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# A Randomized Pilot Study Comparing Cognitive Behavioral Therapy and Basic Health Education for Tobacco Cessation among Current Smokers Aged 35–44 Years at Government Bus Stand, Patna

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## ABSTRACT

**Introduction:**Tobacco use is a significant public health concern, particularly among occupational groups such as government bus drivers, who are often exposed to high stress and irregular routines. Behavioral interventions like Cognitive Behavioral Therapy (CBT) and Basic Health Education (BHE) have shown promise in aiding tobacco cessation, yet their comparative impact in this high- risk group requires further exploration.

**Aim:**This study aimed to evaluate and compare the short- term effectiveness of CBT and BHE in promoting tobacco cessation among current smokers aged 35–44 years employedas government bus drivers attheGovernment Bus Stand, Patna.

**Methods:**A randomized, two-arm, single-blind pilot study was conducted with 10 male participants, equally divided into CBT and BHE groups. Each participant received four weekly group sessions of 45–60 minutes. The interventions included structured CBT focusing on behavioral triggers, self- monitoring, and relapse prevention, while BHE involved general education on tobacco-relatedharms and motivational guidance. Smoking status was assessed at baselineand at 4 weeks using the Fagerström Test for Nicotine Dependence (FTND), self-reports, and CO monitoring where applicable.

**Results:**At 4 weeks, 60% of participants in the CBT group quit smoking and 40% reduced usage, compared to 20% quitting, 40% reducing, and 40% showing no change in the BHE group.

**Conclusion:**CBT showed greater effectiveness than BHE in supporting short-term tobacco cessation among occupational smokers. The results support CBT as a feasible intervention in workplace-based cessation programs and warrant further evaluation through larger randomized controlled trials.

***Keywords:*** *Cognitive Behavioral Therapy (CBT), Basic Health Education (BHE), Smoking behaviour, Tobacco cessation.*

## 1. INTRODUCTION

Tobacco use remains a leading cause of preventable illness and death worldwide. In India, tobacco consumption is widespread, with significant variation across states. Bihar, in particular, shows a high prevalence of tobacco use, with nearly 25.9% of adults smoking and over 50% consuming tobacco in some form, as per the latest Global Adult Tobacco Survey (GATS-2) [1]. These figures underscore the urgent need for targeted cessation strategies. Among the most affected occupational groups are government bus drivers, who often resort to smoking to cope with stress, long working hours, and irregular routines. Various interventions exist to support cessation efforts. Basic Health Education (BHE) focuses on creating awareness about the health risks of tobacco and promoting behavioral change through informational sessions [2]. On the other hand, Cognitive Behavioral Therapy (CBT) works on altering the cognitive processes and behaviors that reinforce tobacco dependence [3,4].

This pilot study was conducted to address this gap and assess the feasibility, acceptability, and short-term outcomes of CBT and BHE in a small group before implementing a full-scale trial and also to evaluate which of these two strategies—CBT or BHE—is more effective in encouraging smoking cessation among government bus drivers.

## 2. METHODOLOGY

This was a two-arm, parallel, single-blind pilot randomized controlled trial conducted among current smokers at the Government Bus Stand, Patna. The study included 10 male participants aged 35–44 years who were current daily smokers, willing to participate, and available for follow-up. Individuals were excluded if they were already participating in any other cessation program, had severe mental illness, or were deemed medically unfit to join group sessions.

A total of 15 individuals were screened for eligibility at the Government Bus Stand, Patna. Of these, 5 were excluded—3 did not meet the inclusion criteria, and 2 declined to participate. The remaining 10 participants were randomized equally into two groups: **CBT (n=5)** and **BHE (n=5)**. All participants completed the 4-week follow-up, ensuring a 100% retention rate.

The questionnaire was divided into two parts: **Part I** collected sociodemographic information, tobacco use history and **Fagerström Test for Nicotine Dependence (FTND)** while **Part II** included an assessment of the participant's stage in the **Transtheoretical Model of Behavior Change**.

