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Awareness of Cervical Cancer and Visual Inspection with Acetic Acid (VIA) Screening Among Rural and Urban Women of Bhopal: A Community-Based Comparative Study

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Abstract

Background: Cervical cancer kills more women in low- and middle-income countries than in high-income settings, largely because organised screening does not reach them. In rural India, this gap is acute: women are rarely told what cervical cancer is, let alone offered Visual Inspection with Acetic Acid (VIA)- a cheap, field-ready screening method recommended by the WHO. How large the awareness gap between rural and urban women actually is in Madhya Pradesh has not been well measured.

Objectives: To compare cervical cancer and VIA screening awareness between rural and urban women in Bhopal, Madhya Pradesh, and to examine how awareness varies with education, income, and age.

Methods: A community-based comparative cross-sectional study enrolled 200 women aged 30-60 years (rural n = 100; urban n = 100) by systematic random sampling. An eight-item binary questionnaire assessed awareness of the disease, VIA, symptoms, risk factors, preventability, and screening necessity. An aggregate score (0-8; greater than or equal to 5 = adequate) was compared between groups using independent t-test, Mann-Whitney U test, and chi-square test; associations with socio-demographic variables were examined by one-way ANOVA.

Results: Urban women scored significantly higher (mean 6.01 plus or minus 1.11 vs. 3.43 plus or minus 1.42; $t = -14.273$, $p < 0.001$). Adequate awareness was found in 89.0% of urban women but only 22.0% of rural women (chi-square = 90.880, $p < 0.001$). Awareness varied significantly with education ($F = 4.677$, $p = 0.001$), income ($F = 6.345$, $p = 0.002$), and age group ($F = 3.531$, $p = 0.031$).

Conclusion: Nearly four in five rural women had inadequate awareness of cervical cancer and VIA screening. Targeted health education designed specifically for rural, low-literacy, and older women is needed to improve screening uptake in Madhya Pradesh.

Keywords: cervical cancer awareness; VIA screening; rural-urban disparity; community-based study; Madhya Pradesh; health literacy; early detection

1. Introduction

Cervical cancer is the fourth most commonly diagnosed cancer in women globally. In 2020, there were an estimated 604,000 new cases and 342,000 deaths, and 90% of those deaths occurred in low- and middle-

income countries, where screening infrastructure is thin and treatment often arrives too late (Sung et al., 2021; World Health Organization [WHO], 2022). India carries about one quarter of the global burden, with an age-standardised incidence rate of 18.3 per 100,000 women (Indian Council of Medical Research [ICMR], 2022). Madhya Pradesh sits near the bottom of the national distribution: incidence and mortality exceed the national average, and in rural districts, cervical screening uptake is reported to be low (Kar et al., 2019; National Cancer Registry Programme [NCRP], 2020).

High-risk HPV strains, primarily types 16 and 18, cause approximately 70% of cases, a fact established decades ago (Clifford et al., 2006). Yet fewer than 25% of Indian women aged 30-49 years have ever been screened (International Institute for Population Sciences [IIPS], 2021). VIA, which involves applying dilute acetic acid to the cervix and visually identifying acetowhite lesions, requires no laboratory and can be performed by trained nurses at a sub-centre. Systematic reviews place its sensitivity for CIN2+ between 49% and 86% (Arbyn et al., 2008; Sankaranarayanan et al., 2007), and the WHO recommends it as a front-line screening option where cytology is unavailable (WHO, 2013).

Screening uptake depends on awareness. Studies across Indian states consistently find lower cervical cancer and VIA awareness in rural populations than urban ones, with illiteracy and low income as the most reliable predictors of non-awareness (Aswathy et al., 2012; Berkman et al., 2011; Chandrika et al., 2020). One further distinction matters: knowing that cervical cancer exists is not the same as knowing how to screen for it. Women who have heard of the disease often have no idea what VIA involves or where it is offered (Sankaranarayanan et al., 2007; Vellakkal et al., 2013).

Comparative data from within Madhya Pradesh are sparse. Bhopal district, where rural villages and urban wards fall under the same district health administration, offers a setting in which both populations share the same health system backbone, making rural-urban comparisons more methodologically defensible than cross-state analyses. This study compared cervical cancer and VIA screening awareness between rural and urban women in Bhopal and examined how awareness tracks with education, income, and age.

2. Materials and Methods

2.1 Study Design and Setting

This was a community-based comparative cross-sectional study conducted in Bhopal district, Madhya Pradesh, India. Rural participants were enrolled from villages within the Bhopal block; urban participants from residential wards within the Bhopal Municipal Corporation limits. Placing both groups within the same district administration meant that differences in district-level health infrastructure were held approximately constant.

2.2 Study Population and Eligibility

Women aged 30-60 years who had lived at their current address for at least six months were eligible. Pregnant women, those who had undergone hysterectomy, and those with a prior cervical cancer diagnosis were excluded. Women unable to complete a structured interview because of communication barriers were also excluded.

