Socio-demographic and Spatial Inequalities in Access to Hypertension Treatment in Nepal

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Background

Nepal is facing a significant challenge due to the increasing prevalence, and long-term need for care of non-communicable diseases (NCDs). In 2022, it was reported that NCD is responsible for over 70% of deaths in Nepal. Hypertension is a risk factor for cardiovascular diseases and one of the most important modifiable causes of mortality. In 2020, it was found that approximately 32% of the adult Nelapese population are hypertensive and only 27% of them are being treated. The study aims to investigate the influence of socio-demographic characteristics such as age, gender, body mass index (BMI), place of residence, access to formal education, and occupation along with spatial factors, on the accessibility of hypertension treatment and identify the disparities in treatment accessibility across different population groups and regions in Nepal.

Methods and Materials

❏ Data Sources

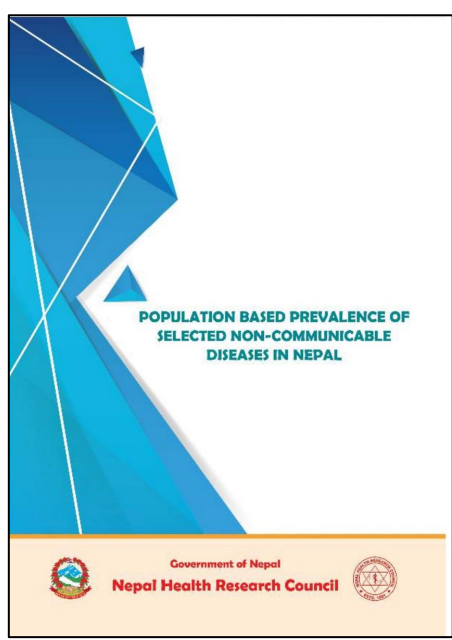The study is based on two nationwide cross-sectional surveys.

✓ Population-based Prevalence of Selected Non-communicable Diseases in Nepal (2019)

