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ILLNESS UNCERTAINTY AND JOB-RELATED AFFECTIVE WELL-BEING AMONG EMPLOYEES WITH URTICARIAL VASCULITIS RECRUITED FROM TERTIARY HOSPITALS IN PESHAWAR, PAKISTAN: THE MODERATING ROLE OF WORKPLACE ACCOMMODATION AVAILABILITY

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Abstract

Urticarial vasculitis (UV) is a rare inflammatory condition characterized by recurrent wheals lasting more than 24 hours and histopathological evidence of small-vessel leukocytoclastic vasculitis. Its unpredictable course may affect attendance, concentration, commuting, task planning, disclosure and emotions at work. This worked analytical example demonstrates the planned analysis for a multicentre cross-sectional study examining illness uncertainty, workplace accommodation availability and job-related affective well-being among employed adults with specialist-documented UV. A computationally generated dataset of 186 records was used solely to illustrate statistical reporting; it contains no participant or hospital data. The proposed questionnaire combines the 23-item Mishel Uncertainty in Illness Scale–Community Form, the 20-item Job-related Affective Well-being Scale and Part 1 of the Workplace Accommodations, Benefits, Policies and Practices Scale. In a covariate-adjusted ordinary least-squares model using HC3 standard errors, illness uncertainty was negatively associated with job-related affective well-being at mean accommodation availability ($b = -0.0189$, SE = 0.0030, 95% CI [−0.0248, −0.0131], $p < .001$). Accommodation availability was positively

associated with well-being at mean uncertainty (b = 0.0416, SE = 0.0124, 95% CI [0.0171, 0.0662], p < .001). The interaction was not statistically significant (b = 0.0007, SE = 0.0011, 95% CI [−0.0014, 0.0027], p = .541; ΔR^2 = .002). Accordingly, the worked analysis supports the two conditional main associations but not the hypothesized buffering effect.

1. Introduction

Urticarial vasculitis (UV) is a rare clinicopathologic inflammatory condition characterized by recurrent urticaria-like lesions and histopathologic evidence of small-vessel leukocytoclastic vasculitis. Unlike typical urticaria, individual lesions commonly persist for more than 24 hours and may be accompanied by burning, pain, bruising, or post-inflammatory hyperpigmentation (Gu & Jorizzo, 2021; Krause et al., 2023). UV is generally classified as normocomplementemic or hypocomplementemic according to complement status. Systemic manifestations, including musculoskeletal, pulmonary, renal, and constitutional symptoms, are reported more frequently in hypocomplementemic disease, although substantial clinical and functional burdens can occur across the complement-defined subtypes (Gu & Jorizzo, 2021; Krause et al., 2023).

The clinical characteristics of UV create considerable illness uncertainty. Its presentation can overlap with chronic spontaneous urticaria, while diagnostic confirmation often requires an appropriately timed lesional biopsy and careful histopathologic assessment. Treatment is similarly uncertain because the available evidence is heterogeneous and relies substantially on off-label therapies selected according to disease severity and systemic involvement (Kolkhir et al., 2019; Krause et al., 2023). Patients may consequently remain uncertain about the meaning of new symptoms, the likelihood and duration of future flares, the effectiveness of treatment, and the length of time for which their usual functioning may be disrupted.

These uncertainties may be particularly consequential in paid employment. UV-related pain, fatigue, visible lesions, joint symptoms, angioedema, treatment effects, and unpredictable recurrence can interfere with commuting, concentration, fixed work schedules, public-facing duties, and sustained physical activity. Bonnekoh et al. (2022) found that longer disease duration, greater systemic symptom burden, and more intensive treatment were associated with poorer patient-reported quality of life among people with UV. Although this evidence demonstrates substantial disease burden, it does not directly explain how UV affects employees or their experiences at work.

Occupational evidence concerning UV remains limited. Research involving chronic spontaneous or inducible urticaria has documented symptoms occurring at work, presenteeism, productivity loss, and treatment-related occupational effects (Baudy et al., 2024). However, chronic urticaria is clinically

distinct from UV, and these findings should therefore be treated as indirect evidence. Similarly, research involving mixed populations of people with vasculitis has identified adverse effects on employment, income, and work productivity but has not provided UV-specific occupational estimates (Barra et al., 2018). These studies nevertheless demonstrate the importance of examining how recurrent inflammatory conditions and their uncertain courses are experienced within the workplace.

Mishel's Uncertainty in Illness Theory provides a useful framework for understanding these experiences. The theory proposes that uncertainty arises when illness-related events are ambiguous, complex, inconsistent, or unpredictable and cannot be assigned a definite meaning (Mishel, 1988, 1990). In chronic illness, uncertainty may become an enduring feature of everyday life rather than a temporary response to diagnosis. For employees with UV, continuing uncertainty may consume cognitive resources, complicate planning, heighten vigilance toward symptoms, and reduce confidence in their ability to meet work expectations. Employees may also experience uncertainty about whether to disclose their condition, how much medical information to provide, and whether requests for workplace flexibility will be accepted.

The Job Demands–Resources (JD-R) model complements this illness-focused perspective by explaining how workplace conditions may influence the consequences of demanding experiences. According to the JD-R model, demands require sustained physical, cognitive, or emotional effort and may contribute to strain, whereas resources facilitate goal attainment, reduce the costs associated with demands, and support employee well-being (Bakker & Demerouti, 2007, 2017; Demerouti et al., 2001). Previous JD-R research also suggests that job resources may weaken associations between demanding conditions and adverse occupational outcomes (Bakker et al., 2005). In the present study, illness uncertainty was conceptualized as a health-related cognitive and emotional demand carried into the workplace, whereas reported workplace accommodation availability was conceptualized as a contextual job resource.

Workplace accommodations may include flexible working hours, remote or hybrid work where job duties permit, additional recovery breaks, protected time for medical appointments, temporary task modification, workload pacing, temperature-sensitive arrangements, and back-up coverage. These arrangements may help employees manage fluctuating symptoms while continuing to perform essential job duties. For example, flexible starting times may assist employees experiencing severe morning symptoms, remote work may reduce commuting difficulties, and additional breaks may permit medication use or short periods of symptom recovery.

Nevertheless, accommodation availability should be distinguished from accommodation use, suitability, timeliness, and effectiveness. The construct examined in this study concerns the breadth of accommodations that employees reported as available. It does not establish that an employer anticipated an employee's needs, offered support without a request, responded promptly, individualized an

arrangement, or made its use psychologically safe. Accordingly, the term *workplace accommodation availability* is used throughout this study rather than *proactive workplace accommodation*.

Job-related affective well-being refers in this study to the balance of positive and negative emotions that employees experience in relation to their jobs. Uncertainty about symptoms, attendance, task completion, disclosure, and employer responses may undermine positive job-related emotions and increase negative affect. In contrast, access to a broader range of workplace accommodations may support control, predictability, and continued work participation. Accommodation availability may therefore be positively associated with job-related affective well-being and may moderate the association between illness uncertainty and well-being.

Direct evidence connecting these constructs among employees with UV remains limited. Existing UV research has concentrated primarily on diagnosis, clinical presentation, treatment, and general quality of life. Occupational research involving chronic urticaria, mixed vasculitis populations, and other chronic conditions provides valuable contextual evidence but cannot substitute for UV-specific investigation. Examining these associations may therefore extend illness-uncertainty research into the employment context and clarify whether workplace resources are associated with differences in employees' job-related affective experiences.

Accordingly, the proposed multicentre cross-sectional study is designed to examine illness uncertainty, workplace accommodation availability, and job-related affective well-being among employees with specialist-documented UV recruited through three tertiary hospitals in Peshawar, Pakistan. The worked analysis addresses the following research question: Is the negative association between illness uncertainty and job-related affective well-being weaker at higher levels of reported workplace accommodation availability?

The following hypotheses were tested:

H1: At the mean level of workplace accommodation availability, illness uncertainty is negatively associated with job-related affective well-being.

H2: At the mean level of illness uncertainty, workplace accommodation availability is positively associated with job-related affective well-being.

H3: The illness uncertainty × workplace accommodation availability interaction coefficient is positive, indicating that the negative association between illness uncertainty and job-related affective well-being is weaker at higher levels of accommodation availability.

