

Access, Knowledge and Taboos: Assessing Period Poverty and Menstrual Hygiene Among Adolescents in Ladakh, North India

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Research Article

Keywords: Menstrual health, period poverty, vulnerability index, adolescent girls, Ladakh, menstrual taboo, health disparities

Posted Date: July 24th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10112579/v1>

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Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at BMC Women's Health on September 19th, 2026. See the published version at <https://doi.org/10.1186/s12905-026-04888-z>.

Abstract

Background

Menstrual health among adolescents in India's high-altitude trans-Himalayan region remains poorly understood. This study examines period poverty as a multidimensional condition among schoolgirls in Leh and Kargil, two districts of Ladakh that differ in geography, culture, and service access.

Methods

A cross-sectional survey of 310 post-menarcheal schoolgirls across 13 administrative blocks was conducted using a structured questionnaire and an 18-item Likert scale. A composite Menstrual Health Vulnerability Index (MHVI, 0-100) was developed across four domains: knowledge, hygiene practices, product access, and sociocultural restrictions. District differences were assessed using Mann-Whitney U and Welch's t-tests, while associations were examined using Spearman correlation and regression analyses.

Results

The mean MHVI was 27.3 (SD 14.3), with 38.1% of girls experiencing deficits in two or more domains. Vulnerability was higher in Leh than Kargil (30.2 vs 24.6, $p = 0.001$), but patterns differed substantially. Leh showed greater sociocultural restriction (65.3 vs 40.0, $p < 0.001$), whereas Kargil exhibited larger hygiene-practice deficits (11.6 vs 5.2, $p < 0.001$). Knowledge was associated with lower vulnerability ($\rho = -0.17$). The four domains were only weakly correlated, suggesting distinct underlying drivers.

Conclusions

Period poverty in Ladakh is heterogeneous and locally patterned. District-specific interventions are needed: taboo reduction and disposal infrastructure in Leh, and affordability support with hygiene education in Kargil. Domain-targeted strategies may be more effective than uniform approaches in improving menstrual equity in remote mountain regions.

1. Introduction

1.1 Reframing period poverty as a multidimensional condition

Menstruation is a routine biological event, yet the capacity to manage it with dignity is anything but evenly distributed. The term period poverty has gained currency as shorthand for the inability to afford

menstrual products, but its everyday reality extends well beyond price [2, 23]. A girl may have money for pads and still lack a private latrine, she may understand menstrual physiology yet remain barred from the kitchen or the shrine, she may attend a well-resourced school that nonetheless provides nowhere to dispose of a used absorbent. Treating these as one undifferentiated deprivation obscures the very differences that determine what help is actually needed. This study therefore begins from a different premise: that menstrual disadvantage is best understood as a bundle of partly independent burdens - economic, informational, behavioural and cultural - whose relative weight shifts from place to place [5, 7, 18].

1.2 Why Ladakh and why two districts

Ladakh occupies the cold, arid, high-altitude north of India, where winters are long, water freezes for months and settlements are scattered across valleys separated by high passes. The region comprises two administrative districts that are frequently spoken of together but are in many respects opposites. Leh is predominantly Buddhist, comparatively connected to tourism and trade and home to the territorial capital. Kargil is predominantly Muslim, more agrarian and historically less served by health and education infrastructure. Religion, livelihood, road access and exposure to outside norms all differ between them. If menstrual disadvantage were uniform, these contrasts would not matter, if it is locally patterned, they should produce measurably different profiles. Ladakh thus offers a natural comparison through which the multidimensional argument can be tested [12, 28].

1.3 What is already known and what is missing

National surveys confirm that hygienic menstrual practice in India has improved but remains stratified by wealth, schooling and geography [3, 4, 9]. A large body of district and state studies has documented knowledge gaps, restrictive customs and product shortages across the plains and the lower hills [8, 10, 25, 26]. High-altitude and frontier populations, however, are seldom represented in this literature and Ladakh in particular has almost no published menstrual-health evidence. Where data do exist for remote regions, they typically report a single composite outcome and rarely separate the cultural dimension from the economic one, leaving programme designers without the disaggregated picture they need to target scarce resources [7, 24, 27].

There is also a methodological gap. Most surveys reduce menstrual disadvantage to a binary - adequate versus inadequate practice, poor versus good knowledge - and report each separately. Such binaries are easy to communicate but discard information about how far short a girl falls and on how many fronts at once [5, 18]. A composite index that preserves gradation and that can be split back into its parts, offers a way to hold the overall picture and the local detail in the same frame. Building and interrogating such an index in a real, contrasting setting is itself a contribution, quite apart from the substantive findings it yields.

1.4 Aim and questions

This study assesses period poverty and menstrual hygiene among adolescent schoolgirls in Leh and Kargil through an explicitly comparative, multidimensional lens. Three questions guide the analysis:

- How vulnerable are adolescents overall when economic, informational, behavioural and cultural burdens are combined into a single index?
- Does the level - and more importantly the composition - of that vulnerability differ between the two districts?
- Are the four domains correlated, such that one entry point would address several, or independent, such that each requires its own response?