Eligible participants were selected through purposive sampling and then randomly allocated into two equal groups: **CBT group (n=5)** and **BHE group (n=5)**. Randomization was conducted using a simple random draw method. Each participant attended four weekly group- based sessions of 45–60 minutes based on their assigned intervention.

- The **CBT group** received structured sessions focusing on identifying triggers, cognitive restructuring, goal setting, relapse prevention, and self-monitoring techniques [3,4].

The **BHE group** received health education on the harmful effects of tobacco, motivational content for quitting, and basic behavior change strategies [1].

Follow-up assessment was done after 4 weeks. Outcomes were measured using the FTND score (pre and post), self-reported tobacco use status, and where feasible, carbon monoxide (CO) monitoring using a portable device.

## 3. RESULTS

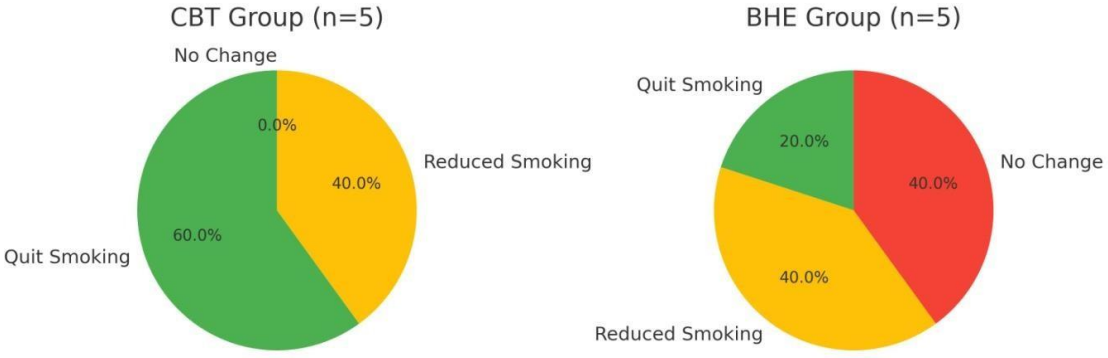
**Primary Outcome: Smoking Behavior at 4 Weeks**

At the 4-week follow-up, the CBT group demonstrated more favorable smoking outcomes compared to the BHE group.

**Figure 1: Smoking Behavior Outcomes at 4 Weeks**

| o | CBT(N=5) | BHE(N=5) |
|---|---|---|
| QUIT | 3(60%) | 1(20%) |
| REDUCED | 2(40%) | 2(40%) |
| NO CHANGE | 0(0%) | 2(40%) |

A visual representation is shown below:




In the **CBT group**, 3 participants achieved complete tobacco abstinence, and 2 participants significantly reduced their cigarette consumption. No participant in the CBT group reported unchanged behavior. In contrast, in the **BHE group**, only 1 participant quit tobacco, 2 participants reduced their usage, and 2 participants showed no change in smoking behavior.

**Secondary Outcome: FTND Score Changes**

The Fagerström Test for Nicotine Dependence (FTND) was administered at baseline and again at 4 weeks. A reduction in FTND scores was observed in **all 5 CBT participants**, indicating decreased nicotine dependence. Among the **BHE group**,

3 participants showed mild improvement in FTND scores, while 2 participants showed **no change**, correlating with their unchanged smoking behavior.

