UGC Approved Indexed Peer Reviewed Journal

ISSN: 2320-6586 (Online)

IILM UNIVERSITY

Technologies for Sustainable Development Goals 2025 (TECH4SDG-2025)

School of Computer Science & Engineering

IILM University Greater Noida

Presents

1st National Conference

on

Technologies for Sustainable Development Goals 2025 (TECH4SDG-2025)

3rd March 2025

Technically Co-Sponsored by IEEE UP SECTION (INDIA)

Venue:

IILM University, Greater Noida

Plot No.18,16, Knowledge Park II, Greater Noida, Uttar Pradesh 201306

Procedings Published at

International Journal of Research in Modern Engineering and Emerging Technology

Vol. 13, Sp. Issue 1, April 2025

Doi: https://doi.org/10.63345/ijrmeet.org.v13.si1.1301

Editor-in-Chief

Dr. Mylavarapu Seetharama Prasad

www.ijrmeet.org

ISSN: (Online) 2320-6586

INTERNATIONAL JOURNAL OF RESEARCH IN MODERN ENGINEERING & EMERGING TECHNOLOGY

(IJRMEET)

I.F. (wef. 2023: 6.004)

Vol. 13, Sp. Issue 1, April: 2025

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Published By
Resagate Global
KDP Grand Savanna, R. N. Ext.,
Ghaziabad- 201017, Uttar Pradesh, India

Powered By
Editor-in-Chief
IJRMEET
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Dear Author / Researcher,

On behalf of the *International Journal of Research in Modern Engineering & Emerging Technology (IJRMEET)*, I extend my heartfelt gratitude to all the authors and research scholars for choosing our platform to publish their valuable research contributions.

IJRMEET, a Refereed, Peer Reviewed, Indexed, and Monthly Journal in Electronic format, has been consistently dedicated since April 2013 to advancing scholarly work in the domains of Modern Engineering and Emerging Technologies. Your innovative and quality research is at the core of our mission to promote academic excellence and practical solutions in the ever-evolving field of engineering and technology.

We believe that publication should be based purely on the merit, originality, and relevance of the research, not on financial considerations. We ensure that every manuscript undergoes a thorough review process to maintain the integrity, reliability, and scholarly value of each published work.

Our journal aims not only to disseminate high-quality research globally but also to highlight critical engineering problems and their practical resolutions. I encourage researchers, academicians, faculty members, and industry professionals to continue contributing to IJRMEET and to inspire their peers and students to join us in this academic pursuit.

We sincerely thank our respected Editors, Reviewers, Technical Advisors, Authors, Web Developers, Subscribers, Supporters, and the extended academic community whose efforts and encouragement make each issue of IJRMEET a successful endeavor.

With warm regards,

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डॉ. मोहम्मद रिहान / Dr. Mohammad Rihan
महानिदेशक / Director General



MESSAGE

I am happy to know about Tech4SDG-2025, a distinguished national conference that aims to explore and highlight the transformative power of technology in achieving the United Nations Sustainable Development Goals (SDGs). This event serves as a critical platform for fostering collaboration among experts, innovators, and leaders who are dedicated to creating solutions that drive sustainable change.

As we face global challenges ranging from environmental sustainability to social equity, it is clear that technological advancements will play a pivotal role in shaping our collective future. Tech4SDG-2025 presents a unique opportunity to examine how cutting-edge technologies can contribute to solving the most pressing issues of our time, from climate change to poverty alleviation.

I look forward to the engaging discussions and innovative ideas that will emerge from this conference. I believe that by working together, we can harness the potential of technology to drive meaningful progress towards a sustainable and equitable world.

I extend my best wishes to all the participants and organizers of Tech4SDG-2025.

