

Experiences and Perceptions of Anganwadi Workers Regarding a Competency-Based Infection Control Programme: A Mixed-Methods Study

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Abstract

Anganwadi workers provide nutrition, preschool education, growth monitoring, health education, and referral support to young children and families. Their routine activities include food handling, assisting children with hygiene, cleaning shared materials, recognizing illness, and communicating with caregivers; consequently, their infection-control competence has direct implications for child safety. This protocol describes an explanatory sequential mixed-methods study designed to evaluate a competency-based infection control programme and explore workers' experiences and perceptions of its usefulness, feasibility, and sustainability. The quantitative phase will use a quasi-experimental pretest-post-test design with an intervention and comparison group. Outcomes will include infection-control knowledge, observed practical competence, self-efficacy, and perception scores. The intervention will combine short theory sessions, demonstrations, return demonstrations, scenarios, local-language materials, and supervisory feedback. Quantitative findings will guide purposive selection for the qualitative phase, in which semi-structured interviews will examine learning experiences, confidence, workload, resource constraints, family interactions, supervisory support, and application of skills. Quantitative data will be analysed using descriptive statistics and baseline-adjusted group comparisons with effect sizes and confidence intervals. Interview data will undergo reflexive thematic analysis. Integration will occur through connecting, building, and joint-display comparison to generate mixed-methods inferences. Ethical safeguards include informed consent, confidentiality, voluntary participation, and non-punitive observation. The study can provide a context-sensitive understanding of whether training changes competence and why particular practices are accepted, adapted, or difficult to sustain.

Keywords: *Anganwadi workers; infection prevention and control; competency-based training; mixed methods; experiences; perceptions; implementation*

Introduction

Anganwadi centres are a major community platform for supplementary nutrition, early childhood care and education, growth monitoring, nutrition and health education, and referral services. Under Mission Saksham Anganwadi and Poshan 2.0, Anganwadi workers are recognized as grassroots functionaries who require continuing capacity-building, practical support, and supervision (Ministry of Women and Child Development [MWCD], 2022). Their role places them in close contact with children, caregivers, food, utensils, toys, toilets, shared surfaces, and minor illness events. Basic infection prevention is therefore not an additional activity; it is embedded in the safe delivery of routine Anganwadi services.

Children below six years are particularly susceptible to respiratory and gastrointestinal infections because they frequently touch their face, share objects, require assistance with toileting and feeding, and have developing immunity. The World Health Organization (WHO, 2025) identifies five important community hand-hygiene moments: before preparing food; before eating, feeding, or breastfeeding; after using the toilet or handling faeces; after coughing, sneezing, or nose-blowing; and when hands are visibly dirty. These recommendations are directly applicable to Anganwadi settings, but correct practice also depends on water, soap, cleaning materials, time, supervision, and supportive social norms.

Training may improve knowledge without producing consistent behaviour if workers cannot practise procedures, receive feedback, or overcome contextual barriers. Research in childcare settings indicates that multimodal programmes can improve infection-control knowledge, self-efficacy, and hand-hygiene performance (Pidjadee et al., 2024; Rosen et al., 2009; Zomer et al., 2016). Indian studies also show that focused training can strengthen Anganwadi workers' knowledge and their capacity to act as community health educators (Prabha et al., 2016; Raj et al., 2013). However, numerical change scores alone cannot explain whether workers found a programme practical, respectful, culturally appropriate, and sustainable. A mixed-methods

evaluation is therefore needed to connect measured outcomes with lived implementation experience.

Aim and Objectives

The study aims to evaluate a competency-based infection control programme and explore the experiences and perceptions of Anganwadi workers who receive it. The quantitative objectives are to determine changes in knowledge, observed infection-control skills, self-efficacy, and perceptions; compare outcomes between intervention and comparison groups; and examine whether selected worker or centre characteristics are associated with improvement.

The qualitative objectives are to explore how workers experience the teaching methods and competency assessment; identify perceived benefits, anxieties, barriers, enabling conditions, and changes in professional confidence; and understand how resources, workload, supervision, family expectations, and local practices influence application. The mixed-methods objective is to integrate both strands so that qualitative accounts explain patterns, unexpected results, and differences in quantitative response.

Conceptual Basis

The programme is informed by the capability-opportunity-motivation model within the behaviour change wheel (Michie et al., 2011). Capability includes knowledge and procedural skill; opportunity includes supplies, time, physical layout, supervisory support, and accepted workplace norms; motivation includes perceived importance, confidence, professional identity, and intention. The theory of planned behaviour further highlights the influence of attitude, subjective norms, and perceived behavioural control on practice (Ajzen, 1991). These frameworks support measurement of both competence and perception and prevent training outcomes from being interpreted without attention to the work environment.

