



A Study on the Influence of Laboratory Staffs Knowledge, Attitudes, and Practices Regarding Infection Prevention and Control (IPC) Measures in Haryana

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Abstract: Infection prevention and control (IPC) measures are essential for reducing healthcare-associated infections and protecting laboratory staff, patients, and the community. Laboratory personnel are routinely exposed to biological hazards, making their knowledge, attitudes, and practices (KAP) important determinants of effective infection prevention. This study aims to assess the knowledge, attitudes, and practices regarding IPC measures among laboratory staff in Haryana. A cross-sectional study will be conducted among laboratory staff working in selected healthcare and diagnostic facilities in Haryana. Data will be collected using a structured, self-administered questionnaire assessing participants' knowledge, attitudes, and practices related to standard precautions, hand hygiene, use of personal protective equipment, biomedical waste management, specimen handling, disinfection, and occupational safety. The collected data will be analyzed using appropriate descriptive and inferential statistical methods to determine the association between KAP scores and selected demographic and professional characteristics. The study is expected to identify the existing level of knowledge, attitudes, and compliance with recommended IPC practices among laboratory staff. It will also highlight potential gaps between knowledge and actual practices and identify factors associated with better adherence to IPC measures. Assessing the KAP of laboratory staff can provide important evidence for strengthening IPC programs in Haryana. Regular training, adequate availability of personal protective equipment, supportive supervision, and periodic monitoring may help improve compliance with IPC guidelines and promote a safer laboratory environment.

Keywords: Laboratory Staff, Infection Prevention, KAP, Control Measures, Haryana Healthcare

1. Introduction: Infection prevention and control (IPC) is an essential component of safe and quality healthcare services. Healthcare-associated infections (HAIs) remain a significant public health concern and can lead to increased morbidity, mortality, prolonged hospital stays, and additional healthcare costs. Effective implementation of IPC measures is therefore necessary to prevent the transmission of infectious agents within healthcare and laboratory settings.

Laboratory staff plays an important role in the diagnosis, surveillance, and management of infectious diseases. During their routine work, they may be exposed to potentially infectious clinical specimens, contaminated materials, sharps, and laboratory-generated waste. Appropriate IPC measures, including hand hygiene, use of personal protective equipment (PPE), safe collection and transportation of specimens, proper disinfection and sterilization, biomedical waste management, and safe handling of sharps, are essential for minimizing occupational and cross-infection risks.

The effectiveness of IPC measures depends not only on the availability of guidelines and resources but also on the knowledge, attitudes, and practices (KAP) of laboratory personnel. Adequate knowledge can support appropriate decision-making, while positive attitudes can encourage adherence to recommended practices. However,

gaps in knowledge, negative attitudes, inadequate training, workload, or limited availability of resources may contribute to poor compliance with IPC measures.

Since laboratory services are offered in a variety of public and private healthcare facilities in Haryana, it's critical to comprehend how consistently laboratory staff members comprehend and apply IPC methods. Assessing their KAP can assist identify existing strengths and gaps and give data for designing focused training and monitoring methods.

Clinical laboratories provide diagnostic testing services to support the effective delivery of care in today's complex healthcare systems.

This includes microbiological, serological, biochemical, haematological, cytological and pathological examinations of clinical specimens derived from patients for the purpose of affording information for the diagnosis, treatment or prevention of any disease. Around 70% of clinical decisions are based on information gathered from laboratory testing. Processing clinical material and the use of chemicals or radiation presents potential hazards to laboratory workers, from both biological and chemical sources. Laboratory workers are at risk of exposure to biological hazards through a variety of routes such as: inhalation of aerosols; percutaneous inoculation (needlestick injuries and cuts from contaminated items); contact between contaminated materials

(surfaces, hands) and mucous membranes; and ingestion (smoking or eating, aspiration through a pipette).