2.3 Sample Size and Sampling

Sample size was estimated for comparing two independent proportions, using community-level cervical cancer awareness of 27% in rural and 62% in urban women (Chandrika et al., 2020), a two-tailed alpha of 0.05, and 80% power. The calculation yielded a minimum of 84 per group; this was rounded up to 100 per group (N = 200) to buffer against non-response. Recruitment used systematic random sampling: rural households were enumerated within selected villages and every third household was approached; an

equivalent interval was applied in selected urban wards. Where the identified woman was absent or ineligible, the adjacent household was used as a replacement.

2.4 Data Collection Instrument

Trained interviewers administered a structured questionnaire with two sections. The first captured socio-demographic data: age, residence, educational qualification, and monthly household income. The second contained eight binary (yes/no) items asking about: awareness of cervical cancer as a disease; awareness of VIA screening; knowledge of cervical cancer risk factors; knowledge of symptoms; understanding that cervical cancer is preventable; understanding that screening is necessary; awareness of the VIA procedure specifically; and knowledge that periodic repeat screening is required. Correct responses were summed to give an awareness score from 0 to 8. A score of 5 or above-corresponding to 60% or more correct-was classified as adequate awareness (Chandrika et al., 2020).

The questionnaire was translated into Hindi and piloted with 20 women who were not part of the final sample. Because the awareness items were binary, internal consistency was assessed with the Kuder-Richardson Formula 20 (KR-20), which gave a coefficient of 0.72-acceptable for a newly developed health awareness scale. Inter-rater reliability among interviewers was confirmed during a structured pre-data-collection exercise.

2.5 Statistical Analysis

Data entry and cleaning were done in Microsoft Excel; all analyses used IBM SPSS Statistics version 25.0. Categorical variables are described as frequencies and percentages; continuous variables as means plus or minus SD and medians with interquartile ranges (IQR). Socio-demographic differences between groups were tested by chi-square. The primary outcome-awareness score-was compared between rural and urban women using the independent samples t-test, with the Mann-Whitney U test run alongside it as a non-parametric check. Item-level proportions were compared with Fisher's Exact Test. The binary adequacy classification (score 5 or above vs. below 5) was compared by chi-square. Associations between awareness score and education, age, and income were tested by one-way ANOVA on the combined sample ($N = 200$); Tukey's Honest Significant Difference (HSD) post-hoc tests followed significant ANOVA results. The significance threshold was $p < 0.05$ throughout.

2.6 Ethical Considerations

The study followed the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee (IEC), RKDF University, with approval reference number 24/RKDF/2025, prior to data collection. Written informed consent was obtained from all participants, and participation was voluntary. To maintain confidentiality, anonymous identification codes were used in place of personal identifiers on all questionnaire forms.

3. Results

A total of 200 women were enrolled in the study, with equal representation from rural ($n = 100$) and urban ($n = 100$) areas of Bhopal, Madhya Pradesh. The mean age of rural participants was 46.11 ± 9.12 years and of urban participants was 44.28 ± 9.38 years ($p = 0.163$). Socio-demographic characteristics, including education ($\chi^2 = 41.707$, $p < 0.001$) and income ($\chi^2 = 26.802$, $p < 0.001$), differed significantly between the two groups, with urban women having higher educational attainment and income levels.

3.1 Item-wise Awareness of Cervical Cancer and VIA Screening

Item-wise awareness responses among rural and urban women are presented in Table 1 and Figure 1. Urban women demonstrated significantly higher awareness on six of the eight assessed items. Awareness

regarding the existence of cervical cancer was reported by only 34.0% of rural women compared to 68.0% of urban women ($p < 0.001$). Knowledge that cervical cancer is preventable was significantly lower among rural women (50.0%) than urban women (79.0%) ($p < 0.001$). Awareness of cervical cancer symptoms showed the most marked disparity, with 36.0% of rural women compared to 93.0% of urban women reporting awareness ($p < 0.001$). Awareness of VIA screening as a preventive procedure (31.0% rural vs. 71.0% urban, $p < 0.001$) and the importance of regular screening (44.0% rural vs. 86.0% urban, $p < 0.001$) were also significantly higher among urban respondents. Awareness of VIA screening modality (44.0% vs. 57.0%, $p = 0.066$) and risk factors for cervical cancer (59.0% vs. 70.0%, $p = 0.104$) did not reach statistical significance.

