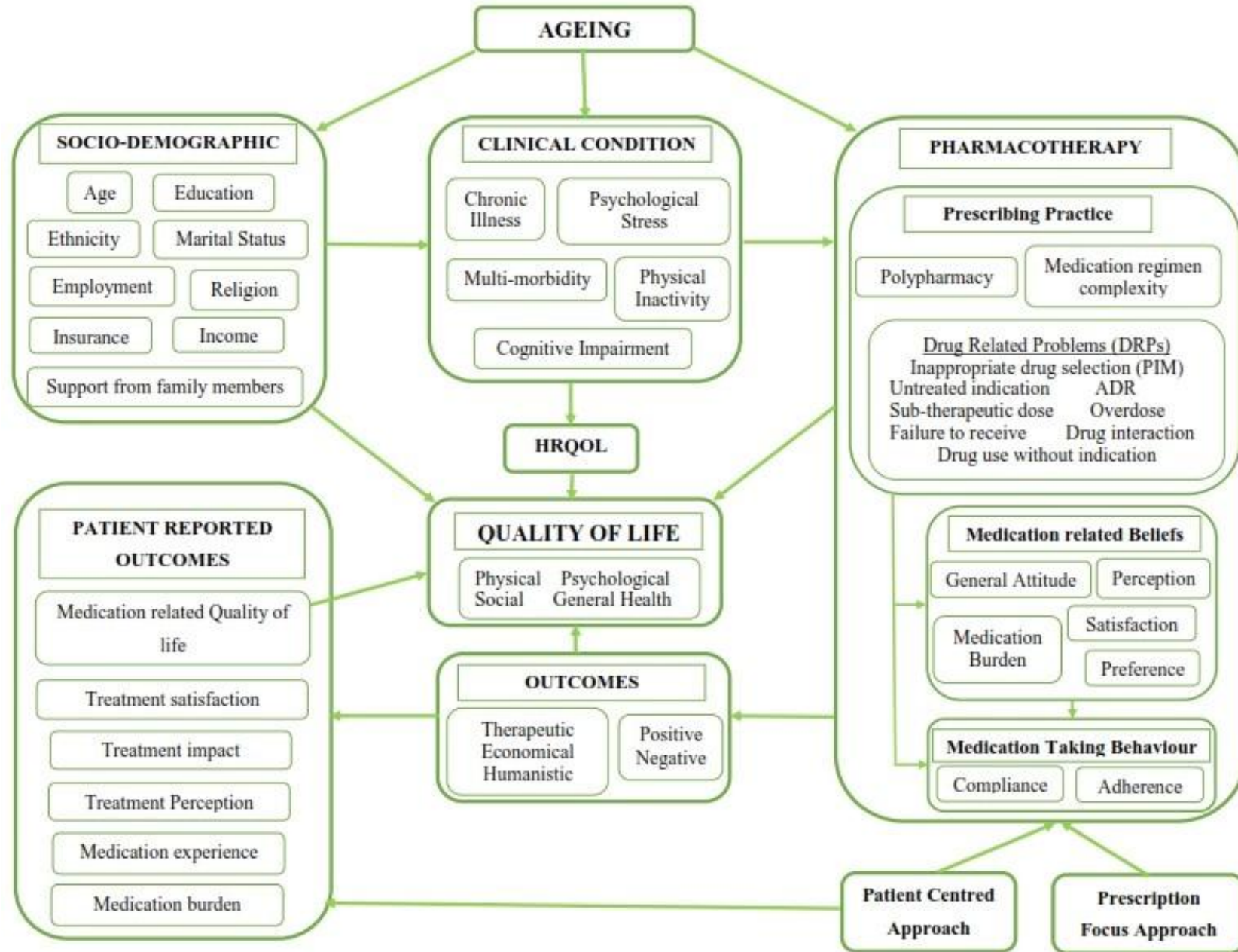
Predictors of medication-related quality of life among older adults with chronic illness in Nepal: Insights from multi-model predictive analytics

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1. Background



1. Background contd..

PROBLEM

Ageing population

- 4.2% in 2001 to 6.9% in 2021.

Rising healthcare complexity:

- Multi-morbidity
- Polypharmacy
- Drug-related problems.

GAP

Limitations of Health-Related Quality of Life (HRQoL)

- Focuses on disease outcomes
- Does not capture treatment burden.

SIGNIFICANCE

Role of MRQoL matters:

- Captures medication-related burden
- Key dimension
- Psychological impact
- Treatment convenience
- Patient-provider relationship.

