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Original Article

Institutional Health Mapping among Teaching and Non-Teaching Staff: A Cross-Sectional Study Assessing Lifestyle, Workplace Factors, and Health Risks

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ABSTRACT

Background: Non-Communicable Diseases (NCDs) are increasingly driven by lifestyle and occupational factors, particularly in academic environments where staff experience varying workloads, sedentary patterns, and role-specific stressors. Systematic health mapping can help identify early risk indicators and guide preventive interventions. **Objectives:** To map the health status of teaching and non-teaching staff using a multidimensional health-mapping tool and to analyse the relationship between lifestyle behaviours, workplace characteristics and overall health-risk levels. **Materials and Methods:** A cross-sectional health-mapping study was conducted among 104 staff members of an academic institution. A structured questionnaire assessed lifestyle behaviours, hydration patterns, sleep, physical activity, symptoms, medication practices and perceived institutional support. Basic vitals (BMI, blood pressure and random blood glucose) were recorded. Participants were categorised into low, moderate and high health-risk groups. Chi-square tests and logistic regression were used to examine associations and identify predictors of elevated risk. **Results:** Short sleep duration, inadequate water intake, physical inactivity and irregular meal timings were significantly associated with moderate and high-risk categories. Musculoskeletal discomfort, persistent tiredness and the perception that work negatively affects health were more common among higher-risk groups. Elevated BMI showed notable clustering in higher-risk participants, while blood pressure and glucose trends indicated early metabolic changes. Logistic regression identified physical inactivity, short sleep and overweight status as independent predictors of elevated risk. **Conclusion:** Modifiable lifestyle behaviours and workplace-related factors play a decisive role in determining health-risk status among academic staff. Structured health mapping offers a practical, preventive approach for institutions to design targeted wellness initiatives.

Keywords: Academic staff, Cross-sectional study, Health mapping, Lifestyle risk factors, non-communicable diseases, Occupational health, Workplace wellness.

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INTRODUCTION

Non-Communicable Diseases (NCDs) have emerged as a dominant global health challenge, accounting for the vast majority of morbidity and mortality across both Low- and Middle-Income Countries (LMICs) and high-income nations. The World Health Organisation estimates that behavioural risk factors, such as physical inactivity, unhealthy diet, tobacco and alcohol use, lead to metabolic changes including raised blood pressure, increased adiposity, hyperglycaemia, and dyslipidaemia, which in turn substantially elevate the risk for cardiovascular disease, diabetes, and other chronic illnesses (World Health Organization, 2018). Beyond individual behaviours, the modern work environment significantly contributes to NCD risk: prolonged sedentary time, high job stress, unhealthy eating, disrupted sleep, and poor hydration habits are increasingly recognised as critical determinants of chronic disease (Soni and Soni, 2017; Banerjee *et al.*, 2023). Indeed, lifestyle factors such as inadequate sleep, suboptimal hydration, irregular meals, chronic psychological stress, and insufficient physical activity, together with preexisting chronic illness, have been consistently identified as predictors of adverse long-term health outcomes (Soni and Soni, 2017; Banerjee *et al.*, 2023; Sengupta *et al.*, 2025).

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In academic institutions, occupational health risks take on particular importance due to the dual nature of the workforce: teaching staff and non-teaching staff. Teaching professionals often spend extended hours seated, facing computer screens, preparing lectures, and grading, which can contribute to musculoskeletal strain, posture-related complaints, and mental fatigue. Empirical studies among university lecturers in Ghana have shown significant associations between job stress and elevated blood pressure, suggesting that occupational stress may fuel the development of hypertension among this group (Brenyah *et al*., 2023). On the other hand, non-teaching staff, including administrative personnel and support staff- may engage in physically demanding work, have irregular working schedules, and often operate with limited health literacy or access to preventive services. Despite their differing roles, both subpopulations are vulnerable to lifestyle- and work-related health risks, yet their needs are not homogeneous. Alarmingly, many higher education institutions lack systematic health surveillance mechanisms to monitor and address these risks across staff categories. In the Indian context, especially, the literature remains sparse: very few studies have conducted structured, comparative evaluations of health status among teaching versus non-teaching university employees, leaving a critical gap in occupational health policy and preventive strategies (Ahmad, 2015; Sogi *et al*., 2018; Singh and Singh, 2018).

