ความแตกต่างเชิงพื้นที่ของประสบการณ์คล้ายโรคจิต: หลักฐานเชิงประจักษ์จากการสำรวจสุขภาพจิตระดับชาติไทย ปี 2566

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บทคัดย่อ

วัตถุประสงค์ : เพื่อศึกษาความแตกต่างในการกระจายตามภูมิภาคของอาการคล้ายโรคจิตตลอดชีวิตในประเทศไทย และสำรวจความแตกต่างทางภูมิศาสตร์ในการเกิดอาการเหล่านี้ตลอดชีวิต โดยใช้ภูมิภาคที่หลากหลายของประเทศไทยเป็นบริบทการศึกษาเชิงธรรมชาติ

วัสดุและวิธีการ : วิเคราะห์ภาคตัดขวางจากผู้ใหญ่ 4,160 คนในการสำรวจระบาดวิทยาสุขภาพจิตระดับชาติปี 2566 ครอบคลุม 6 ภูมิภาค (กรุงเทพฯ ภาคกลาง เหนือ ตะวันออกเฉียงเหนือ ใต้ และชายแดนใต้) ประเมินอาการคล้ายโรคจิตตลอดชีวิตด้วย WHO-CIDI 3.0 Psychosis Screener พร้อมการคัดกรองมาตรฐาน วิเคราะห์ความชุกและอัตราส่วนความชุกที่ปรับแล้วด้วยแบบจำลองเชิงเส้นทั่วไป ใช้ Fairlie's non-linear decomposition ร่วมกับ Primary sampling unit-level bootstrap 1,000 ครั้ง เพื่อแยกความแตกต่างระหว่างภูมิภาคออกเป็นองค์ประกอบด้านประชากรและบริบท ทดสอบปฏิสัมพันธ์ระหว่างภูมิภาคกับปัจจัยเสี่ยงในโมเดลรวมที่ระดับนัยสำคัญ 0.10

ผล : ความชุกตลอดชีวิตของอาการคล้ายโรคจิตโดยรวมร้อยละ 3.0 (95%CI: 2.3–3.9) อาการประสาทหลอนตลอดชีวิตแตกต่างกันมากระหว่างภูมิภาค (1.0–4.3%) หรือประมาณ 4 เท่าหลังปรับปัจจัยกวน โดยที่อาการหลงผิดมีความแตกต่างน้อย (0.2–1.1%; p=0.234) มีค่าเฉลี่ย 4.3% หลังปรับปัจจัย ภาคใต้มีความชุกของอาการประสาทหลอนต่ำกว่ากรุงเทพฯ อย่างมีนัยสำคัญทางสถิติ (อัตราส่วนความชุก 0.34; 95%CI: 0.15–0.78) การวิเคราะห์ Fairlie decomposition พบว่าองค์ประกอบประชากรอธิบายความแตกต่างระหว่างภาคตะวันออกเฉียงเหนือ-กรุงเทพฯ ได้ร้อยละ 57 แต่อธิบายผลแตกต่างระหว่างภาคใต้-กรุงเทพฯ ได้เพียงร้อยละ 30 พบปฏิสัมพันธ์ที่สำคัญระหว่างภูมิภาคกับปัจจัยเสี่ยงบางประการ เช่น การว่างงานมีความสัมพันธ์ที่แข็งแกร่งกว่าในภาคตะวันออกเฉียงเหนือเมื่อเทียบกับกรุงเทพฯ (อัตราส่วนความชุก 1.71; 95%CI: 1.08–2.71; p-interaction=0.042)

สรุป : อาการประสาทหลอนตลอดชีวิตมีความแตกต่างระหว่างภูมิภาคอย่างชัดเจน ซึ่งอธิบายได้เพียงบางส่วนจากองค์ประกอบของประชากร ร้อยละ 43–70 ของความแตกต่างระหว่างภูมิภาคไม่สามารถอธิบายด้วยลักษณะเฉพาะบุคคล บ่งชี้ถึงผลกระทบที่สำคัญจากปัจจัยเชิงพื้นที่ต่อการสะสมอาการคล้ายโรคจิตตลอดชีวิต