Table 1 : Item-wise awareness of cervical cancer and VIA screening among rural and urban women of Bhopal

Awareness Item	Rural (n=100)		Urban (n=100)		Total (N=200)		p-value
	n	%	n	%	n	%	
Aware of Cervical Cancer	34	34.0	68	68.0	102	51.0	**<0.001***
Aware of VIA Screening	44	44.0	57	57.0	101	50.5	0.066
Aware of Risk Factors	59	59.0	70	70.0	129	64.5	0.104
Aware of Symptoms	36	36.0	93	93.0	129	64.5	**<0.001***
CC is Preventable	50	50.0	79	79.0	129	64.5	**<0.001***
Screening is Needed	45	45.0	77	77.0	122	61.0	**<0.001***
Aware of VIA Procedure	31	31.0	71	71.0	102	51.0	**<0.001***
Regular Screening Needed	44	44.0	86	86.0	130	65.0	**<0.001***

*VIA = Visual Inspection with Acetic Acid; CC = Cervical Cancer. *p < 0.05 statistically significant. Fisher's Exact Test used for all 2×2 comparisons. Percentages based on n = 100 per group.*

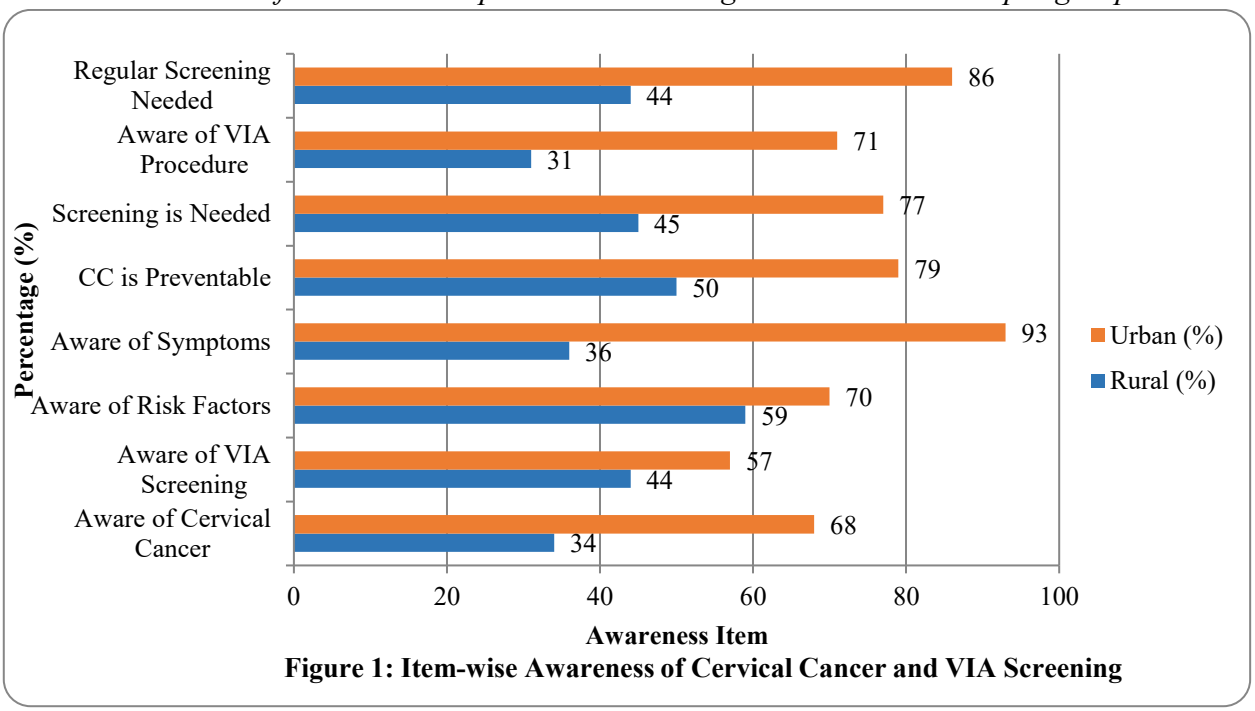

Figure 1: Item-wise Awareness of Cervical Cancer and VIA Screening

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*(Item-wise awareness of cervical cancer and VIA screening among rural and urban women of Bhopal (n = 200). Values represent percentage of women responding 'Yes' to each item. *p < 0.05.)*

3.2 Comparison of Awareness Scores between Rural and Urban Women

The awareness score was computed as the sum of correct responses across the eight items, yielding a possible range of 0 to 8. The mean awareness score was significantly higher among urban women (6.01 ± 1.11) compared to rural women (3.43 ± 1.42) ($t = -14.273$, $p < 0.001$; Mann-Whitney $U = 888$, $p < 0.001$), as presented in Table 2 and Figure 2. Based on a pre-defined cut-off of ≥5 (≥60% correct), adequate awareness was observed in only 22.0% of rural women compared to 89.0% of urban women ($\chi^2 = 90.880$, $p < 0.001$). The proportion with inadequate awareness was substantially higher in the rural group (78.0%) than the urban group (11.0%) (Table 2, Figure 3).

