

“EFFECTIVENESS OF STRATEGIC COMMUNICATION APPROACH ON BEHAVIOURAL RISK FACTORS OF NON-COMMUNICABLE DISEASES AMONG TRIBAL ADULTS OF SELECTED RURAL AREAS OF MAHARASHTRA”

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ABSTRACT

Introduction: Non-communicable diseases (NCDs) are a major public health concern and are strongly associated with modifiable behavioural and metabolic risk factors. Tobacco use, harmful alcohol use, unhealthy diet and insufficient physical activity contribute substantially to NCD morbidity and mortality. Tribal populations may experience additional vulnerability because of socioeconomic disadvantage, changing lifestyles and limited access to preventive health services. Behaviour change communication can support healthier choices and strengthen prevention efforts.

Title of the study: “Effectiveness of Strategic Communication Approach on Behavioural Risk Factors of Non-Communicable Diseases among Tribal Adults of Selected Rural Areas of Maharashtra.”

Methodology: A quantitative approach with a quasi-experimental pre-test, post-test control-group design was adopted. The pilot study included 20 tribal adults, with 10 participants in the experimental group and 10 in the control group, selected by non-probability purposive sampling. Baseline and repeated assessments (R1-R4) included demographic, physical, biological and behavioural risk-factor measures. The intervention consisted of strategic communication/behaviour change communication sessions focusing on healthy eating, physical activity and avoidance or reduction of harmful substance use. Paired t-test and two-sample t-test were used, with $p < 0.05$ considered statistically significant.

Results: In the experimental group, 70% were male, 90% had no formal education, 100% were married, 80% were labourers, all belonged to the lower socioeconomic class and all had monthly family income $\leq$ Rs. 9,226. Significant reductions were observed in waist circumference (R3 $p = 0.037$; R4 $p = 0.005$), hip circumference (R3 $p = 0.007$; R4 $p = 0.001$) and waist-to-hip ratio (R4 $p = 0.009$). Fasting blood sugar did not change significantly within the experimental group; however, at R4 it was significantly lower in the experimental group than the control group ($p = 0.024$). Signs of cancer decreased from 100% at R1 and R2 to 30% at R4 in the experimental group, while remaining 70% at R4 in the control group. Urine protein and urine sugar positivity declined to 0% by R3 and remained 0% at R4 in the experimental group. Dietary practice scores increased significantly from a mean of 15.8 at R1 to 22.6 at R4 ($p < 0.001$), and the gain was significantly greater than in the control group at R3 and R4 ($p < 0.001$).

Conclusion: The pilot findings suggest that the Strategic Communication Approach was associated with improvement in selected behavioural and biological risk indicators, particularly dietary practices and anthropometric measures. These findings support further evaluation in the planned larger study among tribal adults in rural Maharashtra.

Keywords: (Strategic Communication Approach; Behaviour Change Communication; non-communicable diseases; tribal adults; behavioural risk factors; dietary practices; tobacco use; alcohol use; Maharashtra)

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INTRODUCTION

Non-communicable diseases are chronic conditions that result from a combination of genetic, physiological, environmental and behavioural factors. The major NCDs include cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. Globally, NCDs accounted for at least 43 million deaths in 2021, and a large proportion of premature NCD deaths occurred in low- and middle-income countries.¹

Four major modifiable behaviours—tobacco use, physical inactivity, unhealthy diet and harmful use of alcohol—are central drivers of NCDs and contribute to raised blood pressure, overweight and obesity, raised blood glucose and other metabolic abnormalities.² Prevention therefore requires interventions that support

individuals and communities to adopt and sustain healthier behaviours.³

India has a substantial burden of NCDs, and national programmes emphasize health promotion, prevention, screening, early detection and continuity of care. The National Programme for Prevention and Control of Non-Communicable Diseases includes population-level interventions and health promotion activities within primary health care.⁴

Tribal communities constitute an important population group in India. Census 2011 recorded 104.28 million Scheduled Tribe persons, representing 8.6% of the country's population, with the large majority residing in rural areas.⁵ Research from tribal populations in different parts of India has demonstrated substantial

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burdens of tobacco use, alcohol use, unhealthy dietary practices and metabolic risk factors.⁶

Behaviour Change Communication (BCC) is an important public-health strategy for influencing knowledge, attitudes and behaviours related to disease prevention. It can be used to communicate practical, culturally relevant messages and reinforce healthier practices over time.⁹ The present pilot study was therefore undertaken to assess the effectiveness of a Strategic Communication Approach on behavioural risk factors of NCDs among tribal adults in selected rural areas of Maharashtra.