คำสำคัญ : อาการของโรคจิต, ความชุกตลอดชีวิต, ความแตกต่างระหว่างภูมิภาค, การวิเคราะห์ถอดส่วน, ประเทศไทย

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REGIONAL HETEROGENEITY IN LIFETIME PSYCHOTIC EXPERIENCE PHENOTYPES: EVIDENCE FROM THE 2023 THAI NATIONAL MENTAL HEALTH SURVEY

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Abstract

Objectives: To investigate whether lifetime psychotic experiences differ in their regional distribution patterns across Thailand and to explore geographic heterogeneity in the lifetime occurrence of these symptoms using Thailand's diverse regions as a natural experimental setting.

Material and Methods: A cross-sectional analysis was conducted of 4,160 adults participating in the 2023 Thai National Mental Health Survey across six regions (Bangkok, Central, North, Northeast, South, and Southern Border). Lifetime psychotic experiences were assessed using the World Health Organization Composite International Diagnostic Interview version 3.0 (WHO-CIDI 3.0) Psychosis Screener with standard exclusions. Adjusted prevalences and prevalence ratios were estimated using generalized linear models. Fairlie's non-linear decomposition, with primary sampling unit–level bootstrap (1,000 replicates), partitioned regional differences into compositional and contextual components. Region-by–risk factor interactions were tested in pooled models with an alpha of 0.10.

Results: The overall prevalence of lifetime psychotic experiences was 3.0 % (95 %CI: 2.3–3.9%). Lifetime hallucination prevalence varied substantially by region, ranging from 1.0% to 4.3% after adjustment, about a fourfold difference. Delusions showed minimal regional variation (0.2–1.1%; p = 0.234), with a mean of 4.3%. After adjustment, the South had a significantly lower prevalence of hallucinations (prevalence ratio, 0.34; 95% CI, 0.15–0.78) compared with Bangkok. Fairlie decomposition indicated that demographic composition explained 57% of the Northeast–Bangkok difference but only 30% of the South–Bangkok protective effect. Significant region–by–risk factor interactions were observed; for example, unemployment had a stronger association in the Northeast compared with Bangkok (prevalence ratio, 1.71; 95% CI: 1.08–2.71; p-interaction = 0.042).

Conclusion: Lifetime hallucinations showed marked regional heterogeneity, only partially explained by demographic composition. Between 43 % and 70 % of regional differences were unexplained by individual characteristics, indicating substantial place-based effects on the accumulation of lifetime psychotic experiences.

Key words: psychotic experiences, lifetime prevalence, regional variation, decomposition analysis, Thailand

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Introduction

Psychotic experiences in the general population, defined as hallucinations and delusions occurring in the absence of a psychotic disorder diagnosis, affect an estimated 5 to 8% of individuals across the life course and predict increased risk for subsequent psychiatric morbidity, functional impairment, and service use.[1-3] International comparisons show variation in prevalence between countries[4], yet within-country regional patterns of lifetime symptom accumulation remain comparatively understudied. Such patterns may reflect differing distributions of risk and resilience factors across regions that vary in urbanicity, socioeconomic conditions, health care access, cultural norms, and exposure to stressors.[5]

Geographic differences in mental health outcomes are frequently conceptualized as resulting from both compositional effects, arising from differences in population characteristics, and contextual effects, arising from place-based influences that are independent of individual factors. Thailand presents a diverse social and geographic landscape in which to examine these dimensions: urbanized Bangkok with its high population density; the economically marginalized Northeast[6]; the industrialized Central region; the tourism-dependent South; and the conflict-affected Southern Border provinces. The Thai National Mental Health surveys documented a decline in the national prevalence of lifetime psychotic experiences from 5.9% in 2013 to 3.0% in 2023, with hallucinations more frequent than delusions.[7,8] However, national estimates may mask systematic regional variation reflecting cumulative exposures and context-specific risk mechanisms.

This study addressed four objectives: first, to characterize regional patterns of lifetime hallucinations versus delusions; second, to quantify the relative contributions of demographic composition and contextual factors to regional differences using non-linear decomposition[9]; third, to evaluate whether the associations of established risk factors differ by region; and fourth, to assess factors that may confer regional resilience despite adverse socioeconomic or structural conditions.[10]

Methods

Study design, population, and weighting.