One promising approach to addressing this gap is health mapping, which refers to the systematic collection and analysis of multi-dimensional health parameters across a defined population. Unlike traditional screening that focuses on single parameters (e.g., blood pressure), health mapping draws a more holistic picture by integrating self-reported lifestyle behaviours, symptom burden, medication usage, access to health services, and physiological measures. This multidomain approach can unmask asymptomatic risk clusters, staff who may not yet manifest overt disease but are on a trajectory toward higher health risk. By stratifying employees according to risk via a structured scoring matrix, institutions can design and deploy targeted interventions: for example, installing hydration stations, improving ergonomic furniture, organising regular health screening camps, or offering stress-reduction workshops. Moreover, when such a health mapping process is led by students (for instance, pharmacy or public health students), it not only reduces cost but also fosters a culture of preventive healthcare and interprofessional learning. To date, there is limited evidence of prior studies, especially in Indian academic settings, using a structured, multi-domain risk-scoring health-mapping tool across both teaching and non-teaching staff, underscoring the novelty and practical importance of such an initiative.

The rationale for the present study stems from the characteristics of our institution, which comprises a diverse workforce, including faculty, administrative staff, maintenance personnel, and support services. Preliminary discussions and pilot observations revealed recurring issues: many staff members reported poor sleep hygiene, inadequate hydration, high levels of stress, chronic musculoskeletal discomfort, and prolonged working hours. These anecdotal observations, however, lacked empirical validation. Recognising the need for objective data, we developed a comprehensive questionnaire to assess lifestyle behaviours (sleep, diet, hydration, physical activity), symptom burden (pain, stress), medication behaviour, access to health services, and vital signs. We also devised a risk-scoring matrix to classify participants into risk categories. For analytical rigour, we applied statistical methods including chi-square tests and logistic regression to examine associations between occupational role (teaching vs. non-teaching), workplace/lifestyle factors, and health-risk levels. This dual-pronged approach, quantitative mapping plus statistical modelling, allows us to identify significant predictors of high-risk status and generate actionable insights for institutional health policy.

This study aimed to map the health status of teaching and non-teaching staff in an academic institution using a structured health mapping tool, and to analyse the relationships between lifestyle factors, workplace characteristics, and overall health risk levels. We anticipate that our findings will inform the development of institutional wellness policies, guide targeted interventions (such as ergonomic modifications, hydration and rest infrastructure, stress-management programs), and contribute to a long-term preventive health strategy tailored to the specific needs of teaching and non-teaching employees. Ultimately, this study aspires not only to promote a healthier, more resilient workforce within our institution but also to serve as a replicable model for other academic establishments seeking to institutionalise preventive health frameworks.

Unlike conventional workplace screening approaches that rely on isolated clinical measurements, health mapping integrates behavioural, occupational, and early physiological indicators to identify emerging risk patterns before overt disease develops.

MATERIALS AND METHODS

Study Design and Setting

This study adopted a cross-sectional observational design to conduct institutional health mapping among employees of an academic institution in Guntur District of Andhra Pradesh, India. The study was carried out during a structured community health and practice-based training program for B. Pharmacy students, following a standardised protocol. Data collection took place over four weeks within the institutional premises during working hours.

Study Population and Sample Size

A total of 104 staff members were included using a complete enumeration approach. Participants represented two major categories:

- **Teaching staff:** professors, associate professors, and lecturers.
- **Non-teaching staff:** administrative personnel, office staff, laboratory technicians, housekeeping and sanitation workers, hostel staff, drivers, security personnel, and canteen/mess staff.

Inclusion Criteria

- Employees aged ≥18 years.
- Currently employed teaching or non-teaching staff.
- Provided verbal informed consent.

Exclusion Criteria

- Unavailable during data collection.
- Declined participation.
- Incomplete or inconsistent responses.

Ethical Considerations

The study adhered to institutional ethical guidelines and ensured voluntary participation, anonymity, and confidentiality. Because no identifiable personal data, invasive procedures, or biological samples were collected, the study did not require formal ethical board approval under institutional policy. Consent was recorded verbally before questionnaire administration.

