

Original Research Article

Psychological distress among ASHA workers serving zero-dose and non-zero-dose UPHC catchments in Malegaon, Maharashtra: a cross-sectional study

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ABSTRACT

Background: ASHA workers support immunization and community outreach, yet evidence on their psychological well-being in zero-dose programme settings is limited. This study compared psychological distress among ASHA workers serving zero-dose and non-zero-dose UPHC catchments in Malegaon Municipal Corporation, Maharashtra.

Methods: A cross-sectional analytical study included 184 ASHA workers nested within 14 UPHCs (88 in six zero-dose and 96 in eight non-zero-dose catchments). DASS-21 scores were reconstructed directly from the 21 questionnaire items. Group differences were assessed using Welch tests with Mann-Whitney sensitivity analyses; mean differences, 95% confidence intervals and Cohen's d were reported. Adjusted linear models used family type and religion, with small-sample cluster-robust CR2 inference at UPHC level.

Results: Mean stress was 15.34 versus 8.96 (difference 6.38, 95% CI 3.95-8.82; $d=0.78$), anxiety 13.89 versus 8.98 (difference 4.91, 95% CI 2.59-7.22; $d=0.62$), and depression 8.66 versus 6.00 (difference 2.66, 95% CI 0.49-4.83; $d=0.37$) in zero-dose versus non-zero-dose groups. Adjusted CR2 coefficients were +7.47 for stress ($p=0.033$), +6.01 for anxiety ($p=0.068$) and +3.20 for depression ($p=0.305$).

Conclusions: ASHA workers serving zero-dose catchments had higher observed stress and anxiety scores. Stress showed the most consistent evidence across analyses, whereas anxiety was less precise at cluster level and depression remained exploratory. The findings represent cross-sectional associations, not causal effects, and should be interpreted in light of only 14 UPHC clusters and fieldwork conducted after programme expansion.

Keywords: ASHA, Community health workers, DASS-21, Immunization, Stress, Zero-dose

INTRODUCTION

Accredited social health activists (ASHAs) are frontline community health workers who connect households with preventive and primary health services. Their work includes community mobilization, health education, maternal and child health activities and support for immunization. Studies of ASHA working conditions have described multiple concurrent responsibilities, travel demands and practical constraints, while broader community health worker literature has reported high

perceived workload and the challenges associated with multiple tasks and transport.¹⁻³

Zero-dose children are operationally defined by WHO as children who did not receive their first dose of a diphtheria-tetanus-pertussis-containing vaccine (DTP1).⁴ UNICEF similarly describes zero-dose children as those who have not received DTP1 and emphasises the concentration of zero-dose children in underserved communities.⁵ In this study, "zero-dose" refers to the programme/geographic designation of an UPHC

catchment and not to the vaccination status of an individual ASHA worker.

The psychological burden of ASHAs has also been documented in Indian settings. A study from southern Bengaluru reported stress, anxiety and depression among ASHAs during the COVID-19 period, while Maharashtra-based research has described the interaction of ASHA duties, travel, household responsibilities and increasing programme activities.^{6,7} However, the psychological well-being of workers serving catchments designated for zero-dose outreach has received less attention.

The present study therefore compared stress, anxiety and depression among ASHA workers serving zero-dose and non-zero-dose UPHC catchments in Malegaon Municipal Corporation. Stress was designated as the principal outcome, anxiety as a secondary outcome and depression as an exploratory outcome. Because fieldwork occurred after programme expansion, the study was framed as a cross-sectional comparison of workers serving differently classified catchments rather than as a causal evaluation of programme implementation.

METHODS

Study design, setting and fieldwork

A cross-sectional comparative analytical study was conducted among ASHA workers deployed under the urban primary health centres (UPHCs) of Malegaon Municipal Corporation, Maharashtra. Fourteen UPHCs were represented in the study dataset: six classified as zero-dose and eight as non-zero-dose catchments.