Table 2 : Comparison of awareness scores and awareness category between rural and urban women

Parameter	Rural (n=100)	Urban (n=100)	Total (N=200)	Test Statistic / p-value
Mean Awareness Score (±SD)	3.43 ± 1.42	6.01 ± 1.11	4.72 ± 1.81	**t = −14.273; p < 0.001***
Median (IQR)	3.0 (2.0–5.0)	6.0 (5.0–7.0)	5.0 (3.0–7.0)	**Mann-Whitney U = 888; p < 0.001***
Range (Min–Max)	0–7	3–8	0–8	-
Adequate Awareness (≥5), n (%)	22 (22.0%)	**89 (89.0%)**	111 (55.5%)	**χ^2 = 90.880; p < 0.001***
Inadequate Awareness (<5), n (%)	78 (78.0%)	11 (11.0%)	89 (44.5%)	-

*SD = Standard Deviation; IQR = Interquartile Range. *p < 0.05. Independent t-test and Mann-Whitney U test used for score comparison. Chi-square test for categorical comparison. Score range 0–8; ≥5 classified as Adequate Awareness.*

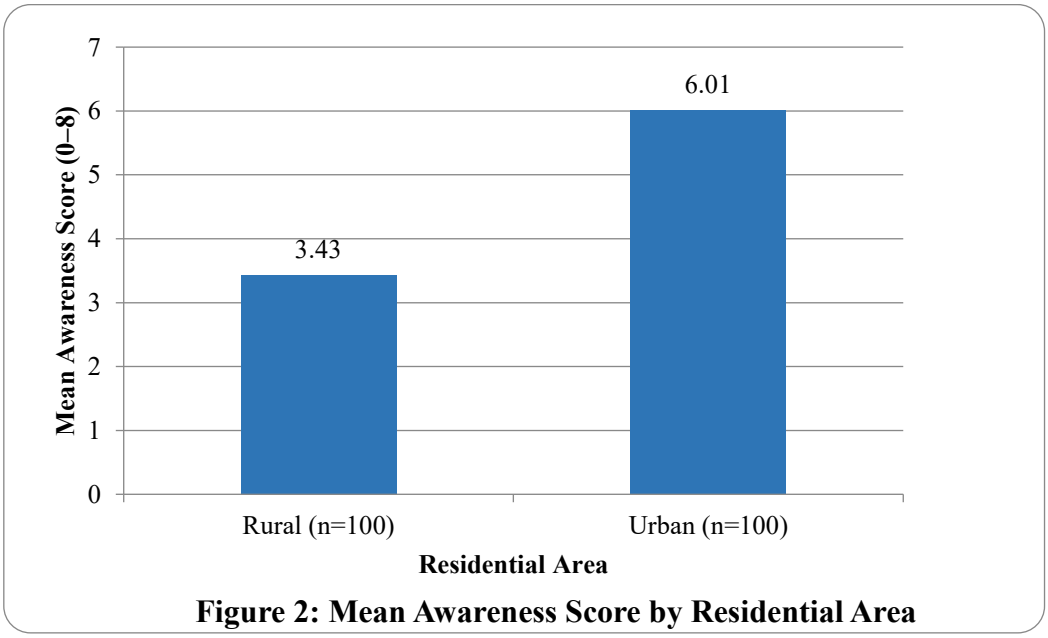

Figure 2: Mean Awareness Score by Residential Area

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(Mean awareness score (±SD) by residential area. Rural mean = 3.43 ± 1.42; Urban mean = 6.01 ± 1.11. Independent t-test: t = −14.273, p < 0.001. Error bars represent standard deviation.)