2. Literature Review and Theoretical Framework

2.1 Urticarial Vasculitis as an Uncertain Chronic Condition

Urticarial vasculitis combines several characteristics that may generate illness uncertainty, including rarity, clinical overlap with other urticarial conditions, episodic symptoms, variable systemic

involvement, and an uneven treatment evidence base. Recurrent wheals may initially be treated as ordinary urticaria. However, lesions persisting for more than 24 hours, residual bruising or hyperpigmentation, and systemic symptoms such as fever, joint pain, or abdominal discomfort should raise suspicion of UV and may warrant further clinical assessment and biopsy (Gu & Jorizzo, 2021; Krause et al., 2023). These diagnostic difficulties may delay confirmation and expose patients to changing or conflicting explanations of their symptoms.

Receiving a diagnosis does not necessarily eliminate uncertainty. Complement status, associated autoimmune disease, medication reactions, infections, and idiopathic presentations may produce different clinical trajectories. The diagnosis may therefore provide recognition and clinical legitimacy without providing a predictable course. Patients may continue to experience uncertainty about flare timing, symptom severity, systemic involvement, treatment effectiveness, and the duration of functional impairment.

The distinction between normocomplementemic and hypocomplementemic UV is clinically important, but neither subtype necessarily provides workers with complete predictability. Normocomplementemic UV may remain predominantly cutaneous, but pain, sleep disruption, visible lesions, fatigue, and treatment effects may still interfere with occupational functioning. Hypocomplementemic disease may generate additional concern because systemic manifestations are more frequently reported in this subtype (Gu & Jorizzo, 2021). Employees may therefore have difficulty anticipating whether they will be able to commute, concentrate, complete a fixed shift, perform physically demanding duties, or participate in public-facing work.

Treatment uncertainty may further complicate employment. Depending on clinical presentation and disease severity, treatment may involve antihistamines, corticosteroids, hydroxychloroquine, dapsone, colchicine, immunosuppressive agents, or biologic therapies. The evidence supporting these treatments remains heterogeneous, and therapeutic decisions frequently depend on clinician judgment and the extent of systemic involvement (Kolkhir et al., 2019). Employees may consequently have to manage changing treatment regimens, laboratory monitoring, medical appointments, adverse effects, and uncertain periods of therapeutic benefit.

Patient-reported evidence demonstrates that UV can create a substantial burden. Bonnekoh et al. (2022) associated longer disease duration, greater systemic symptom burden, and greater treatment need with poorer quality of life among people with UV. Diagnostic delay and repeated clinical reclassification may also weaken confidence in health information and make the condition more difficult to explain to employers. Because UV is uncommon, supervisors and coworkers may lack a familiar framework for understanding recurrent symptoms and fluctuating functional limitations. The uncertainty surrounding

UV may therefore arise from both the disease and the social context in which employees must interpret and communicate it.

2.2 Illness Uncertainty and Job-Related Affective Well-Being

Mishel (1988) defined illness uncertainty as an inability to determine the meaning of illness-related events. Uncertainty may arise from ambiguous symptoms, complex treatment and healthcare systems, inconsistent information, and unpredictability concerning disease course and outcomes. In acute illness, uncertainty may be associated with a temporary period of diagnosis and treatment. In chronic illness, however, uncertainty may become an enduring feature that requires continuous adjustment and reorganization of expectations (Mishel, 1990).

This chronic-illness perspective is particularly relevant to episodic conditions such as UV. An employee may function effectively on one day but experience pain, fatigue, visible lesions, joint symptoms, or systemic manifestations on another. The fluctuating nature of the condition can make it difficult to predict future capacity, arrange work commitments, or provide employers with a definite timeframe for recovery. Uncertainty may therefore persist even during periods when symptoms are relatively controlled.

Several mechanisms may connect illness uncertainty with affective experiences at work. First, symptom monitoring and anticipation of deterioration may consume cognitive resources that would otherwise be directed toward work. Second, unpredictable functional capacity may complicate scheduling, attendance, and commitment to future duties. Third, visible symptoms may generate concern about public judgment, misunderstanding, or stigma. Fourth, fluctuating limitations may be difficult to communicate without disclosing more health information than the employee wishes to provide. Finally, employees may struggle to reconcile their identity as dependable workers with a condition that is inherently difficult to predict.

Disclosure may create an additional source of uncertainty. Employees may be unsure whether to disclose their diagnosis, whom to approach, how much information to provide, and whether disclosure will result in support or disadvantage. Organizational processes involving privacy, communication, and accommodation can become sources of strain when responsibilities are unclear or responses are delayed (Gignac et al., 2021). These concerns may influence how employees feel about their jobs even when they remain capable of performing their essential duties.

Job-related affective well-being refers in this study to the balance of positive and negative emotions experienced in relation to one's job. The Job-related Affective Well-being Scale captures the frequency of positive and negative job-related emotional experiences during a specified period (Van Katwyk et al., 2000). The construct is therefore narrower than general quality of life, overall mental health, or global job satisfaction. This distinction is important because an employee may report satisfactory general health or life circumstances while still experiencing anxiety, frustration, discouragement, or reduced enthusiasm in relation to work.

Evidence across chronic illnesses generally associates greater illness uncertainty with poorer psychological adjustment. This relationship may vary according to how uncertainty is appraised and the coping resources available to the individual (Skojec et al., 2025). Although this evidence is not specific to employment or UV, it supports the expectation that persistent ambiguity and unpredictability may be negatively associated with job-related affective well-being.

2.3 Workplace Accommodation Availability as a Contextual Job Resource

Workplace accommodations involve modifications to a job, schedule, policy, or working environment that enable an employee to perform essential duties while managing a health condition. Examples may include flexible working hours, remote or hybrid work, additional breaks, protected time for medical appointments, temporary task modification, workload pacing, accessible leave, temperature-sensitive arrangements, and back-up coverage.

Different dimensions of accommodation should be distinguished. Need, awareness, availability, use, helpfulness, refusal, unmet need, timeliness, suitability, and psychological safety are conceptually separate. An accommodation may formally exist but remain inaccessible because an employee is unaware of it, fears negative consequences, or does not meet organizational eligibility requirements. Similarly, an available accommodation may not be suitable for a particular employee's symptoms or occupational duties.

Part 1 of the Workplace Accommodations, Benefits, Policies and Practices Scale (WABPPS) identifies 16 accommodations, policies, or benefits and collects information about need, availability, use, and helpfulness (Hammond et al., 2023). In the present study, the moderator was the number of supports that participants reported as available, producing a possible score from 0 to 16. Higher scores represented a broader range of reported workplace supports.

The cited psychometric evaluation concentrated primarily on the WABPPS need question rather than validating the exact availability-count score used in the present analysis (Hammond et al., 2023). Consequently, the availability count was treated as a formative index of breadth rather than a reflective psychological scale. The items represent different types of workplace support and are not expected to function as interchangeable indicators of a single latent trait. Internal consistency is therefore not interpreted as evidence of the reliability or validity of this index. This measurement limitation requires cautious interpretation of the findings.

Previous research has identified tailored workplace support as important for sustaining employment among people with chronic health conditions (Bosma et al., 2020; Gignac et al., 2018). Work–health management research has also shown that conflict between occupational demands and health-management activities may become an additional source of strain (McGonagle et al., 2020). However, these studies do not validate the availability count as a measure of proactive employer conduct,

accommodation quality, or accommodation effectiveness among employees with UV. They instead provide broader theoretical and occupational context.

Within the JD–R model, job resources are aspects of work that facilitate goal attainment, reduce the costs associated with demands, and support employee development and well-being (Bakker & Demerouti, 2007, 2017; Demerouti et al., 2001). Previous research suggests that job resources may also weaken associations between demanding conditions and adverse occupational outcomes (Bakker et al., 2005). In the present study, illness uncertainty is not treated as a conventional job demand originating directly from workload or job design. Instead, it is conceptualized as a health-related cognitive and emotional demand that employees carry into the workplace.

Accommodation availability may function as a contextual job resource by increasing control and reducing conflicts between health-management needs and occupational responsibilities. Flexible starting times may assist employees who experience severe morning symptoms; remote work may reduce commuting difficulties; recovery breaks may support medication use or symptom management; and back-up coverage may reduce concern that an unpredictable flare will harm coworkers or disrupt essential tasks. A broader range of available accommodations may therefore be positively associated with job-related affective well-being.

Accommodation availability may also modify the association between illness uncertainty and well-being. Employees experiencing similar levels of uncertainty may have different affective experiences depending on the workplace options available to them. When fewer accommodations are available, uncertainty about future symptoms may translate more directly into anxiety about attendance, performance, and job security. When more accommodations are available, employees may have greater flexibility to manage fluctuating capacity. This reasoning supports the proposed moderation relationship while recognizing that availability does not necessarily indicate actual use, suitability, or effectiveness.