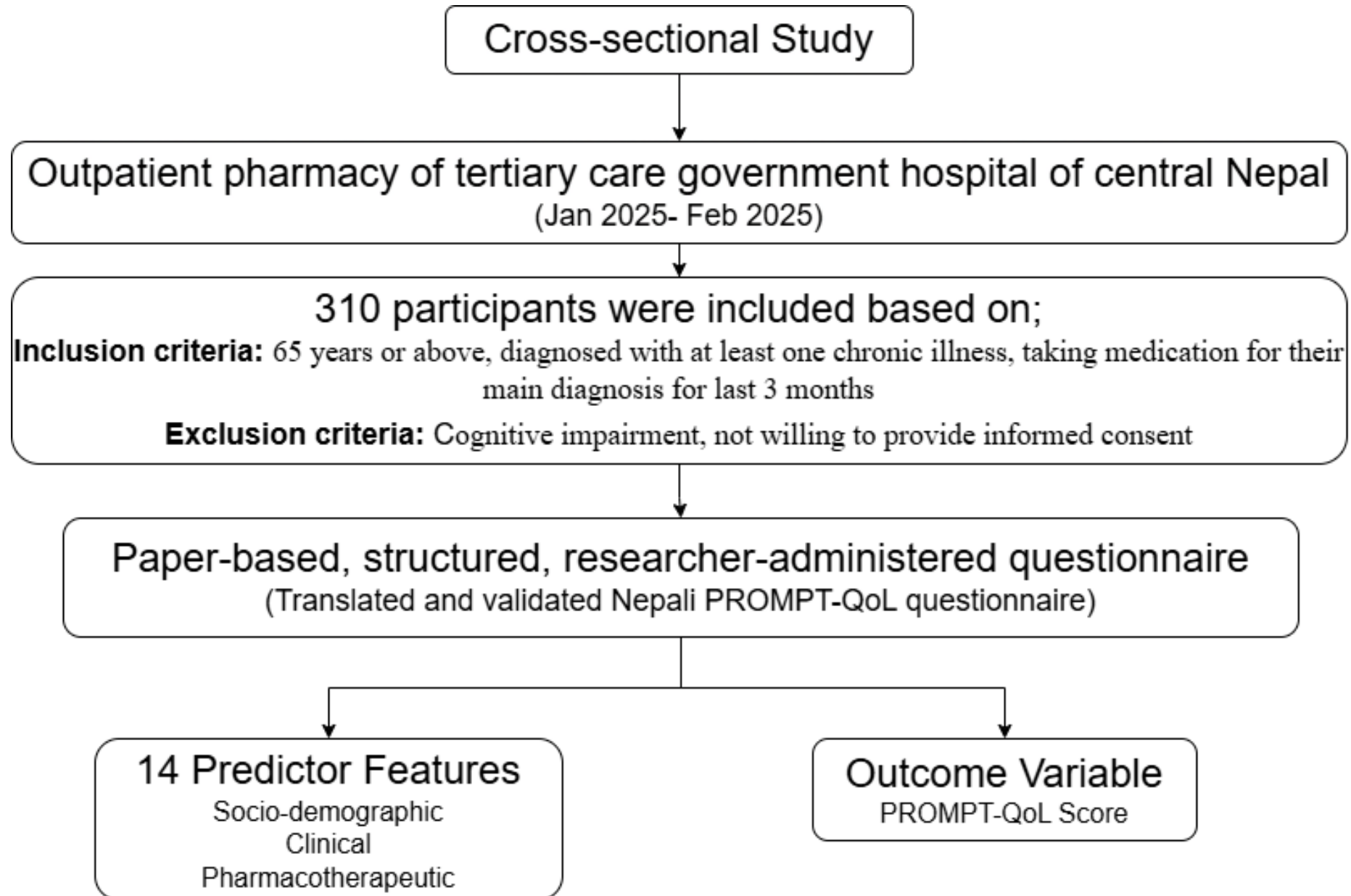
Why it matters in Nepal

- Resource-constrained setting
- Informs targeted interventions
- Supports policy planning.

2. Objectives

- To evaluate the MRQoL among older adults with chronic illness from tertiary care government hospital of Bharatpur using PROMPT-QoL questionnaire
- To evaluate the predictors of MRQoL among older adults with chronic illness using multi-model predictive analytics

3. Methods



3. Methods contd..

3.1 Sample Size

- Determined using the 20:1 rule of thumb for multivariate analysis
- With 14 predictors features and anticipated 10% non-response rate, a final sample size of 310 was included in the study

3.2 Ethical consideration

- Shree College of Technology Institutional Review Committee (SCoT-IRC) (Ref: SCoT-IRC-20250108-01).
- A written informed consent, prepared in both English and Nepali language.
- Permission was taken from the developer of tools, where needed.

3. Methods contd..

3.3 Patient-Reported Outcome Measure of Pharmaceutical Therapy for Quality of life (PROMPT-QoL)

- Developed by Sakthong et al., 2017
- Translated into Nepalese language and validated previously
- Higher PROMPT-QoL score implies higher MRQoL
- Comprises 43 items (scored on 5-point Likert scale) across nine domains

Nine domains of PROMPT-QoL

1. General attitude towards medication use
2. Medicine and disease information (MDI)
3. Satisfaction with medication effectiveness (SME)
4. Impact of medicines and side-effects (IMS)
5. Psychological impacts of medicine use (PI)
6. Convenience (C)
7. Availability or accessibility (AA)
8. Therapeutic relationship with health care providers (TR)
9. Overall quality of life (OQ)

$$\text{Total PROMPT - QoL Score} = \frac{\text{Observed score} - \text{Minimum score}}{\text{Maximum score} - \text{Minimum score}} \times 100$$

