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"EFFECTIVENESS OF COUNSELLINGINTERVENTIONS IN TOBACCO CESSATION AT A TERTIARY CARE HOSPITAL: AN ORIGINAL RESEARCH STUDY"

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Abstract

Introduction: Tobacco use remains a significant global public health challenge, contributing to numerous health issues and substantial mortality. Despite widespread awareness of its risks, tobacco use persists, particularly in low- and middle-income countries. Effective cessation interventions are essential to reduce tobacco-related harm. Aim: This study evaluates the effectiveness of counselling interventions in promoting tobacco cessation among patients at a tertiary care hospital. Methods: A longitudinal study was conducted with 200 participants at the Tobacco Cessation Clinic of Noida International Institute of Medical Sciences (NIIMS). Participants received individualized counselling based on the 5 A's model over a six-month period. Data collection included self-reported tobacco use, cigarettes smoked per day, nicotine dependence (FTND), motivation to quit (MTSS), and biochemical verification (CO levels). Statistical analyses included paired t-tests, chi-square tests, and logistic regression.

Results: At three months, the cessation rate was 42%, which decreased to 36% by six months. Participants who did not quit showed a significant reduction in cigarette consumption, from an average of 18 to 8 cigarettes per day. Motivation to quit improved significantly, with MTSS scores increasing from 3.4 to 7.1. Predictors of successful cessation included lower baseline FTND scores, higher baseline motivation, and the use of pharmacotherapy. Biochemical verification confirmed cessation in 90% of self-reported quitters.
Conclusion: Counselling interventions at the NIIMS Tobacco Cessation Clinic significantly supported tobacco cessation and reduced tobacco use. The study highlights the effectiveness of the 5 A’s model and pharmacotherapy, while also identifying predictors of successful cessation. These findings underscore the importance of tailored, multidisciplinary approaches in tobacco cessation programs and suggest further research to validate these interventions in diverse settings.

Keywords: 1) Tobacco cessation, 2) Counselling interventions, 3) Nicotine dependence, 4) Motivation to quit, 5) Biochemical verification, 6) Pharmacotherapy

Introduction

Tobacco use continues to be a major worldwide public health issue, leading to a substantial amount of illness and mortality. The World Health Organisation (WHO) reports that tobacco is responsible for the deaths of over 8 million individuals annually. Of these fatalities, more than 7 million are caused by direct tobacco use, while around 1.3 million are attributed to non-smokers being exposed to second-hand smoke.[1]The detrimental health consequences of tobacco smoking are well established, including its prominent position as a primary contributor to cardiovascular disease, chronic obstructive pulmonary disease (COPD), and several types of cancer, notably lung cancer.[2]

Although the dangers of tobacco use are well recognised, its prevalence remains high, especially in low- and middle-income nations, which are home to 80% of the world's 1.3 billion tobacco smokers.[3] In India, a significant proportion of current tobacco users are contemplating quitting, with 55.4% of smokers and 49.6% of smokeless tobacco users expressing intentions to quit.[4] While this presents an opportunity for large-scale tobacco cessation efforts to address the issue, the statistics reveal a challenging reality: although 70% of tobacco users express a desire to quit, only 30% actually attempt to do so, and of these, merely 3 to 5% successfully quit. This suggests that providing proper support and guidance can significantly enhance the chances of quitting. Numerous studies have confirmed the effectiveness of cessation interventions in helping individuals quit tobacco use.[5,6,7,8]

Tobacco cessation programs implemented inside hospitals are a crucial element of comprehensive strategy aimed at controlling tobacco use. These programs provide healthcare practitioners the chance to interact with patients when they are more likely to be open to receiving messages about quitting smoking, usually during or after a health concern connected to tobacco use. Counselling interventions are a fundamental aspect of these programs, offering individualised assistance to aid clients in quitting tobacco. Research has shown that counselling effectively enhances the likelihood of successfully quitting smoking by targeting both the physiological and psychological components of nicotine addiction. It generally entails a methodical approach, which includes evaluating the patient's willingness to stop, informing them about the dangers of ongoing usage, aiding in the creation of a cessation plan, and organising subsequent check-ups to avoid a relapse.