Prevalence Study

STEPS Study

✓ Noncommunicable Diseases Risk Factors: STEPS Survey Nepal (2019)
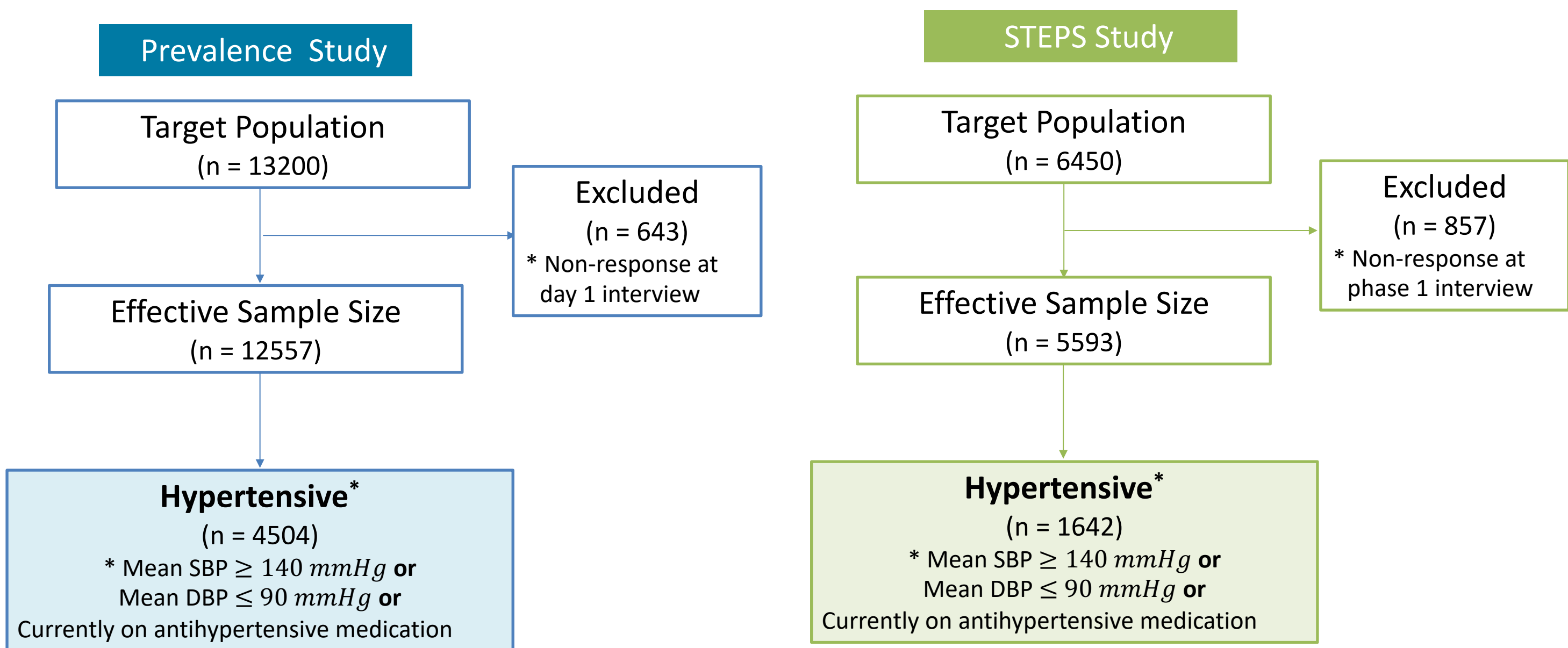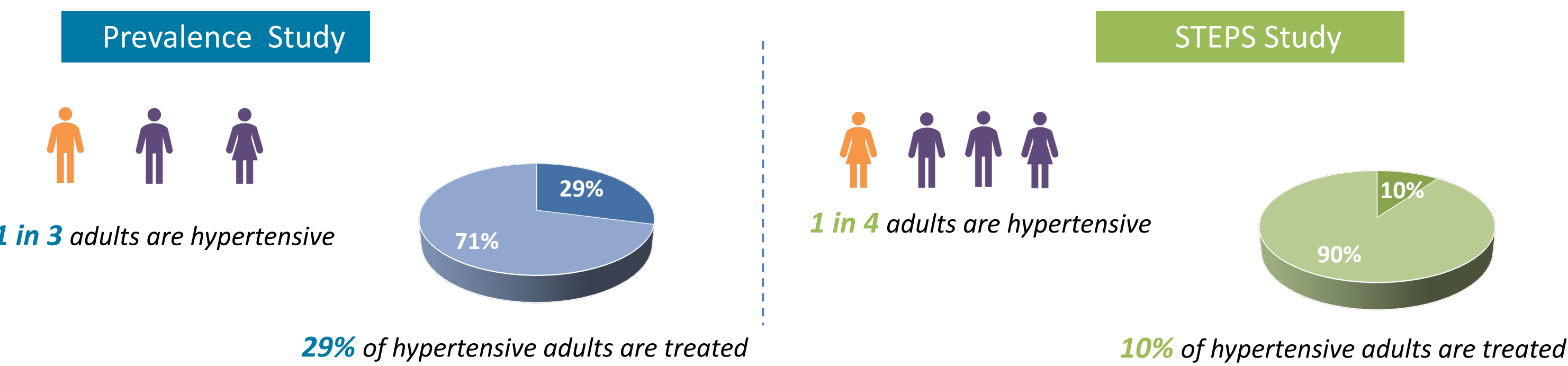
❏ Study Population

Figure 1: Selection of Study Population

Prevalence Study
- Target Population (n = 13200)
- Excluded (n = 643) * Non-response at day 1 interview
- Effective Sample Size (n = 12557)
- Hypertensive* (n = 4504) * Mean SBP ≥ 140 $mmHg$ or Mean DBP ≤ 90 $mmHg$ or Currently on antihypertensive medication