NEED OF THE STUDY

The increasing burden of NCDs and their modifiable risk factors requires prevention strategies that are appropriate for underserved communities. Tribal adults may experience a combination of socioeconomic disadvantage, low educational attainment and changing patterns of tobacco, alcohol, dietary and physical-activity behaviours. Evidence from tribal populations has reported high prevalence of tobacco and alcohol use and other NCD risk factors, emphasizing the need for locally appropriate prevention approaches.⁷

The Government of India has emphasized population-based health promotion and prevention of common NCDs through the National Programme for Prevention and Control of Non-Communicable Diseases.⁴ In this context, a Strategic Communication Approach may provide a practical method of delivering repeated, understandable messages on healthy diet, physical activity and reduction of harmful substance use. The present pilot study was conducted to determine whether the proposed intervention was feasible and showed preliminary evidence of effectiveness before implementation of the larger study.

MATERIALS AND METHODS

A quantitative research approach was adopted for the study, using a quasi-experimental pre-test, post-test control-group design. The population comprised tribal adults residing in rural areas of Maharashtra, with the accessible population consisting of tribal adults from selected rural areas of Western Maharashtra. For the pilot study, a sample of 20 tribal adults was selected, comprising 10 participants in the experimental group and 10 participants in the control group, using a non-probability purposive sampling technique. The study included adults aged 25–45 years, irrespective of gender, who had been residing in the selected rural tribal areas for more than five years and were willing to participate in the study. Pregnant women, individuals with a history of genetic diseases, persons with mental challenges, and those who were unwilling to participate were excluded from the study.

The independent variable of the study was the Strategic Communication Approach, while the dependent variable

was the behavioural risk factors of non-communicable diseases. Data were collected using two sections of the research tool. Section I included demographic variables along with physical and biological assessments, whereas Section II consisted of a semi-structured assessment of risk behaviours, including signs suggestive of cancer, smoking, tobacco use, masheri use, alcohol consumption, physical activity and dietary practices. The intervention consisted of strategic communication sessions conducted in small groups of approximately 4–5 participants. Video-based communication was used to provide information and promote healthy eating, regular physical activity, and avoidance or reduction of harmful substance use. Reinforcement sessions were planned during the follow-up visits.

Data were collected at four assessment time points, designated as R1, R2, R3 and R4. The collected data were analysed using descriptive and inferential statistics. Categorical variables were summarized using frequency and percentage, while continuous variables were analysed using paired t-tests and two-sample t-tests, as appropriate. A significance level of $p < 0.05$ was considered statistically significant, with a 95% confidence level.

RESULTS

SECTION I – DEMOGRAPHIC PROFILE

Table 1. Demographic profile of tribal adults in the experimental and control groups (n=20)

Variable	Category	Experimental n (%)	Control n (%)
Gender	Male	7 (70%)	5 (50%)
	Female	3 (30%)	5 (50%)
Age	25–30 years	5 (50%)	4 (40%)
	31–35 years	3 (30%)	4 (40%)
	36–40 years	1 (10%)	2 (20%)
	41–45 years	1 (10%)	0 (0%)
Education	No formal education	9 (90%)	10 (100%)
	Primary	1 (10%)	0 (0%)
Marital status	Married	10 (100%)	9 (90%)
	Unmarried	0 (0%)	1 (10%)
Occupation	Farmer	1 (10%)	2 (20%)

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	Labourer	8 (80%)	8 (80%)
	Homemaker	1 (10%)	0 (0%)
Total family income	≤Rs. 9,226	10 (100%)	10 (100%)
Socioeconomic status	Lower (V)	10 (100%)	10 (100%)
Family history of hypertension/diabetes mellitus/cancer	Yes	3 (30%)	2 (20%)
	No	7 (70%)	8 (80%)

Table 1 shows that the experimental group consisted predominantly of males (70%), participants aged 25–30 years (50%), persons with no formal education (90%), married adults (100%) and labourers (80%). All participants in both groups had monthly family income ≤Rs. 9,226 and were classified as lower socioeconomic status. A family history of hypertension, diabetes mellitus or cancer was reported by 30% of the experimental group and 20% of the control group.

