Community Yoga and Public Health: Applications and Impact in Punjab, India

Dr. J. Samuel KAMANDA[1], Dr. Atul KHAJURIA[2], Dr. Eric Kwasi ELLIASON[3], Dr. Stephen MONDAY[4], Dr. Kulvir SINGH[5]*

[1]Research Fellow, Faculty of Allied Health Sciences, Desh Bhagat University,India. E-mail: samkamanda744@gmail.com ORCID: 0009-0002-1035-3339

[2]Director, Facukty of Allied Health Sciences, Desh Bhagat University,India. E-mail: directoralliedhealthsciences@deshbhagatuniversity.in. ORCID: 0000-0002-2918366X

[3]Research Fellow,, Faculty of Allied Health Sciences, Desh Bhagat University,India. E-mail:dr.elliason@ericsolutions.in ORCID: 0009—0006-3424-972X

[4]Research Fellow, Faculty of Allied Health Sciences, E-mail:putunok@gmail.com ORCID: 0009-0000-3684-3884

[5]HOD, Faculty of Dental Collage, Desh Bhagat University,India. E-mail: kulvir.sing.hb@gmail.com

ABSTRACT

Background:

Punjab is facing a rising burden of non-communicable diseases (NCDs), including hypertension, obesity, and psychological stress. Yoga—a traditional, holistic practice—has gained international recognition for promoting physical and mental well-being. This study investigates the impact of a 12-week community-based yoga intervention on adult health outcomes in urban and rural populations of Punjab, India.

Objectives:

To assess the effects of structured yoga sessions on cardiovascular indicators (blood pressure, BMI), perceived stress, and psychological well-being among adults across five districts of Punjab.

Methods:

A total of 300 adults aged 20–60 years were recruited from both urban (n = 180) and rural (n

= 120) communities. Participants engaged in thrice-weekly sessions led by certified instructors, incorporating asanas (postures), pranayama (breathing techniques), and guided relaxation. Health indicators were measured at baseline, midpoint, and post-intervention. Paired t-tests and subgroup analyses were conducted to evaluate changes over time.

Results:

Significant health improvements were observed following the intervention. Mean systolic blood pressure (SBP) reduced by 10 mmHg and diastolic blood pressure (DBP) by 6 mmHg ($p < .05$). Body mass index (BMI) declined by 0.6 kg/m², perceived stress scores (PSS) dropped by 6.5 points, and psychological well-being (WHO-5 index) improved by 5.3 points. Urban participants exhibited slightly greater improvements, potentially linked to higher baseline stress and better adherence.

Conclusion:

The study demonstrates the effectiveness of yoga as a community-level intervention for improving cardiovascular and mental health. Given its low cost and cultural relevance, yoga could serve as an integrative component of public health strategies in Punjab and similar settings.

Keywords: Punjab, Public health, Rural-urban health disparities, Community yoga, Hypertension, Stress, Mental health,

INTRODUCTION

Punjab, a northwestern Indian state, is presently experiencing a swift increase in lifestyle-related public health issues, such as hypertension, type 2 diabetes, raised levels of stress, and poor mental health. This trend mirrors general national patterns linked with urbanization, physical inactivity, and nutrition transitions [1]. Although pharmacological interventions are still at the forefront of controlling these conditions, there is increasing interest in the incorporation of complementary measures that focus on prevention, community engagement, and overall well-being.

Yoga, an ancient Indian discipline that integrates movement, breath control, and meditation, has become globally accepted for its beneficial influence on cardiometabolic and psychological health outcomes [2]; [3]. There has been evidence from several studies of multiple populations of decreases in blood pressure, improvements in metabolic profiles, and increased psychological resilience after consistent yoga practice [4]. In spite of this

international evidence base, there has been little structured research within the socioculturally heterogeneous and geographically disparate setting of Punjab.

Particular gaps exist in the knowledge on how to implement community-based yoga programs across city and village populations in relation to participation, retention, and long-term health outcomes.