2. Materials and Methods

2.1 Design and setting

We conducted a school-based, cross-sectional survey across both districts of the Union Territory of Ladakh. Data collection spanned thirteen administrative blocks, capturing the geographic spread from the Indus valley settlements around Leh to the agricultural belts of Kargil. The unit of observation was the individual post-menarcheal adolescent enrolled in a government secondary or higher-secondary school.

2.2 Participants and sampling

Government schools were approached across the participating blocks and within each school girls in grades 8 through 12 who had attained menarche were invited to take part. Girls who had not yet begun menstruating were excluded so that all items on practice and product use applied. The realized sample comprised 310 adolescents, 150 from Leh and 160 from Kargil. The uneven district split reflects the distribution of accessible schools at the time of fieldwork rather than a designed quota, analyses that compare districts therefore rely on rank-based and variance-robust tests that do not assume equal group sizes. Field visits were spread across the participating blocks to avoid concentrating the sample in a single valley or town, so that the diversity of altitudes, road access and settlement size within each district was at least partly reflected in who was surveyed.

2.3 Instrument

A structured questionnaire was assembled from validated menstrual-health surveys and adapted to the local context [3, 15, 20]. It was organized into nine thematic parts spanning background characteristics, menstrual experience, knowledge and information sources, hygiene and disposal practice, product access and affordability, sociocultural restriction, school facilities, menstrual morbidity and felt needs. Most items used fixed response options that were pre-coded at entry. A separate 18-item attitudinal battery used five-point Likert agreement scales grouped into four conceptual domains - knowledge and awareness, period poverty, cultural and social experience and school support - three of which contained

negatively worded items that were reverse-scored before analysis so that higher values consistently denote a more favourable position.

2.4 The Menstrual Health Vulnerability Index

To operationalize the multidimensional argument, we constructed a composite Menstrual Health Vulnerability Index from the structured responses. Four domains were defined a priori. The knowledge-deficit domain counted unmet items among awareness of menstruation as a natural process, knowledge of hygiene and recognition of infection risk. The access-and-poverty domain counted the presence of any of four hardship markers: lack of reliable product access, resort to cloth because pads were unaffordable, perception of pads as expensive and menstruation-related school absence. The practice-gap domain counted shortfalls in product choice, change frequency, safe disposal and handwashing. The sociocultural domain summed reported restrictions, discomfort discussing menstruation and religious or ritual exclusion. Each domain was rescaled to a 0-100 range and the four were averaged with equal weight, yielding an index where 0 represents no measured disadvantage and 100 the maximum. For descriptive purposes the index was banded into low (< 33.3), moderate ($33.3-50$) and high (> 50) vulnerability.

2.5 Analysis

Continuous variables are summarized as means with standard deviations or medians with interquartile ranges, categorical variables as counts and percentages. Because several domain scores were skewed, between-district contrasts were tested primarily with the Mann-Whitney U test, with the Welch t-test and Cohen's d reported for the overall index to convey effect magnitude. Relationships between the index and continuous covariates were examined with Spearman's rank correlation and inter-domain independence with a Spearman correlation matrix. To identify adjusted predictors of the continuous index we fitted an ordinary-least-squares regression including district, age band, family structure and water source. Internal consistency of each attitudinal domain was quantified with Cronbach's α . A two-sided p-value below 0.05 was treated as significant. Analyses were performed in Python (pandas, SciPy and statsmodels).

2.6 Ethics

The study was conducted in accordance with the principles of the Declaration of Helsinki. Approval was obtained from the relevant institutional ethics committee and permission was sought from school authorities before enrolment. Because participants were minors, written informed consent was obtained from parents or guardians together with the girls' assent. No personal identifiers were recorded, participation was voluntary and responses were stored anonymously. Reporting follows the STROBE recommendations for observational studies [1].

3. Results

3.1 Who was surveyed

The 310 participants ranged in age from 12 to 21 years (mean 16.0, SD 1.8) and had reached menarche on average at 12.9 years (SD 1.2). One hundred and sixty girls (51.6%) were from Kargil and 150 (48.4%) from Leh. Nearly all reported a household toilet (94.5%), but reliable piped water was far from universal and household income was unreported or unknown for roughly four in five respondents - a limitation revisited later. Background characteristics are set out in Table 1, presented side by side for the two districts so that the comparison that organizes this paper is visible from the outset.

Table 1
Background characteristics of participants, by district

Characteristic	Leh (n = 150)	Kargil (n = 160)	Total (n = 310)
Age, mean (SD), years	15.3 (1.7)	16.7 (1.7)	16.0 (1.9)
Age at menarche, mean (SD)	12.6 (0.7)	13.2 (1.5)	12.9 (1.2)
Aged 14–16, n (%)	95 (63.3)	46 (28.8)	141 (45.5)
Joint family, n (%)	110 (73.3)	35 (21.9)	145 (46.8)
Household toilet, n (%)	133 (88.7)	160 (100.0)	293 (94.5)
Regular cycle, n (%)	97 (64.7)	132 (82.5)	229 (73.9)

SD, standard deviation. Percentages are column-wise within district.