3. Methods contd..

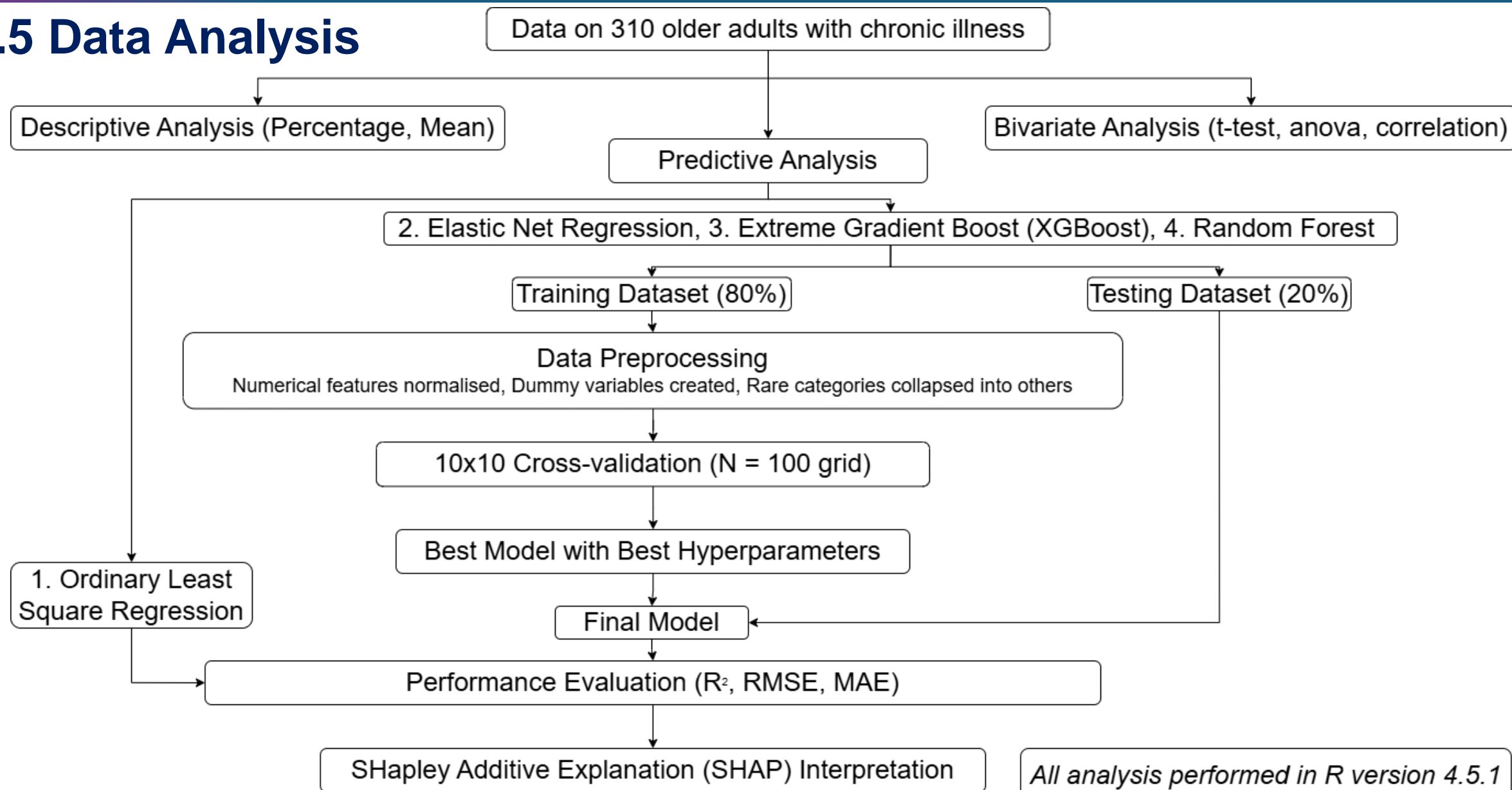
3.4 Predictor Features

Socio-demographic	Clinical	Pharmacotherapeutic
Age	Primary Diagnosis	Number of medications
Gender	Number of Chronic Conditions	Adherence Score (Nep-GMAS)
Education	Charlson Comorbidity Index Score	Encounter with PIM (Beers Criteria 2023)
Ethnicity	EQ Utility Score (EuroQol-5D-3L)	Medication Duration
Marital Status		
Living Status		

GMAS: General Medication Adherence Scale

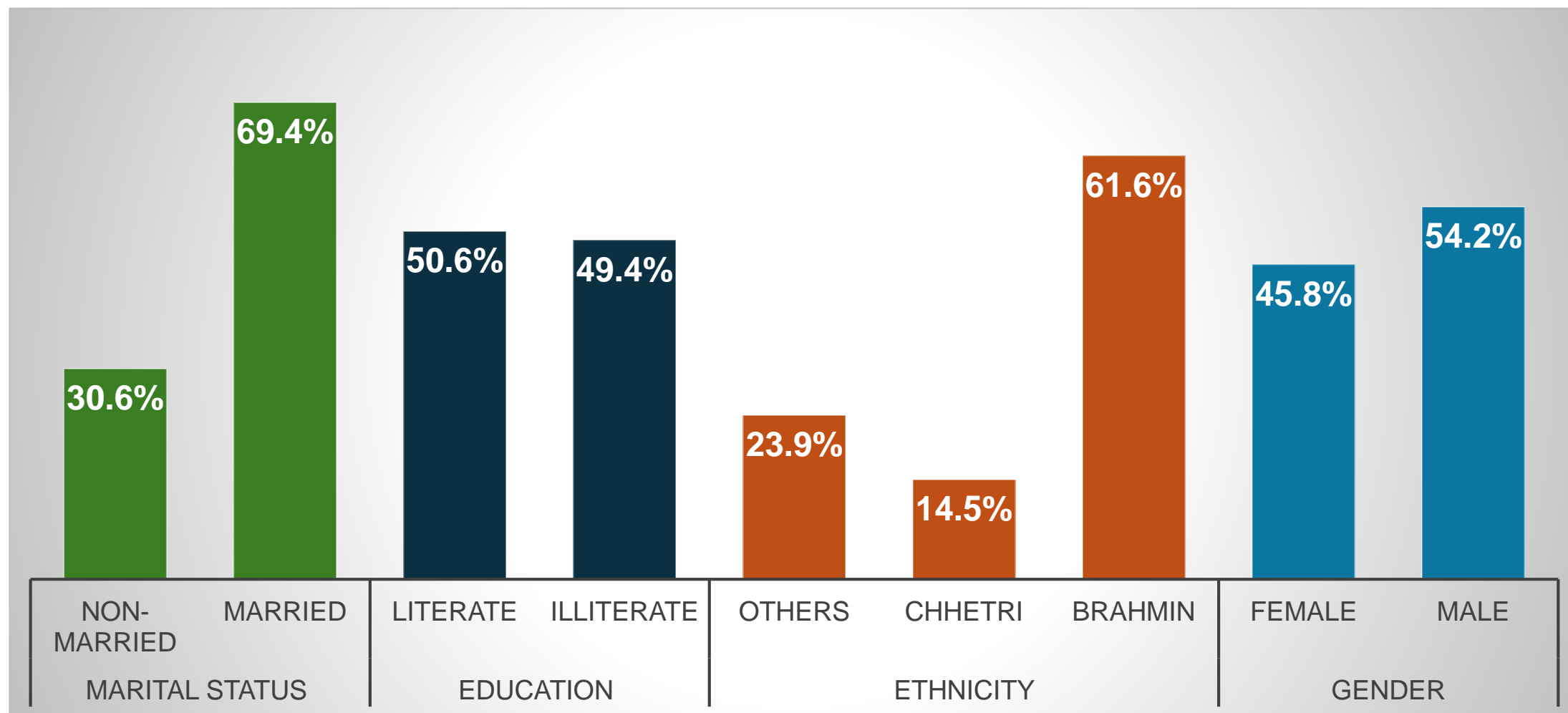
3. Methods contd..