This research aims to fill this gap by assessing the efficacy of a structured 12-week yoga program conducted in five districts of Punjab. In particular, it investigates:

1. The influence of community yoga on physiological health measures (e.g., blood pressure and body mass index) and psychological well-being (e.g., stress levels and satisfaction with life).

2. Participation patterns, program compliance, and variations in outcomes among urban and rural participants.

We predict that the yoga intervention will produce statistically and clinically significant improvement in physical and mental health measures among adults between 20 and 60 years of age.

METHODOLOGY

Study Setting and Participants

The research was carried out in five districts in Punjab, which was an equitable representation of two urban, two rural, and one peri-urban location to provide a reflection of the population diversity of the state. The participants were selected from local community centers, health outreach events, and public awareness campaigns. Inclusion criteria were adults 20-60 years of age who were not on any regular exercise or yoga program and who gave informed consent. Out of 330 participants enrolled at the start, 300 participants (urban: 180; rural: 120) had completed the baseline measurements. Attrition over the study interval was around 10%.

Intervention

The intervention included a standardized 12-week community-based yoga program. Sessions were conducted three times per week, for about 60 minutes. Sessions were led by certified and trained local yoga teachers. Each session combined traditional yoga postures (asanas), breathing techniques (pranayama), and guided relaxation/meditation exercises. The

curriculum was designed to meet the differential levels of physical ability, with modifications provided as necessary.

Data Collection and Outcome Measures

Participants were evaluated at three points in time: baseline (Week 0), midpoint (Week 6), and at program completion (Week 12). Physical health outcomes included:

- Systolic and Diastolic Blood Pressure (SBP/DBP): Measured with a standardized digital sphygmomanometer in resting conditions.
- Body Mass Index (BMI): Derived from height and weight measurements following standard WHO procedures.

Psychological health was measured with

- Perceived Stress Scale (PSS): A 10-item, validated instrument assessing perceived levels of stress during the past month [5].
- WHO-5 Well-being Index: A five-item scale evaluating positive mood, vitality, and general interests [6].

Statistical Analysis

Paired t-tests were used to examine differences between pre- and post-intervention. Subgroup analyses were carried out to compare urban versus rural participants, with outcomes stratified by these groups. Significance was defined as $p < .05$. Data were anonymized and analyzed with SPSS version 25.0.

RESULTS

Participant Flow

Stage	**n**
Enrolled	330
Completed Table-baseline	300
Completed all 3 assessments	290

Completion rate: 88% (290/330), indicating strong engagement.

Physical Outcomes

Measure	Week 0 (Mean ± SD)	Week 12 (Mean ± SD)	Change (p-value)
SBP (mmHg)	138 ± 12	128 ± 10	–10 (p < .001)
DBP (mmHg)	86 ± 8	80 ± 7	–6 (p < .001)
BMI (kg/m²)	26.8 ± 4.1	26.2 ± 3.9	–0.6 (p = .02)

A 10 mmHg drop in SBP and 6 mmHg in DBP demonstrates clinically meaningful improvement.

BMI reduction, though modest, is statistically significant, reflecting healthier body composition.

Psychological Outcomes

Measure	Week 0 (Mean ± SD)	Week 12 (Mean ± SD)	Change (p-value)
PSS (scale 0–40)	22.5 ± 4.8	16.0 ± 4.2	–6.5 (p < .001)
WHO-5 (scale 0–25)	11.5 ± 3.9	16.8 ± 4.1	+5.3 (p < .001)

Participants reported a substantial drop in perceived stress and a marked improvement in sense of well-being.

Urban vs Rural Comparison (Week 12 Improvement)

Group	ΔSBP (mmHg)	ΔPSS (points)	ΔWHO-5 (points)
Urban	–12	–7.0	+5.8
Rural	–8	–5.5	+4.5

Urban participants saw slightly greater improvements, possibly due to higher baseline stress and better program adherence.

Rural participants still benefited appreciably.