Ethical approval was obtained from the institutional research committee of the School of Public Health and Social Medicine, Pravara Institute of Medical Sciences-Deemed to be University, dated 18 November 2025 (Ref: PIMS/SPHSM/IRC/2026/449/2). Field preparation and administrative approvals from district health officials were undertaken in February 2026. Participant data were collected in the field from 17 March to 4 April 2026. Written informed consent was obtained before participation.

The dissertation records expansion of the zero-dose programme across Malegaon UPHCs in February 2026. Thus, the fieldwork period followed programme expansion. The study does not constitute a contemporaneous pre-expansion versus post-expansion or causal programme comparison.

Participants, eligibility and sampling

The study population comprised ASHA workers under Malegaon Municipal Corporation. Eligibility criteria were employment under Malegaon Municipal Corporation, at least one year of work experience, willingness to participate and ability to provide written informed

consent. ASHAs on extended leave during data collection, those unavailable despite repeated attempts to contact them, and those who declined participation were excluded.

The dissertation reports probability-based stratified random sampling. The study population was divided into zero-dose and non-zero-dose UPHC strata; the planned sample was allocated proportionately across UPHCs according to the number of ASHA workers, followed by simple random selection of eligible ASHAs within UPHCs. The minimum calculated sample size was 172 using an expected prevalence of 56.5%, 95% confidence, 5% margin of error, population size 314 and design effect 1. The final analytic sample was 184.

Measurement

Psychological outcomes were assessed using the 21-item depression anxiety stress scales (DASS-21), a self-report measure of negative emotional states. The seven stress items were Q1, Q6, Q8, Q11, Q12, Q14 and Q18; anxiety items were Q2, Q4, Q7, Q9, Q15, Q19 and Q20; depression items were Q3, Q5, Q10, Q13, Q16, Q17 and Q21. Each subscale sum was multiplied by two, as recommended for DASS-21 scoring.⁸

Severity bands were: stress- normal 0-14, mild 15-18, moderate 19-25, severe 26-33, extremely severe ≥ 34 ; anxiety- normal 0-7, mild 8-9, moderate 10-14, severe 15-19, extremely severe ≥ 20 ; depression- normal 0-9, mild 10-13, moderate 14-20, severe 21-27, extremely severe ≥ 28 .⁸

Statistical analysis

All three DASS-21 scores were independently reconstructed from the raw questionnaire items rather than relying on pre-derived spreadsheet columns. Descriptive analyses used means, standard deviations and severity distributions. Because group variances differed, Welch's t-tests were used for mean comparisons. Mann-Whitney tests were used as distribution-robust sensitivity analyses. Differences were defined as zero-dose minus non-zero-dose and reported with 95% confidence intervals and Cohen's d.

Because the exposure designation was assigned at UPHC level, the 184 workers represented only 14 exposure clusters. Adjusted linear models included family type and religion as a parsimonious adjustment set and used cluster-robust CR2 inference with UPHC as the clustering unit. The models reported the adjusted zero-dose coefficient, CR2 standard error, small-sample p value and R^2 . Leave-one-UPHC-out analyses examined sensitivity to individual clusters. No automated stepwise or all-subsets model selection was used.

Internal consistency of each DASS-21 subscale was assessed using Cronbach's alpha. Statistical interpretation

emphasized effect size, confidence intervals, model fit and cluster-level uncertainty rather than p-values alone.

RESULTS

Participant characteristics

The study included 184 ASHA workers: 96 (52.2%) serving non-zero-dose catchments and 88 (47.8%) serving zero-dose catchments. Mean age was approximately 37.6 years in both groups. Most participants were married, and joint families were more common overall.

The distribution of religion differed between the groups, with Hindu participants more common in the non-zero-dose group and Muslim participants more common in the zero-dose group.

DASS-21 scores

Table 2 shows comparison of DASS-21 subscale scores. Welch tests were used because of unequal variances. Mann-Whitney sensitivity p values were <0.001 for stress, <0.001 for anxiety and 0.288 for depression.

Table 1: Participant characteristics by UPHC catchment designation.