3.2 How vulnerable, overall?

Averaged across its four domains, the Menstrual Health Vulnerability Index had a mean of 27.3 (SD 14.3) and a median of 29.2 (IQR 14.6–37.5), with individual scores spanning 0 to 58.3. On the banded scale, 201 girls (64.8%) fell in the low-vulnerability category, 102 (32.9%) in the moderate band and only 7 (2.3%) in the high band. Taken at face value this is reassuring. But the headline index conceals two findings that the remainder of the results brings forward: the domains contributing to it are very unequal in size and a substantial share of girls are simultaneously disadvantaged on more than one front. Figure 1 shows the full distribution of the index in each district.

3.3 The shape of vulnerability: unequal domains

Decomposing the index reveals that the average masks a lopsided profile (Table 2). Two domains dominate. The sociocultural domain was by far the heaviest (mean 52.3 on the 0-100 scale), driven by widespread reluctance to discuss menstruation and by ritual or religious exclusion. The access-and-poverty domain was the next largest (44.8), reflecting how often pads were felt to be expensive even when they were physically available. By contrast, the knowledge-deficit and practice-gap domains were small (3.7 and 8.5 respectively): most girls knew the essentials and washed, changed and disposed in broadly acceptable ways. The practical implication is immediate - the average girl in this sample is constrained far more by cost and culture than by ignorance or poor technique.

Table 2
Decomposition of the vulnerability index into its four domains (n = 310)

Domain	Mean (0-100)	SD	Relative rank
Sociocultural restriction	52.3	40.6	Highest
Access and poverty	44.8	28.8	Second
Practice gap	8.5	11.9	Third
Knowledge deficit	3.7	11.4	Lowest
Composite index (MHVI)	27.3	14.3	-

3.4 Modest difference in level, sharp divergence in composition

Comparing the districts produces the study's central result. The overall index differed modestly but significantly between the two districts (Leh 30.2 vs Kargil 24.6, Welch $t = 3.46$, $p = 0.001$, Mann-Whitney $p < 0.001$, Cohen's $d = 0.40$). The size of this gap, however, is small relative to what the headline figure conceals: the composition of vulnerability diverges far more sharply than its level. The domain-level contrasts in Table 3 show that vulnerability is built from different materials in each place. Leh's adolescents carried a significantly heavier sociocultural burden (65.3 vs 40.0, $p < 0.001$), while Kargil's carried wider practice gaps (11.6 vs 5.2, $p < 0.001$) and a marginally greater knowledge deficit (5.2 vs 2.0, $p = 0.003$), the access-and-poverty difference pointed in the expected direction but did not reach significance (48.2 vs 41.7, $p = 0.078$). Were one to act on the composite alone, the modest overall gap would point to uniformly intensifying effort in Leh, when in fact the two districts require different things. Figure 2 renders these crossing profiles as overlaid domain shapes.

Table 3
Domain-specific vulnerability by district, with rank-based tests

Domain (0-100)	Leh, mean	Kargil, mean	p (Mann-Whitney)
Sociocultural restriction	65.3	40.0	< 0.001
Practice gap	5.2	11.6	< 0.001
Access and poverty	48.2	41.7	0.078
Knowledge deficit	2.0	5.2	0.003
Composite index	30.2	24.6	< 0.001

3.5 Attitudes confirm the divide

The 18-item attitudinal battery, analysed separately, reinforced the same picture from a different measurement angle (Table 4). All four domains differed significantly between districts. Leh scored

higher on knowledge and awareness (4.25 vs 4.01, $p < 0.001$) and markedly higher on cultural and social comfort (2.99 vs 2.34, where higher denotes less felt restriction, $p < 0.001$). Kargil scored notably higher on school support (3.40 vs 2.37, $p < 0.001$), while the period-poverty domain showed only a small difference (Leh 3.21 vs Kargil 3.02, $p = 0.031$). Internal consistency was acceptable for the school-support scale ($\alpha = 0.75$) and moderate for the cultural and period-poverty scales ($\alpha = 0.50$ and 0.45), the knowledge scale was weaker ($\alpha = 0.44$), consistent with a short, content-heterogeneous set, so its items are read individually rather than as a unitary trait. The divergence is visualised in Fig. 3.

Table 4
Attitudinal Likert domains by district (mean of 1–5 items, higher = more favourable)

Likert domain	Leh	Kargil	p	α
Knowledge & awareness	4.25	4.01	< 0.001	0.44
Period poverty	3.21	3.02	0.031	0.45
Cultural & social	2.99	2.34	< 0.001	0.50
School support	2.37	3.40	< 0.001	0.75

3.6 Independent burdens that pile up

If the four domains rose and fell together, a single well-chosen programme might lift all of them. They do not. The Spearman correlation matrix (Table 5) shows weak associations throughout, the strongest pairing - access with sociocultural burden ($p = 0.31$) - still leaves the great majority of variance unshared and knowledge, practice and the others are essentially uncorrelated. The domains are, in statistical terms, largely orthogonal. This independence has a sobering corollary: because the burdens do not substitute for one another, they accumulate. More than a third of all participants (38.1%) carried a substantial deficit in two or more domains at once (Fig. 4). Vulnerability in this population is less a single deep hole than several shallow ones a girl may fall into in any combination.