SUMMARY INTERPRETATION

- **Overtime:** Retention of 88% indicates high community interest.
- **Cardiovascular health**: BP reduction is significant clinically and may lower long-term risk for heart disease.
- **Mental well-being**: Significant alterations in stress and well-being scores indicate psychosocial gain.
- **Equity:** Urban and rural communities both improved, although the urban communities had slightly better results.

DISCUSSION

This research highlights the immediate health benefits of yoga interventions in a community context. The reduction in SBP (–10 mmHg) and DBP (–6 mmHg) is consistent with earlier evidence indicating yoga's contribution to reducing blood pressure through parasympathetic activation and stress reduction (Innes et al., 2005). Even a slight BMI decrease (–0.6 kg/m²) is significant in terms of long-term health risk reduction, considering the intervention's short period.

On the psych -emotional side, volunteers showed noteworthy reduction in perceived stress with a 6.5-point reduction on PSS scores and an increase of 5.3 points in the WHO-5 scores. Such findings reinforce results of previous meta-analyses showing yoga as effective in mental health promotion [7]

While urban participants showed more improvement across measures, rural residents benefited markedly as well, validating the cross-contextual applicability of yoga. Variability may be due to differences in baseline stress, lifestyle, and participation adherence - factors which are yet to be investigated in future research.

PUBLIC HEALTH IMPLICATIONS

In light of increasing NCD prevalence in India, particularly in middle-income states such as Punjab, community-based well-being programs present a sustainable option to medication treatments. This research presents strong evidence favoring yoga's twin advantages on physical and mental levels. The high rate of intervention completion (88%) speaks to its scalability and acceptability. Incorporating yoga into primary healthcare outreach or school/community wellness programs may lessen the cost of healthcare while enhancing quality of life.

LIMITATIONS

Several limitations warrant consideration. First, the absence of a control group limits causal inference. Second, self-selection bias may have influenced outcomes, as participants who voluntarily enrolled may have been more health-conscious or motivated. Third, the reliance on self-reported psychological scales introduces subjectivity. Lastly, follow-up beyond 12 weeks was not conducted, limiting insights into long-term sustainability of benefits.

CONCLUSION

This research shows that a well-structured community yoga program can make meaningful short-term changes in blood pressure, BMI, levels of stress, and general sense of well-being in Punjab adults. The results highlight the value of traditional wellness practices if integrated into local contexts and amplified through community participation. Long-term impacts and cost-benefits should be looked at by future studies to ascertain the feasibility of state-level policy implementation.

Author Contributions:

Conceptualization: JSK; methodology: JSK, AK, EKE, SM; software: JSK; validation: JSK; formal analysis, JSK; investigation: AK, EKE, SM; resources: JSK, AK, EKE, SM; data curation: JSK; writing - original draft preparation: JSK; writing—review and editing, AK, visualization: JSK; supervision: JSK; project administration: JSK. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Acknowledgments: None.

Conflicts of Interest: The authors declare no conflict of interest

REFERENCES

1. Gupta, R., Xavier, D., & Bhansali, A. (2019). Emerging epidemic of hypertension in India: A meta-analysis of blood pressure data. *Journal of Human Hypertension*, *33*(8), 575–587.

2. Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. *Journal of Alternative and Complementary Medicine*, *16*(1), 3–12.

3. Cramer, H., Lauche, R., Haller, H., Steckhan, N., Michalsen, A., & Dobos, G. (2014). Effects of yoga on cardiovascular disease risk factors: A systematic review and meta-analysis. *International Journal of Cardiology*, *173*(2), 170–183.

4. Innes, K. E., Bourguignon, C., & Taylor, A. G. (2005). Risk indices associated with the insulin resistance syndrome, cardiovascular disease, and possible protection with yoga: A systematic review. *The Journal of the American Board of Family Practice, 18*(6), 491–519.

5. Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385–396.

6. World Health Organization. (1998). *Wellbeing measures in primary health care: The DepCare Project*. Copenhagen: WHO Regional Office for Europe.

7. Cramer, H., Lauche, R., Langhorst, J., & Dobos, G. (2013). Yoga for depression: A systematic review and meta-analysis. *Depression and Anxiety*, *30*(11), 1068–1083.