The Tobacco Cessation Clinic, located at the Noida International Institute of Medical Sciences (NIIMS) in District Gautam Budh Nagar, is a specialised facility that forms part of a larger effort to decrease tobacco use and mitigate the related health hazards. The clinic provides specialised services such as individual counselling, group therapy, and pharmaceutical assistance for those seeking to stop smoking or using other tobacco products. In a tertiary care institution, a multidisciplinary approach is

used to integrate medical, psychological, and social assistance in order to increase the likelihood of effective quitting.

Although these services are accessible, it is necessary to consistently evaluate their efficacy in providing solutions, especially in specialised settings such as tertiary care facilities. This research aims to address this deficiency by assessing the results of counselling treatments offered at the Tobacco Cessation Clinic at Noida International Institute of Medical Sciences (NIIMS) Hospital. The results of this research will add to the increasing amount of information on successful methods for quitting tobacco and assist in improving the counselling technique used in hospital-based programs.

The present study is designed to answer key questions about the impact of counselling on tobacco cessation rates, reduction in tobacco use, and changes in patients' motivation to quit. Additionally, the study aims to identify factors that predict successful cessation, which can inform future interventions and policy decisions. Through this research, we aim to contribute valuable insights into the optimization of tobacco cessation services in hospital settings, ultimately aiding in the global fight against tobacco-related morbidity and mortality.

Aim and Objectives

Aim: To evaluate the effectiveness of counselling interventions in promoting tobacco cessation among patients attending a tobacco cessation clinic at a tertiary care hospital.

Objectives:

1. To determine the cessation rate at three and six months following counselling interventions.
2. To assess the reduction in the number of cigarettes smoked per day after counselling.
3. To evaluate changes in patients' motivation to quit tobacco use.
4. To identify predictors of successful tobacco cessation.

Material and Methods

Study Design

This study utilized a longitudinal design to evaluate the effectiveness of counselling interventions in promoting tobacco cessation over a six-month period (starting from 31st May 2023). The longitudinal approach allowed for the observation of changes in tobacco use behaviours and motivation over time, providing a comprehensive understanding of the impact of the counselling interventions.

Setting

The study was conducted at the Tobacco Cessation Clinic of NIIMS Hospital, a tertiary care facility equipped with specialized resources for smoking cessation. The clinic is part of a larger hospital taken care by Dental Department that provides comprehensive healthcare services, including specialized care for patients with tobacco-related health issues. The setting provided an ideal environment for implementing and assessing the effectiveness of structured counselling interventions, as it allowed for the integration of medical, psychological, and social support systems.

Participants

A total of 200 patients were recruited for this study. Participants were selected based on the following inclusion criteria:

- **Age:** Patients aged 18 years and above.
- **Tobacco Use:** Participants were current users of tobacco products, including cigarettes, chewing tobacco, and other forms of smokeless tobacco.
- **Desire to Quit:** Only those who expressed a desire to quit tobacco use were included in the study.

Exclusion criteria included:

- **Severe Psychiatric Conditions:** Patients with severe psychiatric disorders, such as schizophrenia or bipolar disorder, which could interfere with their ability to participate in counseling, were excluded.
- **Ongoing Treatment for Other Addictions:** Individuals currently undergoing treatment for other substance use disorders (e.g., alcohol or drug addiction) were excluded to avoid confounding effects.
- **Lack of Consent:** Patients who did not provide informed consent were excluded from the study.

Intervention

Participants received individualized counselling sessions based on the 5 A’s model, a widely recognized approach in tobacco cessation. The five components of this model are:

1. **Ask:** Patients were systematically identified as tobacco users during their routine healthcare visits. This involved direct questioning about their tobacco use history.
2. **Advise:** Participants were strongly urged to quit tobacco use through clear, personalized advice about the benefits of cessation and the risks of continued use.
3. **Assess:** Counselors assessed each participant's readiness to quit using a structured tool, which helped determine the appropriate level of intervention.
4. **Assist:** Personalized quit plans were developed for each participant. These plans included setting a quit date, identifying triggers and strategies to avoid them, and managing withdrawal symptoms. Participants were also provided with educational materials and, where appropriate, pharmacotherapy (e.g., nicotine replacement therapy) to support their quit attempt.
5. **Arrange:** Follow-up visits were scheduled to monitor progress, provide ongoing support, and address any challenges encountered during the quitting process. These follow-ups were conducted at one week, one month, three months, and six months post-initiation of the quit plan.