Table 5
Spearman correlation matrix among the four vulnerability domains

Knowledge deficit	Knowledge	Access	Practice	Sociocult.
	1.00	0.03	0.08	-0.07
Access / poverty	0.03	1.00	-0.17	0.31
Practice gap	0.08	-0.17	1.00	-0.06
Sociocultural	-0.07	0.31	-0.06	1.00

3.7 What predicts a lower index?

Among individual characteristics, larger family size was the most consistent correlate of lower vulnerability (Spearman $\rho=-0.21$, $p < 0.001$), followed by knowledge score ($\rho=-0.17$, $p = 0.002$), practice score, age and age at menarche were not significantly related. When district, age band, family structure and water source were entered together in a linear model (Table 6), district was the one significant adjusted predictor: girls in Leh scored about 5 points higher on the index than those in Kargil ($\beta=+5.41$, $p = 0.007$), consistent with the modestly higher overall vulnerability seen in Leh. The model nonetheless explained little of the total variance (adjusted $R^2=0.04$, overall $p = 0.008$), and no other covariate was significant. The most defensible reading is that the index is not reducible to a handful of sociodemographic switches, its district patterning operates through the composition of burdens rather than through any single background variable.

Table 6
Linear regression of the vulnerability index on selected covariates

Covariate	β (points)	95% CI	p
District = Leh (ref. Kargil)	+ 5.41	1.50 to 9.32	0.007
Age 14–16 (ref. 12–13)	-2.63	-8.18 to 2.92	0.352
Age 17–21 (ref. 12–13)	-0.10	-5.86 to 5.65	0.972
Joint family (ref. nuclear)	+ 2.00	-1.68 to 5.68	0.286
Improved water (ref. other)	-0.89	-4.13 to 2.35	0.588

Adjusted $R^2=0.04$, model F-test $p = 0.008$. CI, confidence interval. Higher β indicates greater vulnerability.

4. Discussion

This study set out to test whether period poverty in Ladakh behaves as a single deprivation or as a bundle of distinct burdens and whether two districts that differ in religion, livelihood and connectivity would show different menstrual-health profiles. The answer to both questions is yes. Overall vulnerability was modest and only slightly higher in Leh than Kargil, far more striking was that the composition of that vulnerability diverged in ways that the small difference in the headline figure would have hidden entirely.

4.1 A low average that hides a lopsided reality

The composite index sat in the low-to-moderate range for most girls, which on its own might invite complacency. Decomposition told a different story. Sociocultural restriction and the felt cost of products accounted for almost all of the measured disadvantage, while knowledge and hygiene technique contributed very little. That ordering matters for policy. Decades of menstrual programming have leaned heavily on education and product supply, in this population, girls largely already know what to do and mostly do it, but they remain hemmed in by taboo and by the perception that pads are expensive even

when obtainable. Effort directed at information alone would chase the smallest of the four burdens [6, 12, 17].

4.2 Two districts, two different problems

The crossing domain profiles are the heart of the analysis. In Leh, the dominant burden was sociocultural: girls there were more likely to report restrictions and discomfort, despite - or perhaps alongside - higher knowledge and a more open attitudinal stance on some measures. In Kargil, the practice gap was wider, even though the perception of financial pressure differed little between the districts on the attitudinal scale, as the structured items recorded real hygiene shortfalls. One plausible reading is that better school support in Kargil, which scored markedly higher on that attitudinal domain, partly buffers affordability worry, while leaving individual practice less polished. Conversely, Leh's greater exposure to outside norms may raise awareness without dislodging deep-rooted ritual restriction. Whatever the mechanism, the implication is unambiguous: a uniform territorial programme would over-serve each district on its weaker problem and under-serve it on its real one.

4.3 Burdens that are independent and therefore cumulative

The near-absence of correlation among the four domains is an important and somewhat counterintuitive result. It means a girl with excellent knowledge can still be heavily restricted, a girl facing no affordability barrier can still practise poorly. Because the domains do not travel together, addressing one does little to relieve the others and they stack within individuals - more than a third of the sample carried two or more substantial deficits at once. Interventions conceived as single levers will therefore leave most girls still disadvantaged on a dimension the programme never touched [6, 16, 27]. This argues for modular, multi-component designs in which education, affordability, infrastructure and taboo-reduction are deployed together but tuned to local weight.

4.4 How the findings sit against existing evidence

The broad contours echo the wider South Asian literature: pads have become the predominant absorbent, most adolescents know the basics and restriction and stigma remain widespread [3, 8, 10, 21]. Where this study departs is in showing, within one small high-altitude region, that the same overall burden can be assembled from very different components on either side of a district line. Much published work reports a single composite figure for a study area, by disaggregating, we surface heterogeneity that such figures suppress [5, 18]. The persistence of heavy sociocultural restriction even among knowledgeable girls is consistent with reports elsewhere that information does not automatically dissolve taboo [14, 17, 19] and the modest contribution of pure knowledge deficit fits the national trajectory of improving awareness [3, 4].

It is worth dwelling on the pattern in Kargil, where girls showed wider practice gaps yet reported much better school support and no greater financial worry than their Leh counterparts on the attitudinal scale. This need not be contradictory. Stronger institutional provision can lower the felt economic stakes of menstruation without necessarily perfecting individual technique, particularly where products are

supplied but accompanied by little hands-on instruction. In Leh the inverse held: greater knowledge and openness coexisted with the heaviest ritual restriction, a reminder that cultural constraint is not simply a function of ignorance and does not retreat as information advances [13, 18, 22]. These patterns caution against assuming that the districts sit at different points on a single development ladder, they are following different paths, with different residual problems.