27.02.25

(Dr. Mohammad Rihan)

Dated: 27th February, 2025
Place: Gurugram

दूरभाष / Tel. No. : 0124-285 3000, 3056
ईमेल / Email : dgnise.mnre@nise.res.in, mohdrihan@nise.res.in, वेबसाइट/ Website : www.nise.res.in

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4. Leave 1 inch margin for each – top, bottom, left and right.
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Prevalence of Low Back Pain Among Women Attending General Outpatient Departments

Dr. Trushna Tembhekar,

Professor & HOD,

L N Ayurved College & Hospital, Kolar Road, Bhopal

Under LNCT University- 462042

https://orcid.org/0009-0001-8824-125X

Abstract : Low back pain can affect mobility, sleep, household responsibilities, and participation in paid employment among women. General outpatient departments provide an opportunity to assess symptoms among patients attending for diverse health concerns. This manuscript presents a hospital-based cross-sectional study framework for estimating low back pain prevalence and examining associated characteristics among nonpregnant women aged 18–65 years. The simulated analytical sample comprises 400 attendees. Low back pain is assessed using an anatomical diagram and clearly distinguished recall periods, with seven-day prevalence designated as the primary outcome. Seven-day low back pain occurs in 184 women, corresponding to 46.0% prevalence (95% confidence interval: 41.2%–50.9%). Pain on the interview day and during the preceding twelve months occurs in 32.0% and 61.0%, respectively. Seven-day prevalence increases across age categories and is higher among women reporting frequent lifting or carrying. The unadjusted prevalence ratio for frequent lifting is 1.50 (95% confidence interval: 1.22–1.85). These simulated findings demonstrate a consistent reporting framework but establish no empirical prevalence estimate. Actual interpretation requires representative sampling within outpatient services, assessment of confounding, and clinical evaluation where indicated.

Keywords: Low back pain; women; outpatient departments; prevalence; functional limitation; cross-sectional study

Introduction

Low back pain is an important source of disability and healthcare use. Its consequences extend beyond discomfort, potentially affecting walking, sleep, self-care, employment, and social participation. Among women, assessment should consider paid work, unpaid household activities, caregiving, and health conditions without assuming that any single role explains symptoms.

Hartvigsen et al. described low back pain as a complex condition influenced by interacting biological, psychological, and social circumstances [1]. A symptom-based survey can identify its frequency and impact, but it cannot reliably establish the anatomical cause of every episode. Likewise, an association with lifting, body mass index, or physical activity does not demonstrate causation. PubMed

Prevalence estimates depend strongly on the population and recall period. Pain experienced today, during the preceding week, and at any time during the past year

represent different outcomes. Combining these measures under one unspecified prevalence figure makes comparison difficult.

General outpatient departments offer a useful setting because women attend for varied complaints, including conditions unrelated to back pain. However, attendees remain a selected healthcare-seeking population. Their symptom prevalence cannot be interpreted as the prevalence among all women living in the surrounding community.

The present framework therefore specifies the denominator, anatomical region, recall periods, and functional assessment. It focuses on nonpregnant adult women attending general outpatient services and separates symptom prevalence from diagnostic classification.

Literature Review

Global burden and variation in prevalence

Hoy et al. [2] systematically reviewed global low back pain prevalence and examined how definitions and methodological differences affected estimates. Their findings support careful reporting of anatomical boundaries, recall periods, and sampling procedures rather than comparing percentages without context. Wiley Online Library

Wu et al. [3] examined low back pain prevalence and years lived with disability using Global Burden of Disease estimates for 1990–2017. Their analysis illustrates the distinction between the number of people affected and disability associated with symptoms.