3.5 Data Analysis



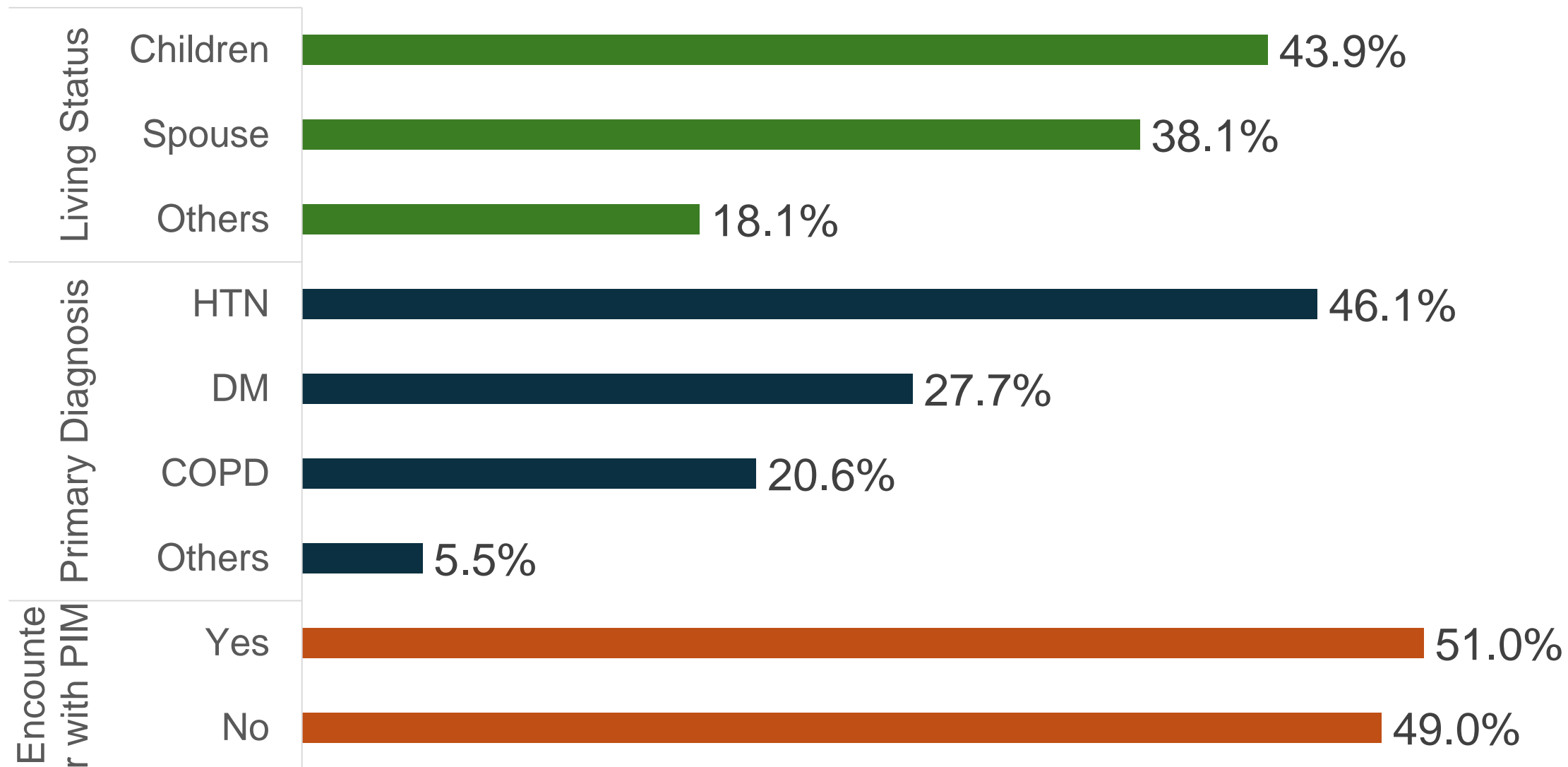
4. Results

4.1 Participants characteristics (N =310)



4. Results contd..

4.1 Participants characteristics (N = 310) contd..



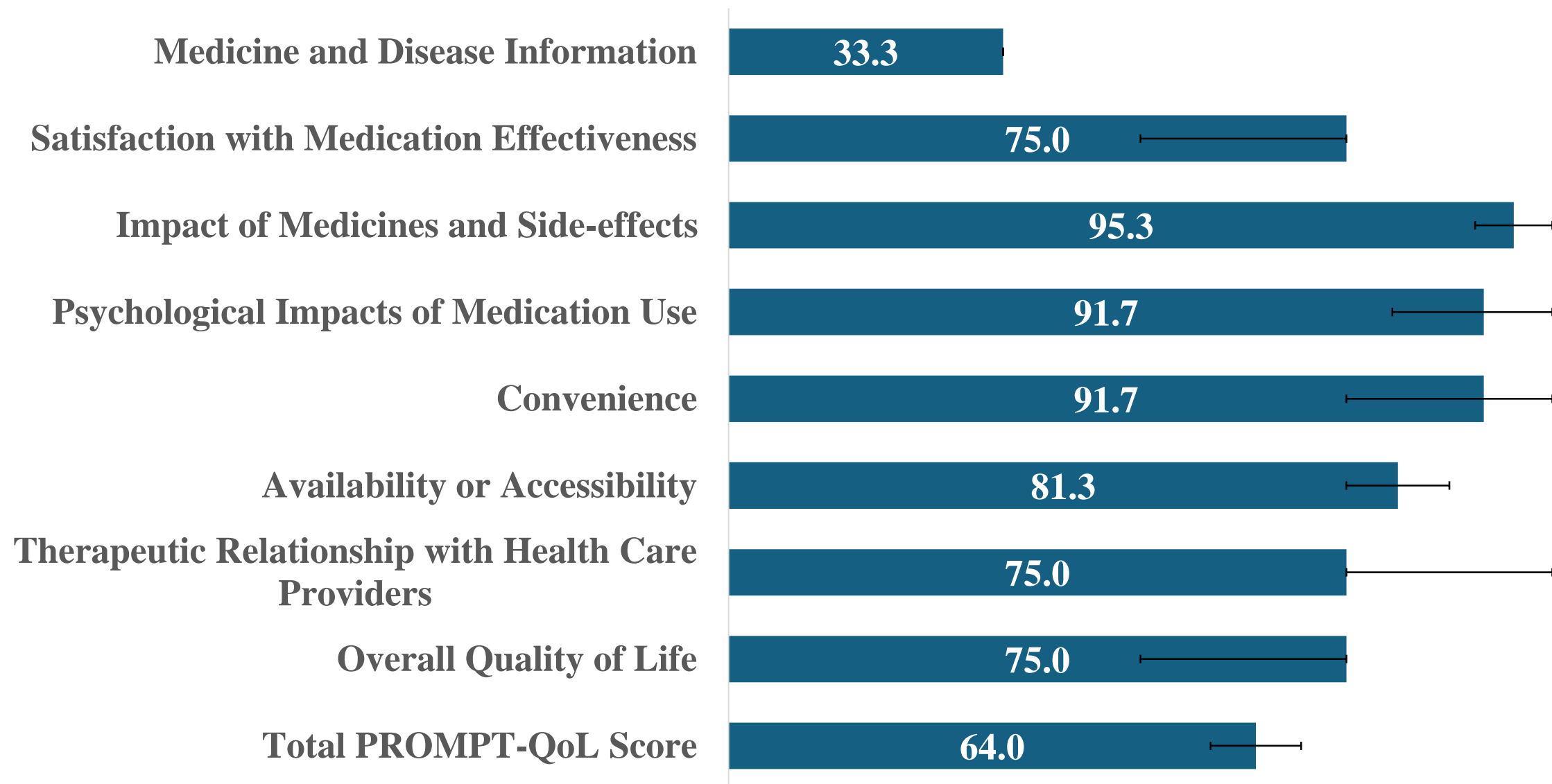
4. Results contd..