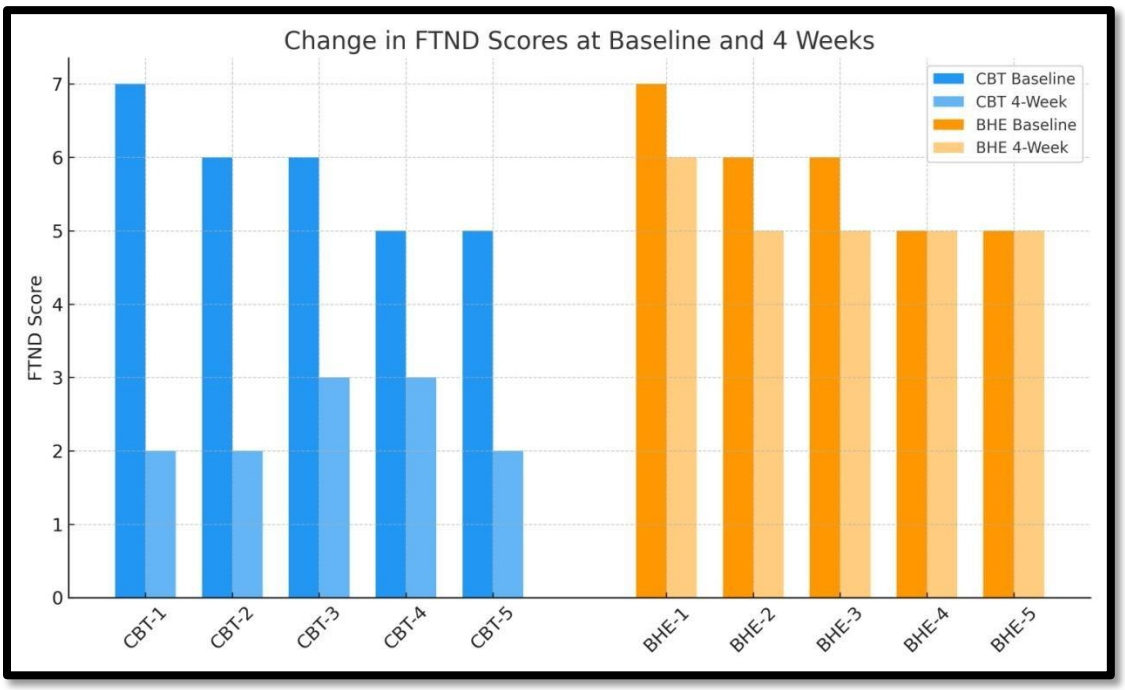



**Figure 2: Change in FTND Scores at baseline and 4 weeks**

### Self-Reported Behavior and CO Monitoring

Self-reported tobacco use matched FTND outcomes. **(CO) monitoring** using PiCO smoke analyzer, confirmed a measurable reduction in exhaled CO levels among CBT group participants who quit or reduced smoking.

## 4. DISCUSSION

This pilot study demonstrates that CBT produced higher smoking cessation and reduction outcomes compared to BHE. The CBT group had a 60% quit rate versus 20% in the BHE group, with all CBT participants showing reductions in nicotine dependence as measured by FTND scores. These findings are in line with previous studies suggesting that CBT provides a more structured and psychologically rooted approach to tobacco cessation by addressing cognitive patterns and behavioral triggers [3,4,5].

Several randomized trials have consistently reported the effectiveness of CBT in varied populations, such as among cancer patients [6], rural tobacco users [4], college students [10], and women from low-income communities [8]. In these studies, CBT has shown to outperform general health education approaches due to its focus on individual behavior modification, coping strategies, and relapse prevention [3,5,7].

In our study, the BHE group showed limited success, with two participants making no behavioral change, aligning with the known limitations of purely educational interventions that do not address underlying behavioral reinforcement [2,7]. The structured nature of CBT helped participants develop self-awareness and coping mechanisms, likely contributing to better outcomes.

### Limitations

This study had a small sample size (n=10), which limits the generalizability of the findings. The study was conducted in a single urban occupational setting and lacked long-term follow- up.

### Recommendations

Larger randomized controlled trials with longer follow-up periods, diverse populations, and inclusion of biochemical validation such as cotinine testing are needed. Integration of CBT- based cessation strategies into workplace health programs—especially for mobile or underserved populations—may improve quit rates and long-term abstinence outcomes.

## 5. CONCLUSION

Cognitive Behavioral Therapy was more successful than Basic Health Education in promoting smoking cessation and reducing tobacco use among government bus drivers. These promising early findings highlight the need for larger, more comprehensive trials to validate the effectiveness of CBT in broader populations [4,5].

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