The 2023 Thai National Mental Health Survey employed a nationally representative, stratified, multistage probability sampling design conducted from January through December 2023. Sampling was stratified by six regions: Bangkok, Central, North, Northeast, South, and Southern Border. Provinces were selected with probability proportional to size, followed by the selection of primary sampling units and households.[11] Within

each sampled household, one adult aged 18 years or older was selected. Of the 4,800 eligible households, 4,160 interviews were completed, yielding a response rate of 86.7%.

Survey weights were incorporated to account for base selection probabilities, non-response adjustments, and post-stratification, ensuring alignment with 2023 national age, sex, and regional totals. The complex design was analysed in Stata 14[12] using: svyset psu [pweight=wt_final], strata (stratum) vce (linearized). All estimates, confidence intervals, and hypothesis tests were adjusted for the complex survey design. Ethical approval was obtained from the Department of Mental Health Institutional Review Board (DMH.IRB.COA 066/2565). Written informed consent was obtained from all participants.

Measures

Lifetime psychotic experiences were assessed using the Thai version of the World Health Organization Composite International Diagnostic Interview 3.0 Psychosis Screener [13, 14.] Standard exclusions were applied to remove experiences occurring during sleep–wake transitions, intoxication or withdrawal, fever, or other medical causes.[4] Mutually exclusive lifetime categories were defined: hallucinations only, delusions only, both hallucinations and delusions, and any psychotic experience (at least one after exclusions).

Covariates included age (18–24, 25–40, 41–59, and 60 years or older), sex, educational attainment (bachelor's degree or higher versus lower), employment status (unemployed versus employed), marital status (not married versus married or cohabiting), and region (Bangkok as reference).

Statistical analysis

Effect Measures and Model Selection

Given the low prevalence of psychotic experiences (3%), prevalence ratios (PRs) were prioritized over odds ratios to avoid overestimation of associations.[15] Modified Poisson regression with robust variance estimation was employed to estimate prevalence ratios, ensuring stable convergence.[16]

Analytical Approach

Three complementary models were fitted: (1) generalized linear models with binomial family and identity link for adjusted prevalence estimates, (2) Poisson regression with log link and robust standard errors for prevalence ratios[16], and (3) logistic regression for odds ratios as a sensitivity analysis. All models incorporated survey weights and accounted for the complex sampling design using Taylor linearization methods.

Decomposition Analysis

Fairlie's non-linear decomposition was

applied to partition regional differences in hallucination prevalence into compositional (explained by demographic differences) and contextual (unexplained) components.[9] Bootstrap confidence intervals were generated using 1,000 primary sampling unit–level replications to account for survey design effects.

Interaction Testing

Region-by-risk factor interactions were evaluated in pooled models at an alpha level of 0.10, given the limited statistical power to detect interactions. Design-adjusted Wald tests assessed interaction significance.

Software and Sensitivity Analyses

Analyses were conducted in Stata 14[12] using survey-specific commands. Sensitivity analyses examined alternative regional groupings, complete-case datasets, flexible age modeling using restricted cubic splines, and the inclusion of household size.

Results

Sample characteristics

The weighted sample included 4,160 participants with a mean age of 45.2 years (standard deviation 16.3), and 63.4% were female. Regional sample sizes ranged from 643 in Bangkok to 1,041 in the Northeast. Sociodemographic characteristics varied significantly across regions. The proportion of unemployed individuals ranged from 22.3% in the Central region to 28.4% in the Northeast ($p = 0.021$). The educational attainment of at least a bachelor's degree ranged from 6.6% in the Southern Border to 26.5% in Bangkok ($p < 0.001$). Additional details are presented in Table 1.