4.1 Participants characteristics (N = 310) contd..

Numerical features	Median [IQR]
Age (in years)	72.0 [69.0 - 76.0]
Chronic Conditions	2.0 [1.0 - 2.0]
Charlson Comorbidity Index (CCI) Score	4.0 [3.0 - 4.0]
Adherence Score	33.0 [32.0 - 33.0]
EQ Utility Score	0.8 [0.5 – 0.9]
Number of Medications	5.0 [3.0 – 7.0]
Medication Duration (in years)	10.0 [5.0 – 15.0]

4. Results contd..

4.2 Total PROMPT-QoL and Domain Scores (Mean)



4. Results contd..

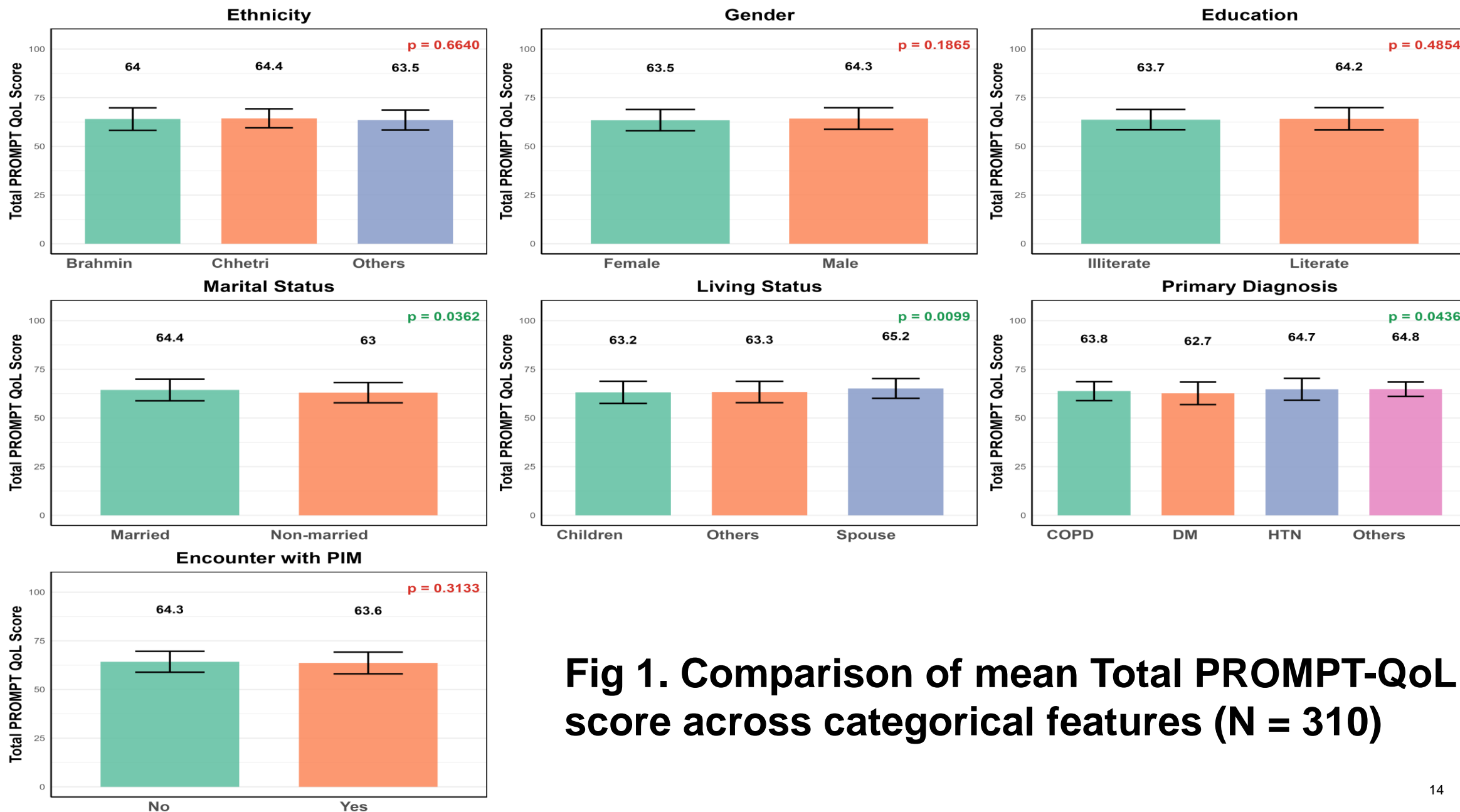


Fig 1. Comparison of mean Total PROMPT-QoL score across categorical features (N = 310)