STEPS Study
- Target Population (n = 6450)
- Excluded (n = 857) * Non-response at phase 1 interview
- Effective Sample Size (n = 5593)
- Hypertensive* (n = 1642) * Mean SBP ≥ 140 $mmHg$ or Mean DBP ≤ 90 $mmHg$ or Currently on antihypertensive medication

❏ Methods

1. Descriptive Statistics: Weighted proportions of socio-demographic factors by Treatment Status. (Yes / No)
2. Statistical Model: A **Multilevel Logistic Regression Model** with random intercepts at community-level factors (province, district, and ward) was used. The model accounted for the binary outcome variable ("Treatment Status") and hierarchy in the dataset. The random intercepts were used to assess the cluster-level variation in the outcome. The community-level predictors were set at provinces and wards in the STEPS study. The results from the **Prevalence Study** were validated using the **STEPS Study**.
3. Spatial Analysis: A smooth spatial effect map was used to examine the spatial variation based on the longitude and latitude of the district's centroids.

Results: Weighted Proportions

Prevalence Study
1 in 3 adults are hypertensive
29% / 71%
29% of hypertensive adults are treated

STEPS Study
1 in 4 adults are hypertensive
10% / 90%
10% of hypertensive adults are treated

Scan here to access the full poster as a PDF, references, and explore additional figures and data.

Results: Multilevel Logistic Regression Model

❏ *Comparison of Fixed Effects using Adjusted Odds Ratios with 95% Confidence Intervals*
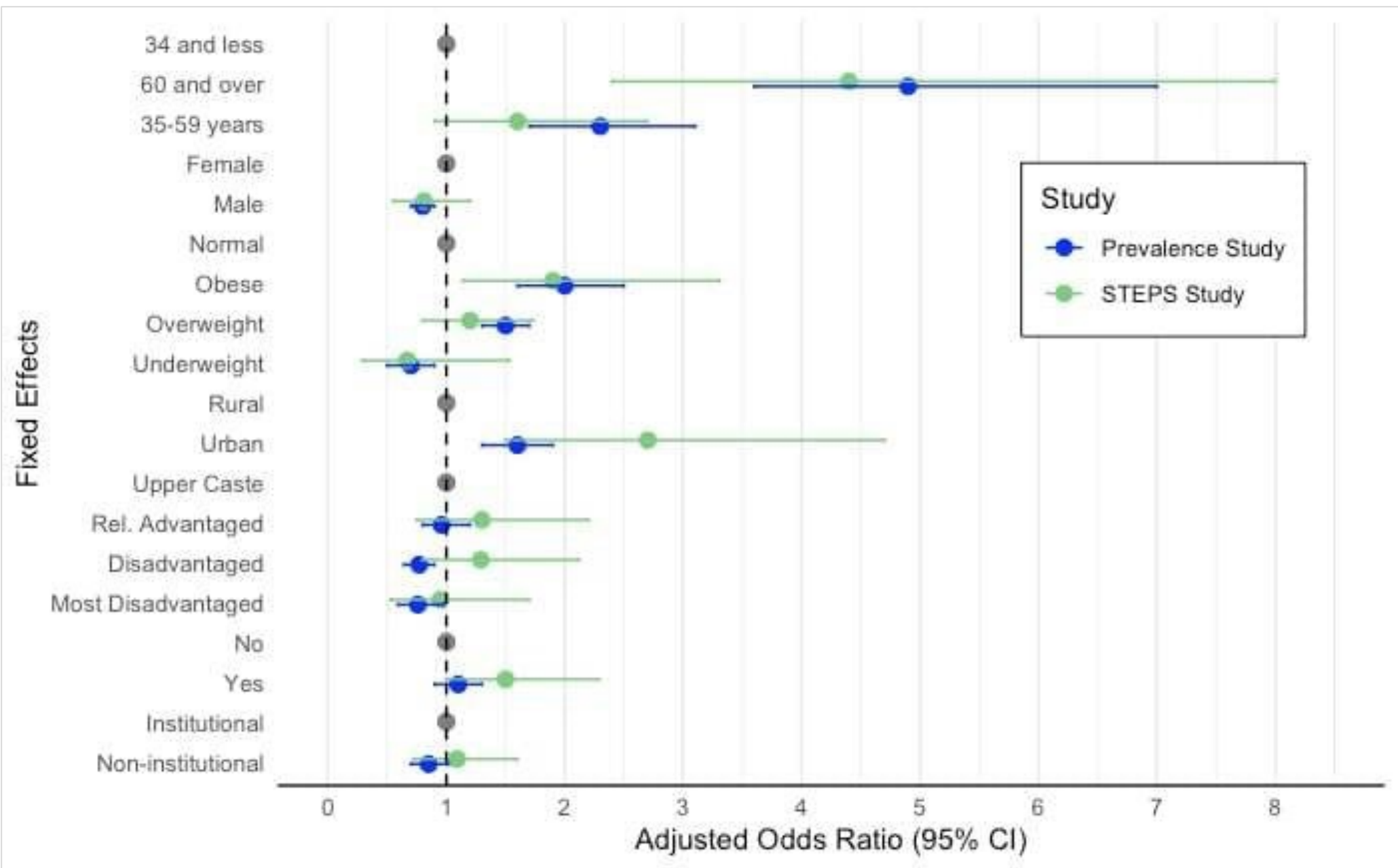