4.5 Strengths and limitations

The study's principal strength is its comparative, multidimensional framing, operationalised through a transparent composite index that can be decomposed and re-weighted by others. Coverage of thirteen blocks across both districts lends the sample reasonable geographic breadth for a hard-to-reach region and the pairing of a structured instrument with an attitudinal battery allowed the central finding to be confirmed by two independent measurement approaches. Several limitations temper the conclusions. The sample of 310, while substantial for this hard-to-reach region, was drawn from accessible government schools, so out-of-school and very remote adolescents are not represented. Household income was unknown for most respondents, weakening the economic interpretation of the access domain. The index uses equal, a priori domain weights rather than empirically derived ones and the short knowledge sub-scale showed only modest internal consistency. All measures are self-reported and cross-sectional, so social-desirability bias and reverse causation cannot be excluded [5, 11]. Finally, the index is a construct of this study and awaits external validation before it is treated as a standard tool.

4.6 The index as a transferable tool

Beyond Ladakh, the approach taken here may be useful wherever menstrual programmes must allocate limited resources across heterogeneous areas. The index is deliberately simple: four conceptually clear domains, equally weighted, each rescaled to a common range and recombined. That simplicity makes it easy to compute from a short survey and easy to communicate to non-specialist planners, while its decomposability preserves the detail that a single headline figure throws away. The equal weighting is a starting assumption rather than a claim about the true relative importance of each domain, as comparable datasets accumulate, the weights could be estimated empirically and the bands recalibrated to local distributions [7, 15]. We present the construct in that spirit - as a practical scaffold for disaggregated planning that others can adapt, rather than a finished instrument.

4.7 Implications

Read together, the results make a case for locally disaggregated menstrual-health planning in frontier regions. The composite index is useful for surveillance and for tracking change over time, but the domain decomposition is what should drive resource allocation. In practice this means Leh's programmes should foreground taboo-reduction, safe disposal and community dialogue, while Kargil's should foreground affordability support and hands-on hygiene education - distinctions that the modest difference in overall vulnerability between the two districts would entirely obscure.

5. Conclusions

Among adolescent schoolgirls in Leh and Kargil, overall menstrual-health vulnerability was modest and only slightly higher in Leh than Kargil, but its composition differed far more than its level. Sociocultural restriction and the perceived cost of products dominated the burden everywhere, while knowledge and hygiene technique contributed little. Crucially, the dominant burden differed by district - cultural in Leh, practice-related in Kargil - and the four constituent domains were largely independent, so that more than a third of the girls faced multiple disadvantages at once. Period poverty in this cold-arid frontier is best understood not as one problem with one solution but as several overlapping problems whose local balance must guide the response. Disaggregated, domain-specific and district-tailored programming is the more efficient path to menstrual equity here.

6. Recommendations

Translating these findings into action points by the level at which each lever sits:

For district health and education administrations

abandon a single territorial template in favour of two district plans - prioritise taboo-reduction and menstrual-waste disposal in Leh and product affordability and practical hygiene education in Kargil.

For schools

install and maintain functional disposal facilities, ensure a discreet supply of products and create routine, non-stigmatising spaces in which menstruation can be discussed by trained female staff.

For community and religious leaders

engage directly on ritual and religious restriction, the single largest contributor to measured vulnerability, since knowledge campaigns alone do not displace it.

For programme designers

adopt modular, multi-component interventions rather than single levers, given that the four burdens are independent and cumulative within individuals.

For researchers

validate and, where possible, empirically re-weight the vulnerability index in larger and out-of-school samples and extend measurement to remote and nomadic populations not captured here.

Declarations

Ethics approval and consent to participate. The study followed the Declaration of Helsinki and received institutional ethics approval of University of Ladakh, Leh, India. Written informed consent was obtained from parents or guardians, with assent from the adolescent participants.

Consent for publication. Not applicable, no individually identifiable data are presented.

Availability of data and materials. The de-identified dataset is available from the corresponding author on reasonable request.

Competing interests: The authors declare no competing interests.

Funding: State funding source / not applicable.

Authors' contributions: The author conceived and designed the study, collected and analyzed the data, interpreted the findings, drafted and revised the manuscript and approved the final version for publication.

Acknowledgements. The authors thank the participating schools, district authorities and the adolescent participants and their families.