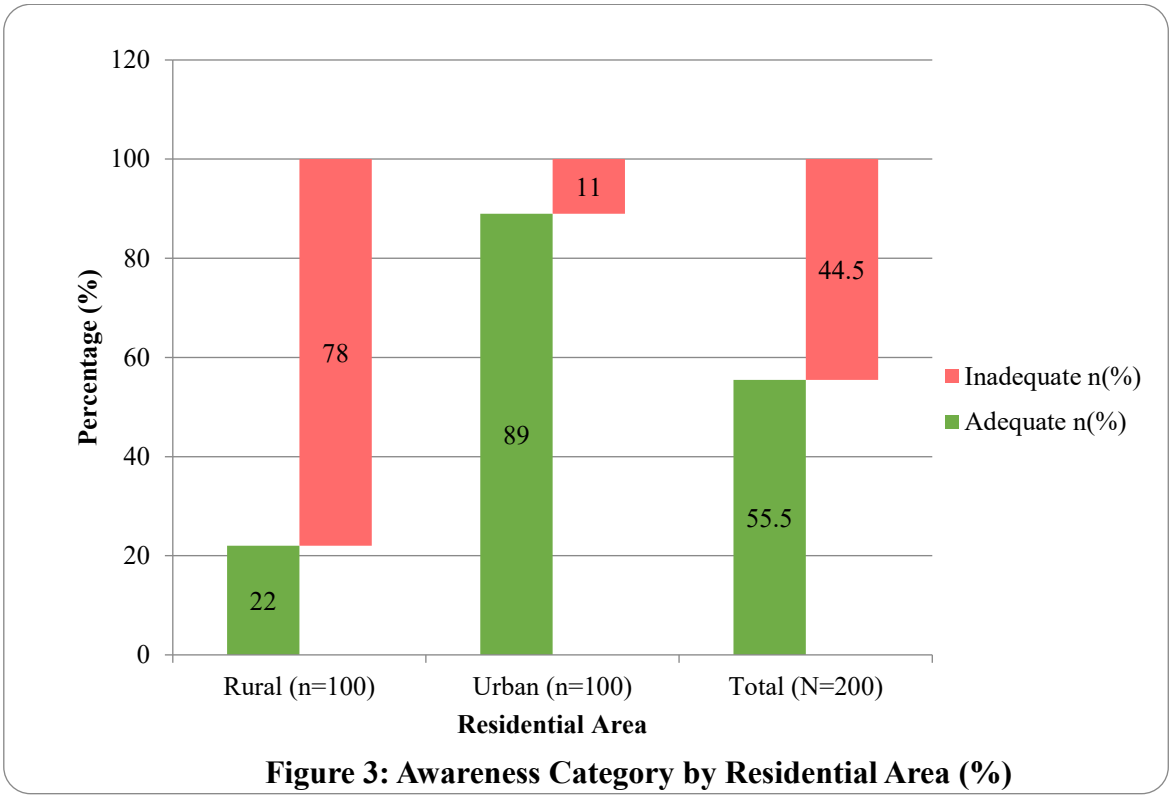

Figure 3: Awareness Category by Residential Area (%)

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(Distribution of awareness adequacy (Adequate ≥5 vs. Inadequate <5) by residential area (%). Adequate awareness: Rural 22.0% vs. Urban 89.0%; $\chi^2 = 90.880$, $p < 0.001$.)

3.3 Association between Awareness and Socio-demographic Factors

Awareness scores were compared across education levels, age groups, and income categories using one-way ANOVA and Kruskal-Wallis tests. Significant variation in awareness scores was observed across education levels (F = 4.677, p = 0.001) and income groups (F = 6.345, p = 0.002), as shown in Table 3 and Figure 4. Women with Graduate/Above education had the highest mean awareness score (5.43 ± 1.29), while illiterate women had the lowest (4.00 ± 1.58). Higher income was associated with higher awareness scores, with women earning >₹20,000 per month achieving a mean score of 5.62 ± 1.50 compared to 4.33 ± 1.83 among those earning <₹10,000 (p = 0.002). Significant variation was also observed across age groups (F = 3.531, p = 0.031), with younger women (30–39 years) demonstrating higher awareness (5.19 ± 1.66) compared to older age groups.

Table 3 : ***Mean awareness score by socio-demographic characteristics among study participants***

Characteristic	Rural		Urban		Total		Overall Mean±SD	F (p-value)
	n	Mean±SD	n	Mean±SD	n	Mean±SD		
Education Level								
Illiterate	25	3.64±1.44	5	5.80±0.84	30	4.00±1.58	4.00±1.58	**F=4.677**
Primary	32	3.22±1.26	18	6.11±1.37	50	4.26±1.90	4.26±1.90	**p=0.001***

Secondary	29	3.45±1.53	24	6.21±1.18	53	4.70±1.95	4.70±1.95	
Higher Secondary	9	3.22±1.64	23	6.22±0.85	32	5.38±1.76	5.38±1.76	
Graduate/Above	5	4.00±1.58	30	5.67±1.09	35	5.43±1.29	5.43±1.29	
Age Group								
30–39 years	29	3.97±1.52	38	6.13±1.04	67	5.19±1.66	5.19±1.66	**F=3.531**
40–49 years	28	3.14±1.43	27	5.93±1.21	55	4.51±1.92	4.51±1.92	**p=0.031***
50–60 years	43	3.26±1.27	35	5.94±1.14	78	4.46±1.81	4.46±1.81	
Income Level (INR)								
< ₹10,000	65	3.35±1.39	37	6.05±1.08	102	4.33±1.83	4.33±1.83	**F=6.345**
₹10,000–20,000	33	3.64±1.52	39	6.05±1.10	72	4.94±1.78	4.94±1.78	**p=0.002***
> ₹20,000	2	2.50±0.71	24	5.88±1.23	26	5.62±1.50	5.62±1.50	

**p < 0.05 statistically significant. One-way ANOVA used. SD = Standard Deviation. Post-hoc Tukey test performed for Education (F=4.677, p=0.001) and Income (F=6.345, p=0.002). Overall Mean±SD reflects combined rural and urban groups.*

