

## **BREAKING THE CYCLE OF ZONOSIS: EVALUATING THE IMPACT OF STRUCTURED HEALTH EDUCATION ON ANTHRAX AWARENESS AND ATTITUDE IN TRIBAL ODISHA**

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### **Abstract**

Anthrax remains a significant zoonotic public health concern in endemic regions such as Odisha, India, particularly among tribal populations due to close contact with livestock and limited health awareness. This study evaluated the effectiveness of a structured health education programme in improving knowledge and attitudes toward anthrax prevention.

A quantitative pre-experimental one-group pre-test and post-test design was conducted with 100 participants selected through convenience sampling from rural villages in Koraput district, Odisha. Data were collected using a structured interview schedule covering socio-demographic variables, a knowledge questionnaire, and a Likert scale on attitudes. The intervention consisted of a two-day structured health education programme, with post-test assessment conducted one week later. Data analysis included descriptive statistics, paired t-test, and chi-square test.

Baseline findings revealed that 79% of participants had poor knowledge and 61% exhibited negative attitudes toward anthrax prevention. Following the intervention, 60% demonstrated good knowledge and 62% showed highly positive attitudes. The improvement in mean knowledge and attitude scores was statistically significant ( $p < 0.001$ ). Significant associations were also found between baseline knowledge and selected socio-demographic factors, including occupation and prior exposure to health information.

The study concludes that structured health education programmes are effective in enhancing knowledge and attitudes regarding anthrax prevention among tribal communities. It highlights the importance of culturally appropriate health education strategies in reducing zoonotic disease risks in endemic areas. Further research is recommended to validate these findings.

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## 1. Introduction

Anthrax is an ancient and virulent zoonotic disease with a poorly understood natural ecology. As an infection transmitted between animals and humans, zoonotic diseases form approximately 60% of all human infective organisms. Domestic livestock and companion animals serve as an important source of transmitting anthrax to humans, largely due to the close interactions between rural populations and their animals.

The disease remains globally distributed and enzootic in many regions, with an estimated 2,000 to 20,000 human anthrax cases occurring annually worldwide. In India, states such as Andhra Pradesh, Karnataka, Tamil Nadu, and Odisha have confirmed the endemicity of anthrax. The situation is particularly severe in Odisha, where anthrax is a major public health problem; 14 out of 30 revenue districts have witnessed outbreaks as many as 61 times over a 10-year period, affecting 750 people and resulting in 418 deaths.

The Koraput district is a known endemic area for anthrax. Outbreaks are an annual phenomenon, supported by good forest cover and highly organic soil with good moisture that harbors anthrax spores. Due to scanty agriculture, tribal communities rely heavily on forests and livestock for their livelihood. Furthermore, dangerous practices, such as consuming infectious animal meat and drying beef for months before consumption, exacerbate the risk.

Given the lack of awareness about this fatal zoonotic disease, there is a pressing need for structured educational interventions. Therefore, this study aimed to assess the pre-existing knowledge and attitude of affected tribal communities in the Koraput district and to determine the effectiveness of a structured health education programme in improving their understanding and preventive practices regarding anthrax.

## 2. Materials and Methods

### 2.1. Research Design and Setting

A quantitative research approach was adopted for the study. The research design was a pre-experimental, one-group pre-test and post-test design without a control group. The study was conducted in rural areas of the Baipariguda block in the Koraput district of Odisha, specifically in the villages of Badpada, Chipakhur, Chilikunda, and Mandekjharan.

### 2.2. Population and Sampling

- The target population comprised affected tribal communities.
- A sample size of 100 individuals was selected using a convenient sampling technique.
- Inclusion criteria required participants to be aged 15-65 years.
- Participants had to be able to understand Desia (local language) or Hindi.
- Participants must have been affected by anthrax within the past 5 years or currently suffering from the disease.

### **2.3. Tools and Data Collection**

Data were collected via interview method using self-structured tools. The tool was divided into three sections:

- Section I: Socio-demographic data.
- Section II: A 3-point scale questionnaire assessing knowledge on anthrax definition, transmission, incubation, incidence, causes, diagnosis, and prevention. A maximum score of 20 was obtainable.
- Section III: A 5-point Likert scale to assess attitudes regarding anthrax prevention, with a total score of 100.