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Figures

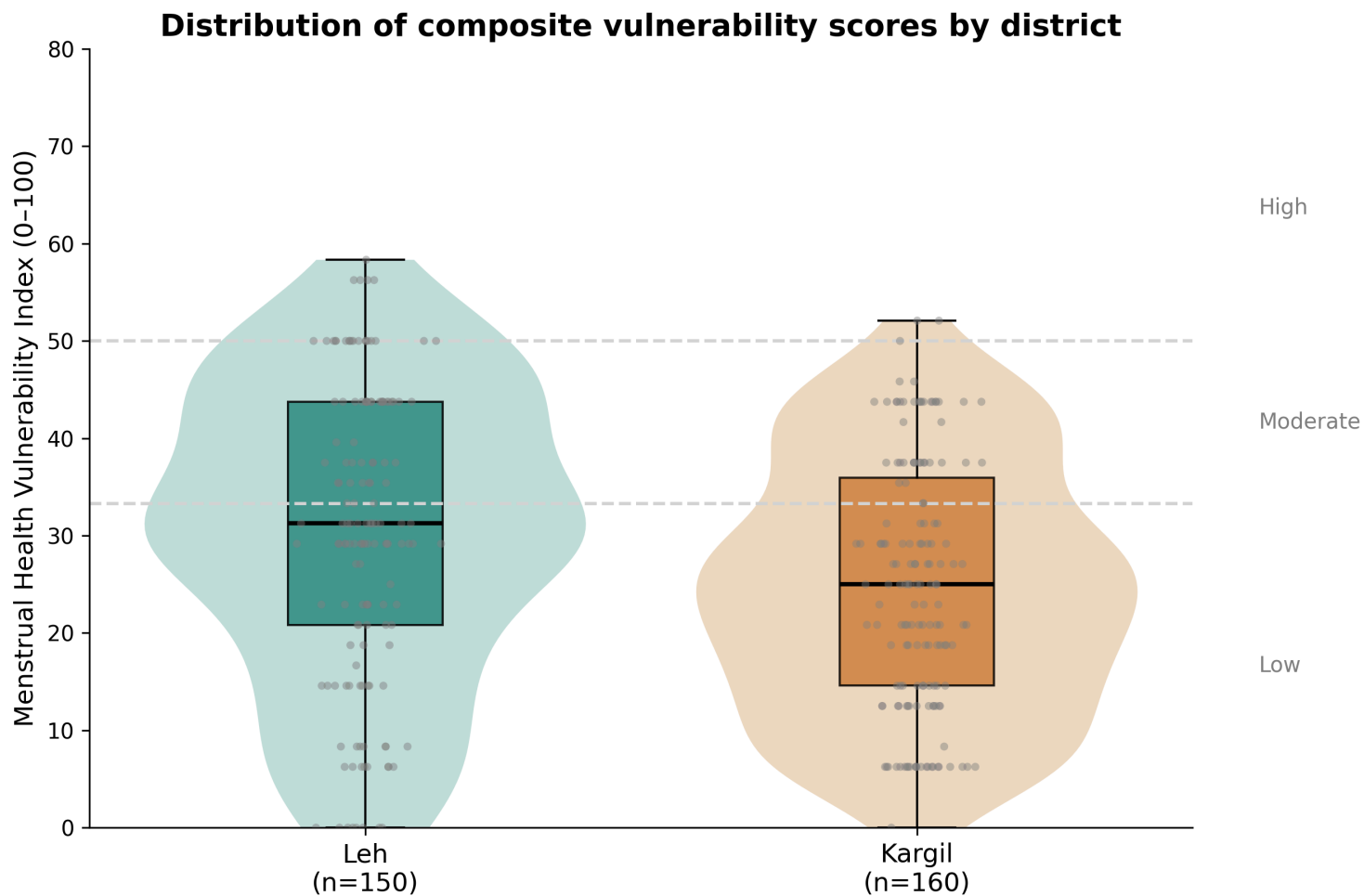


Figure 1

Distribution of the Menstrual Health Vulnerability Index by district. Violin shapes show the probability density, embedded boxplots mark the median and interquartile range, points are individual respondents. Dashed lines separate the low, moderate and high bands.

Domain-specific vulnerability profile (mean 0-100)