All counselling sessions were conducted by trained counsellors who had received specialized training in tobacco cessation. The sessions were designed to be supportive, non-judgmental, and tailored to the individual needs of each participant.

Data Collection

Data were collected at three key time points: baseline (prior to the initiation of the intervention), three months, and six months. The following measures were used:

- **Tobacco Use:** Participants provided self-reported data on their tobacco use, including the type and quantity of tobacco products used daily.
- **Cigarettes Smoked per Day:** For those using cigarettes, the average number of cigarettes smoked per day was recorded at each time point.
- **Nicotine Dependence:** The Fagerström Test for Nicotine Dependence (FTND) was used to assess the level of nicotine dependence at baseline. This validated tool measures dependence based on factors such as the time to first cigarette after waking and the number of cigarettes smoked daily.
- **Motivation to Quit:** The Motivation to Stop Scale (MTSS) was used to assess participants' motivation to quit tobacco. This scale, which ranges from 1 (not at all motivated) to 10 (extremely motivated), was administered at each data collection point.
- **Biochemical Verification:** Where possible, cessation was biochemically verified using exhaled carbon monoxide (CO) levels, with a CO level of less than 7 ppm considered indicative of successful cessation.

Statistical Analysis

Data were analysed using SPSS latest version. Descriptive statistics were used to summarize the baseline characteristics of the participants, including age, gender, type of tobacco used, and baseline FTND scores.

- **Paired t-tests** were employed to assess changes in the number of cigarettes smoked per day and motivation to quit between baseline and follow-up points (three and six months).
- **Chi-square tests** were used to evaluate changes in tobacco use status (cessation versus continued use) over time.

- **Logistic regression analysis** was conducted to identify predictors of successful tobacco cessation. Variables included in the regression model were age, gender, baseline nicotine dependence, motivation to quit, and the presence of comorbid conditions.

The significance level was set at $p < 0.05$ for all statistical tests.

Results

Baseline Characteristics of Participants

A total of 200 participants were enrolled in the study, of which 180 (90%) completed the six-month follow-up. The baseline characteristics of the participants are summarized in **Table 1**. The mean age of the participants was 37.2 years (SD = 10.4), with a predominance of males (65%). The majority of participants (68%) were cigarette smokers, while the remaining 32% used other forms of tobacco, including chewing tobacco and smokeless tobacco products. The mean baseline Fagerström Test for Nicotine Dependence (FTND) score was 6.1 (SD = 2.2), indicating moderate to high nicotine dependence.

Table 1: Baseline Characteristics of Participants

Characteristic	Total (N=200)
Age (years), mean (SD)	37.2 (10.4)
Gender, n (%)	
- Male	130 (65%)
- Female	70 (35%)
Type of Tobacco Use, n (%)	
- Cigarette Smoking	136 (68%)
- Chewing Tobacco/Smokeless Tobacco	64 (32%)
Baseline FTND Score, mean (SD)	6.1 (2.2)
Motivation to Quit (MTSS), mean (SD)	3.4 (1.6)

Tobacco Cessation Rates

At three months, 84 participants (42%) had successfully quit using tobacco. By the six-month follow-up, the cessation rate decreased slightly, with 72 participants (36%) remaining tobacco-free. This reduction was statistically significant, indicating that a proportion of those who initially quit had relapsed by six months (**Table 2**). The cessation rate was higher among those who had lower baseline FTND scores and higher baseline motivation to quit.

Table 2: Tobacco Cessation Rates at 3 and 6 Months

Time Point	Number of Quitters (n)	Cessation Rate (%)	p-value
3 Months	84	42%	< 0.05*
6 Months	72	36%	< 0.01*

* Statistical significance compared to baseline.

Reduction in Cigarette Consumption

There was a significant reduction in the number of cigarettes smoked per day among participants who did not quit but continued to use tobacco. The mean number of cigarettes smoked per day decreased from 18 at baseline to 10 at three months, and further to 8 at six months ($p < 0.01$). This reduction was more pronounced among participants who received additional pharmacotherapy in conjunction with counseling.

Table 3: Reduction in Cigarette Consumption Over Time

Time Point	Mean Cigarettes Smoked Per Day (SD)	p-value
Baseline	18 (7.4)	
3 Months	10 (5.1)	< 0.01*
6 Months	8 (4.3)	< 0.01*

* Paired t-test significance level compared to baseline.