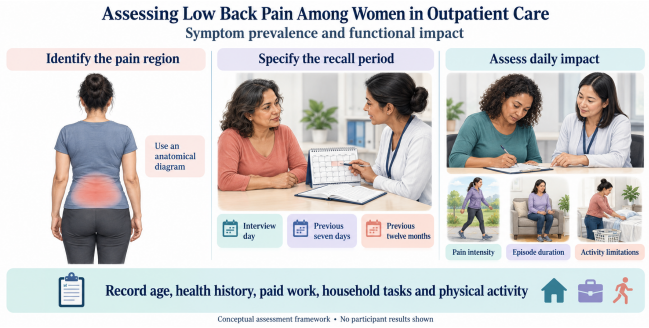
Ferreira et al. [4] extended burden assessment through 2020 and projected future burden to 2050. Such population-level modelling establishes the importance of low back pain but does not provide an expected prevalence for a particular

outpatient department. Hospital attendees differ from the populations represented in these estimates. PMC

Standardizing symptom measurement

Dionne et al. [5] developed consensus recommendations for standardizing back pain definitions in prevalence research. Their work addresses a central methodological difficulty: studies using different questions may appear comparable while measuring different experiences.

Kuorinka et al. [6] developed the standardized Nordic questionnaires for musculoskeletal symptoms. Their regional symptom approach and anatomical presentation provide a useful foundation for structured questioning. Nevertheless, modifying questions or recall periods requires explicit reporting; an adapted questionnaire should not automatically be described as fully validated. PubMed



Symptoms, disability, and clinical interpretation

Roland and Morris [7] developed a questionnaire measuring back-pain-related disability. This distinction matters because pain prevalence alone does not describe the extent to which symptoms interfere with daily activities.

Maher, Underwood, and Buchbinder [8] reviewed nonspecific low back pain and its clinical assessment. Their work reinforces the need to distinguish symptom identification from a specific diagnosis. A positive survey response does not establish disc disease, nerve-root involvement, or another structural condition. PubMed

Associated characteristics

Shiri et al. [9] reviewed associations between overweight or obesity and low back pain. Their findings support including measured body size in epidemiological assessment. However, body mass index remains an imperfect indicator, and observational relationships may involve activity, comorbidity, occupational exposure, and other circumstances. PubMed

Age, physical demands, and activity patterns also require careful interpretation. For example, women reporting less activity may have reduced their activity because of pain. A cross-sectional survey cannot determine whether exposure preceded symptoms.

Implications for outpatient care

Foster et al. [10] discussed evidence and challenges in low back pain prevention and treatment, emphasizing the gap between evidence and routine care. Their analysis supports collecting information about functional impact and service needs rather than focusing exclusively on anatomical explanations.

WHO's guideline for chronic primary low back pain [11] addresses care in primary and community settings. Its scope is narrower than all low back pain: a survey reporting long-duration symptoms cannot assume that every case meets the clinical definition of chronic primary low back pain. PubMed

NICE guidance [12] similarly emphasizes assessment for alternative diagnoses and appropriate management. These recommendations inform referral procedures within research, but a prevalence survey is not a substitute for clinical evaluation. NICE

Research gap

A practical gap remains in obtaining clearly defined estimates among women attending general outpatient services while capturing unpaid physical work and functional consequences. The proposed study addresses this through separate recall periods, systematic attendee sampling, and transparent exposure definitions.

Objectives

The primary objective is to estimate seven-day low back pain prevalence among eligible women attending general outpatient departments.

Secondary objectives are to describe pain on the interview day, twelve-month symptoms, episode duration, pain intensity, and functional limitation, and to examine unadjusted associations with selected demographic and activity-related characteristics.

Hypotheses

The null hypotheses state that seven-day low back pain prevalence does not differ across age categories or according to body mass index, frequent lifting or carrying, reported physical activity, or sitting duration.

The primary emphasis remains prevalence estimation; association analyses are exploratory.

Materials and Methods

Study design and population

A hospital-based cross-sectional survey is proposed among nonpregnant women aged 18–65 years attending designated general outpatient clinics. Eligible women would be approached regardless of their presenting complaint.

Pregnant women, accompanying persons who are not patients, and individuals requiring immediate emergency care would not enter this particular sampling frame. Findings would therefore apply only to the defined eligible population.