2.4 Integrated Conceptual Model

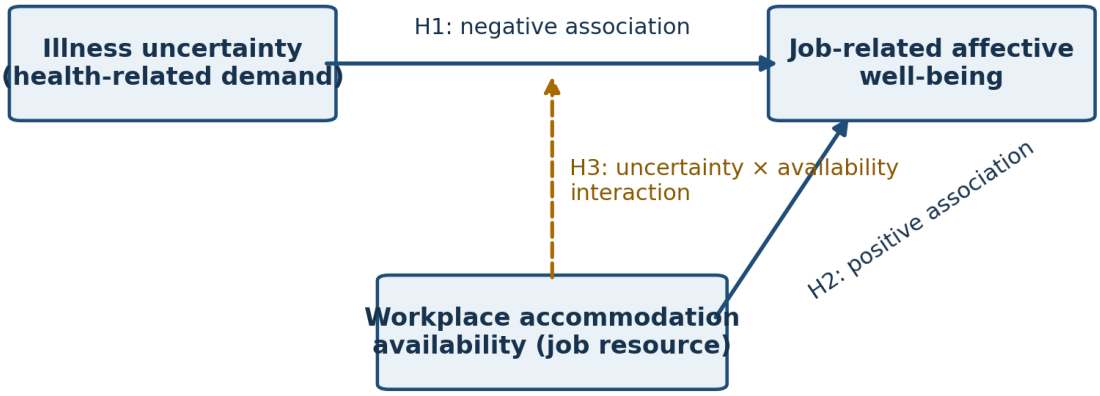
The conceptual model integrates Mishel's Uncertainty in Illness Theory with the JD–R model. Mishel's theory explains how ambiguity, complexity, inconsistency, and unpredictability contribute to illness uncertainty. The JD–R model explains why the association between this health-related demand and job-related affective well-being may vary according to the contextual resources available within the workplace.

The model specifies three relationships. First, illness uncertainty is expected to be negatively associated with job-related affective well-being at the mean level of accommodation availability. Second, accommodation availability is expected to be positively associated with job-related affective well-being at the mean level of illness uncertainty. Third, the illness uncertainty × accommodation availability

interaction is expected to be positive, indicating that the negative uncertainty–well-being association becomes weaker as accommodation availability increases.

The model does not propose that workplace accommodations remove illness uncertainty or replace appropriate clinical care. Instead, accommodation availability is conceptualized as a contextual resource that may alter how strongly uncertainty is associated with employees' affective experiences at work. Furthermore, symptoms, illness uncertainty, and occupational difficulty provide the conceptual background rather than a tested mediation sequence. Because the study is cross-sectional, the model estimates conditional associations and a statistical interaction without establishing temporal order or causal effects.

Figure 1. *Conceptual moderation model*



Note. H3 tests a statistical illness uncertainty x workplace accommodation availability interaction. Arrows represent hypothesized associations, not established causal effects.

3. Method

3.1 Study Design and Setting

This section specifies the protocol modelled in the worked analysis. The proposed empirical study uses a multicentre cross-sectional survey conducted through the dermatology outpatient departments of Khyber Teaching Hospital, Lady Reading Hospital, and Hayatabad Medical Complex in Peshawar, Khyber Pakhtunkhwa, Pakistan. The worked scenario assumes recruitment between 1 January and 30 June 2026. These sites and dates must be confirmed against actual recruitment records before an empirical submission. The design estimates cross-sectional associations and a statistical interaction; it cannot establish temporal order or causality. The empirical report should be accompanied by a completed STROBE checklist for cross-sectional studies (von Elm et al., 2007).

3.2 Participants and Eligibility

Eligible participants were adults aged 18 years or older who had worked for pay under an employer or organizational supervisor for at least 10 hours per week during the preceding month and had held their current job for at least three months. Participants were also required to be able to complete the approved English-language questionnaire. Self-employed individuals without an organizational supervisor were excluded because the workplace-accommodation measure required an identifiable organizational employment context.

Clinical eligibility required a diagnosis of UV documented by a consultant dermatologist, allergist, or rheumatologist and supported by relevant clinical documentation. Biopsy-confirmed status was assigned when a histopathology report from lesional skin documented findings compatible with small-vessel leukocytoclastic vasculitis, including leukocytoclasia and evidence of injury to dermal small vessels. Clinical symptoms without supporting histopathology were not classified as biopsy confirmation.

Specialist-documented cases without biopsy confirmation were retained in the primary analytic sample and identified separately. Individuals with chronic spontaneous or inducible urticaria without documented evidence of vasculitis were excluded. A sensitivity analysis was conducted after restricting the sample to participants with biopsy-confirmed UV.

The date of diagnosis, diagnosing specialty, biopsy status, biopsy date, and available complement results were extracted from the submitted clinical documentation. Complement classification was based on documented C3 and C4 results closest to the time of diagnosis. Participants whose documented C3 and C4 concentrations were within the reporting laboratory's reference ranges were classified as having normocomplementemic UV. Participants with a documented reduction in either C3 or C4 were classified as having hypocomplementemic UV. Subtype was coded as unknown when the required complement results were unavailable. Other complement-related findings, including CH50, C1q, and anti-C1q results, were recorded when available but were not required for the primary subtype classification.

Clinic staff provided study information to potentially eligible patients. Interested individuals accessed a secure online questionnaire independently of their clinical care and employment. The recruitment catchment included employed adults residing or working in Peshawar and patients referred to the participating hospitals from other districts of Khyber Pakhtunkhwa. Participation was voluntary, no employer was informed about an employee's participation or responses, and participants did not receive financial compensation.

Potential duplicate and low-quality submissions were reviewed using a prespecified, non-identifying screening procedure. Possible duplication was flagged when submissions contained identical combinations of recruitment site, diagnosis date, biopsy date, employment characteristics, and response patterns. Low-quality submissions were flagged when completion time was less than one-third of the

sample median, responses showed extensive straight-lining across multi-item measures, eligibility information was internally inconsistent, or impossible values were reported. Flagged submissions were reviewed against the clinical-verification record. An entry was excluded only when the review provided sufficient evidence of duplication, ineligibility, or unusable response quality.

3.3 Sample-Size Calculation

The required sample size was estimated using G*Power 3.1 for the increase in explained variance associated with one tested interaction in a multiple regression model (Faul et al., 2009). The calculation assumed an incremental effect size of $f^2 = .05$, $\alpha = .05$, statistical power of .80, and 12 predictor coefficients in the final model. The 12 coefficients comprised nine covariate coefficients, two centred main-effect coefficients, and one interaction coefficient. The calculation produced a minimum analyzable sample of 160 participants.

Because directly comparable moderation research involving employees with UV was unavailable, $f^2 = .05$ was treated as a planning assumption rather than an effect-size estimate derived from previous UV research. The recruitment target was increased to 190 participants to allow for incomplete questionnaires, ineligible participants, possible duplicates, and low-quality entries. The final complete-case analytic sample comprised 186 participants.

3.4 Measures

Illness Uncertainty

Illness uncertainty was measured using the 23-item Mishel Uncertainty in Illness Scale–Community Form (MUIS-C), developed for non-hospitalized adults living with chronic health conditions (Mishel, 1981, 1997). Participants rated each item on a five-point response scale. Items specified by the instrument developer were reverse-scored before the responses were summed. Possible total scores ranged from 23 to 115, with higher scores indicating greater illness uncertainty.

A MUIS-C score was calculated when a participant had answered at least 19 of the 23 items. After the required reverse scoring, the participant's mean response across the completed items was multiplied by 23 to obtain a prorated total score. Scores were not calculated when fewer than 19 items had been answered. Internal consistency was assessed in the analytic sample using Cronbach's alpha and McDonald's omega total.

Workplace Accommodation Availability

Workplace accommodation availability was assessed using Part 1 of the Workplace Accommodations, Benefits, Policies and Practices Scale (WABPPS; Hammond et al., 2023). Part 1 identifies 16 workplace accommodations, policies, or benefits and records whether each support is needed, available, used, and helpful.