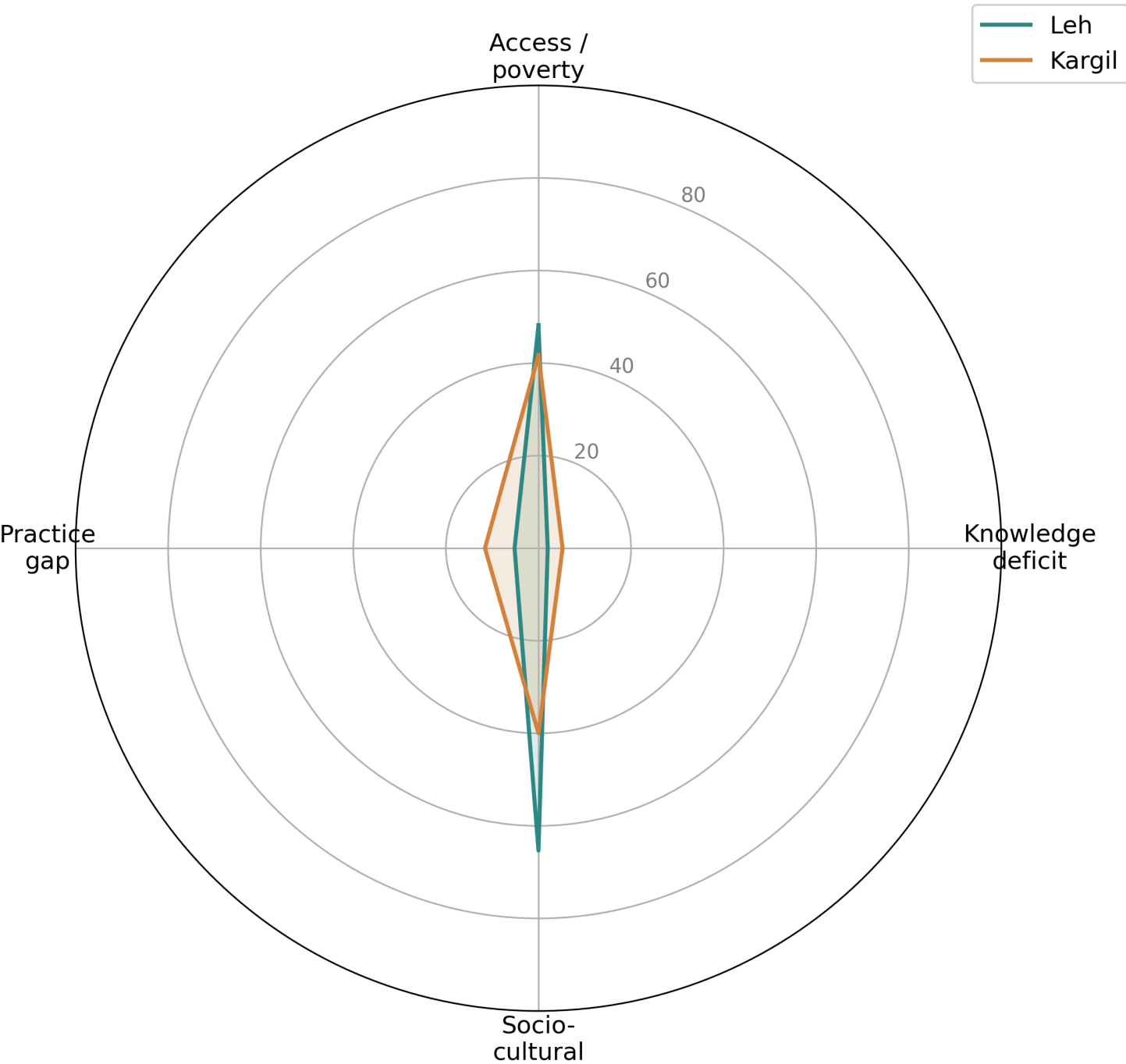


Figure 2

Domain-specific vulnerability profiles for Leh and Kargil. The crossing shapes illustrate the paper's central finding: a modest difference in overall vulnerability that conceals sharply different dominant burdens - sociocultural in Leh, practice-related in Kargil.