Changes in Motivation to Quit

Participants showed significant improvement in their motivation to quit tobacco use over the course of the study. The mean score on the Motivation to Stop Scale (MTSS) increased from 3.4 at baseline to 6.8 at three months and 7.1 at six months ($p < 0.001$). Higher motivation scores were positively correlated with successful cessation outcomes.

Table 4: Changes in Motivation to Quit (MTSS) Over Time

Time Point	Mean Motivation Score (SD)	p-value
Baseline	3.4 (1.6)	
3 Months	6.8 (2.3)	< 0.001*
6 Months	7.1 (2.1)	< 0.001*

* Paired t-test significance level compared to baseline.

Predictors of Successful Cessation

Logistic regression analysis identified several significant predictors of successful tobacco cessation at six months. Participants with lower baseline FTND scores were more likely to quit successfully (Odds Ratio [OR] = 1.8, 95% Confidence Interval [CI] = 1.3-2.4, $p < 0.01$). Higher motivation to quit at baseline (OR = 2.1, 95% CI = 1.5-2.9, $p < 0.001$) and the use of pharmacotherapy (OR = 2.5, 95% CI = 1.7-3.4, $p < 0.001$) were also significant predictors of cessation.

Table 5: Logistic Regression Analysis of Predictors of Successful Cessation at 6 Months

Predictor Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Baseline FTND Score	1.8	1.3-2.4	< 0.01*
Baseline Motivation (MTSS)	2.1	1.5-2.9	< 0.001*
Use of Pharmacotherapy	2.5	1.7-3.4	< 0.001*

* Statistical significance.

Biochemical Verification of Cessation

Among the participants who reported quitting tobacco at six months, 60% (n=43) were able to provide biochemical verification using exhaled carbon monoxide (CO) levels. Of these, 90% (n=39) had CO levels below 7 ppm, confirming cessation. The remaining 10% (n=4) had CO levels above 7 ppm, suggesting either recent relapse or continued exposure to second-hand smoke.

Summary of Results

- The overall cessation rate at six months was 36%.
- There was a significant reduction in the number of cigarettes smoked per day among those who continued using tobacco.
- Motivation to quit increased significantly over the course of the study.
- Lower baseline FTND scores, higher baseline motivation, and the use of pharmacotherapy were significant predictors of successful cessation.

Discussion

This study evaluated the effectiveness of counselling interventions provided at the Tobacco Cessation Clinic of NIIMS Hospital in promoting tobacco cessation among patients. The findings demonstrate that individualized counselling, based on the 5 A’s model, significantly contributed to both short-term and sustained tobacco cessation. The study also identified key predictors of successful cessation, which align with previous research and provide valuable insights for future tobacco cessation strategies.

Tobacco Cessation Rates

The overall cessation rate of 36% at six months is consistent with outcomes observed in other hospital-based tobacco cessation programs. A study by Stead et al. (2013) reported similar cessation rates in clinical settings where patients received counselling interventions.[9] This finding reinforces the role of counselling as an effective tool in clinical practice, particularly when delivered by trained professionals who can provide personalized support. However, the decline in cessation rates from 42% at three months to 36% at six months highlights the challenge of maintaining tobacco abstinence over time, a challenge documented in several other studies . Both our observation and Hughes et al.’s study recognize that while initial cessation efforts can be successful (e.g., a 42% cessation rate at three months), maintaining this success over time can be more difficult.[4] Hughes et al. discuss the concept that relapse is common after initial success, which aligns with the decline from 42% to 36% in cessation rates.[10]

Reduction in Cigarette Consumption

Among participants who did not quit entirely, the significant reduction in cigarette consumption—from 18 cigarettes per day at baseline to 8 per day at six months—indicates a meaningful reduction in tobacco exposure. This finding aligns with the work of Fiore et al. (2008), who noted that even a reduction in smoking can significantly lower the risk of tobacco-related diseases.[11] The more pronounced reduction among participants who received pharmacotherapy suggests that combining counselling with pharmacological support, such as nicotine replacement therapy (NRT) or varenicline, is particularly effective in helping individuals reduce tobacco use . This supports the integration of pharmacotherapy as a standard adjunct to counseling in tobacco cessation programs.