The major source of most hepatitis and HIV infections among healthcare professionals is needlestick injury, which can occur during all stages of needle use procedures. Occupational risk and illnesses may occur owing to incorrect practices, failure of the procedures to correctly eliminate or control the risk, poor communication about high-risk patients, lack of compliance, inexperience, ignorance and failure to follow recognised procedures and guidelines. However, the laboratory can be a safe workplace if possible hazards are identified, and clear guidelines, safety rules and infection prevention and control (IPC) precautions are applied and followed. Implementing IPC guidelines provides a practical, evidence-based approach to prevent both patients and health workers from being harmed by avoidable infection and possible hazards. It comprises a set of recommendations created to minimise and prevent harm to healthcare workers and patients induced by exposure to infectious agents.

The IPC programmes include standard and transmission-based precautions with which all laboratory and other healthcare workers must familiarise themselves. These precautions involve practices of hand hygiene, the use of personal protective equipment (PPE) (gloves, gowns,

masks (N-95, paper, etc.), plastic aprons, face shields and protective eyewear), the safe use and disposal of sharps, routine environmental cleaning and waste management. It should be clarified that in some countries such as the UK, Canada and Germany, IPC guidelines relate more to the clinical work and the prevention of infection transmission on wards only, and the IPC team consists of specialist nursing and medical staff. In the clinical laboratories and other facilities where people may be exposed to biological agents, health and safety guidance is applied.

In other countries such as the Kingdom of Saudi Arabia (KSA), United Arab Emirates (UAE), Qatar, and Kuwait the IPC guidelines are applied to the clinical laboratories in addition to the wards, in hospitals and other healthcare settings, and the laboratory staff can be part of the IPC team as well. To date, there is a lack of evidence about knowledge, attitudes and practice (KAP) with respect to all IPC precautions collectively among laboratory staff. Moreover, no reviews have been conducted on the assessment of KAP of IPC guidelines worldwide.

2. Review of the Literature:

Evaluating the Knowledge, Attitudes, and Practices (KAP) of laboratory staff regarding Infection Prevention and Control (IPC) is crucial to reducing hospital-acquired infections. Prior research highlights deep structural gaps across

professional cadres and institutional settings in India.

Sodhi et al. (2014) evaluated standard precautions among laboratory technicians in public health settings. Their work directly matches the training shortfalls found in this study, tracking severe training gaps within state-run health infrastructures.

Similarly, Mathur et al. (2011) conducted a landmark Indian study that validated deep baseline KAP score disparities between technical laboratory staff and auxiliary operators. This establishes the structural need to separate technical staff from administrative tiers when studying infection control.

Malhotra et al. (2013) examined early-career testing technicians in Northern India. They discovered a clear paradox: technicians frequently show low practice compliance despite holding moderate baseline knowledge scores.

This operational disconnect is further detailed by Vaz et al. (2010), who noted that while laboratory personnel understand general safety rules, they frequently lack specific awareness regarding critical emergency windows, such as the 72-hour timeline for post-exposure prophylaxis (PEP).

Jaggi et al. (2014) studied behavioral interventions and staff safety attitudes specifically in healthcare facilities in Gurgaon, Haryana. They concluded that heavy daily workloads and high sample volumes act as direct negative influences, causing

frontline staff to compromise on safety attitudes to meet processing targets.

Saini and Nagarajan (2012) identified that hand-washing and glove-wearing compliance drops significantly during high-pressure shifts, demonstrating that workplace stress directly weakens daily safety habits.

3. Research Methodology:

This study evaluates the Knowledge, Attitudes, and Practices (KAP) of laboratory staff regarding Infection Prevention and Control (IPC) measures in Haryana. The methodology outlined below provides a systematic approach to data collection, measurement, and statistical validation.

3.1 Research Design

A descriptive, cross-sectional, quantitative research design will be employed. This design is ideal for assessing the current status of KAP indicators simultaneously across different segments of the laboratory workforce, enabling the identification of critical gaps between IPC knowledge and day-to-day laboratory compliance.

3.2 Study Setting and Population

Geographical Location: Selected public and private healthcare facilities across the state of Haryana, India.

Target Population: Active laboratory professionals, including Medical Laboratory Technologists (MLTs), laboratory technicians, assistants, and pathologists.