Table 1. Sample Characteristics by Region

Characteristic	Bangkok	Central	North	Northeast	South	S.Border	p-value
n	643	726	705	667	703	716	
Age, mean (SD)	44.3 (15.8)	45.8 (16.1)	46.2 (16.5)	45.9 (16.4)	44.8 (16.2)	43.2 (15.9)	0.042
Female, %	61.2	63.8	64.1	65.2	62.9	63.5	0.634
Unemployed, %	24.3	22.3	24.8	28.4	26.8	27.2	0.021
≥Bachelor's,%	26.5	12.3	10.8	9.5	11.4	6.6	<0.001
Not married, %	42.3	35.8	34.2	36.1	33.8	38.9	0.008

Table 1: Demographic and socioeconomic characteristics across six Thai regions (n=4,160). Standard deviation indicates dispersion around the mean. P-values are from survey-adjusted chi-square tests (categorical variables) and design-adjusted F tests (continuous variables).

Regional Patterns of Lifetime Psychotic Experiences

The overall prevalence of any lifetime psychotic experience was 3.0 % (95 %CI: 2.3–3.9%). Adjusted prevalences and prevalence ratios are shown in Table 2. Hallucination prevalence showed substantial regional heterogeneity, ranging from 1.0% in the South to 6.3% in the Southern Border ($p < 0.001$), whereas delusion prevalence varied minimally across regions (0.2–1.1%, $p = 0.234$).

After adjustment for covariates, the South had a significantly lower prevalence of hallucinations compared with Bangkok (prevalence ratio, 0.34; 95% CI: 0.15–0.78). The Southern Border had the highest adjusted prevalence, although its confidence interval overlapped with that of Bangkok. Patterns of delusions were comparatively flat and not statistically significant across regions.

Table 2. Adjusted Prevalence and Prevalence Ratios for Lifetime Psychotic Experiences by Region

Region	Hallucinations		Delusions	
	Adj. Prev % (95% CI)	PR (95% CI)	Adj. Prev % (95% CI)	PR (95% CI)
Bangkok (ref)	2.9 (1.5-4.3)	1.00	0.6 (0.2-1.0)	1.00
Central	3.3 (1.9-4.7)	1.14 (0.68-1.91)	0.7 (0.3-1.1)	1.17 (0.42-3.26)
North	2.6 (1.4-3.8)	0.90 (0.52-1.56)	0.6 (0.2-1.0)	1.00 (0.33-3.03)
Northeast	3.5 (1.9-5.1)	1.21 (0.72-2.03)	0.6 (0.2-1.0)	1.00 (0.33-3.03)
South	1.0 (0.2-1.8)	0.34 (0.15-0.78)*	0.2 (0.0-0.4)	0.33 (0.07-1.55)
S.Border	4.3 (2.5-6.1)	1.48 (0.91-2.41)	1.1 (0.3-1.9)	1.83 (0.68-4.93)
p-value		<0.001		0.234

*Table 2: Adjusted prevalence from marginal means and prevalence ratios from Poisson regression. *p<0.05 (statistically significant). ref = reference category. PR = Prevalence ratio. CI = 95% confidence interval. Adj. Prev = Adjusted prevalence.*

Fairlie Decomposition of Regional Differences

The Fairlie non-linear decomposition results are presented in Table 3, contrasting each region with Bangkok. Compared to Bangkok, demographic composition explained 57% of the higher prevalence of hallucinations, with specific contributions from age structure (15%), unemployment (32%), and education (10%). Compared with Bangkok, only 30% of the lower prevalence was attributable to composition, with 70% remaining unexplained, indicating strong contextual protective effects. For the Southern Border compared with Bangkok, 32% was explained by composition, and 68% was unexplained.

Table 3. Fairlie Decomposition of Regional Differences in Lifetime Hallucinations (Reference: Bangkok)

Component	Central-Bangkok pp (% of gap)	North-Bangkok pp (% of gap)	Northeast-Bangkok pp (% of gap)	South-Bangkok pp (% of gap)	S.Border-Bangkok pp (% of gap)
Total difference	0.40 (100)	-0.30 (100)	0.60 (100)	-1.60 (100)	1.30 (100)
Explained (composition)	0.20 (50)	-0.13 (43)	0.34 (57)	-0.48 (30)	0.41 (32)
- Age structure	0.07 (18)	-0.05 (17)	0.09 (15)	-0.15 (9)	0.14 (11)
- Unemployment	0.08 (20)	-0.02 (7)	0.19 (32)	-0.14 (9)	0.20 (15)
- Education	0.05 (13)	-0.06 (20)	0.06 (10)	-0.19 (12)	0.07 (5)
Unexplained (contextual)	0.20 (50)	-0.17 (57)	0.26 (43)	-1.12 (70)	0.89 (68)
Bootstrap 95% CI	(0.08-0.32)	(-0.31--0.03)	(0.11-0.41)	(-1.43--0.81)	(0.62-1.16)