Women would not be excluded solely because back pain was their reason for attendance or because they had a previously diagnosed spinal condition. This preserves the intended assessment of overall symptom prevalence.

Sampling procedure

Systematic sampling would be conducted from eligible registration lists across clinic days and sessions. A random starting position and sampling interval would be selected according to attendance volume.

Unique identifiers would prevent repeat enrolment during the study period. Investigators would record invitations, refusals, exclusions, and incomplete assessments.

The simulated analysis contains 400 complete records. No recruitment dates, hospital identity, response rate, or completed fieldwork is claimed.

Sample-size determination

Assuming unknown prevalence of 50%, a 95% confidence level, and five percentage points of absolute precision:

\[n=\frac{1.96^2(0.50)(0.50)}{0.05^2}\approx384. \]

A target of 400 complete assessments exceeds this simple-random-sampling minimum. Approximately 445 invitations would be needed if 10% nonresponse were anticipated. Any clustering or unequal sampling probabilities would require corresponding adjustments.

Definition of low back pain

Participants would identify symptoms on an anatomical diagram covering the region between the lower rib margins and the lower gluteal folds, with or without associated leg pain.

The primary outcome would be any pain in this region during the preceding seven days. Separate questions would assess pain on the interview day and during the preceding twelve months.

Interviewers would clarify that isolated upper-back pain or isolated leg pain without low-back symptoms does not satisfy the anatomical definition. Symptoms would be recorded without assigning an unverified diagnosis.

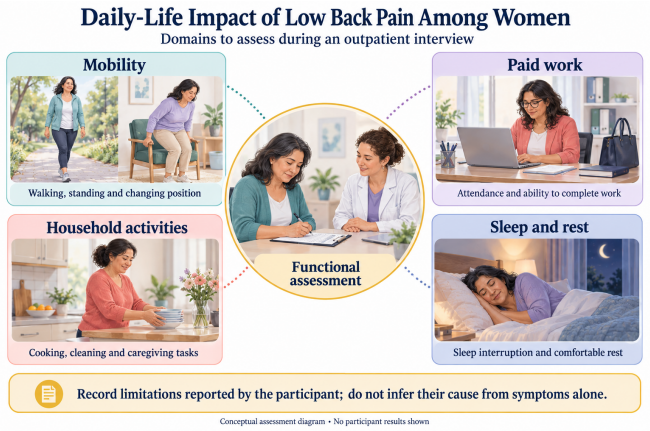
Pain characteristics

Among seven-day cases, participants would rate their worst pain during that week on a numerical scale from zero to ten. Study-defined descriptive categories would be mild, 1–3; moderate, 4–6; and severe, 7–10.

Current or most recent episode duration would be categorized as less than six weeks, six to less than twelve weeks, or at least twelve weeks. This describes the reported episode and does not independently establish chronic primary low back pain.

Functional assessment

Women reporting pain on the interview day would complete the 24-item Roland–Morris Disability Questionnaire using its original current-day framing [7]. Scores range from zero to 24, with higher scores indicating greater reported limitation.



Restricting this analysis to current-day cases prevents retrospective alteration of the questionnaire. Its denominator would therefore differ from the seven-day prevalence denominator.

Explanatory variables

Age would be grouped as 18–29, 30–39, 40–49, and 50–65 years. Height and weight would be measured, with body mass index categorized as below 25 versus at least 25 kg/m² for the exploratory comparison.

Frequent lifting would mean lifting or carrying loads estimated at 5 kg or more, at least ten times daily on four or more days weekly. Paid work, household work, and caregiving would all count. This is an analytical exposure definition, not a safety limit.

Participants would report weekly moderate-to-vigorous activity, grouped below versus at least 150 minutes, and usual sitting time, grouped above versus at most six hours daily. These self-reported thresholds describe exposure rather than establish causes.

Clinical procedures

Participants with concerning symptoms would receive clinical review according to the hospital's procedures. Research interviews would not delay necessary care.