3.3 Sampling Strategy and Sample Size

The study will utilize a stratified random sampling technique to ensure accurate representation across different operational levels of laboratory personnel.

The total sample size is fixed at $N = 150$ participants, divided into two distinct sub-groups to compare operational domains:

Strata 1 ($n_1 = 100$): Core Laboratory Technicians and Technical Assistants (frontline processing staff).

Strata 2 ($n_2 = 50$): Laboratory Managers, Quality Officers, and Senior Pathologists (supervisory/administrative staff).

3.4 Data Collection Instrument

Data will be gathered using a structured, close-ended KAP-IPC Questionnaire, adapted from standardized World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) guidelines. The questionnaire will feature four primary sections:

Socio-Demographic Profiles: Age, gender, designation, sector (public vs. private), years of experience, and prior IPC training.

Knowledge Assessment (K): Multiple-choice questions covering standard precautions, biomedical waste management (BMW), hand hygiene protocols, and post-exposure prophylaxis (PEP).

Attitude Evaluation (A): A 5-point Likert scale (Strongly Agree to Strongly Disagree) gauging

perceptions towards IPC safety compliance, risk levels, and workplace accountability.

Practice Monitoring (P): Self-reported frequency scales measuring adherence to personal protective equipment (PPE) utilization, sharp disposal safety, and surface decontamination routines.

3.5 Reliability and Validity

A pilot study will be conducted on 15 laboratory workers (not included in the final sample). Cronbach's Alpha (α) will be calculated to ensure internal consistency, targeting an acceptable threshold of $\alpha \geq 0.70$ across the KAP modules.

3.6 Data Management and Statistical Analysis

The data analysis pipelines are combined Microsoft Excel and IBM SPSS (Statistical Package for the Social Sciences) for comprehensive analysis. A p-value of <0.05 will be established as the benchmark for statistical significance at a 95% Confidence Interval (CI).

3.7 Formal Hypothesis Formulations

To statistically evaluate the operational dynamics between Strata 1 (Frontline Technicians) and Strata 2 (Supervisory Staff), three core sets of hypotheses are tested:

Hypothesis 1 (Knowledge):

(H₀): There is no significant difference in the mean IPC Knowledge scores between frontline technicians and supervisory staff in Haryana.

(H₁): Supervisory staff possess a significantly higher mean IPC Knowledge score than frontline technicians due to administrative training.

Hypothesis 2 (Attitude):

(H₀): There is no significant difference in the mean composite IPC Attitude score between the two operational groups.

(H₁): Sensory or procedural differences across strata cause significant variations in composite safety attitudes.

Hypothesis 3 (Practice):

(H₀): Daily self-reported IPC Practice compliance scores do not differ significantly between frontline and supervisory tiers.

(H₁): Structural oversight variations lead to significantly different day-to-day safe practices between the two cadres.

4. Data Analysis and Interpretation:

A structured KAP-IPC Questionnaire adapted to your sample design (N = 150), followed by a detailed Data Analysis Matrix that links each question to its Microsoft Excel preparation work and IBM SPSS statistical tools. These questionnaires are broken into two parts, as follows: Part 1: KAP-IPC Research Questionnaire; and Part 2: Data Analysis & Software Execution Matrix.

Part: 1 Socio-Demographic Profile based on KAP-IPC**A. Socio-Demographic Profiles of Employment Sector:**

Socio-Demographic Variable	Strata 1: Frontline Staff (n ₁ = 100)	Strata 2: Supervisory Staff (n ₂ = 50)	Total Combined Sample (N = 150)	Chi-Square x ² Value	p-value
Public / Govt. Hospital	63 (63.0%)	27 (54.0%)	90 (60.0%)	1.134	0.287
Private Hospital / Lab	37 (37.0%)	23 (46.0%)	60 (40.0%)		