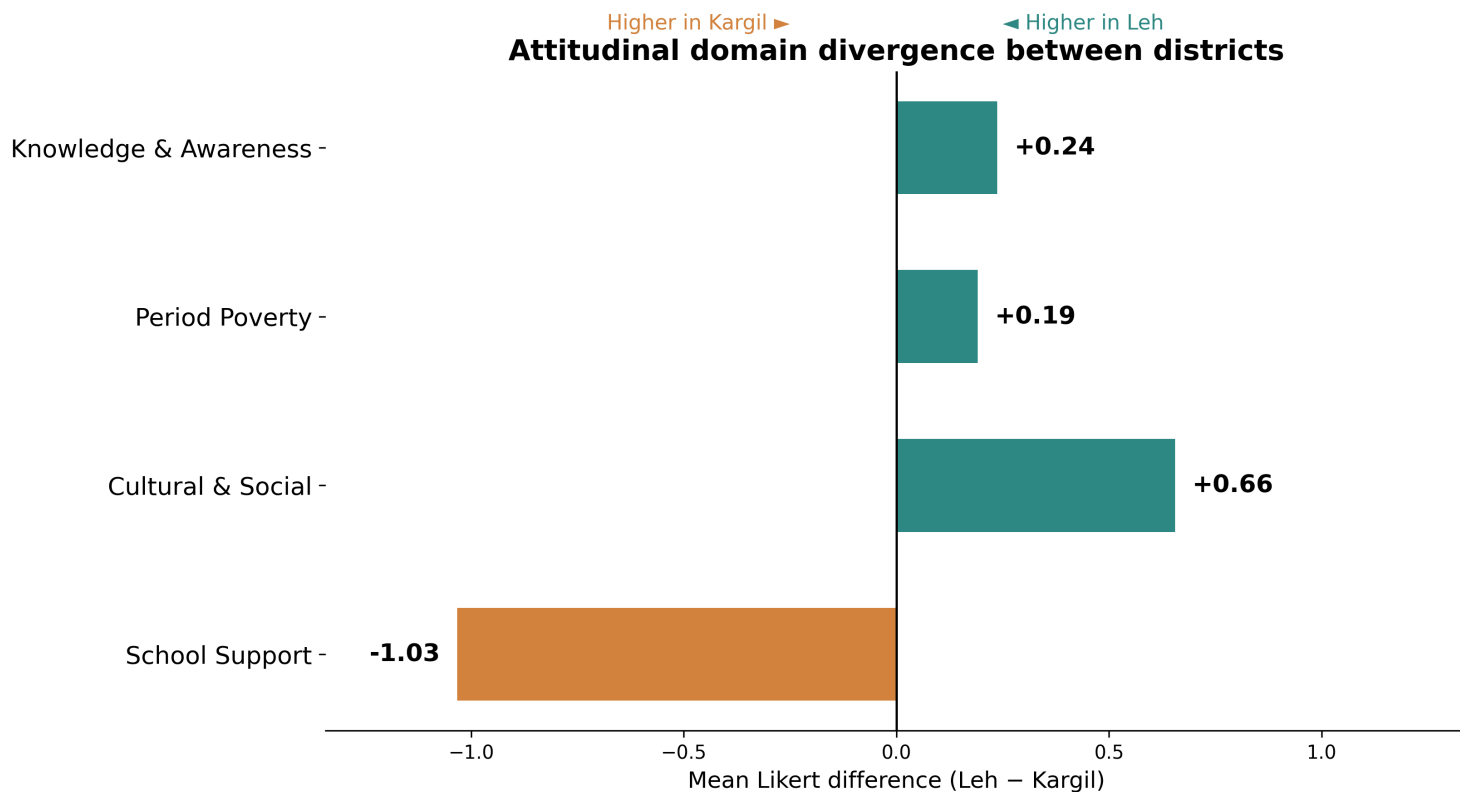


Figure 3

Diverging attitudinal differences between districts (Leh minus Kargil). Bars to one side indicate the domain is more favourable in Leh, to the other, in Kargil. All four differences are statistically significant ($p < 0.001$ for knowledge, culture and school support, $p = 0.031$ for period poverty).

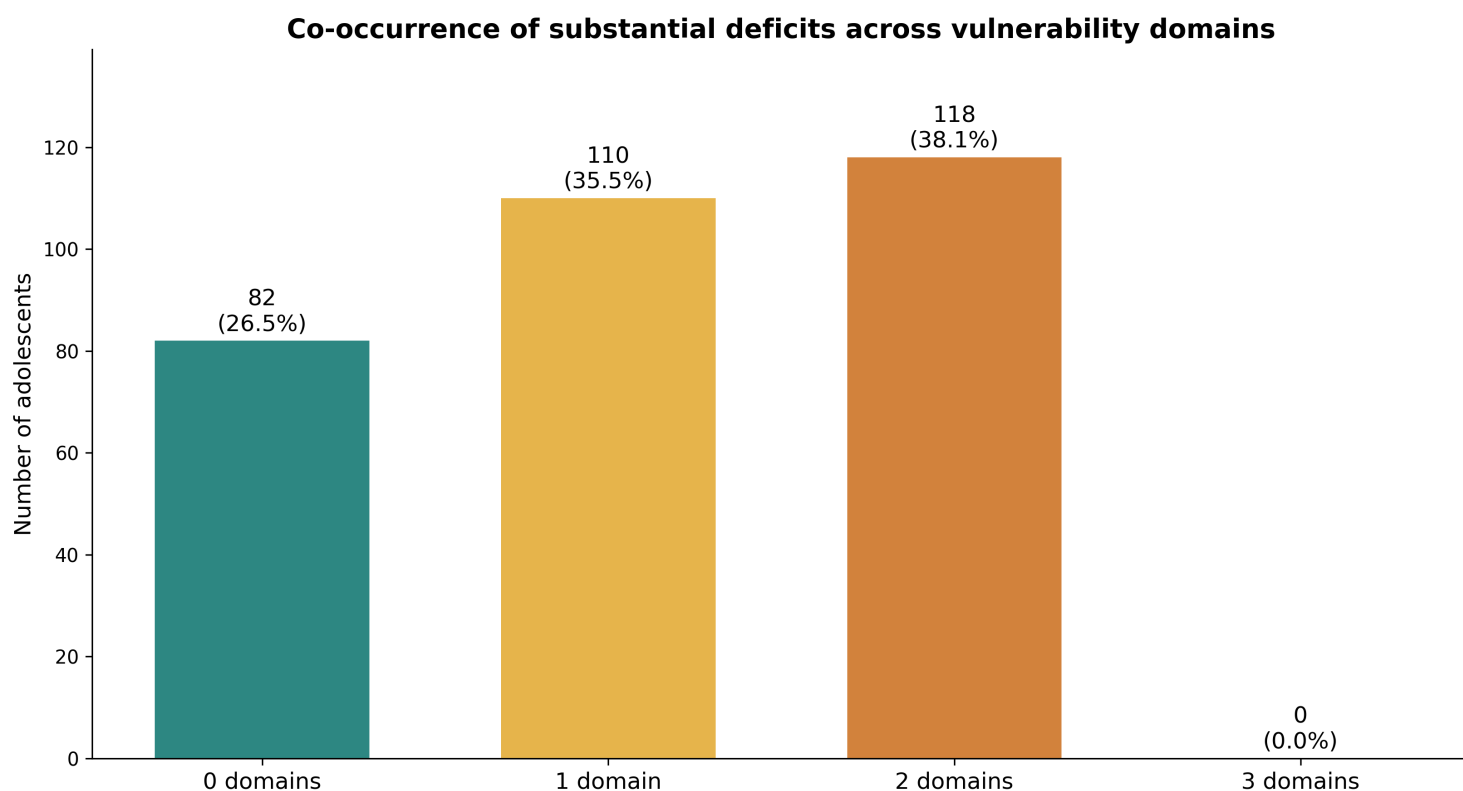


Figure 4

Co-occurrence of substantial deficits across the four domains. More than a third of participants face two or more burdens simultaneously, illustrating how largely independent domains accumulate within individuals.