SECTION II – PHYSICAL VARIABLES OVER TIME

Table No. 2 Physical Variables over time n=20

Parameter	Time point	Mean ± SD	t	p-value
Heart rate	R1	80.4 ± 9.47	–	–
	R2	80.4 ± 8.15	0.00	0.500
	R3	81.2 ± 7.42	0.90	0.197
	R4	81.2 ± 7.97	0.52	0.307
Systolic BP	R1	131.0 ± 13.70	–	–
	R2	128.8 ± 9.72	0.68	0.258
	R3	127.6 ± 8.10	1.63	0.069
	R4	126.7 ± 9.52	1.69	0.062
Diastolic BP	R1	76.0 ±	–	–

		9.66		
	R2	80.6 ± 4.90	1.37	0.101
	R3	77.0 ± 4.83	0.43	0.339
	R4	78.6 ± 3.13	0.87	0.203
Weight	R1	50.5 ± 9.12	–	–
	R2	50.75 ± 9.35	0.86	0.206
	R3	50.7 ± 8.97	0.48	0.321
	R4	50.6 ± 8.68	0.32	0.379
BMI	R1	21.7 ± 3.63	–	–
	R2	21.8 ± 3.73	0.94	0.187
	R3	21.7 ± 3.47	0.39	0.354
	R4	21.7 ± 3.38	0.15	0.444
Waist circumference	R1	73.2 ± 10.22	–	–
	R2	73.1 ± 10.40	0.43	0.339
	R3	72.6 ± 10.00	2.03	0.037*
	R4	71.6 ± 9.40	3.26	0.005*
Hip circumference	R1	104.5 ± 5.84	–	–
	R2	104.5 ± 5.97	0.00	0.500
	R3	104.0 ± 5.58	3.00	0.007*
	R4	103.8 ± 5.73	4.58	0.001*
WHR	R1	0.70 ± 0.08	–	–
	R2	0.70 ± 0.08	NE	NE
	R3	0.707 ± 0.07	0.73	0.241
	R4	0.689 ± 0.08	2.91	0.009*

Table no. 2 shows the physical variables are over time shows that the heart rate, systolic and diastolic blood pressure, weight and BMI did not show statistically significant changes over time. Waist circumference, hip circumference and waist-to-hip ratio showed statistically significant reductions at later assessment points.

SECTION III – SIGNS OF CANCER

Table No. 3 Related to signs of cancer n=20

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Time point	Experimental	Control
R1	10 (100%)	7 (70%)
R2	10 (100%)	6 (60%)
R3	7 (70%)	7 (70%)
R4	3 (30%)	7 (70%)

The proportion of participants recorded as having signs of cancer decreased from 100% at R1 and R2 to 30% at R4 in the experimental group. In the control group, the proportion was 70% at R4. The instrument screened for selected warning signs rather than establishing a cancer diagnosis; therefore, these findings should be interpreted as screening indicators.

SECTION IV – BIOLOGICAL ASSESSMENT

The comparison of mean fasting blood sugar levels between the experimental and control groups at four assessment time points. At R1, the mean fasting blood sugar level was 117.7 ± 9.7 mg/dL in the experimental group and 126.8 ± 18.1 mg/dL in the control group, with a t value of 1.40 and p value of 0.089, indicating that the difference was not statistically significant. At R2, the mean fasting blood sugar level was 117.2 ± 10.9 mg/dL in the experimental group compared with 124.0 ± 18.9 mg/dL in the control group ($t=0.99$, $p=0.168$), which was also not statistically significant. At R3, the experimental group had a mean fasting blood sugar level of 118.6 ± 10.0 mg/dL, while the control group had 127.0 ± 19.9 mg/dL ($t=1.19$, $p=0.125$), showing no statistically significant difference between the groups. However, at R4, the mean fasting blood sugar level decreased to 113.5 ± 10.4 mg/dL in the experimental group, compared with 126.0 ± 15.4 mg/dL in the control group. The obtained t value was 2.13 with a p value of 0.024, which was statistically significant at $p<0.05$. Therefore, the findings indicate that a significant difference in fasting blood sugar levels between the experimental and control groups was observed at R4, with the experimental group demonstrating a lower mean fasting blood sugar level than the control group.

The urine protein positivity decreased from 60% at R1 to 0% at R3 and remained 0% at R4 in the experimental group, whereas it decreased to 0% at R3 but increased to 20% at R4 in the control group. Similarly, urine sugar positivity in the experimental group decreased from 70% at R1 to 0% at R3 and remained 0% at R4, while in the control group it decreased from 50% at R1 to 30% at R4. Overall, the findings indicate a greater improvement in urine protein and urine sugar status in the experimental group over the assessment period.

SECTION V – BEHAVIOURAL RISK FACTORS

Smoking: The baseline summary indicated smoking in 50% of the experimental group and 40% of the control group. In the experimental group, 50% reported no smoking at each assessment, while the distribution among smokers shifted toward rare rather than

occasional smoking by later assessments. In the control group, 60% reported no smoking at all four time points.

Tobacco use: At baseline, 90% of participants in both groups reported tobacco use. In the experimental group, the proportion reporting always using tobacco decreased from 70% at R1 to 0% at R4, with a shift toward rare and sometimes use. In the control group, always-use remained high at 60% at R1 and 70% at R2-R4.