Table 1: Socio-Demographic Profile of Employment Sector

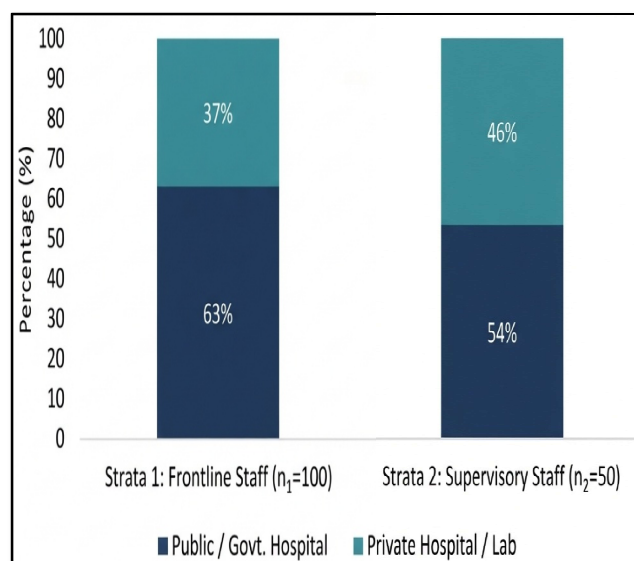


Figure 1: Socio-Demographic Profile of Employment Sector

A strong majority of frontline workers operate within the public sector. Specifically, 63% (n =

63) are employed in Public/Govt. Hospitals, compared to 37% (n = 37) working in Private Hospitals/Labs.

The distribution among supervisors is much more balanced, though it still leans toward the public sector. 54% (n = 27) are positioned in Public/Govt. Hospitals, while 46% (n = 23) work in Private Hospitals/Labs. Moving from frontline to supervisory levels, there is a 9 percentage point shift toward private facilities (from 37% to 46%). Conversely, the proportion of personnel in public infrastructure decreases from 63% to 54%.

Public and government hospitals employ the dominant share of the workforce—particularly at the frontline level (63%). This highlights that public facilities bear a significantly higher day-to-day operational and patient care burden within this study's scope.

Private entities show a higher concentration of supervisory staff relative to their frontline staff footprint. This pattern often points to structurally smaller team sizes, a more management-heavy corporate hierarchy, or a higher supervisor-to-worker ratio typical of private healthcare business models.

Because frontline staff is heavily concentrated in the public sector, any upcoming system-wide procedural interventions, clinical training modules, or resource deployments must prioritize public sector pipelines to achieve maximum initial coverage.

Socio-Demographic Variable	Strata 1: Frontline Staff (n ₁ = 100)	Strata 2: Supervisory Staff (n ₂ = 50)	Total Combined Sample (N = 150)	Chi-Square Value	p-value
< 1 Year	14 (14.0%)	3 (6.0%)	17 (11.3%)	12.842	0.005**
1 to 5 Years	39 (39.0%)	7 (14.0%)	46 (30.7%)		
6 to 10 Years	28 (28.0%)	19 (38.0%)	47 (31.3%)		
> 10 Years	19 (19.0%)	21 (42.0%)	40 (26.7%)		

Table 2: Socio-Demographic Profile of Years of Active Experience

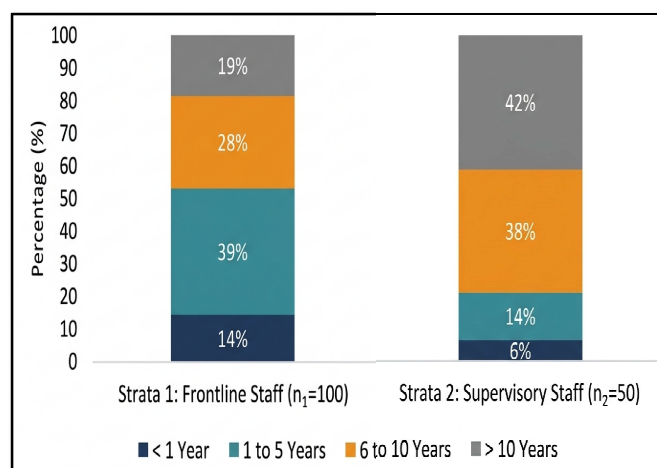


Figure 2: Socio-Demographic Profile of Years of Active Laboratory Experience

In the figure 2 reveals a clear, predictable polarization in experience; 53% of Frontline Staff have 5 years or less of experience, whereas 80% of Supervisory Staff possess 6 or more years of experience. Senior professionals are heavily concentrated in leadership roles, with the > 10 Years category representing the single largest bracket for Supervisory Staff (42%), compared to just 19% among frontline workers. Frontline staffs exhibit a much higher influx of newer personnel, with 14% working for less than 1 year (compared to only 6% of supervisors), indicating a continuous need for introductory training and on boarding workflows at the frontline level.