The primary moderator was the number of supports participants reported as available. A "yes" response was coded 1, whereas "no" and "don't know" responses were coded 0 because neither response confirmed that the employee could access the support. Responses were summed to produce an availability count ranging from 0 to 16, with higher scores indicating a broader range of reported workplace accommodation availability. Missing responses were left missing, and an availability score was calculated only when all 16 availability items had been answered.

Accommodation need, use, helpfulness, refusal, and unmet need were summarized separately. Participants were classified as having unmet accommodation needs when they identified at least one needed support that was unavailable, refused, or not implemented. Needs were classified as met when participants reported one or more needed accommodations and no unmet need. Availability was classified as exceeding current need when participants reported that supports were available but did not identify a current unmet accommodation need.

The availability count was treated as a formative index rather than a reflective psychological scale. Its items represented different types of workplace support and were not assumed to be interchangeable indicators of a single latent characteristic. Consequently, internal-consistency coefficients were not interpreted as evidence of the reliability or validity of the availability count.

Job-Related Affective Well-Being

Job-related affective well-being was measured using the 20-item short form of the Job-related Affective Well-being Scale (JAWS; Van Katwyk et al., 2000). Participants indicated how frequently they had experienced each emotion in relation to their jobs during the preceding 30 days. Responses ranged from 1 (*never*) to 5 (*extremely often or always*).

Negatively worded items were reverse-scored before an overall mean was calculated. Possible scores ranged from 1 to 5, with higher values indicating more favourable job-related affective well-being. A score was calculated when at least 16 of the 20 items had been answered. For participants meeting this threshold, the overall score was calculated as the mean of the available items after the required reverse scoring. Scores were not calculated when fewer than 16 items had been completed. Internal consistency was assessed using Cronbach's alpha and McDonald's omega total.

Demographic, Clinical, and Employment Characteristics

Demographic characteristics included age, gender, education, residence, work location, and household financial strain. Employment characteristics included employment sector, occupational group, industry, organization size, supervisory responsibility, full- or part-time employment, weekly working hours, job tenure, and on-site, hybrid, or remote working arrangements.

Clinical characteristics included disease duration, diagnostic delay, diagnosing specialty, biopsy confirmation, complement subtype, recent flare, current symptom severity, systemic symptoms, treatment

burden, and comorbidities. Disease duration was calculated as the interval between the date of specialist-confirmed UV diagnosis and the date of questionnaire completion. Diagnostic delay was calculated as the interval between the participant-reported onset of the first persistent urticarial lesions compatible with UV and the date of specialist-confirmed diagnosis.

A recent flare was defined as a participant-reported new occurrence or worsening of UV-related skin lesions, pain, burning, angioedema, fatigue, joint symptoms, or other systemic symptoms during the preceding four weeks. Current symptom severity was measured using a numerical rating scale ranging from 0 (*no current UV-related symptoms*) to 10 (*the worst UV-related symptoms imaginable*).

3.5 Data Collection and Ethical Safeguards

Under the proposed protocol, the questionnaire would be administered in English through REDCap hosted on an institutionally approved secure server. Before accessing survey questions, participants would view an electronic information sheet explaining the study purpose, eligibility requirements, voluntary nature, confidentiality protections, foreseeable risks, data-management procedures and withdrawal arrangements. Electronic informed consent would be recorded before participation.

Participants would be asked to upload only those pages of clinical documentation required to verify eligibility: the recorded diagnosis, diagnosing specialist, relevant complement findings and the histopathological conclusion when a biopsy had been performed. Instructions would require removal of names, identity numbers, addresses, telephone numbers, hospital registration numbers and other direct identifiers before upload.

Each questionnaire would be assigned a randomly generated study identification number used to link the questionnaire temporarily with the clinical-verification record. The linkage file would be encrypted, access-restricted and stored separately from the analytical dataset. Clinical documentation would be transferred through an approved encrypted portal and would not be retained with the analysis file.

Eligibility documentation would be reviewed independently by a consultant dermatologist and a clinically trained research officer. Each verifier would record whether the documentation supported specialist-documented UV, biopsy-confirmed UV, complement subtype or exclusion. Disagreements would be resolved through documented joint review. Cases remaining insufficiently documented would be classified conservatively or excluded in accordance with the approved protocol.

Uploaded clinical documentation would be retained and deleted according to the period specified in the approved ethics and data-management plan. Only the verification outcome would remain in the analytical dataset. The authorized data controller, access permissions, encryption arrangements, retention periods and deletion log should be documented. Employers would receive no individual responses, clinical documentation or participation information.

3.6 Statistical Analysis

The worked analysis was conducted using R version 4.5.1 with the sandwich, lmtest, interactions and psych packages. The analysis script was finalized on 20 August 2026. An empirical version must report the actual software and package versions and archive the exact script that reproduced the submitted tables and figures. Eligibility, possible duplication, completion time, straight-lining, impossible values, response completeness and missingness should be assessed before inferential analysis.

Continuous variables were summarized using means and standard deviations when approximately symmetrically distributed and medians and interquartile ranges when distributions were skewed. Categorical variables were summarized using frequencies and percentages. Preliminary bivariate associations among continuous study variables were examined using Pearson correlation coefficients.

Item-level missingness ranged from 0% to 3.2%. Scale scores were calculated when at least 80% of the relevant items had been completed, using the scoring procedures described above. The accommodation-availability count required complete responses to all 16 availability items. No variable included in the primary regression model had more than 5% missing data after scoring. Multiple imputation was therefore not undertaken, and the primary complete-case model included 186 participants.

The primary analysis used ordinary least squares regression with HC3 heteroskedasticity-consistent standard errors. HC3 standard errors were used to provide heteroskedasticity-consistent inference and to account more conservatively for leverage in the finite sample. Illness uncertainty and workplace accommodation availability were mean-centred before their interaction term was calculated.

Age, gender, weekly working hours, current symptom severity, disease duration, diagnostic delay, UV subtype, and work arrangement were selected a priori as potential confounding or precision variables. Because UV subtype contained three categories, it was represented by two indicator coefficients. The final covariate block therefore contained nine coefficients.

For the worked model, gender was represented by one indicator contrasting women with respondents in all other categories to avoid estimating a separate coefficient for a three-record cell. In the empirical analysis, gender categories must follow the questionnaire, disclosure-control thresholds and a prespecified analytical rationale; substantively different categories should not be combined solely for convenience. Normocomplementemic UV was the subtype reference category, and work arrangement contrasted hybrid or remote work with on-site work.

Current symptom severity was treated as a potential confounding or precision variable because it could be associated with illness uncertainty and job-related affective well-being. It was not interpreted as a mediator because the cross-sectional design did not establish temporal ordering. Before empirical analysis, the adjustment set should be justified using an explicit causal model, and a sensitivity model

omitting current symptom severity should be reported. All coefficients represent covariate-adjusted cross-sectional associations rather than causal effects.

The final regression model was specified as:

$$Y_i = \beta_0 + \beta_1 U_i + \beta_2 A_i + \beta_3 (U_i \times A_i) + \Sigma_{k=1}^{9} \gamma_k C_{ki} + \varepsilon_i$$

where Y_i represents job-related affective well-being, U_i represents mean-centred illness uncertainty, A_i represents mean-centred workplace accommodation availability, $U_i \times A_i$ represents their interaction, and C_{ki} represents the nine covariate coefficients.

The nine covariate coefficients were entered in Model 1. Mean-centred illness uncertainty and workplace accommodation availability were added in Model 2, and their interaction was added in Model 3. With 186 complete cases, the residual degrees of freedom were 176 for Model 1, 174 for Model 2, and 173 for Model 3.

The interaction was evaluated primarily using its HC3 coefficient test and 95% confidence interval. Ordinary R^2, adjusted R^2 and change in R^2 were reported as measures of model fit. Conventional nested-model F tests were reported separately and were not described as HC3-robust.

The conditional association between illness uncertainty and job-related affective well-being was estimated at one standard deviation below the mean, at the mean, and at one standard deviation above the mean of accommodation availability (Aiken & West, 1991; Hayes, 2022). Attenuation was inferred only when the interaction coefficient and conditional estimates indicated that the negative uncertainty–well-being association became weaker as accommodation availability increased.

Variance inflation factors were examined to assess multicollinearity. Residual-versus-fitted and quantile–quantile plots were inspected to evaluate linearity and residual patterns. Leverage, studentized residuals, and Cook's distance were examined to identify potentially influential observations. Observations were not excluded solely because they exceeded a diagnostic threshold; sensitivity analyses were used to determine whether influential observations materially changed the estimates.