Data Collection Tool

A structured, pre-validated health mapping questionnaire was used. The tool was designed based on occupational health literature and institutional wellness priorities. It comprised six sections:

Demographics

Age, gender, marital status, job role, employment type, department, years of service.

Work Pattern and Lifestyle

Work nature, daily work hours, sleep duration, sleep quality, hydration, meal timing, physical activity, tobacco/alcohol use.

Health and Symptoms

Fatigue, chronic pain, breathlessness/chest discomfort, diagnosed chronic diseases, self-rated stress.

Health Behaviours

Regular medication use, prescriber type, medication adherence, self-medication, awareness of government health schemes, and last BP/glucose check.

Access to Health Services

Prior health camp attendance, emergency service awareness, perception of institutional health support, preferred wellness initiatives.

Clinical Vitals

- Blood pressure, random blood glucose, weight, height, BMI.
- The questionnaire was administered in English or Telugu based on participant preference.

Data Collection Procedure

Data were collected through face-to-face interviews conducted by trained student teams. Before initiation, students received formal training in:

- Interview technique and questionnaire administration.
- Standardised measurement of blood pressure, random blood glucose, height, and weight.

Ethical conduct, confidentiality, and neutral data handling

Participants were approached at their workplaces during non-disruptive intervals. Each interview lasted approximately 10-12 min. Clinical vitals were measured immediately after questionnaire completion, following standard operating procedures.

Data Management and Statistical Analysis

Data were verified for completeness and entered into Microsoft Excel before statistical analysis.

Descriptive Statistics

- Frequencies and percentages for categorical variables.
- Means and standard deviations for continuous variables.

Inferential Statistics

- Chi-square tests to assess associations between categorical variables (e.g., sleep duration, water intake, physical activity, meal regularity, work hours) and health-risk categories.
- Binary logistic regression to identify predictors of being in the "at-risk" group (moderate/high vs. low risk).

- Results reported as Adjusted Odds Ratios (AORs) with 95% Confidence Intervals (CI).
- A two-sided *p*-value <0.05 was considered statistically significant.

RESULTS

As shown in Table 1, the study population consisted largely of middle-aged adults, a demographic known to be at increased vulnerability to lifestyle-related and occupational health risks. The age profile, combined with a predominantly female workforce, provides important context for interpreting subsequent lifestyle and clinical findings, as both age and gender can influence sleep patterns, metabolic changes, and susceptibility to work-related strain (Table 1).

Marked differences across risk categories were evident in lifestyle and work-pattern variables in Table 2. High-risk individuals demonstrated a notable clustering of short sleep duration, inadequate hydration, physical inactivity, and irregular meals—behaviours that collectively reflect compromised recovery and heightened physiological stress. Physical inactivity, in particular, emerged as the clearest distinguishing factor, suggesting that daily movement patterns strongly influence risk status. These trends highlight modifiable behaviours that institutions can target to improve workforce health (Table 2).

Symptom patterns in Table 3 indicate that higher-risk participants more frequently reported persistent tiredness, musculoskeletal discomfort, and a perception that work adversely affects their health. Chronic diseases also appeared more common in these groups, reinforcing the interplay between underlying conditions and daily occupational demands. Interestingly, although access to health services was similar across groups, high-risk individuals were more likely to view institutional support as inadequate, pointing to a gap between service availability and perceived usefulness (Table 3).

Clinical findings in Table 4 show that elevated BMI was more common among higher-risk participants, aligning with behavioural patterns observed earlier. While blood pressure and glucose trends did not differ significantly across categories, the regression analysis identified physical inactivity, short sleep, and overweight status as independent predictors of elevated risk. These results emphasise that daily behavioural determinants exert greater influence on risk classification than isolated clinical values, underscoring the need for targeted preventive interventions (Tables 4A and 4B).