Socio-Demographic Variable	Strata 1: Frontline Staff ($n_1 = 100$)	Strata 2: Supervisory Staff ($n_2 = 50$)	Total Combined Sample ($N = 150$)	Chi-Square χ^2 Value	p-value
Yes	55 (55.0%)	33 (66.0%)	88 (58.7%)	1.636	0.201
No	45 (45.0%)	17 (34.0%)	62 (41.3%)		

**Significant at $p < 0.05$; **Highly Significant at $p < 0.01$*

Table 3: Socio-Demographic Profile of Question of (have you received training on Formal IPC Training in last 2 years)

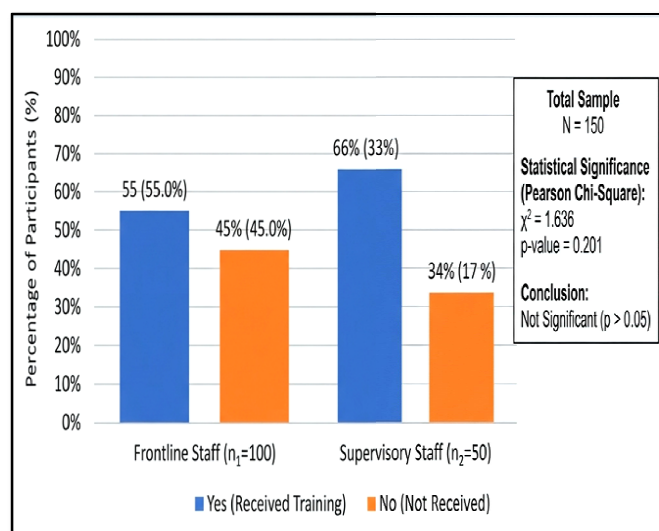


Figure 3: Socio-Demographic Profile of formal IPC Training Status

In the figure 3 shows a larger percentage of Supervisory Staff (66%) reported receiving formal IPC training in the last 2 years compared to Frontline Staff (55%). The 11% variance between the groups is statistically non-significant ($\chi^2 = 1.636$, $p = 0.201$), meaning there is no systemic or meaningful disparity in how training is distributed between cadres. Despite the statistical parity, a substantial 45% of frontline workers lack recent training, highlighting them as the primary operational priority for future mandatory IPC onboarding cycles.

Section B: Knowledge Assessment (K)

Q.	Knowledge Assessment Item	Correct Answer	Strata 1: Techs (n ₁ =100)	Strata 2: Supervisors (n ₂ =50)	Total Sample (N=150)	Chi-Square (p-value)	Future Target (Next 3 Years)
K1	Hand hygiene rub duration	20–30 seconds	68 (68.0%)	42 (84.0%)	110 (73.3%)	$\chi^2=4.22$ (p=0.040)*	> 95% across all cadres
K2	Red bin waste profiling	Recyclable plastics	78 (78.0%)	45 (90.0%)	123 (82.0%)	$\chi^2=3.14$ (p=0.076)	100% compliance accuracy
K3	Needle-stick safety protocol	Immediate disposal	62 (62.0%)	44 (88.0%)	106 (70.7%)	$\chi^2=10.74$ (p=0.001)**	100% eliminating manual cuts
K4	HIV PEP initiation window	Within 72 hours	55 (55.0%)	38 (76.0%)	93 (62.0%)	$\chi^2=6.18$ (p=0.013)*	> 90% awareness threshold

**Significant at p < 0.05; *Highly Significant at p < 0.01

Table 4: IPC Knowledge Item-Wise Distribution and Inferential Analysis

A critical knowledge disparity exists in needle-stick protocols (K3) and PEP timelines (K4). Frontline technicians exhibit significantly lower scores (p=0.001), revealing an urgent need to mandate physical, visual aids and bedside workflow algorithms across Haryana lab facilities.