4. Results contd..

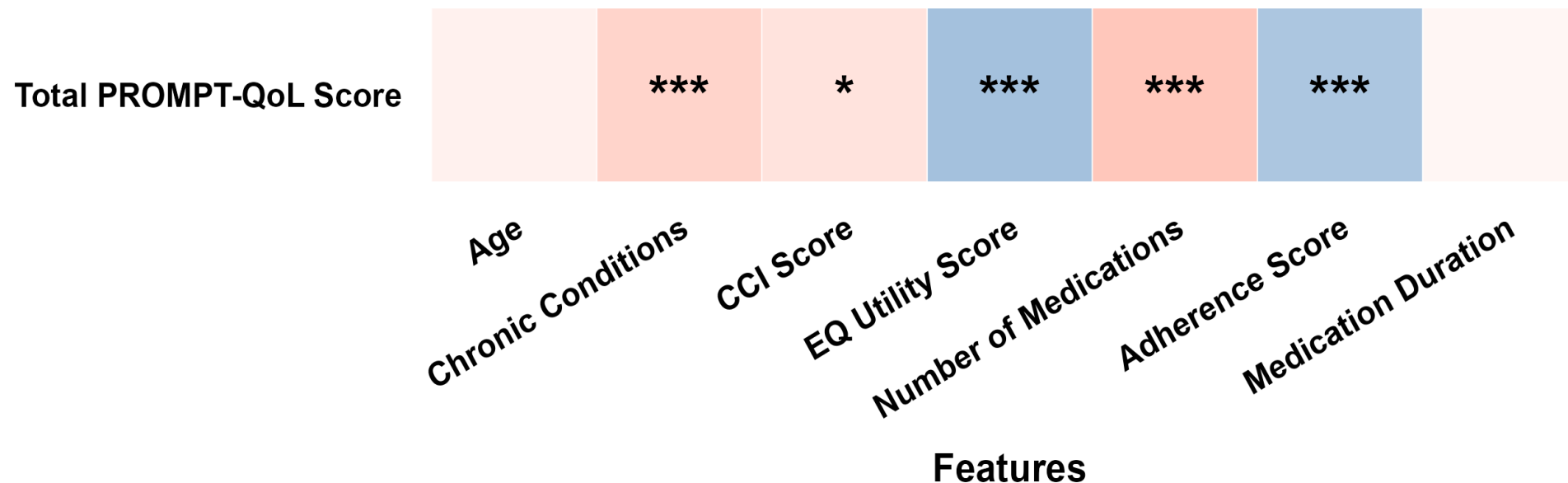


Fig 2. Spearman correlation matrix of Total PROMPT-QoL score with numerical features (N = 310). Significant correlations are indicated by asterisks: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. CCI: Charlson Comorbidity Index

4. Results contd..

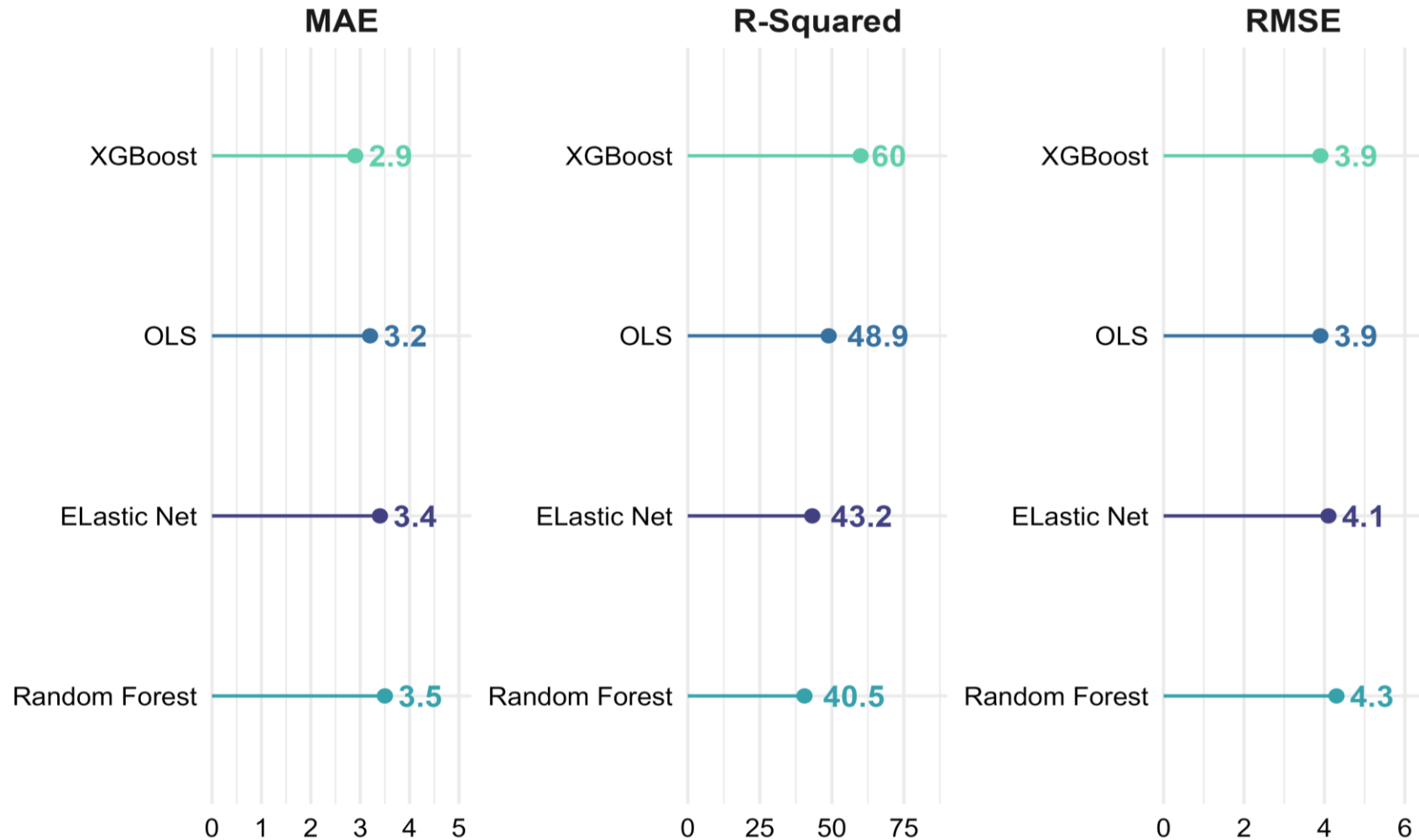


Fig 3. Comparison of predictive performance metrics across four predictive models. MAE: Mean Absolute Error; OLS: Ordinary Least Square; RMSE: Root Mean Squared Error.