Changes in Motivation to Quit

The significant increase in motivation to quit, as reflected in the Motivation to Stop Scale (MTSS) scores, is encouraging. Motivation is a critical determinant of smoking cessation success, and the observed increase suggests that counselling effectively enhances participants' readiness to quit. This finding is consistent with the literature, where higher motivation levels are associated with greater cessation success . Koh-Knox et al.(2009) have emphasized the importance of motivational interviewing in further enhancing motivation, which could be considered for future iterations of the program to improve outcomes .[12]

Predictors of Successful Cessation

The logistic regression analysis identified several key predictors of successful cessation, including lower baseline FTND scores, higher baseline motivation to quit, and the use of pharmacotherapy. The association between lower nicotine dependence and higher cessation success is well-documented in the literature . The findings from our study align with those reported by Heatherton et al. (1991), who found that individuals with lower FTND scores are more likely to quit successfully.[13] This underscores the importance of early intervention before nicotine dependence becomes severe. Additionally, the strong correlation between higher motivation and cessation success further supports the role of motivation in cessation interventions, a relationship also noted by West (2005).[14]

The positive impact of pharmacotherapy on cessation outcomes is consistent with existing evidence, which shows that pharmacological aids significantly increase the likelihood of quitting . Participants in our study who used pharmacotherapy were 2.5 times more likely to quit successfully compared to

those who did not, which is in line with findings from previous meta-analyses . This suggests that pharmacotherapy should be considered a standard component of tobacco cessation programs, especially for individuals with higher levels of nicotine dependence or those who have struggled to quit in the past.

Biochemical Verification

Biochemical verification of cessation through exhaled carbon monoxide (CO) levels provided an objective measure of tobacco abstinence. The high rate of CO-verified cessation among self-reported quitters (90%) enhances the credibility of our findings and aligns with the literature, which advocates for the use of biochemical measures to validate self-reported smoking status . However, the presence of elevated CO levels in 10% of participants who reported quitting highlights the potential for underreporting of tobacco use or continued exposure to second-hand smoke. This finding suggests that biochemical verification should be an integral part of cessation programs to ensure the accuracy of outcomes, as recommended by Benowitz et al. (2002).[15]

Study Limitations

Several limitations of this study should be acknowledged. First, the reliance on self-reported data for tobacco use introduces the potential for reporting bias. Although biochemical verification was used for some participants, it was not feasible for all, which may have affected the accuracy of cessation rates. Future studies should consider using more widespread biochemical verification to minimize this bias. Second, the absence of a control group limits our ability to attribute changes in tobacco use solely to the counseling intervention. Randomized controlled trials, as suggested by Cahill et al. (2013), would provide stronger evidence of the effectiveness of the intervention .[16]

Additionally, the study was conducted in a single tertiary care hospital, which may limit the generalizability of the findings. Patients in tertiary care settings may differ in characteristics and motivation compared to those in primary care or community settings. Therefore, further research is needed to assess the effectiveness of similar interventions in diverse healthcare environments.

Implications for Practice

The findings of this study have important implications for clinical practice. The demonstrated effectiveness of counselling, particularly when combined with pharmacotherapy, supports the continued implementation and expansion of tobacco cessation programs in hospital settings. Healthcare providers should be trained in the 5 A’s model and motivational interviewing to maximize the impact of counseling interventions. Additionally, the study highlights the importance of early identification and intervention for tobacco users, particularly those with lower nicotine dependence, to improve cessation outcomes.

Future programs should also incorporate regular follow-ups and relapse prevention strategies to sustain cessation over time. The integration of pharmacotherapy as a routine component of cessation programs should be emphasized, given its significant impact on quit rates. Finally, the use of biochemical verification as a standard practice can enhance the accuracy of outcome assessments and strengthen the overall quality of cessation programs.

Conclusion

In conclusion, the counselling interventions provided at the Tobacco Cessation Clinic of NIIMS Hospital were effective in promoting tobacco cessation and reducing tobacco use among participants. The study identified key predictors of successful cessation, including lower nicotine dependence, higher motivation to quit, and the use of pharmacotherapy. These findings underscore the importance of tailored, multidisciplinary approaches in tobacco cessation programs and provide a basis for refining strategies to achieve sustained tobacco cessation. Further research, particularly in diverse settings, is needed to build on these findings and continue improving tobacco cessation efforts.

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