Characteristics	Non-zero-dose (n=96) (%)	Zero-dose (n=88) (%)	Total (n=184) (%)
Age, mean years	37.6	37.5	37.6
Work experience, mean years	6.31	6.89	6.59
Married	86 (89.6)	77 (87.5)	163 (88.6)
Divorced	3 (3.1)	6 (6.8)	9 (4.9)
Widowed	7 (7.3)	5 (5.7)	12 (6.5)
Nuclear family	26 (27.1)	42 (47.7)	68 (37.0)
Joint family	70 (72.9)	46 (52.3)	116 (63.0)
Hindu	73 (76.0)	31 (35.2)	104 (56.5)
Muslim	22 (22.9)	53 (60.2)	75 (40.8)
Other religion	1 (1.0)	4 (4.5)	5 (2.7)

Percentages are within column groups. Age values are rounded from the audited dataset; work-experience values are means.

Table 2: Comparison of DASS-21 subscale scores.

Outcome	Non-zero-dose mean (SD)	Zero-dose mean (SD)	Difference (95% CI)	Cohen's d	Welch p
Stress	8.96 (6.61)	15.34 (9.66)	+6.38 (3.95 to 8.82)	0.78	<0.001
Anxiety	8.98 (6.69)	13.89 (8.95)	+4.91 (2.59 to 7.22)	0.62	<0.001
Depression	6.00 (5.18)	8.66 (9.02)	+2.66 (0.49 to 4.83)	0.37	0.017

Difference = zero-dose minus non-zero-dose.

Table 3: DASS-21 severity distributions using standard cut-points.

Severity	Stress non-zero (%)	Stress zero-dose (%)	Anxiety non-zero (%)	Anxiety zero-dose (%)	Depression non-zero (%)	Depression zero-dose (%)
Normal	80 (83.3)	49 (55.7)	43 (44.8)	20 (22.7)	72 (75.0)	59 (67.0)
Mild	9 (9.4)	10 (11.4)	15 (15.6)	7 (8.0)	13 (13.5)	4 (4.5)
Moderate	5 (5.2)	18 (20.5)	23 (24.0)	26 (29.5)	10 (10.4)	16 (18.2)
Severe	1 (1.0)	3 (3.4)	4 (4.2)	9 (10.2)	1 (1.0)	5 (5.7)
Extremely severe	1 (1.0)	8 (9.1)	11 (11.5)	26 (29.5)	0 (0.0)	4 (4.5)

Table 4: Parsimonious adjusted linear models with UPHC-clustered CR2 inference.

Outcome	Adjusted zero-dose coefficient	CR2 SE	95% CI	CR2 p	R ²
Stress	+7.47	3.00	+0.76 to +14.19	0.033	0.193
Anxiety	+6.01	2.92	-0.53 to +12.55	0.068	0.156
Depression	+3.20	2.95	-3.41 to +9.80	0.305	0.065

Models adjusted for family type and religion. Confidence intervals are based on the reported CR2 standard errors and Satterthwaite degrees of freedom (9.72).

Severity distributions

Table 3 shows DASS-21 severity distributions using standard cut-points. Five-category comparisons were treated primarily as descriptive because some cells were small. Five-category chi-square p values were 0.0003 for stress, 0.0007 for anxiety and 0.0080 for depression.

Internal consistency

Cronbach's alpha was 0.779 for stress, 0.799 for anxiety and 0.809 for depression. These coefficients indicate internal consistency of the subscales in this sample; they do not establish diagnostic validity or causality.

Adjusted and cluster-robust analyses

The adjusted zero-dose coefficient remained positive for all three outcomes. Stress showed the strongest cluster-robust evidence. Anxiety retained a substantial positive estimate but with greater cluster-level uncertainty, while Depression was not supported by the CR2 analysis. The models explained 19.3% of stress variance, 15.6% of anxiety variance and 6.5% of depression variance.