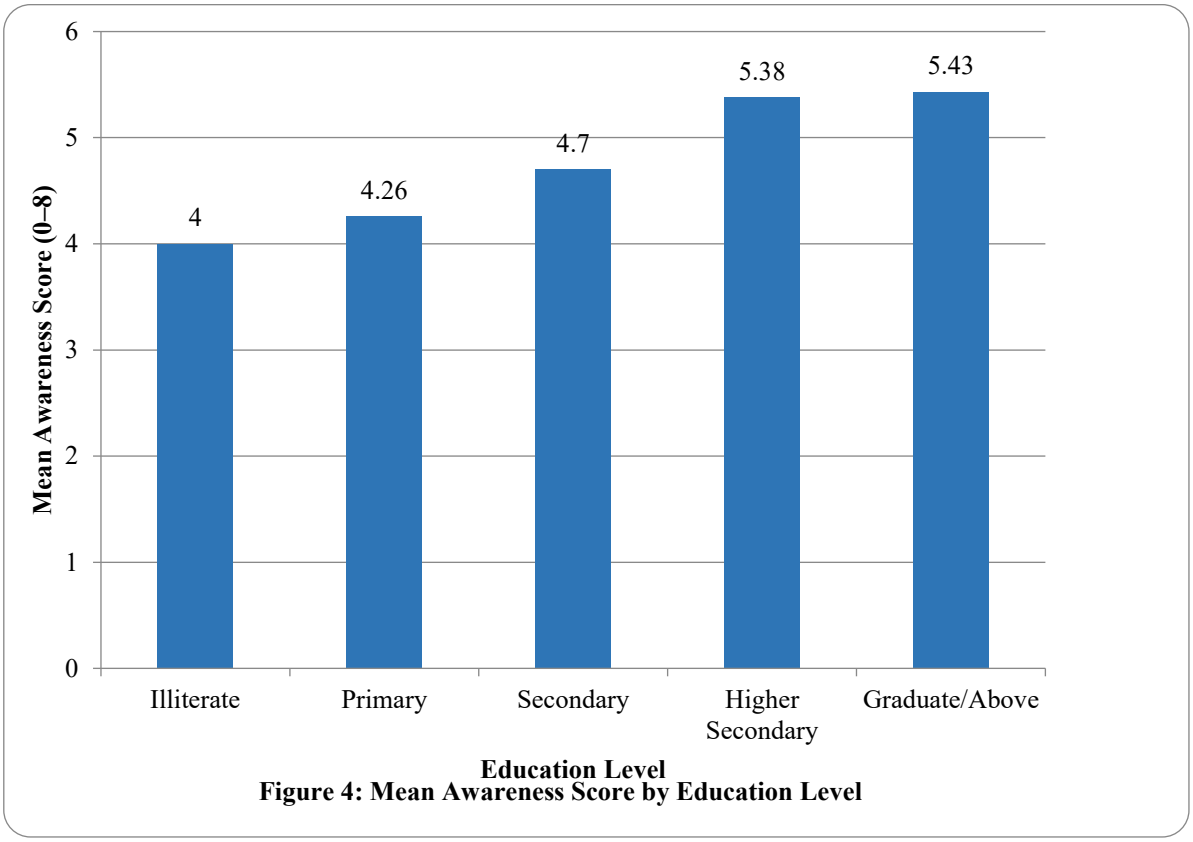

Figure 4: Mean Awareness Score by Education Level

(*Mean awareness score by education level among study participants (n = 200). One-way ANOVA: F = 4.677, p = 0.001. Error bars represent standard deviation.)*

4. Discussion

The gap documented here is large by any reasonable standard. Urban women in Bhopal averaged 6.01 on an 8-point awareness scale; rural women averaged 3.43-a difference of 2.58 points, or roughly 32% of the

total possible score. More starkly, 78% of rural women failed to meet the pre-set adequacy threshold, compared with 11% of urban women. This pattern held across individual items, composite scores, and every socio-demographic subgroup. Similar rural-urban gaps have been reported in Odisha (Kar et al., 2019) and Kerala (Aswathy et al., 2012), suggesting the disparity is structural rather than specific to Bhopal.

The symptom awareness finding deserves particular attention. Only 36% of rural women could identify cervical cancer symptoms, against 93% of urban women-a 57-percentage-point gap that is the largest of any item in the questionnaire. This matters because symptom non-recognition is a direct route to late presentation. Armo et al. (2019) found that rural women in central India routinely attributed inter-menstrual bleeding and abnormal discharge to menstrual irregularity rather than gynaecological pathology, a misattribution that delays care-seeking by months. The rural cancer registries consistently record a higher proportion of stage III-IV diagnoses than urban registries (NCRP, 2020), and symptom non-recognition is one credible explanation. By contrast, the two items that did not reach significance-risk factor knowledge and VIA awareness by name-were precisely the items where rural women scored highest in absolute terms, possibly because ASHA workers have communicated some general preventive messaging even without conveying procedural specifics.