Table 3: Fairlie non-linear decomposition partitioning regional differences into explained (demographic composition) and unexplained (contextual) components. pp = percentage points. Bootstrap based on 1,000 PSU-level replications. Negative values indicate a lower prevalence than in Bangkok.

Region-Specific Risk Factors

Prevalence ratios from the pooled interaction model are shown in Table 4. Younger age (18–24 years) and not being married were associated with a higher prevalence of hallucinations nationally, with evidence that these associations differed by region. In the Northeast, the association between unemployment and hallucinations was stronger than in Bangkok (prevalence ratio, 1.71; 95% CI, 1.08–2.71; p-interaction = 0.042). The interaction for youth status also indicated stronger associations in the Northeast compared to Bangkok (p-interaction = 0.018). Interaction effects for the South were attenuated and not statistically significant at conventional thresholds.

Table 4. Prevalence Ratios for Lifetime Hallucinations: Main Effects and Region Interactions

Risk Factor	Main Effect PR (95% CI)	Northeast×Factor PR	South×Factor PR	S.Border×Factor PR	p-interaction
Youth (18-24 vs ≥60)	2.31(1.42-3.76) **	1.68(1.02-2.77) *	0.39(0.09-1.70)	1.77(0.84-3.73)	0.018
Unemployed	1.41 (0.98-2.03)	1.71(1.08-2.71) *	0.77(0.19-3.13)	1.44(0.72-2.88)	0.042
Not married	1.54 (1.08-2.19) *	0.85 (0.46-1.57)	0.34(0.10-1.16)	1.43 (0.74-2.76)	0.037

*Table 4: Prevalence ratios from Poisson regression with robust variance. Main effects represent Bangkok associations. Interaction terms show multiplicative effects for other regions. *p<0.05, **p<0.01. PR = Prevalence ratio.*

Sensitivity Analyses

Alternative specifications yielded consistent inferences. Combining the South and Southern Border maintained the observed gradient in hallucination prevalence. Complete-case analyses (n = 4,012) yielded estimates similar to those from the primary analysis. Restricted cubic splines revealed non-linear age effects, with prevalence peaking at approximately 20-25 years of age. Inclusion of household size attenuated but did not eliminate regional differences, suggesting partial confounding by household structure and incomplete accounting for contextual effects.

Discussion

This nationally representative analysis demonstrated substantial regional heterogeneity in lifetime psychotic experiences within Thailand, most pronounced for hallucinations and relatively absent for delusions. The six-fold range in hallucination prevalence across regions points to etiological and contextual differentiation, rather than uniform national risk.

These regional variations align with international findings demonstrating geographic heterogeneity in psychotic experiences. Similar patterns have been observed in Brazil, where urban-rural differences showed comparable magnitudes of variation, with compositional factors accounting for approximately 40-60% of the differences.[17] European studies from the EU-GEI consortium found that neighborhood-level social fragmentation and ethnic density significantly influenced psychosis risk beyond individual factors, with unexplained variance

ranging from 30% to 65% across regions.[18] Our findings of more substantial protective effects in the South, despite economic challenges, mirror observations from Mediterranean areas, where strong social cohesion and family support systems appear to buffer against psychotic experiences.[19] However, unlike Western contexts where urbanicity consistently predicts higher risk, our results show a more complex pattern with the highly urbanized Bangkok serving as an intermediate reference point, suggesting that cultural and structural factors may modify established risk gradients.