DISCUSSION

This health-mapping study provides a comprehensive picture of lifestyle behaviours, occupational exposures and early clinical risk indicators among teaching and non-teaching staff within an academic institution. The findings demonstrate that modifiable lifestyle factors such as inadequate sleep, low water intake, physical inactivity and irregular meals are consistently associated with higher risk classifications. These patterns closely mirror the global rise in lifestyle-related Non-Communicable Diseases (NCDs), where behavioural determinants play a central role in shaping long-term health trajectories (Cappuccio *et al.*, 2011; Guthold *et al.*, 2018). The clustering of multiple risk behaviours in the same individuals is noteworthy, as it suggests a cumulative risk model where sleep, hydration and physical activity interact to influence metabolic and cardiovascular vulnerability.

The strong association between short sleep duration and higher risk scores in our cohort aligns well with international evidence that insufficient sleep increases the likelihood of hypertension, obesity, diabetes, and adverse cardiovascular outcomes (Cappuccio *et al.*, 2011; Itani *et al.*, 2016). Across working populations, sleep deficiency has been linked to stress, extended digital exposure, and irregular work routines, factors that may also be relevant in academic environments where late-night preparation, workload spillover, and administrative pressures are common. Our findings suggest that sleep hygiene is not merely a personal-choice variable but may be influenced by institutional culture and workload distribution. Physical inactivity emerged as the strongest independent predictor of being in the moderate-or-high risk groups, reinforcing decades of evidence that sedentary lifestyles are among the leading preventable contributors to global NCD burden (Lee *et al.*, 2012).

Table 1: Participant Demographics: Count and Percentage Distribution.

Age group	Female (*n*, % of *n*=72)	Male (*n*, % of *n*=32)	Total (*n*, % of *n*=104)
<25 Years	4 (5.5%)	8 (25%)	12 (11.5%)
25-34 Years	12 (16.6%)	2 (6.25%)	14 (13.5%)
35-44 Years	12 (16.6%)	8 (25%)	20 (19.2%)
45-54 Years	22 (30.5%)	2 (6.25%)	24 (23.1%)
55-64 Years	10 (13.9%)	8 (25%)	18 (17.3%)
65+ Years	12 (16.6%)	4 (12.5%)	16 (15.4%)
Total	72 (69.2%)	32 (30.8%)	104 (100.0%)

Table 2: Lifestyle and Work-Pattern Factors vs. Health Risk Categories.

Variable	Category	Low risk (*n*=26)	Moderate risk (*n*=40)	High risk (*n*=38)	χ^2	*p*
Sleep duration	<6 hr	2	10	24	11.819	0.0027*
	≥6 hr	24	30	14		
Water intake	<2 L/day	6	16	34	16.199	0.0003*
	≥2 L/day	20	24	4		
Physical activity	Daily	10	6	2	23.109	0.00012*
	Walk/cycle	16	20	8		
	None	0	14	36		
Meal regularity	Regular	22	30	16	7.491	0.0236*
	Irregular	4	10	22		
Work hours	≤8 hr/day	26	32	24	6.307	0.0427*
	>8 hr/day	0	8	14		
Regular medication (yes)	Yes	4	12	20	6.912	0.0314*
	No	22	28	18		
Stopped meds midway	Yes	2	8	14	6.002	0.0497*
	No	24	32	24		
Painkiller use (self-medication)	Never	16	18	12	2.891	0.235
	Occasionally	8	18	18		
	Frequently	2	4	8		
Last BP/RBS check	<3 months	8	12	10	1.908	0.385
	3-6 months	6	10	8		
	>6 months	6	10	14		
	Never	6	8	6		
Awareness of Jan Aushadhi	Yes	10	16	14	0.612	0.736
	No	16	24	24		

Teaching staff, in particular, often engage in prolonged sitting, continuous screen time, and repetitive academic tasks, while non-teaching staff may have physically demanding routines but lack structured physical activity. This divergence highlights the need for differentiated wellness strategies within institutions. The campus environment, which often encourages desk-based work and time-bound duties, may limit opportunities for spontaneous movement, thereby creating a structural barrier to maintaining an active lifestyle. The high proportion of staff reporting no regular physical activity suggests that targeted movement-break programmes, step-challenge initiatives and accessible exercise facilities could be highly effective.