The rural group's score distribution is worth unpacking. The range ran from 0 to 7 and the median was 3.0-indicating that awareness is not uniformly absent, and that a small but real subset of rural women knew almost as much as the average urban woman. Tukey post-hoc tests located the significant education differences primarily at the extremes: illiterate women vs. those with graduate-level education. The intermediate strata showed graded, overlapping distributions-a dose-response pattern, not a sharp threshold. The difference between the rural illiterate and rural graduate subgroups was 0.36 points on an 8-point scale, a modest within-rural variation. The more important gradient runs between rural and urban groups overall, and that gradient is driven more by residential context than by education alone.

Income showed its own independent gradient ($F = 6.345$, $p = 0.002$): mean scores rose from 4.33 in the lowest income bracket to 5.62 in the highest. NFHS-5 data (IIPS, 2021) show the same direction nationally-lower-income women use preventive services less, even after adjusting for education. Vellakkal et al. (2013) attribute this partly to reduced exposure to health programming through television and print media, and partly to the practical reality that subsistence pressures crowd out discretionary health-seeking. Whatever the mechanism, it means that the women who most need outreach are the hardest to reach through conventional channels. Community radio, self-help group meetings, and ASHA home visits are the realistic alternatives.

The age findings add an important programme-planning wrinkle. Awareness was highest among the 30-39 year group (5.19 plus or minus 1.66) and declined through the 40-49 and 50-60 year bands. The younger cohort's advantage probably reflects smartphone-mediated health information. The problem is that the oldest group, who scored lowest, is the group at greatest biological risk for high-grade lesions and invasive cancer (Clifford et al., 2006). Conventional outreach through social media will not reach women who are not online. Interpersonal, face-to-face contact remains the primary channel for this subgroup.

VIA-specific awareness needs to be read separately from general cervical cancer awareness. Even among urban women-89% of whom had adequate composite scores-awareness of the VIA procedure specifically was 57%, and awareness of VIA as a preventive tool was 71%. The gap between knowing the disease exists and knowing what the screening test involves or where to get it is real, and it is present even in the better-informed urban group. Sankaranarayanan et al. (2007) made the same observation in a Tamil Nadu

demonstration project: disease-level and procedure-level knowledge are not interchangeable. A campaign that raises general cervical cancer awareness without explaining what VIA is, what to expect, and where it is available will not reliably translate into screening attendance.

Beyond the measured socio-demographic variables, structural barriers sustain the awareness gap in ways that survey data cannot fully capture. Rural sub-centres in Bhopal have fewer female providers, and many women in this sample would be reluctant to discuss gynaecological concerns with a male health worker (Armo et al., 2019). Distance to district facilities, transportation costs, and the cultural discomfort of discussing intimate symptoms with anyone other than a trusted community member all reduce incidental health information exposure. Addressing these barriers requires more than increasing the volume of health messaging; it requires redesigning the delivery context.

India has committed to the WHO target of screening 70% of eligible women by age 35 and 45 by 2030 (WHO, 2022). In Madhya Pradesh, where 78% of rural women currently lack adequate cervical cancer awareness, that target is not achievable without a qualitative change in outreach strategy-not just more of the same.

5. Conclusion

Rural women in Bhopal had mean awareness scores less than half those of urban women; 78% fell below the adequacy threshold. The deficits were sharpest for symptom recognition, knowledge of the VIA procedure, and understanding that periodic re-screening is required. Illiterate, older, and economically marginalised rural women carried the largest knowledge deficits within an already low-awareness rural group. These findings point to specific subpopulations and specific knowledge gaps that health education programmes in Madhya Pradesh should prioritise. General awareness campaigns alone will not close this gap-the content and the delivery channels both need to be rethought for audiences with low literacy, limited media access, and the lowest screening uptake.

6. Study Limitations

The cross-sectional design cannot establish whether low awareness causes low screening uptake or whether both reflect a shared underlying determinant. The study covered a single district, so the results cannot be assumed to apply to other parts of Madhya Pradesh or other states. Awareness was self-reported, and urban women may have been more susceptible to social desirability bias, potentially overstating their knowledge. The awareness instrument has not been validated against an external gold standard, and while the KR-20 of 0.72 is acceptable, it indicates only moderate internal consistency. Women with a prior cervical cancer diagnosis were excluded; this group may carry higher disease-specific knowledge and their absence could slightly underestimate awareness in the rural sample.

7. Implications for Practice, Policy, and Future Research

ASHA workers and ANMs are the most accessible point of contact for rural women who never reach a health facility. Refreshed, standardised training on cervical cancer and VIA-with materials designed for low-literacy audiences-is the most direct leverage point available within the existing health system. Illustrated flipcharts, pictorial symptom cards, and short video clips played at self-help group meetings can reach women who cannot read. Cervical cancer counselling should be folded into every reproductive and maternal health visit at community health centres, not treated as a separate programme requiring a special visit.

The Madhya Pradesh health department could include district-level cervical cancer awareness audits in the annual non-communicable disease programme implementation plan, with corrective outreach funding tied to measured performance. This would create accountability for the gap documented here rather than leaving it to individual district managers to address on an ad hoc basis.