The final moderation model was repeated among the 154 participants with biopsy-confirmed UV. This sensitivity analysis examined whether including specialist-documented non-biopsy cases materially influenced the direction or magnitude of the primary interaction. For the empirical analysis, additional prespecified sensitivity checks should include hospital-site indicator terms, assessment of nonlinear functional forms for disease duration and diagnostic delay, a model excluding current symptom severity, and alternative accommodation scoring that distinguishes 'don't know' from 'no'. If employer identifiers are available and cell sizes permit, dependence among respondents from the same workplace should also be evaluated.

The empirical report should provide the number of missing observations for every important variable, justify complete-case analysis against the observed missingness pattern, and document any imputation or sensitivity analysis. Crude and adjusted coefficients should be presented with 95% confidence intervals.

Procedural safeguards intended to reduce common-method risk included anonymous questionnaire responses, neutral instructions, separation of predictor and outcome sections, different response formats across measures, and assurances that there were no right or wrong answers (Podsakoff et al., 2003). These procedures were not interpreted as eliminating common-method bias, and no statistical test was used to claim that common-method bias was absent.

4. Results

Illustrative-data status: Computationally generated participant-level records.

Worked analytic sample: N = 186

Primary worked analysis: Ordinary least squares moderation with HC3 standard errors

4.1 Recruitment and Participant Characteristics

Of 248 individuals represented in the illustrative recruitment flow, 213 provided electronic consent and 35 did not consent. Among those who consented, 201 completed eligibility screening and 12 did not complete screening. Fifteen screened respondents were excluded: seven lacked acceptable diagnostic confirmation, four had not worked during the preceding month, two were self-employed without an organizational supervisor, and two were duplicate or low-quality entries according to the prespecified screening protocol. The final analytic sample comprised 186 computationally generated records (Figure 2).

Participants had a mean age of 41.8 years (SD = 10.7), and 151 (81.2%) were coded as women. Most worked full time (74.7%); 40.9% worked primarily on site, 32.8% in hybrid arrangements, and 26.3% remotely. Normocomplementemic UV was recorded for 65.1%, hypocomplementemic UV for 23.1%, and subtype was unknown for 11.8%. Median disease duration was 5.2 years (IQR = 3.3-9.2), median diagnostic delay was 10 months (IQR = 4.2-21), and 70.4% were coded as having experienced a flare during the preceding four weeks. Recruitment totals were 68 from Khyber Teaching Hospital, 63 from Lady Reading Hospital, and 55 from Hayatabad Medical Complex.

Figure 2. *Participant flow from survey access to the analytic sample in the worked dataset.*

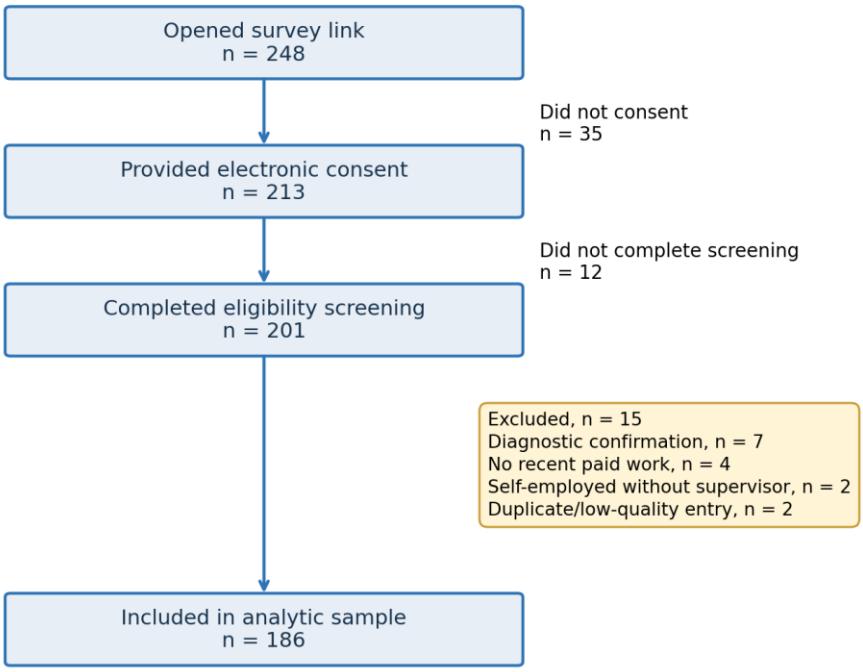


Table 1 ***Participant and study characteristics (N = 186)***

Characteristic	Value
Recruitment setting	Three tertiary hospitals in Peshawar
Recruitment period	1 January-30 June 2026
Survey language/platform	English/REDCap
Khyber Teaching Hospital, n (%)	68 (36.6)
Lady Reading Hospital, n (%)	63 (33.9)
Hayatabad Medical Complex, n (%)	55 (29.6)
Age, years, mean (SD)	41.8 (10.7)
Women, n (%)	151 (81.2)
Other gender categories combined, n (%)	35 (18.8)
Bachelor's degree or higher, n (%)	152 (81.7)
Public-sector employment, n (%)	88 (47.3)
Private-sector employment, n (%)	98 (52.7)
Professional/managerial occupation, n (%)	68 (36.6)

Clerical/administrative occupation, n (%)	49 (26.3)
Service/sales occupation, n (%)	39 (21.0)
Manual/technical occupation, n (%)	30 (16.1)
Weekly work hours, mean (SD)	39.6 (8.7)
Job tenure, years, median (IQR)	4.2 (2.4-8.2)
Supervisory responsibility, n (%)	54 (29.0)
Full-time employment, n (%)	139 (74.7)
Part-time employment, n (%)	47 (25.3)
Primarily on-site work, n (%)	76 (40.9)
Hybrid work, n (%)	61 (32.8)
Remote work, n (%)	49 (26.3)
Normocomplementemic UV, n (%)	121 (65.1)
Hypocomplementemic UV, n (%)	43 (23.1)
Subtype unknown, n (%)	22 (11.8)
Disease duration, years, median (IQR)	5.2 (3.3-9.2)
Diagnostic delay, months, median (IQR)	10 (4.2-21)
Biopsy-confirmed diagnosis, n (%)	154 (82.8)
Flare in preceding four weeks, n (%)	131 (70.4)
Current symptom severity, mean (SD), 0-10	5.9 (2.2)
Accommodation needs unmet, n (%)	72 (38.7)
Accommodation needs met, n (%)	88 (47.3)
Availability exceeded current need, n (%)	26 (14.0)

Note. All values are illustrative and computationally generated. UV = urticarial vasculitis; SD = standard deviation; IQR = interquartile range. Small gender cells were combined for disclosure protection. An empirical table should additionally report verified residence and work-location distributions and the number missing for each characteristic.

4.2 Descriptive Statistics, Reliability, and Correlations

The mean MUIS-C total was 72.0 (SD = 13.0), the mean JAWS composite was 3.17 (SD = 0.52), and the mean accommodation-availability count was 7.38 (SD = 2.78) of 16. Internal consistency was high for the MUIS-C (Cronbach's alpha = 0.91; omega total = 0.91) and acceptable to high for the JAWS (Cronbach's alpha = 0.87; omega total = 0.87). Reliability coefficients were calculated among records with complete item sets (MUIS-C n = 153; JAWS n = 143); composite scores were available for all 186 records under the 80% completeness rule.

Illness uncertainty was negatively correlated with job-related affective well-being ($r = -0.55$, $p < .001$) and positively correlated with current symptom severity ($r = 0.53$, $p < .001$). Accommodation availability was positively correlated with job-related affective well-being ($r = 0.31$, $p < .001$). Its correlation with current symptom severity was not statistically significant ($r = -0.08$, $p = 0.261$). All correlations reported in Table 2 are Pearson product-moment correlations.

Table 2 ***Descriptive statistics and Pearson correlations***

Variable	M	SD	1	2	3	4
1. Illness uncertainty	72.0	13.0	-			
2. Accommodation availability	7.38	2.78	-.15*	-		
3. Job-related affective well-being	3.17	0.52	-.55***	.31***	-	
4. Current symptom severity	5.9	2.2	.53***	-.08	-.33***	-

Note. N = 186. *p < .05. **p < .01. ***p < .001 (two-tailed).