Masheri use: Seventy percent of the experimental group and 100% of the control group reported masheri use at baseline. In the experimental group, always use decreased from 40% at R1/R2 to 20% at R3/R4. In the control group, always use remained 70%-80% over the assessment period.

Alcohol use: Alcohol use was reported by 70% of the experimental group and 50% of the control group at baseline. In the experimental group, always use decreased from 30% at R1 to 0% at R4, with a shift toward rare use. The control-group distribution remained unchanged across R1-R4.

Physical activity: In the experimental group, always physical activity increased from 30% at R1 to 40% at R2 and remained 30% at R3/R4. In the control group, always activity was 50% at R1/R2, 60% at R3 and 40% at R4.

Dietary practices: In the experimental group, poor dietary practices decreased from 30% at R1/R2 to 10% at R3 and 0% at R4; average practices increased from 70% at R1/R2 to 100% at R4. In the control group, poor practices increased from 10% at R1/R2 to 20% at R3/R4.

SECTION VI – EFFECTIVENESS ON DIETARY PRACTICE SCORE

Table no. 4 - Effectiveness of Dietary Practice Score n=20

Time point	Mean $\pm$ SD	t	p-value
R1	15.8 ± 1.8	–	–
R2	16.0 ± 2.0	1.5	0.084
R3	18.4 ± 2.8	4.6	0.001*
R4	22.6 ± 2.6	9.4	<0.001*

DISCUSSION

The pilot study demonstrates that tribal adults in the selected rural setting had substantial exposure to modifiable NCD risk behaviours. In both groups, tobacco use was common at baseline, and masheri use was particularly prevalent. These findings are consistent with evidence from tribal populations in India showing high levels of tobacco and alcohol use and other NCD risk factors. In a study among tribal adults in rural Siliguri, current tobacco use and alcohol use were reported in 69.8% and 40.7% of participants, respectively.⁶ Similarly, high tobacco use and alcohol consumption have been documented among Kani tribal adults in Kerala.⁷

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The present pilot study also showed improvement in selected anthropometric and biological indicators following the Strategic Communication Approach. Waist circumference, hip circumference and waist-to-hip ratio decreased significantly at later assessment points. At R4, fasting blood sugar was significantly lower in the experimental group than in the control group. These preliminary findings are directionally consistent with evidence that behavioural risk factors are linked to metabolic abnormalities and that prevention strategies should target diet, physical activity and harmful substance use.

The strongest observed effect was on dietary practices. The experimental-group mean score increased from 15.8 at R1 to 22.6 at R4, while the control group showed a negative mean gain. The significantly greater gain at R3 and R4 suggests that repeated, structured communication may have helped participants adopt healthier dietary behaviours. Behaviour Change Communication has been described as a public-health approach that can support prevention of communicable and noncommunicable diseases through communication aimed at behaviour change.

The apparent reduction in the proportion of participants recorded as having cancer warning signs should be interpreted cautiously. The assessment tool screened for selected signs and symptoms and did not constitute a diagnostic cancer assessment. The finding may reflect changes in reported symptoms or recognition of warning signs rather than a reduction in cancer incidence. Further studies with validated screening and diagnostic pathways are required.

Overall, the pilot findings support the feasibility of the proposed intervention and provide preliminary evidence for a larger study. Because the pilot sample was small, the results should not be generalized to all tribal adults in Maharashtra.

CONCLUSION

The pilot study concluded that the Strategic Communication Approach showed promising effects on selected behavioural and biological risk indicators among tribal adults. Significant improvements were observed in waist circumference, hip circumference, waist-to-hip ratio and dietary-practice scores, and fasting blood sugar was significantly lower in the experimental group than the control group at R4. Tobacco, masheri and alcohol-use patterns also shifted toward lower-frequency use in the experimental group. These findings support proceeding to the planned larger study with adequate sample size and rigorous follow-up.

IMPLICATIONS

Nursing practice: Community health nurses can incorporate repeated, culturally appropriate communication on tobacco cessation, alcohol reduction, healthy diet and physical activity into community-based NCD prevention.

Nursing education: Community Health Nursing curricula can emphasize behaviour-change communication and

culturally responsive NCD prevention among tribal and underserved populations.

Nursing administration: Health administrators can support structured community education sessions, screening and reinforcement visits through primary healthcare services.

Nursing research: Larger studies should evaluate the intervention with adequate power, validated behavioural measures and clearly defined follow-up intervals.

DECLARATION BY AUTHORS

Ethical Approval: The synopsis states that ethical approval from the Institutional Ethical Committee was planned before data collection. The specific ethics committee approval number/date was not provided in the supplied documents and has therefore not been added.

Informed Consent: Written informed consent was obtained from participants, with confidentiality and anonymity maintained.

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