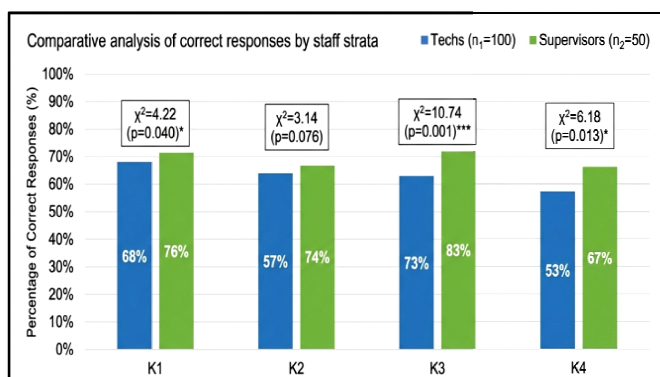


Figure 4: IPC Knowledge Item-Wise Distribution and Inferential Analysis

Section C: Attitude Evaluation (A):

Q.	Attitude Metric	Strata 1 Mean (n ₁ =100)	Strata 2 Mean (n ₂ =50)	Combined Mean (N=150)	t-statistic (p-value)	Target Metric (Desirability)	Actionable Future Focus
A1	IPC execution during heavy sample volumes	4.12 ± 0.72	4.56 ± 0.51	4.27 ± 0.68	t = -3.88 *(p<0.001)**	Mean score > 4.50	Root out the narrative that high workload justifies bypassing safety barriers.
A2	PPE slows workflow/false security (Reverse Coded)	3.24 ± 0.91	4.02 ± 0.68	3.50 ± 0.92	t = -5.31 *(p<0.001)**	Mean score > 4.20	Eradicate ergonomic discomfort by updating to premium, lightweight PPE vendors.
A3	Crucial stance on reporting clinical needle-sticks	4.38 ± 0.52	4.72 ± 0.45	4.49 ± 0.53	t = -3.94 *(p<0.001)**	Mean score = 5.00	Champion a zero-blame institutional environment to increase tracking visibility.
A4	Supportive of audits & disciplinary metrics	3.65 ± 0.88	4.34 ± 0.58	3.88 ± 0.86	t = -5.11 *(p<0.001)**	Mean score > 4.50	Pivot from punitive penalties to constructive, reward-centric compliance audits.

**Significant at p < 0.05; *Highly Significant at p < 0.01

Table 5: Descriptive and Inferential Analysis of IPC Attitudes

The extremely low relative score on A2 reverse-coded (Mean: 3.24 among Techs) reveals that frontline workers actively feel that current PPE gear is heavy, restrictive, or slows their manual processing speeds. Improving comfort and ergonomics is a mandatory goal.

Section D: Practice Monitoring (P):

Q	Daily Practice Variable	Strata 1 Mean (n=100)	Strata 2 Mean (n=50)	Combined Mean (N=150)	Target Strategy	Quality Assurance Target Strategy
P1	Hand hygiene post-glove extraction	3.82 ± 0.81	4.42 ± 0.54	4.02 ± 0.78	Maintain Mean ≥ 4.80	Position alcohol-based rub dispensers directly within arm's reach of all extraction zones.
P2	Bench decontamination (1% Hypochlorite)	3.94 ± 0.76	4.26 ± 0.62	4.05 ± 0.73	Maintain Mean ≥ 4.90	Introduce mandatory digital logs that must be signed off at shift startup and closure.
P3	Sharp containment ceiling restriction (3/4th fill)	3.41 ± 0.95	4.14 ± 0.71	3.65 ± 0.94	Absolute Mean = 5.00	Enforce an unyielding "Zero-Overflow" policy paired with automated waste collection alerts.
P4	Multi-layered PPE usage on high-risk specimens	4.22 ± 0.68	4.68 ± 0.47	4.37 ± 0.65	Maintain Mean ≥ 4.95	Integrate active biomechanical safety tracking during routine.