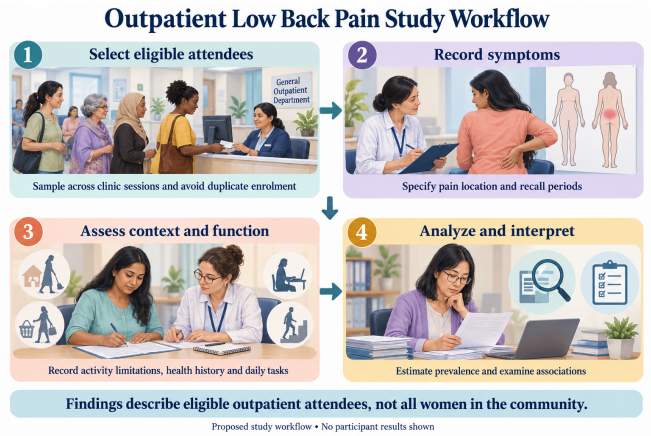
No routine imaging would be required solely for survey classification. Suspected specific conditions would be documented separately when clinically assessed.

Statistical analysis

Prevalence is expressed as a percentage with a Wilson 95% confidence interval. Pearson's chi-square tests compare categorical distributions without continuity correction.

Unadjusted prevalence ratios and log-scale confidence intervals describe associations. No multivariable effects are reported because participant-level joint data were not supplied. Exploratory p-values are not adjusted for multiple comparisons.

All numerical results below derive from simulated summaries.



Ethical considerations

Actual implementation would require ethics approval, informed consent, confidential data handling, and referral arrangements. No completed approval or consent process is asserted for this draft.

Results

Prevalence across recall periods

Table A. Simulated low back pain prevalence

Recall period	Women reporting pain	Without pain	Prevalence
Interview day	128	272	32.0%
Previous seven days	184	216	46.0%
Previous twelve months	244	156	61.0%

Each row uses the same denominator of 400 women. Recall periods overlap and must not be added.

The primary seven-day prevalence is 46.0% (95% CI: 41.2%–50.9%). Current-day cases are included within seven-day cases, which are included within twelve-month cases.

Age distribution

Table B. Simulated seven-day prevalence by age

Age, years	Total	With pain	Without pain	Prevalence
18–29	100	28	72	28.0%
30–39	120	50	70	41.7%
40–49	110	62	48	56.4%
50–65	70	44	26	62.9%
Total	400	184	216	46.0%

The age-group comparison gives $\chi^2(3)=26.71$, $p<0.001$. These unadjusted differences do not identify an independent age effect.

Pain intensity and duration

Table C. Simulated characteristics among seven-day cases

Characteristic	Women, n	Percentage of 184 cases
Mild pain	36	19.6%
Moderate pain	112	60.9%
Severe pain	36	19.6%
Episode <6 weeks	56	30.4%
Episode 6 to <12 weeks	40	21.7%
Episode ≥12 weeks	88	47.8%

Intensity and duration are separate classifications. Minor percentage discrepancies reflect rounding.

Among the 128 women with current-day pain, the simulated mean Roland–Morris score is 9.2 ± 5.1. This summary does not classify disability severity or apply to all 184 seven-day cases.

Associated characteristics

Table D. Simulated unadjusted associations with seven-day pain

Comparison	Pain in exposed category	Pain in reference category	Prevalence ratio (95% CI)	p-value
BMI ≥25 vs. <25 kg/m²	100/180 (55.6%)	84/220 (38.2%)	1.46 (1.18–1.80)	<0.001
Frequent lifting: yes vs. no	92/160 (57.5%)	92/240 (38.3%)	1.50 (1.22–1.85)	<0.001
Activity <150 vs. ≥150 minutes/week	128/250 (51.2%)	56/150 (37.3%)	1.37 (1.08–1.74)	0.007
Sitting >6 vs. ≤6 hours/day	78/150 (52.0%)	106/250 (42.4%)	1.23 (0.99–1.51)	0.062

Each row separately classifies the same 400 women, including the same 184 cases.