Consistent with theoretical frameworks of social defeat and stress sensitization. The social defeat hypothesis posits that the experience of being excluded from the majority group, particularly in contexts of chronic socioeconomic disadvantage, increases vulnerability to psychotic experiences through dysregulation of dopaminergic systems and heightened stress reactivity.[10] Stress sensitization theory suggests that repeated exposure to stressors progressively lowers the threshold for symptom emergence, whereby individuals become increasingly reactive to minor stressors following initial adverse experiences.[20] In the Northeast context, chronic socioeconomic adversity combined with limited opportunity structures may create conditions where both mechanisms operate synergistically, lowering thresholds for perceptual anomalies and related phenomena.

The Southern Border exhibited elevated hallucination prevalence with a significant unexplained component, plausibly reflecting unmeasured exposures related to chronic conflict and insecurity, as well as differential help-seeking, stigma, or reporting patterns. The lower hallucination-to-delusion ratio relative to other regions may suggest shifts in symptom expression toward more cognitive or belief-related content under prolonged stress exposure. However, definitive conclusions require phenotype-specific analyses with adequate statistical power.

Methodologically, the emphasis on adjusted prevalence and prevalence ratios improved interpretability at low base rates compared with odds ratios, which can overstate relative differences.[15,21] The identification of region–by–risk factor interactions underscore that risk factors do not operate uniformly across geographic contexts; therefore, universal prevention or screening strategies may underperform if regional contexts are not considered.

Strengths of this study include national representativeness, a high response rate, use of a validated assessment instrument with standard exclusions,[13] and rigorous statistical modeling that

accounted for the complex survey design. The application of Fairlie's non-linear decomposition with bootstrap confidence intervals provided a transparent partitioning of compositional and contextual components.[9,22]

Limitations include the cross-sectional design, which precludes causal inference regarding the timing and accumulation of exposures; potential recall bias inherent in lifetime assessments; and unmeasured confounding, including childhood adversity, substance use patterns (particularly cannabis and methamphetamine), and family psychiatric history. The relatively small number of delusion cases limited precision for delusion-specific and joint-phenotype analyses. Future work should incorporate longitudinal designs, richer characterization of exposure, and regionally stratified qualitative inquiry to elucidate protective mechanisms and context-specific stressors.

Implications for clinical practice and mental health systems follow from the predominance of hallucinations over delusions, suggesting prioritization of detection and intervention for sensory-perceptual disturbances in community and primary care settings. Training in culturally sensitive assessment of perceptual phenomena, combined with brief psychological interventions and stepped-care pathways, may yield measurable benefits, particularly in regions with high prevalence.[5]

Conclusions and Implications for Thailand

Regional heterogeneity in lifetime psychotic experiences within Thailand indicates that place exerts a strong influence on mental health trajectories beyond individual demographic characteristics. With 43 to 70% of regional differences unexplained by composition, contextual determinants, including economic structures, conflict exposure, service organization, social cohesion, and environmental factors, appear to play decisive roles in the accumulation of lifetime psychotic experiences. Risk factors such as youth and unemployment vary in strength across regions, challenging one-size-fits-all prevention and care models.

Implications for Thailand include the following priorities. First, in the Northeast, targeted economic development and labor market initiatives aimed at reducing youth unemployment are warranted, given the heightened association between unemployment and mental health issues, including hallucinations.[6] The integration of vocational support, youth-focused outreach, and early mental health screening into provincial public health strategies may help mitigate risk. Second, in the Southern Border, scaling trauma-

informed and community-based mental health services, with attention to safety, trust-building, and culturally appropriate engagement, is indicated to address elevated prevalence and potential conflict-related exposures. Third, in the South, systematic investigation of protective regional features, such as social capital, family structures, access pathways, or culturally embedded coping practices, should be undertaken to inform transferable resilience-promoting interventions in other regions. Fourth, at the national level, mental health planning should adopt geographically tailored strategies, incorporating regional surveillance of psychotic experiences, differentiated screening thresholds, and resource allocation proportional to context-specific need and risk profiles. Finally, given the greater burden of hallucinations relative to delusions, clinical pathways should enhance early detection and management of perceptual disturbances in primary care and community settings, supported by workforce training and referral networks.

Collectively, these actions align mental health policy and services with the demonstrated geographic patterning of psychotic experiences in Thailand, addressing region-specific vulnerabilities while leveraging contextual strengths to reduce lifetime burden and improve population mental health.

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