4.3 Hypothesis Testing

Model 1 contained nine covariate coefficients and explained 14.0% of the variance in job-related affective well-being, $R^2 = 0.140$, adjusted $R^2 = 0.096$, $F(9, 176) = 3.19$, $p = .001$. Adding centered illness uncertainty and accommodation availability in Model 2 increased R^2 to 0.379, $\Delta R^2 = 0.239$, $\Delta F(2, 174) = 33.41$, $p < .001$.

In Model 3, the estimated illness-uncertainty coefficient at mean accommodation availability was $b = -0.0189$, HC3 SE = 0.0030, 95% CI [-0.0248, -0.0131], $p < .001$. The coefficient was negative, supporting H1. At mean illness uncertainty, the accommodation-availability coefficient was $b = 0.0416$, HC3 SE = 0.0124, 95% CI [0.0171, 0.0662], $p < .001$. The coefficient was positive, supporting H2.

The illness uncertainty-by-accommodation availability coefficient was positive but not statistically significant, $b = 0.0007$, HC3 SE = 0.0011, 95% CI [-0.0014, 0.0027], $p = .541$. Adding the interaction increased ordinary R^2 from 0.379 to 0.381, $\Delta R^2 = 0.002$, $\Delta F(1, 173) = 0.53$, $p = .466$. The final adjusted R^2 was 0.338. Thus, the worked analysis did not support H3. The HC3 coefficient test was the primary inferential test; the conventional R^2-change test is reported separately.

Table 3 ***Hierarchical regression model summary***

Model	Predictors	R^2	Adjusted R^2	ΔR^2	Conventional change test
1	Nine covariate coefficients	0.140	0.096	-	$F(9, 176) = 3.19$, $p = .001$
2	+ uncertainty and availability	0.379	0.340	0.239	Delta $F(2, 174) = 33.41$, $p < .001$

3	+ interaction	0.381	0.338	0.002	ΔF(1, 173) = 0.53, p = .466

Note. Conventional F tests are not HC3-robust. The coefficient tests in Table 4 use HC3 heteroskedasticity-consistent standard errors.

Table 4 ***Final moderation model predicting job-related affective well-being***

Predictor	b	HC3 SE	Std. β	p	95% CI
Intercept	3.3788	0.2514	-	< .001	[2.8825, 3.8751]
Age	-0.0059	0.0033	-.121	.074	[-0.0123, 0.0006]
Woman (vs. all other categories; worked coding)	0.0446	0.0887	.034	.616	[-0.1304, 0.2196]
Weekly work hours	0.0020	0.0036	.033	.581	[-0.0051, 0.0090]
Current symptom severity	-0.0163	0.0179	-.069	.365	[-0.0516, 0.0191]
Disease duration	-0.0014	0.0055	-.016	.793	[-0.0123, 0.0094]
Diagnostic delay	0.0003	0.0019	.011	.864	[-0.0034, 0.0040]
Hypocomplementemic subtype (vs. normocomplementemic)	0.0008	0.0752	.001	.991	[-0.1476, 0.1493]
Unknown subtype (vs. normocomplementemic)	0.0995	0.1123	.062	.377	[-0.1222, 0.3212]
Hybrid/remote work (vs. on-site)	0.0260	0.0661	.025	.695	[-0.1045, 0.1565]
Illness uncertainty (centered)	-0.0189	0.0030	-.477	< .001	[-0.0248, -0.0131]
Accommodation availability (centered)	0.0416	0.0124	.224	< .001	[0.0171, 0.0662]
Uncertainty × availability	0.0007	0.0011	.045	.541	[-0.0014, 0.0027]

Note. N = 186. Outcome range = 1-5. Normocomplementemic subtype and on-site work are the reference categories. Standardized coefficients were calculated as b × SD(X)/SD(Y); the intercept was not standardized.

4.4 Probing the Interaction

At low accommodation availability (one SD below the mean; score = 4.6), the conditional illness-uncertainty slope was b = -0.0207, HC3 SE = 0.0040, 95% CI [-0.0287, -0.0128], p < .001. At mean availability (score = 7.4), the slope was b = -0.0189, HC3 SE = 0.0030, 95% CI [-0.0248, -0.0131], p < .001. At high availability (one SD above the mean; score = 10.2), the slope was b = -0.0171, HC3 SE = 0.0043, 95% CI [-0.0257, -0.0086], p < .001.

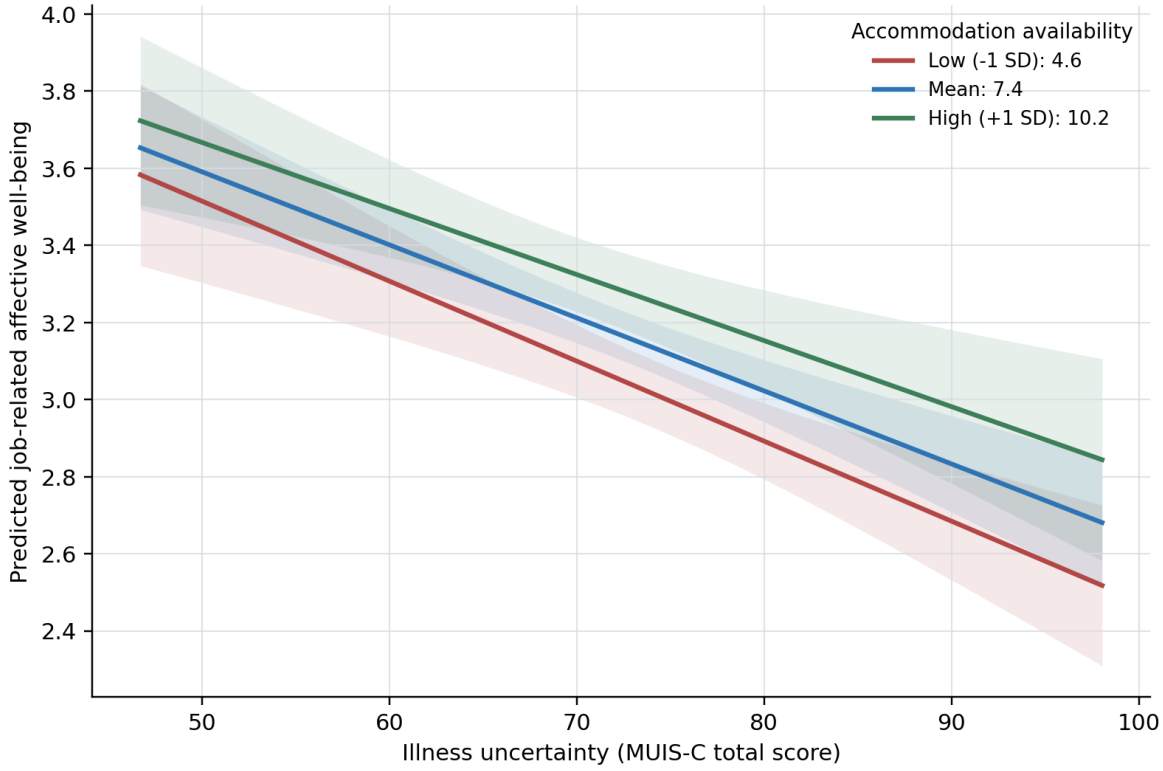
The estimated slope was slightly less negative at higher accommodation availability, but the interaction coefficient was nonsignificant and its confidence interval included zero. Accordingly, the conditional-slope pattern should not be interpreted as evidence that accommodation availability moderated the illness uncertainty-well-being association in the worked dataset.

Table 5 ***Conditional association of illness uncertainty with job-related affective well-being***

Availability level	Score	Slope (b)	HC3 SE	p	95% CI
Low (-1 SD)	4.6	-0.0207	0.0040	< .001	[-0.0287, -0.0128]
Mean	7.4	-0.0189	0.0030	< .001	[-0.0248, -0.0131]
High (+1 SD)	10.2	-0.0171	0.0043	< .001	[-0.0257, -0.0086]

Note. Intervals are HC3 model-based confidence intervals from the final moderation model.

Figure 3. *Model-implied association between illness uncertainty and job-related affective well-being at low, mean and high accommodation availability. Shaded regions represent 95% HC3 confidence bands; other covariates are held at their worked-sample means.*



4.5 Sensitivity Analysis Restricted to Biopsy-Confirmed Cases

The final moderation model was repeated among the 154 synthetic records coded as biopsy-confirmed UV. Illness uncertainty remained negatively associated with job-related affective well-being, b = -0.0195, HC3 SE = 0.0033, 95% CI [-0.0260, -0.0130], p < .001, and accommodation availability remained positively associated with well-being, b = 0.0441, HC3 SE = 0.0137, 95% CI [0.0170, 0.0711], p = .002.