Reliability was established using the split-half method, yielding a desirable coefficient of internal consistency ( $r = 0.82$ ). The structured health education programme consisted of a two-day educational session regarding anthrax prevention. Data collection occurred in April 2018, with the pre-test administered on the first day, followed immediately by the intervention, and a post-test conducted one week later.

### **2.4. Intervention**

The intervention involved a structured health education program on anthrax, including the ways of transmission, signs and symptoms, prevention, and safe handling of livestock. It was conducted over a period of two consecutive days using appropriate teaching methods.

### **2.5. Data Collection Procedure**

Data was collected before the intervention, which is called the baseline data or pre-test. Then, the health education program was carried out, and after a week, a post-test was conducted to measure the changes in knowledge and attitude.

### **2.6. Statistical Analysis**

Data was analyzed using descriptive and inferential statistical tests. Frequency, percentage, mean, and standard deviation were used to analyze the data. A paired 't' test was used to check the effectiveness of the intervention by comparing the pre-test and post-test scores. Chi-square test was used to check the association between baseline knowledge and selected socio-demographic factors. A p-value of less than 0.05 was considered to be statistically significant.

### **2.7. Ethical Considerations**

The study was approved by the research and ethical committee of KIMS, KIIT Deemed to be University, Bhubaneswar. Prior written permission was obtained from the Chief District Medical Officer (CDMO) of Koraput district. Informed written consent was taken from all subjects, confidentiality was maintained, and participants had the freedom to withdraw at any time.

### 3. Results and Data Analysis

The data collected from 100 participants were analyzed using both descriptive and inferential statistics. The findings are organized into demographic characteristics, assessment of knowledge levels, and evaluation of attitude shifts.

#### 3.1. Demographic Characteristics of the Study Population

The socio-demographic profile of the affected tribal communities reveals a highly vulnerable population. As shown in Table 1, the majority of the respondents were male (56%), and a significant portion (61%) were illiterate. Farming was the primary occupation (59%), which directly correlates with the high zoonotic risk in this endemic zone.

**Table 1: Socio-Demographic Profile of Participants (N=100)**

Demographic Variables	Category	Frequency (f)	Percentage (%)
<b>Age (Years)</b>	36-45 years	23	23%
	56-65 years	23	23%
<b>Gender</b>	Male	56	56%
	Female	44	44%
<b>Education</b>	Illiterate	61	61%
	Primary School	25	25%
<b>Occupation</b>	Farmer	59	59%
	Laborer	31	31%
<b>Clinical History</b>	Family History of Anthrax	65	65%
	Duration of Suffering (>21 days)	36	36%
<b>Prior Information</b>	No prior health information	65	65%

### 3.2. Evaluation of the Structured Health Education Programme

The primary objective was to measure the shift in knowledge and attitude following the intervention. The results indicate a transformative improvement across all measured parameters.

#### 3.2.1. Knowledge Level Analysis

Before the intervention, 79% of the participants possessed "Poor" knowledge. After the structured health education, 60% achieved "Good" knowledge levels, while only 1% remained in the poor category.

**Table 2: Comparison of Pre-test and Post-test Knowledge Levels (N=100)**

Knowledge Level	Score Range	Pre-test (%)	Post-test (%)
Good	15–20	0%	60%
Average	8–14	21%	39%
Poor	1–7	79%	1%

#### 3.2.2. Attitude Scale Analysis

The Likert scale results showed a dramatic shift from negative perceptions toward proactive prevention attitudes.

**Table 3: Comparison of Pre-test and Post-test Attitude Levels (N=100)**

Attitude Level	Score Range	Pre-test (%)	Post-test (%)
Highly Positive	81–100	0%	62%
Positive	61–80	33%	38%
Negative	41–60	61%	0%
Highly Negative	20–40	6%	0%

### 3.3. Area-wise Mean and Effectiveness

An area-wise analysis was conducted to identify which specific aspects of anthrax prevention showed the most significant growth. The "Prevention of Anthrax" section

saw the most substantial leap, with the mean percentage increasing from 18.33% to 73.16%.