Methods

Study Design

An explanatory sequential mixed-methods design will be used. The first phase will collect and analyse quantitative data, and the second phase will use qualitative interviews to explain selected quantitative findings (Creswell & Plano Clark, 2018; Ivankova et al., 2006). Quantitative priority is appropriate because the programme has defined competency outcomes, while the qualitative follow-up is essential for understanding implementation, meaning, and variation. Integration will be planned from the outset rather than added after two separate analyses.

Setting and Participants

The study will be conducted in selected Anganwadi centres within the chosen study district. Eligible participants will be currently appointed Anganwadi workers who provide routine services, are available during data collection, and provide written informed consent. Workers who have recently completed an equivalent structured infection-control course or who cannot participate in competency assessment will be excluded. Centres should be allocated to intervention or comparison conditions at cluster level where feasible to reduce contamination between workers.

Sample Size and Sampling

The quantitative sample size will be calculated before recruitment using the expected between-group difference in the primary outcome, a two-sided alpha of .05, power of at least 80%, allowance for clustering, and anticipated attrition. Multistage or cluster sampling may be used to select projects and centres, followed by recruitment of eligible workers. For the qualitative phase, approximately 15-20 intervention participants will be selected purposively, with final sampling guided by information adequacy. Maximum variation will be sought across years of experience, centre location, baseline score, degree of improvement, and perception score.

Competency-Based Infection Control Programme

The proposed intervention will comprise a two-day face-to-face programme followed by a brief workplace booster approximately four weeks later. Local adaptation should occur after observing facilities and consulting supervisors and health personnel. The content will address routes of infection transmission; critical hand-hygiene moments and technique; respiratory etiquette; safe food and water handling; cleaning and disinfection of toys, surfaces, toilets, spills, and linen; waste segregation; appropriate glove use; early recognition of illness; referral; documentation; and communication with caregivers.

Every module will use a teach-demonstrate-practise-assess-feedback sequence. Facilitators will employ pictures, local-language explanations, case scenarios, low-cost simulation, and return demonstration. Participants will receive immediate corrective feedback using standardized checklists. The booster will review difficult steps, correct misunderstandings observed in practice, and reinforce procedures through peer demonstration. Comparison centres will continue routine practice during the study and should be offered the programme after completion of outcome assessment.

Quantitative Measures

Quantitative tools will include a demographic and work-profile form; an infection-control knowledge questionnaire; an observation checklist for core competencies; and a five-point perception and self-efficacy scale. Knowledge items will cover transmission, hand hygiene, food safety, environmental cleaning, waste, respiratory practices, illness recognition, and referral. Skills will be assessed through return demonstration or structured workplace observation. Perception items will address usefulness, confidence, feasibility, workload, perceived control, social support, safety responsibility, and intention to maintain practice.

Investigator-developed tools will undergo content validation by experts in community health nursing, paediatrics, public health, infection control, Anganwadi services, and research methodology. A pilot study will assess clarity, administration time, and feasibility. Reliability will be examined using Kuder-Richardson or an appropriate internal-consistency coefficient for

the knowledge tool, Cronbach's alpha for the perception scale, and inter-rater agreement for observed skills. Assessors should receive standardized training and, where feasible, remain unaware of group allocation.

Quantitative Data Collection

Baseline assessment will be completed for both groups before the intervention. Immediate post-test assessment will examine knowledge acquisition and demonstrated skill, while follow-up at approximately one and three months will assess retention and routine application. Information on water, soap, cleaning materials, waste containers, workload, helper availability, and supervisory contact will also be recorded because these opportunity variables may influence performance. Programme fidelity will be documented through attendance, module completion, practice time, facilitator adherence, booster delivery, and feedback received.

Qualitative Phase

Quantitative results will guide participant selection and development of the interview guide. Workers showing large, modest, or minimal improvement and those reporting strongly positive or negative perceptions will be invited so that interviews can explain contrasting patterns. Individual semi-structured interviews of approximately 30-45 minutes will be conducted in the participant's preferred language at a private location. With consent, interviews will be audio-recorded and transcribed verbatim.