Future research should test whether awareness actually converts to VIA uptake in this population. Longitudinal intervention studies with structured health education components would clarify the size of the awareness-to-uptake effect and help identify which communication channels contribute most. Qualitative work with rural women, ASHA workers, and programme managers would surface implementation barriers that survey methods cannot reach.

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References

1. Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: A Cancer Journal for Clinicians, 71(3), 209-249. https://doi.org/10.3322/caac.21660
2. World Health Organization. (2022). Cervical cancer. WHO Fact Sheets. https://www.who.int/news-room/fact-sheets/detail/cervical-cancer
3. Indian Council of Medical Research. (2022). National cancer incidence estimates for India, 2022. ICMR-National Centre for Disease Informatics and Research.
4. Kar, M., Karmee, N., & Satapathy, D. M. (2019). Knowledge, awareness and practice of cervical cancer screening among ever married rural women of Ganjam District, Odisha: A community-based cross-sectional study. International Journal of Research in Medical Sciences, 7(6), 2161-2167. https://doi.org/10.18203/2320-6012.ijrms20192492
5. National Cancer Registry Programme. (2020). Report of National Cancer Registry Programme 2012-2016. Indian Council of Medical Research.
6. Clifford, G. M., Gallus, S., Herrero, R., Muñoz, N., Snijders, P. J., Vaccarella, S., Anh, P. T., Ferreccio, C., Hieu, N. T., Matos, E., Molano, M., Rajkumar, R., Ronco, G., de Sanjosé, S., Shin, H. R., Sukvirach, S., Thomas, J. O., Tunsakul, S., Meijer, C. J., Franceschi, S., … IARC HPV Prevalence Surveys Study Group (2005). Worldwide distribution of human papillomavirus types in cytologically normal women in the International Agency for Research on Cancer HPV prevalence surveys: a pooled analysis. Lancet (London, England), 366(9490), 991–998. https://doi.org/10.1016/S0140-6736(05)67069-9
7. International Institute for Population Sciences. (2021). National Family Health Survey (NFHS-5), 2019-21: India. IIPS. https://dhsprogram.com/pubs/pdf/FR375/FR375.pdf
8. Arbyn, M., Sankaranarayanan, R., Muwonge, R., Keita, N., Dolo, A., Mbalawa, C. G., & Parkin, D. M. (2008). Pooled analysis of the accuracy of five cervical cancer screening tests assessed in eleven studies in Africa and India. International Journal of Cancer, 123(1), 153-160. https://doi.org/10.1002/ijc.23489

9. Sankaranarayanan, R., Esmy, P. O., Rajkumar, R., Muwonge, R., Swaminathan, R., Shanthakumari, S., Fayette, J. M., & Cherian, J. (2007). Effect of visual screening on cervical cancer incidence and mortality in Tamil Nadu, India: a cluster-randomised trial. Lancet (London, England), 370(9585), 398–406. https://doi.org/10.1016/S0140-6736(07)61195-7
10. World Health Organization. (2013). WHO guidelines for screening and treatment of precancerous lesions for cervical cancer prevention. WHO Press. https://www.who.int/publications/i/item/9789241548694
11. Aswathy, S., Quereshi, M. A., Kurian, B., & Leelamoni, K. (2012). Cervical cancer screening: Current knowledge and practice among women in a rural population of Kerala, India. Indian Journal of Medical Research, 136(2), 205-210. https://pmc.ncbi.nlm.nih.gov/articles/PMC3461731/
12. Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. Annals of Internal Medicine, 155(2), 97-107. https://doi.org/10.7326/0003-4819-155-2-201107190-00005
13. Chandrika, K., Naik, B. N., & Kanungo, S. (2020). Awareness on cancer cervix, willingness, and barriers for screening of cancer cervix among women: A community-based cross-sectional study from urban Pondicherry. Indian Journal of Public Health, 64(4), 374-380. https://doi.org/10.4103/ijph.IJPH_29_20
14. Vellakkal, S., Subramanian, S. V., Millett, C., Basu, S., Stuckler, D., & Ebrahim, S. (2013). Socioeconomic inequalities in non-communicable diseases prevalence in India: Disparities between self-reported diagnoses and standardized measures. PLoS ONE, 8(7), e68219. https://doi.org/10.1371/journal.pone.0068219
15. Armo, M., Khunte, V., Sainik, S., Kanniga, G. R., & Jatwar, N. (2019). Awareness and practices of cervical cancer screening among women in Rajnandgaon district, central India: Health education is the need of the hour. International Journal of Reproduction, Contraception, Obstetrics and Gynecology, 8(4), 1266-1270. https://doi.org/10.18203/2320-1770.ijrcog20190971
16. International Institute for Population Sciences. (2021). National Family Health Survey (NFHS-5), 2019-21: India. IIPS. https://dhsprogram.com/pubs/pdf/FR375/FR375.pdf *(NFHS-5, second citation)*