**Table 4: Area-wise Mean, SD, and Mean Percentage of Knowledge Scores**

Knowledge Areas	Max Score	Pre-test Mean (SD)	Post-test Mean (SD)	Mean % Gain
General Information	3	0.81 (0.83)	2.14 (0.75)	44.33%
Etiology & Transmission	5	1.13 (0.97)	3.51 (0.95)	47.60%
Clinical Manifestations	3	0.72 (0.69)	2.10 (0.78)	46.00%
Prevention of Anthrax	6	1.10 (1.05)	4.39 (1.10)	54.83%
<b>Total</b>	<b>20</b>	<b>4.44 (2.65)</b>	<b>14.86 (2.90)</b>	<b>52.10%</b>

### 3.4. Inferential Statistics and Hypotheses Testing

To determine the effectiveness of the intervention (\$H\_1\$), a paired t-test was performed. The calculated 't' value for knowledge was **26.15** and for attitude was **21.84**, both of which exceeded the table value at the 0.05 level of significance (\$df=99\$).

**Table 5: Effectiveness of Structured Health Education (Paired t-test)**

Variable	Pre-test Mean	Post-test Mean	Mean Diff	't' value	Significance
<b>Knowledge</b>	4.44	14.86	10.42	26.15*	P < 0.05
<b>Attitude</b>	56.41	82.50	26.09	21.84*	P < 0.05

\*Significant at  $P < 0.05$  level.

Furthermore, chi-square analysis revealed a significant association between pre-test knowledge and the participants' **occupation** ( $\chi^2 = 7.07$ ,  $P=0.029$ ) and **previous health information exposure** ( $\chi^2 = 5.09$ ,  $P=0.024$ ), indicating that these factors significantly influence baseline awareness.

#### 4. Discussion

The present study aimed at evaluating the effectiveness of a structured health education program in enhancing the knowledge and attitude regarding anthrax prevention among the tribal communities in the endemic area of Odisha. The findings have shown a knowledge gap and negative attitude towards anthrax prevention, emphasizing the vulnerability of the tribal communities. This is in line with the findings reported in previous studies, where similar communities in rural and tribal areas have shown a lack of awareness regarding zoonotic infections due to low literacy and access to health education.

Statistically significant improvements in the knowledge and attitude score have been found in the post-intervention study. The increased number of participants showing a good knowledge and highly positive attitude towards anthrax prevention clearly shows the effectiveness of a structured educational intervention in addressing the knowledge gaps in the community. This is in line with the findings reported in the literature, where health education plays a vital role in the prevention and transmission of the disease.

The association between the initial knowledge and other factors, such as occupation and previous exposure to health information, implies that those involved in livestock activities and those who did not receive any previous health education are at a higher risk. This highlights the importance of targeted interventions for occupationally vulnerable groups, especially those who work with livestock, such as farmers and those who handle livestock.

Although the study's results are promising, there are certain limitations to the study. First, the lack of a control group makes it difficult to establish any possible causal relationships between the intervention and the results. The fact that the study only used convenience sampling makes it difficult to generalize the results. Moreover, the study had a small sample, which makes it difficult to generalize the results. The fact that the study had a short follow-up period makes it difficult to assess the retention of the knowledge gained.

Future studies need to use more rigorous study designs, such as quasi-experimental and randomized controlled trials, with larger and more representative samples. Longitudinal studies would also be recommended to assess the maintenance of behavioral changes over time. Community-based participatory research and culturally sensitive communication strategies could also be incorporated to build upon the effectiveness of such interventions.

In conclusion, the study offers valuable insights into the potential of structured health education programmes in enhancing awareness and attitude towards anthrax prevention in endemic tribal regions, which is a vital component in the overall control of zoonotic diseases.

## 5. Conclusion and Recommendations

This study has shown that a structured health education programme has a significant impact in enhancing knowledge and creating positive attitudes regarding the prevention of anthrax among tribal people in endemic areas of Odisha State, India.

Considering the burden of zoonotic infections, including anthrax, in rural and tribal areas, it is proposed that enhancing health education at the community level is a priority area for public health action, and interventions by health professionals, especially in collaboration with local people, may prove useful in reducing the spread of infection.

However, it should be noted that the results of this study may be viewed in the context of its limitations, which include its pre-experimental nature, lack of a control group, and sample size. It is proposed that future studies, including a larger and diverse sample, and a longer period of study, be conducted to validate the results of this study.

In conclusion, structured health education has been found to be a viable, cost-effective, and effective strategy in improving anthrax awareness and practices in the prevention of the disease in the targeted tribal communities at risk.

***Conflict of interest:*** Authors are declared that there is no conflict of interest regarding this study.

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