Questions will explore memorable learning experiences, reactions to return demonstration and observation, changes in confidence, procedures considered easy or difficult, use of skills during routine work, communication with families, resource and workload barriers, supervisor responses, perceived child-safety benefits, unintended consequences, and suggestions for improvement. Interviewers will use open prompts and avoid presenting competency scores as judgement of the worker.

Data Analysis

Quantitative analysis will include frequency, percentage, mean and standard deviation, or median and interquartile range as appropriate. Baseline comparability will be examined before estimating intervention effects. Primary comparisons should use analysis of covariance or mixed-effects models that adjust for baseline values and account for repeated observations and clustering. Categorical competency outcomes may require generalized mixed models. Effect sizes and 95% confidence intervals will accompany p values. Missing data, attrition, model assumptions, and sensitivity analyses will be reported transparently.

Qualitative data will be analysed through reflexive thematic analysis: familiarization, coding, development of candidate themes, review, definition and naming of themes, and production of the analytic account (Braun & Clarke, 2006). Coding will be attentive to both shared experiences and negative or divergent cases. Software may assist organization, but interpretation will remain the responsibility of the research team.

Mixed-Methods Integration

Integration will occur at three points. First, quantitative results will connect the phases by determining whom to interview. Second, findings will build the qualitative guide by identifying outcomes that require explanation. Third, the datasets will be merged in a joint display that places quantitative patterns beside themes and illustrative quotations. The team will examine convergence, complementarity, expansion, and discordance and develop meta-inferences that are supported by both strands (Fetters et al., 2013). For example, a modest skill gain accompanied by positive perceptions may indicate insufficient practice time, whereas strong knowledge with negative feasibility scores may indicate resource or workload barriers.

Rigour and Trustworthiness

Quantitative quality will be strengthened through validated tools, pilot testing, assessor training, standardized intervention delivery, reliability testing, and appropriate control of baseline and cluster effects. Qualitative credibility will be supported through purposeful variation, prolonged engagement with the dataset, reflective notes, peer discussion of themes, and attention to



disconfirming accounts. An audit trail will document sampling, interview-guide changes, coding decisions, and integration. Mixed-methods quality will be demonstrated by clear justification of design, explicit points of integration, and transparent handling of contradictory findings.

Ethical Considerations

Approval will be obtained from an institutional ethics committee and permission from the responsible Women and Child Development authorities. Participants will receive written information and provide voluntary consent. Data will be de-identified, securely stored, and reported without naming workers or centres. Participation, withdrawal, observed mistakes, and interview comments will not affect employment or appraisal. If observation identifies an immediate child-safety risk, the assessor will provide discreet corrective guidance according to the approved safety procedure.

Expected Contribution and Implications

The study will generate more than a post-training satisfaction report. Quantitative outcomes will indicate whether knowledge, skills, confidence, and perceptions change, while interviews will explain why certain competencies are adopted, adapted, or resisted. The results can identify which programme components are most acceptable, which skills require additional practice, and whether infrastructure or organizational factors limit performance despite adequate knowledge.

Findings may inform induction curricula, quarterly refresher sessions, supervisory checklists, digital micro-learning, and minimum supply standards. The MWCD guidelines already emphasize participatory training, workplace hand-holding, immediate feedback, and regular capacity-building (MWCD, 2022). A rigorously evaluated programme can translate these principles into a focused child-safety intervention. It may also strengthen coordination between Anganwadi services, community health nursing, local health facilities, and caregivers.

WHO guidance stresses that education is most effective when combined with a conducive environment, monitoring, feedback, and reliable hygiene materials (WHO, 2009, 2024, 2025). Consequently, the study should avoid attributing all outcomes to individual workers.

Recommendations must distinguish gaps in capability from gaps in opportunity and institutional support.

Strengths and Limitations

The protocol's strengths are direct assessment of competence, follow-up measurement, contextual qualitative inquiry, and planned integration. Limitations may include contamination between nearby centres, observer-related improvement, self-report bias, unequal supplies, and limited generalizability beyond the selected district. A quasi-experimental design cannot eliminate all selection bias. These risks should be reduced through cluster allocation where feasible, standardized assessment, documentation of context and fidelity, baseline adjustment, and transparent reporting.

Conclusion

A mixed-methods evaluation is appropriate for understanding both the measurable and experiential dimensions of an infection-control competency programme for Anganwadi workers. By combining knowledge and skill outcomes with accounts of confidence, feasibility, workload, resources, supervision, and family interaction, the study can produce practical recommendations for sustainable implementation. The proposed design remains a protocol; participant results and conclusions about effectiveness must be added only after ethical data collection and analysis.

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