Figure 2: Forest Plot comparing the fixed effects from the Prevalence and STEPS Study

The accessibility of treatment was the highest for females and the oldest age group. Urban and upper-caste participants had a higher likelihood of treatment accessibility compared to the rural and marginalized participants respectively. Also, obese participants had significantly higher chances of treatment when hypertensive. Access to formal education and institutional jobs were positively associated with treatment accessibility but this association was insignificant.
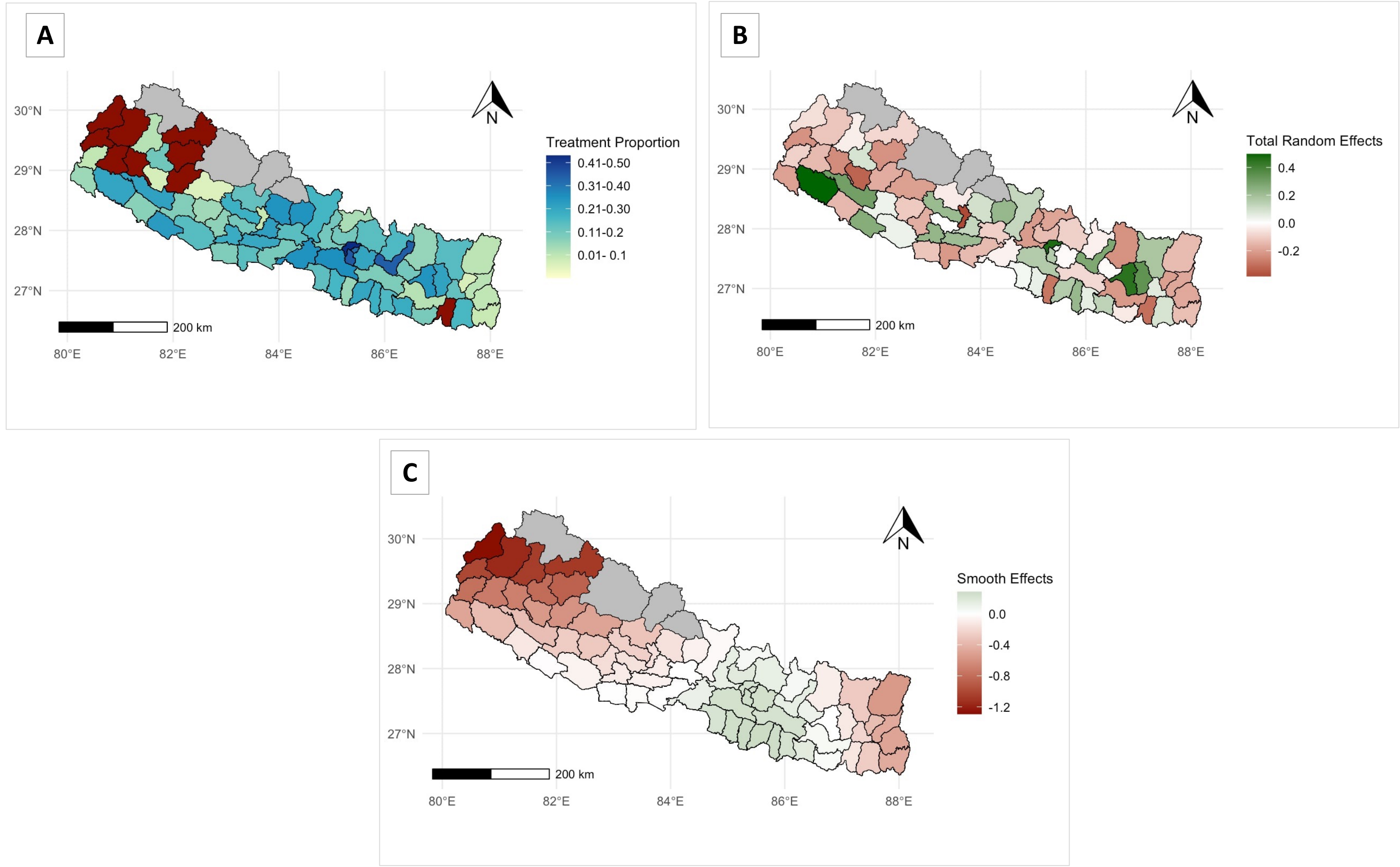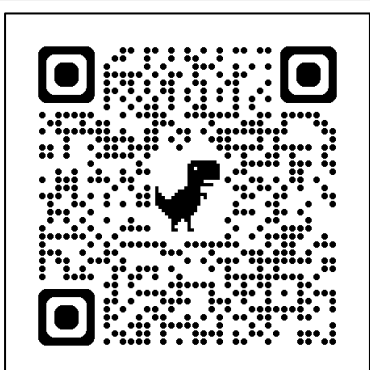
❏ *Spatial Analysis*

Figure 3: (A) Hypertension Treatment Proportion. (B) Total Random Effect (RE) of Hypertension Treatment. (C) Smooth Effect Plot of Access to Hypertension Treatment.

After correcting the fixed effects, geographic disparities were present in treatment accessibility in Nepal. Higher treatment rates were found in Madhesh and Bagmati provinces. Lower treatment proportions were in the furthest west (Karnali and Sudurpashchim) and furthest east (Koshi) regions. Rural and Hilly areas were found to be deprived of treatments.

Discussion & Conclusion

1. Implement equality in screening programs and treatment distribution. Non-risk groups should be screened more. Marginalized ethnic groups should be prioritized.
2. Awareness regarding NCD consequences and treatment benefits should be raised among the less educated population.
3. Decentralization of healthcare facilities and formulation of community and region-specific healthcare solutions. Prioritize Implementing healthcare facilities and providers in Koshi, Karnali, and Sudurpashchim Provinces.
4. Improvement of telemedicine and health information systems to overcome geographic barriers and make healthcare deliveries more accessible and cost-effective.

Socio-demographic factors and geographic disparities significantly impact access to hypertension treatment in Nepal. Targeted interventions are essential, with a focus on improving services in the rural and geographically challenged regions identified in the study.