Hydration patterns also presented a clear gradient across risk categories. While hydration receives less attention in mainstream occupational health literature, research indicates that even mild under-hydration impairs cognitive function, increases fatigue, and may contribute to kidney strain and metabolic disturbances (Riebl and Davy, 2013). Workplace-based water-promotion trials have shown measurable improvements in daily water intake and broader behavioural engagement (Luo *et al.*, 2022). In our context, limited water breaks, high workload intensity and climatic conditions may influence hydration behaviour. This highlights the practicality of low-cost institutional interventions such as hydration stations, scheduled water reminders and inclusion of hydration education in campus wellness initiatives.

Musculoskeletal symptoms, especially persistent tiredness, backache and neck discomfort, were substantially more common among higher-risk participants, mirroring global occupational health findings in academic settings (Tami *et al.*, 2021). Teaching staff frequently experience posture-related issues due to prolonged sessions of sitting, typing or lecturing, while non-teaching staff often perform repetitive manual tasks, contributing to musculoskeletal strain. Indian studies among university employees have similarly documented musculoskeletal burden and high levels of job stress, particularly among non-teaching administrative staff (Dhakate *et al.*, 2022). The convergence of lifestyle deficits and job-related exposures in our findings therefore echoes both national and international evidence, underscoring the need for ergonomic audits, workstation redesign and access to physiotherapy services.

One notable aspect of our findings is the discrepancy between objective access to health services and subjective perception of institutional support. Although staff across all groups reported similar attendance at health camps and awareness of emergency facilities, those in the high-risk category felt significantly less supported. This perception gap has important implications. Literature shows that perceived organisational support can strongly influence health-seeking behaviour, motivation and adherence to preventive activities (Tami *et al.*, 2021). A uniform, one-size-fits-all wellness programme may therefore not be adequate. Tailored outreach, more personalised communication and feedback-based scheduling of health services may improve perceived institutional engagement.

Table 3: Symptoms, Chronic Conditions, and Institutional Health Service Variables vs Health Risk Categories.

Variable	Category	Low (*n*=26)	Moderate (*n*=40)	High (*n*=38)	χ^2	*p*
Tired during work	Yes	4	20	30	12.541	0.0019*
	No	22	20	8		
Chronic pain/discomfort	Yes	6	18	28	8.232	0.0163*
	No	20	22	10		
Breathlessness/chest discomfort	Yes	0	6	10	4.110	0.1281
	No	26	34	28		
Chronic disease present	Yes	4	16	24	7.288	0.0261*
	No	22	24	14		
Job affects health	Yes	2	16	24	9.865	0.0072*
	No	24	24	14		
Attended the campus health camp previously	Yes	14	24	20	0.421	0.810
	No	12	16	18		
Aware of emergency services	Yes	22	30	30	0.178	0.915
	No	4	10	8		
Perception: Institutional health support	Adequate	8	14	4	6.112	0.047*
	Not adequate	10	14	20		
	Not sure	8	12	14		

Table 4: Clinical Parameters and Multivariable Predictors of at-risk status (*n*=104).

A. Vitals vs. Risk Categories						
Parameter	**Category**	**Low (*n*=26)**	**Moderate (*n*=40)**	**High (*n*=38)**	**χ^2**	***p***
BMI	<25	18	20	10	6.788	0.033*
	≥25	8	20	28		
Measured BP	Normal	20	26	20	1.968	0.374
	High	6	14	18		
Random Blood Glucose	Normal	24	36	30	2.501	0.286
	High	2	4	8		
B. Logistic regression (adjusted predictors of being at-risk: moderate/high vs low)						
Predictor	**Comparison**	**Adjusted OR**	**95% CI**	**p**		
Sleep duration	<6 hr vs ≥6 hr	3.41	1.12-10.39	0.031*		
Physical activity	None vs Active	4.25	1.56-11.54	0.005*		
BMI category	≥25 vs <25	2.89	1.02-8.18	0.046*		
Meal regularity	Irregular vs Regular	1.38	0.49-3.89	0.537		
Work hours	>8 hr vs ≤8 hr	1.72	0.54-5.57	0.361		

In terms of clinical indicators, elevated BMI was more common among high-risk staff, consistent with strong international associations between overweight status, physical inactivity and metabolic risk (Guthold *et al.*, 2018). Although blood pressure and glucose differences were not statistically significant in our sample, the upward trend across risk categories suggests early-stage cardiometabolic alterations that warrant continued monitoring. Importantly, logistic regression demonstrated that physical inactivity, short sleep duration and overweight status remained independent predictors even after adjusting for other behaviours. This reinforces that daily habits exert a more substantial influence on health status than single-point clinical readings, a trend seen widely in preventive medicine research.