Higher BMI, frequent lifting, and lower activity show exploratory associations. The sitting comparison does not meet the specified 5% significance threshold.

Discussion

The simulated analysis demonstrates a substantial symptom burden within an outpatient denominator, with seven-day prevalence positioned between current-day and annual prevalence. This ordering is consistent with the nested recall periods and avoids presenting three different measures as interchangeable.

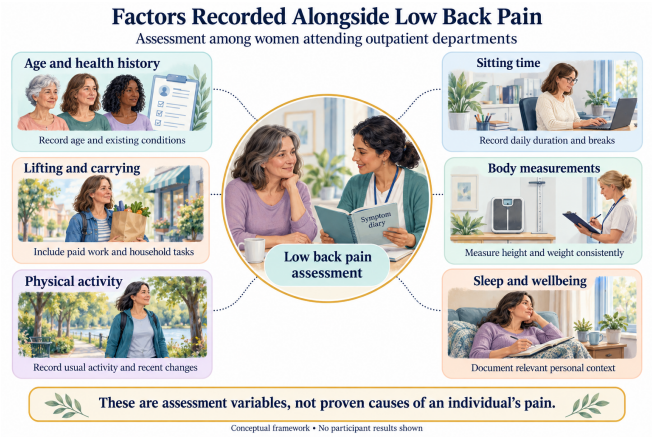
The estimate cannot be compared directly with general-population figures. Healthcare attendance may relate to age, comorbidity, pain, and access to services. Sampling only women whose presenting complaint is back pain would produce a different denominator and would not answer the proposed question.

The age gradient may reflect accumulated exposures, other health conditions, or differences in healthcare attendance. It cannot establish a biological explanation or a menopause-related effect because those pathways were not measured.

Frequent lifting shows an unadjusted association, but exposure assessment remains approximate. Household work and caregiving are included to avoid classifying unpaid physical work as inactivity. Nevertheless, frequency, load, posture, duration, and opportunities for rest may differ substantially within the same category.

The activity association is particularly vulnerable to reverse causation. Women may reduce movement because symptoms interfere with activity. Consequently, these results would not show that insufficient activity caused the observed pain.

The BMI association is broadly compatible with published observational evidence [9], but confounding remains unresolved. It should not be interpreted as proof that weight change would produce a specified reduction in symptoms.



Functional assessment adds information beyond prevalence. However, the current-day questionnaire denominator is deliberately narrower. Comparing its mean with studies administering the instrument to all annual cases would be inappropriate.

For service planning, observed data could identify needs for clinical assessment, education, and functional support. They would not justify routine imaging or a single treatment for every respondent. WHO and NICE guidance [11,12] emphasize the importance of appropriate clinical context.

Limitations

The numerical findings are simulated and establish no actual outpatient prevalence.

The proposed cross-sectional design cannot determine temporal order or causation. Recall error, self-reported activity, exposure misclassification, and nonresponse could affect estimates. Women attending other services, pregnant women, and those older than 65 years fall outside the sampling frame.

No adjusted analysis is possible from the supplied summaries. Clinical causes, psychosocial circumstances, and comorbidity require fuller assessment. A facility-based estimate cannot be generalized automatically to the surrounding community.

Conclusion

A reliable outpatient assessment should distinguish anatomical symptoms, recall periods, episode duration, and functional impact. The simulated analysis provides consistent tables and statistics for that purpose. Final conclusions must rely on collected observations and should describe associations without assigning unverified causes or generalizing beyond the eligible outpatient population.

Declarations

Ethics approval and consent: Required before recruitment; no participants were recruited for this draft.

Funding: Not supplied.

Conflicts of interest: To be completed by the authors.

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