The interaction remained small and nonsignificant, b = 0.0003, HC3 SE = 0.0012, 95% CI [-0.0022, 0.0027], p = .830.

The biopsy-confirmed model explained 37.0% of outcome variance, $R^2 = 0.370$, adjusted $R^2 = 0.317$. Adding the interaction explained less than 0.1% additional variance, $\Delta R^2 = 0.000$, $\Delta F(1, 141) = 0.06$, p = .802. The result was consistent with the primary analysis: the two main associations remained, but H3 was not supported.

Table 6 ***Biopsy-confirmed sensitivity analysis and conditional slopes (n = 154)***

Estimate	Availability score	b	HC3 SE	p	95% CI
Illness uncertainty main effect	-	-0.0195	0.0033	< .001	[-0.0260, -0.0130]
Accommodation availability main effect	-	0.0441	0.0137	.002	[0.0170, 0.0711]
Uncertainty × availability	-	0.0003	0.0012	.830	[-0.0022, 0.0027]
Conditional slope: low availability	4.6	-0.0203	0.0045	< .001	[-0.0292, -0.0113]
Conditional slope: mean availability	7.4	-0.0195	0.0033	< .001	[-0.0260, -0.0130]
Conditional slope: high availability	10.2	-0.0188	0.0050	< .001	[-0.0287, -0.0089]

Note. The same covariates and full-sample centering constants were retained in the sensitivity analysis.

4.6 Model Diagnostics and Summary of Hypotheses

Multicollinearity was not evident; the maximum variance inflation factor was 1.50. No observation had a Cook's distance of 1 or greater, and the maximum Cook's distance was 0.057. The maximum leverage value was 0.230. A Breusch-Pagan diagnostic did not indicate heteroskedasticity, $\chi^2(12) = 8.27$, p = .763; nevertheless, HC3 standard errors were retained as prespecified.

Overall, H1 and H2 were supported in the worked analysis: illness uncertainty was negatively associated with job-related affective well-being, and accommodation availability was positively associated with well-being. H3 was not supported because the uncertainty-by-availability interaction was nonsignificant. These results illustrate statistical reporting only and do not establish findings about actual employees with UV.

Table 7 ***Summary of hypothesis tests***

Hypothesis	Prediction	Conclusion	Key estimate
H1	Negative illness uncertainty association at mean availability	Supported	b = -0.0189, p < .001
H2	Positive accommodation availability association at mean uncertainty	Supported	b = 0.0416, p < .001
H3	Positive uncertainty × availability interaction	Not supported	b = 0.0007, p = .541

Note. Support refers only to the direction and statistical significance of associations in the worked dataset; it does not imply causal confirmation or empirical evidence from actual participants.

5. Discussion

Within the computationally generated dataset, the analysis identified two statistically significant conditional main associations but did not provide evidence of moderation. At mean workplace accommodation availability, greater illness uncertainty was associated with poorer job-related affective well-being (b = −0.0189, HC3 SE = 0.0030, 95% CI [−0.0248, −0.0131], p < .001). At mean illness uncertainty, broader reported accommodation availability was associated with better job-related affective well-being (b = 0.0416, HC3 SE = 0.0124, 95% CI [0.0171, 0.0662], p < .001). The interaction was nonsignificant (b = 0.0007, HC3 SE = 0.0011, 95% CI [−0.0014, 0.0027], p = .541). Thus, the worked results were consistent with H1 and H2 but not H3. They demonstrate interpretation of the proposed model and are not empirical findings about employees with UV.

The negative association between illness uncertainty and job-related affective well-being is theoretically plausible in the context of urticarial vasculitis (UV). Employees living with UV may need to interpret symptoms whose timing, duration, severity, and functional implications are difficult to predict. A visible skin flare may remain manageable or may occur alongside fatigue, joint pain, angioedema, sleep disruption, treatment effects, or systemic manifestations. Employees may also be uncertain about whether treatment will control their symptoms, how long any improvement will last, and whether treatment-related adverse effects will interfere with their ability to work. Such uncertainty may consume attention, complicate task planning, and increase concerns about attendance, performance, disclosure, and continued employment.

Mishel's Uncertainty in Illness Theory proposes that uncertainty develops when illness-related events are ambiguous, complex, inconsistent, or unpredictable and cannot be assigned a definite meaning (Mishel, 1988, 1990). The negative association identified in this analysis is consistent with this theoretical account. It is also compatible with broader evidence linking greater illness uncertainty with poorer psychological

adjustment among people living with chronic illnesses (Skojec et al., 2025). Although that literature is not specific to UV or paid employment, the present analysis extends the application of illness-uncertainty theory to emotions experienced in relation to work. Nevertheless, this association does not demonstrate that illness uncertainty caused poorer affective well-being. Poorer job-related affect may also influence employees' perceptions of their symptoms, work capacity, and illness uncertainty.

The positive association between accommodation availability and job-related affective well-being is consistent with evidence that workplace context influences how chronic health conditions are experienced at work (Bosma et al., 2020; Gignac et al., 2018). Within the JD–R framework, workplace resources may facilitate goal attainment, reduce avoidable demands, and support employee well-being (Bakker & Demerouti, 2007, 2017). Flexible scheduling, remote or hybrid work, additional recovery breaks, protected appointment time, temporary task modification, workload pacing, and back-up coverage may give employees greater control over how they manage fluctuating health needs while continuing to perform their occupational duties.

The association between accommodation availability and well-being must nonetheless be interpreted cautiously. The WABPPS-derived measure captured the number of accommodations, policies, and benefits reported as available rather than their actual quality or effectiveness. A higher availability count does not establish that an accommodation was needed, requested, used, appropriately designed, provided promptly, or experienced as helpful. It also does not establish that employees could use available arrangements without stigma, interpersonal conflict, or adverse career consequences. The positive coefficient should therefore not be interpreted as evidence that employers acted proactively or that any particular accommodation improved employee well-being.

The interaction constituted the worked analysis's central statistical test, but it was not statistically significant. Although the estimated illness-uncertainty slope became descriptively less negative as accommodation availability increased, the coefficient was small and its confidence interval included zero. Adding the interaction explained only 0.2% additional outcome variance, and the conventional change test was nonsignificant ($\Delta R^2 = .002$, $\Delta F(1, 173) = 0.53$, $p = .466$). The worked analysis therefore provides no statistical illustration of a buffering effect.

The conditional slopes require similarly careful interpretation. Illness uncertainty was negatively associated with well-being at low, mean, and high levels of accommodation availability. At low availability, the conditional coefficient was −0.0207; at mean availability, it was −0.0189; and at high availability, it was −0.0171. All three conditional slopes were statistically significant. However, the statistical significance of the individual slopes does not demonstrate that the slopes differed significantly from one another. That question is addressed by the interaction test, which was nonsignificant.

Consequently, the descriptively smaller negative coefficient at higher availability should not be presented as evidence of a statistically supported buffering effect.

The absence of a significant interaction does not necessarily mean that workplace context is unimportant. The availability count may have been too broad to capture the workplace resources required to manage illness uncertainty. Some accommodations may have been nominally available but unsuitable for an employee's symptoms, occupation, or organizational setting. Availability may also be less influential than timeliness, supervisor support, procedural clarity, accommodation fit, or psychological safety. In addition, statistical power and the observed range of accommodation availability may have limited the ability to identify a small interaction. These possibilities require further investigation and should not be treated as explanations established by the present analysis.

In the illustrative biopsy-confirmed sensitivity analysis, the two conditional main associations remained statistically significant. Among 154 records coded as biopsy-confirmed, illness uncertainty remained negatively associated with job-related affective well-being ($b = -0.0195$, HC3 SE = 0.0033, 95% CI [−0.0260, −0.0130], $p < .001$), and accommodation availability remained positively associated with well-being ($b = 0.0441$, HC3 SE = 0.0137, 95% CI [0.0170, 0.0711], $p = .002$). The interaction remained nonsignificant ($b = 0.0003$, HC3 SE = 0.0012, 95% CI [−0.0022, 0.0027], $p = .830$).

Even at high accommodation availability, illness uncertainty retained a statistically significant negative association with job-related affective well-being. Workplace arrangements cannot replace accurate diagnosis, coordinated clinical care, symptom control, or psychological support. Accommodation availability should therefore be understood as a potentially relevant contextual resource within a wider health and employment system rather than as medical treatment or a proven intervention for reducing the consequences of illness uncertainty.