4. Results contd..

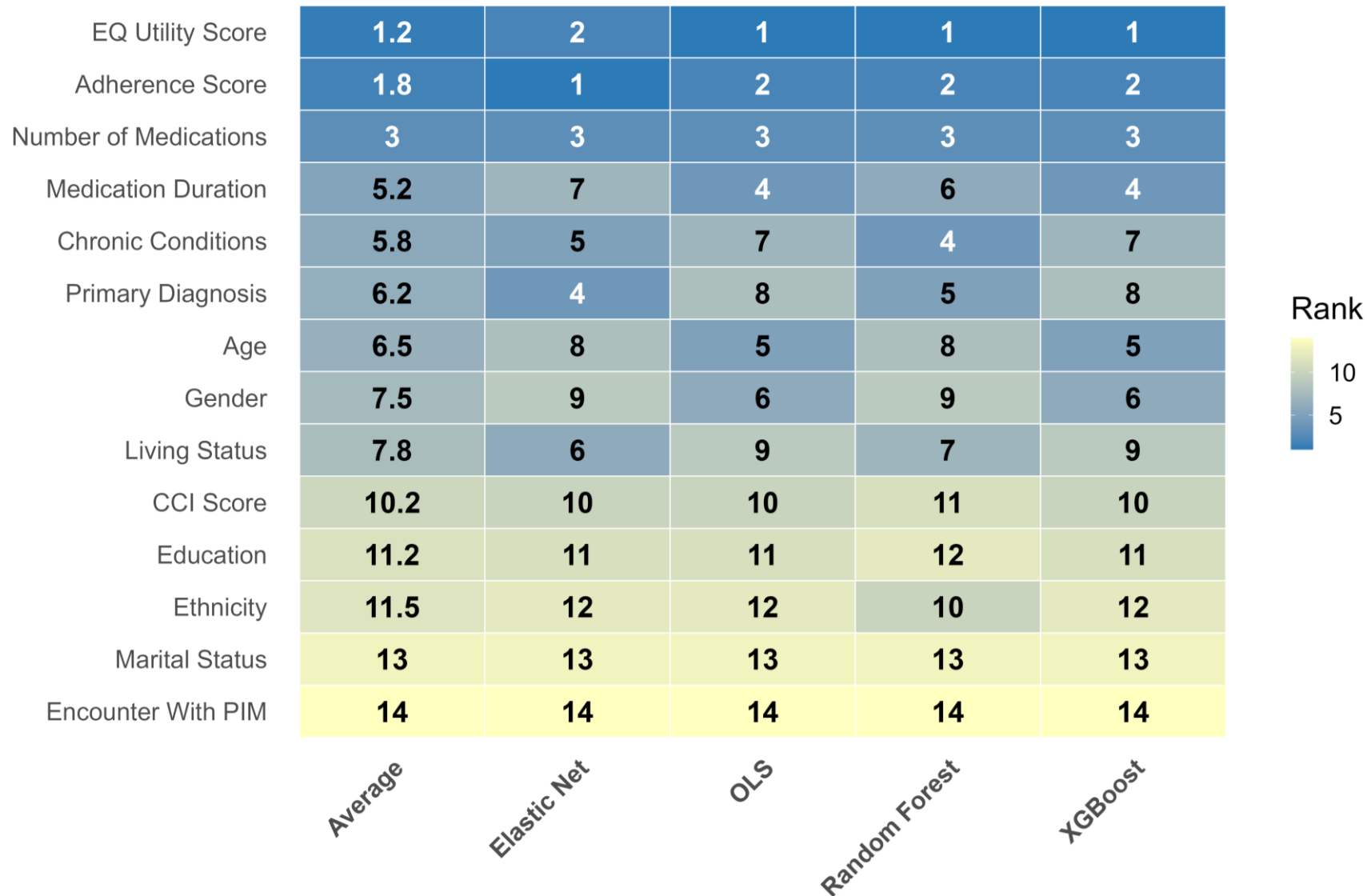


Fig 4. Heatmap of SHAP feature importance ranks across multiple predictive models, including an average. OLS: Ordinary Least Square