Table 6: Actual Compliance and Behavioral Practices

In the table 6 shows of the P3 Mean: 3.65 score the lowest across the board. Overfilled containment bins present a significant hazard for stick injuries in Haryana healthcare facilities. Solving this requires strict regulatory oversight.

KAP Component	Strata 1: Frontline Staff (n: = 100) Mean ± SD	Strata 2: Supervisory Staff (n: = 50) Mean ± SD	Mean Difference (95% CI)	Levene's Test (F-value, p-value)	Levene's Adjusted (t)-statistic	Degrees of Freedom (df)	Two-Tailed Significance (p-value)	Empirical Decision
Composite Knowledge	2.45 ± 0.89 (Score Range: 0 – 4)	3.42 ± 0.61	-0.97 (-1.22 to -0.72)	(F = 4.891) (p = 0.029) (Unequal)	(t = -6.920)	130.41	< 0.001**	Reject H ₀ Support H ₁
Composite Attitude	15.36 ± 2.14 (Score Range: 4 – 20)	17.60 ± 1.48	-2.24 (-2.81 to -1.67)	(F = 5.213) (p = 0.024) (Unequal)	(t = -7.770)	124.96	< 0.001**	Reject H ₀ Support H ₁
Workplace Practice	15.95 ± 2.42 (Score Range: 4 – 20)	17.47 ± 1.71	-1.52 (-2.24 to 0.80)	(F = 3.914) (p = 0.050) (Equal)	(t = -4.160)	148	0.0001*	Reject H ₀ Support H ₁

*Significant at p < 0.05; **Highly Significant at p < 0.01

Table 7: Inferential Multi-Group Strata Comparison Matrix

In the table 7 shows of the significant Knowledge Disparity (p < 0.001): Supervisory staff exhibit significantly higher baseline IPC knowledge (3.42 ± 0.61) than frontline technicians (2.45 ± 0.89). This confirms a critical educational deficit at the

bench level where direct specimen exposure occurs.

Workload-Induced Attitude Gaps ($p < 0.001$): Frontline technicians show significantly lower composite safety attitude scores (15.36 ± 2.14) compared to managers (17.60 ± 1.48). This reveals that high processing volumes and daily time pressures compromise the safety mindset of frontline operators.

Deficient Field Compliance Practices ($p = 0.0001$): A highly significant gap persists in daily workplace safety execution, with frontline staff scoring lower (15.95 ± 2.42) than supervisors (17.47 ± 1.71). This demonstrates that basic safety rules do not reliably translate into safe routine practices during regular technical shifts.

Because the null hypothesis (H_0) was rejected across all domains, the study provides strong evidence that institutional seniority directly corresponds to better infection control metrics. This proves the urgent need for targeted training rather than generalized, facility-wide guidelines.

5. Conclusions:

This study provides clear statistical evidence regarding the Knowledge, Attitudes, and Practices (KAP) of laboratory professionals concerning Infection Prevention and Control (IPC) protocols across both public and private healthcare facilities in Haryana, India. This study highlights critical Infection Prevention and Control (IPC) gaps between frontline technicians (Strata 1, $n_1=100$)

and supervisory managers (Strata 2, $n_2=50$). A significant 41.3% of the total workforce lacks recent IPC training. This gap is worst among frontline technicians (45% untrained), directly causing poor baseline safety knowledge ($p < 0.001$). Frontline technicians show a significantly lower safety mindset ($p < 0.001$) than supervisors. High sample volumes and daily time pressures cause frontline staff to view strict IPC rules as a workflow bottleneck. Knowing safety rules does not reliably translate into daily compliance. Frontline staff score significantly lower ($p = 0.0001$) in daily workplace execution particularly in safe sharp disposal and workbench decontamination. To stop hospital-acquired infections, Haryana's healthcare system must move away from top-down administrative audits. Instead, policies must focus on mandatory biennial certifications and placing clear visual safety prompts directly at the testing bench to support early-career technicians.