5.1 Theoretical Implications

The worked analysis illustrates how illness-uncertainty theory may be extended into paid employment and how JD–R reasoning may be applied to a chronic-illness-related cognitive and emotional demand. In the generated dataset, illness uncertainty and accommodation availability operated as separate correlates of job-related affective well-being. Whether this pattern occurs in the target population must be determined from empirical data.

However, the hypothesized moderating effect was not supported. The findings therefore do not confirm the JD–R buffering proposition in this context. Accommodation availability was positively associated with job-related affective well-being, but it did not significantly alter the strength of the uncertainty–well-being association. This distinction is theoretically important because a resource can have a positive association with an outcome without necessarily buffering the consequences of a particular demand.

The null interaction may also suggest that the breadth of available accommodations is insufficient for explaining how workplace resources affect employees experiencing illness uncertainty. The suitability, accessibility, timing, and psychological safety of accommodations may be more important than their number. Future theoretical models should therefore distinguish general availability from the processes through which workplace support becomes usable and beneficial.

The analysis also reinforces the conceptual distinction between accommodation availability and employer proactivity. The WABPPS-derived availability count provides an index of the number of supports employees reported as available. It does not assess whether employers anticipated employees' needs, initiated support, responded promptly, individualized arrangements, or created psychologically safe conditions for their use. Future measurement should distinguish awareness, need, availability, use, helpfulness, refusal, unmet need, timeliness, suitability, and psychological safety. These dimensions should also be culturally evaluated among employees with UV in Pakistan.

5.2 Practical Implications

Although accommodation availability was positively associated with job-related affective well-being in the worked dataset, the analysis did not establish that accommodations reduced the negative uncertainty–well-being association. The following practical points should therefore be presented as considerations derived from theory and prior literature, not as interventions proven by the illustrative results.

Employers may consider establishing predictable procedures for responding to fluctuating health needs. Potential arrangements include flexible starting and finishing times, remote or hybrid work where occupational duties permit, additional recovery breaks, workload pacing, protected time for medical appointments, temporary task modification, temperature-sensitive arrangements, and back-up coverage. The suitability of each arrangement will depend on the employee's functional needs, job responsibilities, organizational setting, and preferences.

Managers may also benefit from guidance on privacy-respecting communication. Employees should be able to describe relevant functional limitations without repeatedly disclosing unnecessary clinical information. A named organizational contact, a straightforward request-and-review procedure, clear response timeframes, and periodic reassessment may make accommodation processes more predictable for employees and supervisors. Because UV is uncommon, concise clinical documentation may help employers understand symptom variability and likely functional effects without making unsupported predictions about an employee's future capacity.

Clinicians caring for working-age patients should consider asking about employment alongside clinical symptoms. Questions concerning attendance, presenteeism, commuting, concentration, temperature exposure, prolonged standing, visible symptoms, medication effects, and difficulties completing fixed shifts may help identify threats to continued employment. Where appropriate and available, patients may

benefit from referral to occupational-health, vocational-rehabilitation, or social-work services. Clinical documentation should describe functional needs clearly while respecting patients' preferences concerning diagnostic disclosure.

5.3 Strengths and Limitations

The proposed design has several methodological strengths. It focuses on an under-researched rare condition, integrates clinical and occupational theories, distinguishes illness uncertainty from current symptom severity, uses established measurement instruments, incorporates diagnostic documentation, reports HC3 standard errors and confidence intervals, and includes a biopsy-confirmed sensitivity analysis. These are features of the proposed protocol, not evidence that the procedures have already been completed.

Several limitations require careful consideration. Most importantly, the results used in this were generated from a synthetic dataset. They demonstrate the proposed analytical and reporting procedures but do not constitute empirical evidence concerning employees with UV. No substantive clinical, occupational, or policy conclusions can be based on these synthetic observations. The analyses must be repeated using the genuine participant-level dataset before the manuscript can be submitted as an empirical study.

Beyond the synthetic nature of the dataset, the proposed cross-sectional design would not establish that illness uncertainty causes poorer well-being or that accommodation availability causes better well-being. Employees with better affective well-being may perceive their workplaces more positively, while supportive organizations may be more likely to retain employees who can continue working. Longitudinal or intervention research would be required to establish temporal ordering and investigate potential causal mechanisms.

All substantive variables were measured using self-report responses collected in a single survey. This creates a risk of common-method bias despite the reported procedural safeguards. Recruitment through tertiary-hospital clinics may also overrepresent individuals who are engaged with specialist care, have internet access, or experience greater disease burden. The denominator of all potentially eligible clinic patients was not available in the recruitment scenario, limiting the assessment of participation and nonresponse bias.

Requiring current employment introduces healthy-worker and survivor biases because individuals who substantially reduced their working hours, changed occupations, or left employment because of UV were excluded. Recruitment was restricted to hospitals in Peshawar, although the proposed catchment included patients from other districts of Khyber Pakhtunkhwa. Generalizability to other regions, healthcare systems, rural populations, informal-sector workers, and people outside paid organizational employment would therefore be limited.

The English-language online questionnaire may have disproportionately selected highly educated and formally employed participants while underrepresenting workers with limited English-language or digital literacy. In the sample, 81.7% of participants had at least a bachelor's degree. This proportion should be interpreted as evidence of sample selection rather than as representative of all employees living with UV in the region.

The accommodation-availability count measured breadth rather than the quality, timing, suitability, use, or stigma associated with workplace support. Its exact scoring approach has limited direct psychometric validation. In addition, the MUIS-C, JAWS, and WABPPS were not developed specifically for UV and were not culturally validated for the proposed population in Pakistan. These measurement limitations may have affected the meaning and precision of the estimated associations.

Complement results were unavailable for some participants, and specialist-documented cases without biopsy confirmation may be vulnerable to diagnostic misclassification. Possible dependence among participants recruited from the same hospital or employed in the same workplace was not explicitly modelled. Residual confounding, reverse causation, small categorical cells, healthy-worker selection, and limited precision for smaller interaction effects further constrain interpretation. Coefficient estimates and confidence intervals should therefore receive greater emphasis than isolated *p*-values.

5.4 Future Research

Future studies should follow employees over time to determine whether changes in symptoms, illness uncertainty, and workplace accommodations precede subsequent changes in job-related affective well-being, absence, presenteeism, and job retention. Repeated-measures or diary designs could capture daily fluctuations and distinguish within-person effects of symptom flares from stable differences between employees.

Qualitative interviews could examine how employees define proactive and psychologically safe workplace support, which accommodations fit particular symptom patterns, and why apparently available arrangements may remain unused. Intervention studies could evaluate manager training, pre-agreed flare-management plans, occupational-health navigation, structured accommodation-review procedures, and specific accommodation packages.

Future research should also include individuals who reduced their working hours, entered informal employment, changed occupations, or left work because of UV. Current-worker samples cannot represent the full occupational burden of the condition. Larger multicentre studies using culturally validated measures and participants from different regions, employment sectors, educational backgrounds, and linguistic groups would improve generalizability and provide greater precision for detecting potentially small interaction effects.

6. Conclusion

This worked moderation analysis demonstrates how a proposed multicentre cross-sectional study could examine illness uncertainty, workplace accommodation availability and job-related affective well-being among employed adults with specialist-documented urticarial vasculitis. In the computationally generated dataset, illness uncertainty was negatively associated with well-being at mean accommodation availability, while accommodation availability was positively associated with well-being at mean uncertainty. These illustrative associations were consistent with H1 and H2.

The illness uncertainty × workplace accommodation availability interaction was not statistically significant in the worked dataset. H3 was therefore not supported, and the conditional slopes should not be interpreted as evidence of a buffering effect. The biopsy-restricted worked analysis produced the same overall pattern: the two conditional main associations remained significant, whereas the interaction remained nonsignificant.

Accordingly, the demonstrates cautious reporting of conditional associations and a null interaction; it does not establish facts about employees with UV. A final empirical manuscript must replace the full recruitment flow, participant characteristics, reliability estimates, correlations, regression coefficients, figures and conclusions with results reproduced from the dataset. Even then, the cross-sectional design will not establish temporal order or causality. Longitudinal, qualitative and intervention research would be needed to determine whether the suitability, accessibility, timing, use and psychological safety of workplace accommodations influence occupational well-being and continued employment.

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