4. Results contd..

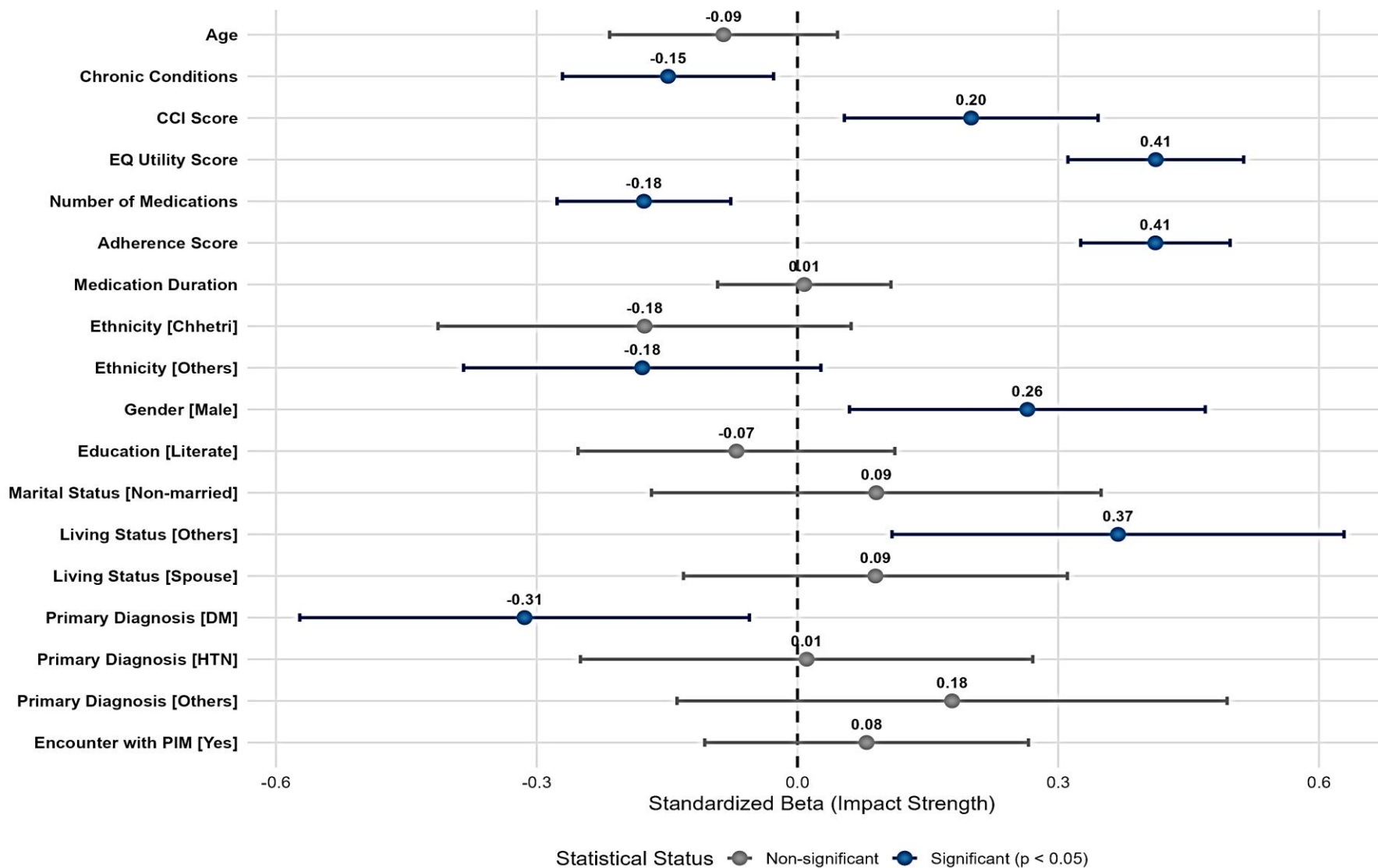


Fig 5. Forest plot of predictors for Total PROMPT-QoL score based on OLS regression

4. Results contd..

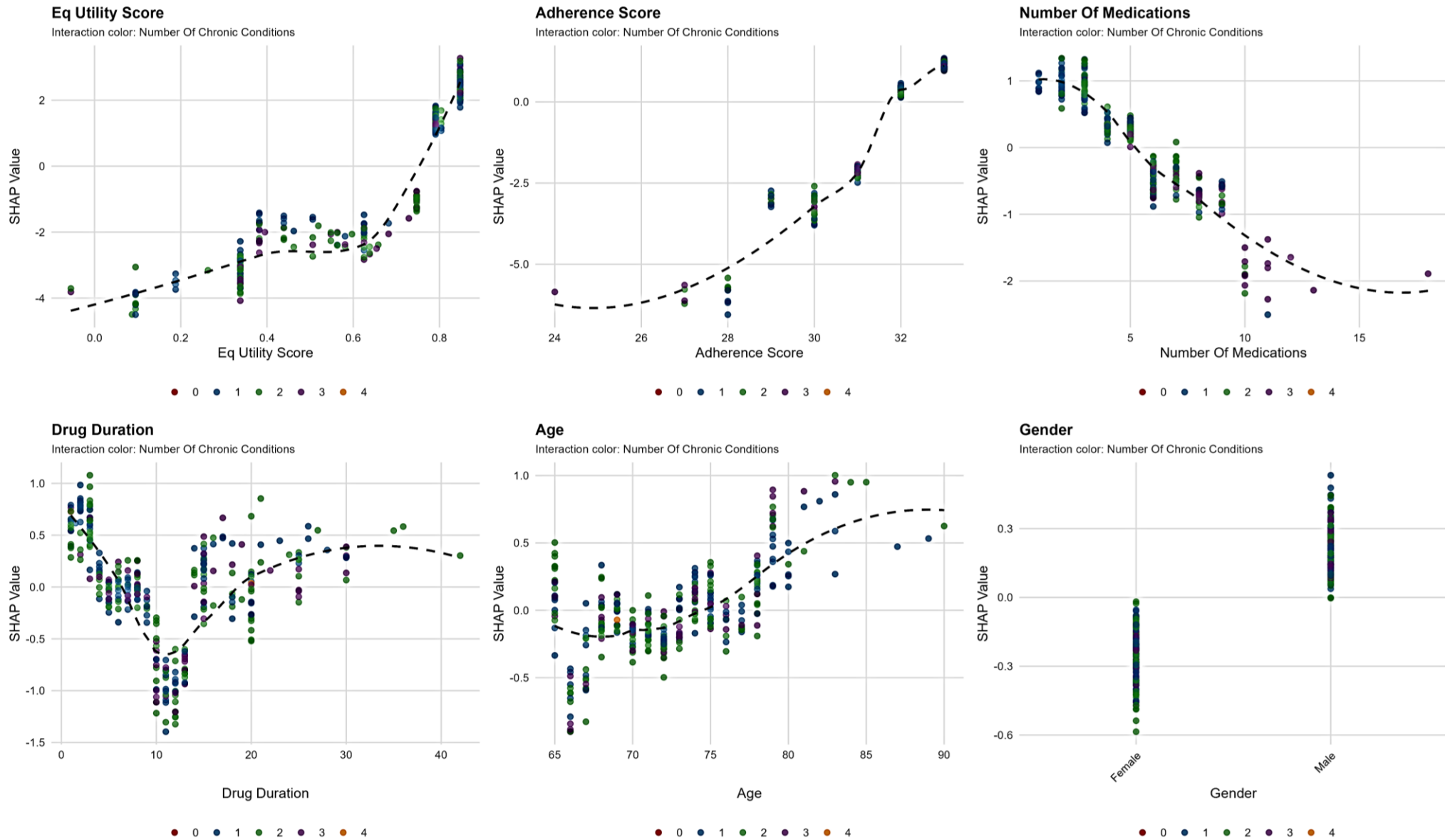


Fig 6. SHAP dependence plot for prediction of Total PROMPT-QoL score 19

5. Conclusion

- Moderate MRQoL in older adults with chronic illness
- Poor medication knowledge → need for targeted patient education (local-language brochures, videos)
- Superior predictive analysis with modern ML architectures
- Pharmacotherapeutic features identified as top predictive features of MRQoL
- Critical non-linear relationship identified between predictors and MRQoL
 - ❑ Adherence therapeutic window (28 – 32)
 - ❑ Saturation of polypharmacy burden (> 10)
 - ❑ Valley of burden of medication duration (10 – 15 years)
 - ❑ Resilience interaction (Oldest-old and higher number of chronic conditions)

Takeaway Message

Move beyond counting medicines



Focus on identifying and acting on risk windows

- **Insight:** MRQoL declines at predictable thresholds
- **Action:** Target adherence, duration, and polypharmacy thresholds
- **Impact:** Enable early intervention and prevent treatment failure

“Not fewer medicines – better-timed care”

**THANK
YOU**

ROHIT AGRAWAL

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Research Interests: Drug use, Geriatric patients, Medication related quality of life, Quality use of medications

Skills: Systematic review, meta-analysis, SPSS, R, Machine Learning, Predictive analytics