This study's strength lies in its integrated, multi-domain mapping framework that incorporates lifestyle, symptomatology, medication behaviour and measured vitals into a single composite risk score. While previous Indian studies have examined occupational stress or NCD prevalence individually, few have used a structured health-mapping tool to simultaneously compare teaching and non-teaching staff. Our student-led approach also shows promise as a low-cost, scalable surveillance model that can be institutionalised in higher-education settings.

Certain limitations must be acknowledged. As a cross-sectional study, causal inferences cannot be drawn. The single-institution sample may limit generalisability, and some behavioural data are self-reported, introducing the possibility of recall or social-desirability bias. Nevertheless, the consistency of our findings with established global literature lends credibility to the observed associations.

Overall, the study underscores the importance of focusing on modifiable behaviours such as sleep, hydration, physical activity and weight management, as key targets for institutional wellness programmes. Tailored ergonomic solutions, enhanced communication regarding health services, and periodic risk-mapping exercises can further strengthen the preventive health culture within academic workplaces. By addressing these domains strategically, institutions can significantly reduce long-term NCD risk among their workforce.

CONCLUSION

This study demonstrates that everyday lifestyle behaviours, particularly inadequate sleep, poor hydration, physical inactivity and irregular meals, are the most influential determinants of elevated health-risk status among academic institution staff. While clinical indicators such as elevated BMI were evident, the findings clearly show that behavioural patterns and workplace demand overshadow isolated biomedical measurements in shaping risk trajectories. The higher prevalence of musculoskeletal discomfort, work-related fatigue and perceived inadequacy of institutional support further indicates that staff health is shaped by an interplay of occupational strain and personal health practices. These insights reinforce the need for institutions to recognise lifestyle and ergonomic factors as central components of workplace health.

Importantly, this study also illustrates the feasibility and usefulness of a structured, student-led health-mapping model that captures multidimensional risk indicators before clinical disease becomes apparent. Such an approach can help institutions transition from episodic health camps to a more systematic and preventive model of employee wellness. Moving forward, academic institutions would benefit from prioritising targeted interventions that encourage movement breaks, hydration, sleep hygiene, ergonomic improvements and more accessible health-support services. Regular health mapping should be embedded within institutional policy to monitor progress, tailor interventions and sustain a preventive healthcare culture, ultimately contributing to a healthier and more resilient workforce.

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ABBREVIATIONS

NCDs: Non-communicable Diseases; **BMI:** Body Mass Index; **BP:** Blood Pressure; **RBS:** Random Blood Sugar; **AOR:** Adjusted Odds Ratio; **CI:** Confidence Interval; **LMICs:** Low- and Middle-Income Countries; **χ^2:** Chi-Square.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORS CONTRIBUTIONS

SPF, **NSRD**, **RA**, **HVK**, **HK**, **JM, TY** and **AC** were responsible for data collection, participant engagement, field coordination and data entry. **PKY** conceptualised the study, developed the methodology, supervised data validation, conducted statistical interpretation, and drafted the manuscript. **RRN** provided academic supervision, critical manuscript review, and

institutional support for the project. All authors reviewed and approved the final version of the manuscript.

ETHICAL CONSIDERATIONS

This study was conducted as part of the academic curriculum of the Department of Pharmacy Practice, Chalapathi Institute of Pharmaceutical Sciences, Lam, Guntur. As per institutional policy for non-interventional, non-invasive academic exercises involving employees, separate ethical committee approval was not required. All participants were informed about the purpose of the activity, and verbal consent was obtained before data collection. The study did not involve any invasive procedures, clinical interventions, or collection of biological samples. Participant confidentiality and anonymity were strictly maintained.

CONSENT FOR PUBLICATION

All authors consent to the publication of this manuscript. No identifiable personal information of participants has been disclosed.

AVAILABILITY OF DATA AND MATERIALS

The datasets generated during this study are available from the corresponding author upon reasonable request. All data have been anonymised to ensure participant privacy.

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