Sensitivity and UPHC heterogeneity

Leave-one-UPHC-out analysis retained a positive adjusted association after removal of every UPHC. The stress estimate ranged from +5.68 to +9.08, anxiety from +4.38 to +7.83 and depression from approximately +0.82 to +4.26. No single UPHC reversed the direction of the observed association.

Substantial heterogeneity was also observed within zero-dose UPHCs: mean stress scores ranged from 3.69 to 25.47 across the six zero-dose UPHCs. This variation indicates that the zero-dose designation did not correspond to a uniform psychological environment.

DISCUSSION

The principal finding was that ASHA workers serving zero-dose UPHC catchments had higher observed stress and anxiety scores than those serving non-zero-dose catchments. The stress difference was substantial (Cohen's $d=0.78$) and remained positive in the adjusted cluster-robust analysis. Anxiety also showed a substantial participant-level difference ($d=0.62$), although its cluster-robust estimate was less precise. Depression showed a smaller effect and weaker, inconsistent evidence across sensitivity analyses.

The findings are compatible with broader evidence that community health workers may experience high workload, multiple concurrent tasks, transport constraints and other structural challenges.^{1-3,7} Research among ASHAs in Maharashtra has documented expanding responsibilities, travel demands and tiredness, while studies of ASHA psychological well-being have

identified measurable stress, anxiety and depression.^{6,7} These studies provide context but do not demonstrate that the same mechanisms explain the present Malegaon findings.

Several plausible mechanisms could be relevant in zero-dose outreach settings, including repeated household contact, mapping of underserved populations, community engagement and organizational demands. However, this study did not measure workload hours, travel distance, number of visits, refusal rates, programme targets, supervision quality, remuneration or other mechanisms. The observed association therefore should not be attributed to any single pathway.

Cluster structure is central to interpretation. The exposure was assigned at UPHC level, with only 14 UPHCs represented. Treating all 184 workers as independent exposure units would overstate the amount of independent exposure information. The CR2 analysis therefore provides a more conservative inferential framework. Under this framework, stress has the clearest evidence, anxiety remains noteworthy but imprecise, and depression is exploratory.

The timing of the study is equally important. Data collection occurred from 17 March to 4 April 2026, after programme expansion in February 2026. Consequently, the dataset does not represent a clean contemporaneous pre-expansion comparison. The results should therefore be understood as differences among workers serving catchments classified differently in the study framework, rather than as the causal effect of introducing the zero-dose programme.

Strengths include reconstruction of DASS-21 scores from raw questionnaire items, standard DASS-21 scoring, reporting of effect sizes and confidence intervals, explicit recognition of UPHC clustering, small-sample cluster-robust inference and leave-one-UPHC-out sensitivity analysis.

The limitations include the cross-sectional design, which prevents causal inference; only 14 UPHC clusters, which limits precision and generalizability; absence of direct measurement of mechanisms that might explain between-catchment differences; reliance on a self-report psychological measure that is not a clinical diagnostic assessment; and fieldwork conducted after programme expansion, which limits interpretation as a contemporaneous zero-dose versus non-zero-dose programme comparison.

Implications

The stronger stress signal suggests that worker well-being should be considered when planning and monitoring immunization outreach in zero-dose catchments. Programme managers could consider periodic assessment of workload, supervision, travel demands, community-

engagement difficulties and psychological well-being rather than assuming that programme burden is captured by service coverage indicators alone.

Future studies should measure workload and implementation conditions directly, recruit a larger number of UPHCs or other clusters, and use longitudinal or quasi-experimental designs where feasible. Such designs would help distinguish catchment characteristics from individual and organizational determinants of worker well-being.

CONCLUSION

Among ASHA workers in Malegaon Municipal Corporation, those serving zero-dose UPHC catchments had higher stress and anxiety scores than those serving non-zero-dose catchments. Stress showed the most consistent evidence across participant-level, adjusted, cluster-robust and sensitivity analyses. Anxiety showed a substantial positive association but less precise cluster-level inference, while depression remained exploratory. These findings should be interpreted as cross-sectional associations rather than causal effects of zero-dose programme implementation.

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