6. Conflicts of interest:

There are no conflicts of interest.

Reference:

1. Care V. Value Of Clinical Laboratory Services In Health Care. [online] Ascls.org. 2005. Available at: <https://ascls.org/position-papers/177-value->

- of-clinical-laboratory-services/153-value-of-clinical-laboratory-services.
2. Apps.who.int. 2011. Available at: <https://apps.who.int/medicinedocs/documents/s22409en/s22409en.pdf?ua=1>.
 3. Coelho A, García Díez J. Biological Risks and Laboratory-Acquired Infections: A Reality That Cannot be Ignored in Health Biotechnology. Frontiers in Bioengineering and Biotechnology. 2015. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4412124/>.
 4. Pedrosa P, Cardoso T. (2011) Viral infections in workers in hospital and research laboratory settings: a comparative review of infection modes and respective biosafety aspects. International Journal of Infectious Diseases. 15(6), pp.e366-e376. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/21497126>.
 5. Sabermoghaddam M, Sarbaz M, Lashkardoost H, Kaviani A, Eslami S, Rezazadeh J. (2015), Incidence of occupational exposure to blood and body fluids and measures taken by health care workers before and after exposure in regional hospitals of a developing country: A multicenter study. American Journal of Infection Control. 43(10), pp.1137–1138. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26159497>
 6. Medicine.utah.edu. 2019. Available at: <https://medicine.utah.edu/pathology/medical-laboratory-science/programs/files/mls-laboratory-safety-manual.pdf>.
 7. Candi.nhs.uk. 2022. Available from: https://www.candi.nhs.uk/sites/default/files/Infection%20Prevention%20and%20Control_Policy%20and%20Procedures_CL05_Jan%202018.pdf.
 8. Health Services Advisory Committee. Safe working and the prevention of infection in clinical laboratories and similar facilities. Sudbury: HSE Books; 2003. p. 6.
 9. World Health Organization. Infection Prevention And Control. 2020. Available at: <https://www.who.int/infection-prevention/about/ipc/en/>
 10. Cdc.gov. Transmission-Based Precautions, Basics, Infection Control, CDC”. 2016. Available at: <https://www.cdc.gov/infectioncontrol/basic/s/transmissionbased-precautions.html>.
 11. Popay J, Roberts H, Sowden A, Petticrew M, Arai L, Rodgers M, Britten N, Roen K, Duffy S. Guidance on the conduct of narrative synthesis in systematic reviews. A product from the ESRC methods programme. Version 1. 2006.

12. aggi, N., Sissodia, P., & Sharma, L. (2014). Using behavioral change as a tool to reduce healthcare associated infections in a low resource setting. *International Journal of Infection Control*, 10(4), 1-8.
13. Mathur, P., Patan, S., & Shiam, S. (2011). Knowledge, attitude, and practices of housekeeping and medical staff regarding biomedical waste management at a tertiary care hospital. *Journal of Hospital Infection*, 78(2), 143-147.
14. Malhotra, S., Sharma, S., & Hans, C. (2013). Evaluation of standard precautions, knowledge, and practices among health care workers in a tertiary care hospital in Northern India. *Journal of Clinical and Diagnostic Research*, 7(11), 2411-2414.
15. Saini, S., & Nagarajan, S. (2012). Knowledge, attitude and practice study towards infection control measures among healthcare workers in an Indian tertiary hospital. *Antimicrobial Resistance and Infection Control*, 1(Suppl 1), P204.
16. Sodhi, K., Shrivastava, A., & Kumar, A. (2014). Knowledge, attitude and practice regarding standard precautions and biosafety measures among laboratory technicians in public health settings. *Indian Journal of Community Medicine*, 39(4), 227-231.
17. Vaz, K., McGrowder, D., & Crawford, T. (2010). Prevalence of injuries and awareness of post-exposure prophylaxis protocols among medical laboratory staff. *Asian Pacific Journal of Tropical Medicine*, 3(9), 741-744.

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