Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 3 (2026): September 2026 Issue
https://doi.org/10.51168/y34h3793
Original Article

Knowledge, perception, and utilization of nicotine replacement therapy among smokers: a cross-sectional study.

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Abstract

Background

Cigarette smoking remains one of the biggest public health concerns in the world and has contributed a lot to illness and death. Nicotine replacement therapy is a technique for stopping smoking that has been shown to help overcome the withdrawal symptoms and assist in quitting.

Objective

The objective of this research study is to find out the level of knowledge, perception, and usage of NRT by smokers.

Materials and Methods

A cross-sectional observational study was performed on 427 adults who are smokers at the outpatient department and smoking cessation clinic of a tertiary care teaching hospital. Patients were administered a structured questionnaire to assess their sociodemographic characteristics, smoking behaviors, knowledge, perceptions, and use of NRT.

Results

The mean age of the participants was 38.6 ± 11.2 years, and 84.5% were males. Awareness of NRT products was seen to be 74.5%, and adequate knowledge of NRT was seen to be present in 57.4% of the participants. Positive perception of NRT was seen, and 56.4% thought that NRT is effective, while 50.4% perceived NRT to be safe for smoking cessation. However, 34.4% had ever used NRT. Adequate knowledge ($p < 0.001$), quit attempt ($p < 0.001$), graduate education ($p < 0.001$), and smoking history of more than 10 years ($p = 0.006$) were significantly associated with NRT use.

Conclusion

Despite the fairly good knowledge and favorable attitudes towards Nicotine Replacement Therapy in the smokers, there were still some shortcomings in terms of its use. Improved knowledge and reduced misconceptions might lead to increased use of scientifically proven smoking cessation techniques.

Recommendation

Health care professionals should concentrate on smoking cessation counseling as well as encouraging evidence-based NRT. Public health interventions should focus on raising awareness and lowering misconceptions about safety and addiction, as well as increasing accessibility and affordability of NRT products.

Keywords: *Nicotine Replacement Therapy; Smoking Cessation; Tobacco Use; Knowledge; Perception; Utilization; Smokers; Public Health.*
Submitted: *June 05, 2026* ***Accepted:*** *August 01, 2026* ***Published:*** *September 30, 2026*
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Introduction

Tobacco smoking remains one of the leading preventable causes of morbidity and mortality worldwide, accounting for more than eight million deaths annually. Despite extensive public health initiatives and increasing awareness regarding the harmful effects of tobacco use, smoking

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continues to be highly prevalent across both developed and developing countries. Nicotine, the primary psychoactive component of tobacco, is responsible for the development and maintenance of tobacco dependence. The addictive properties of nicotine contribute significantly to the difficulty experienced by smokers attempting cessation, resulting in high rates of relapse even among motivated individuals [1,2].

Smoking is strongly associated with numerous adverse health outcomes, including cardiovascular diseases, chronic obstructive pulmonary disease (COPD), stroke, and various malignancies, particularly lung cancer. The burden of tobacco-related diseases extends beyond individual health, contributing substantially to healthcare expenditures, reduced productivity, and premature mortality. Consequently, effective smoking cessation strategies have become a major public health priority worldwide. Among the available interventions, Nicotine Replacement Therapy (NRT) has emerged as one of the most widely recommended and evidence-based pharmacological approaches for tobacco cessation [3,4].

Nicotine Replacement Therapy refers to the administration of nicotine through alternative delivery systems that do not involve tobacco combustion. Common formulations include nicotine patches, chewing gums, lozenges, inhalers, nasal sprays, and oral sprays. These products provide controlled doses of nicotine to alleviate withdrawal symptoms and cravings associated with smoking cessation while minimizing exposure to the harmful toxicants present in cigarette smoke. Extensive clinical evidence has demonstrated that NRT significantly increases the likelihood of successful smoking cessation compared to placebo or no treatment. Meta-analyses and systematic reviews have reported that NRT can increase long-term quit rates by approximately 50–70%, making it a cornerstone of tobacco dependence treatment programs [5–7].

Despite the proven efficacy and safety of NRT, its utilization remains suboptimal in many populations. Several studies have identified inadequate knowledge regarding the availability, mechanisms, benefits, and proper use of NRT among smokers. Misconceptions concerning nicotine addiction, fears of adverse effects, concerns regarding efficacy, and limited awareness of cessation resources frequently act as barriers to NRT adoption. Furthermore, socioeconomic factors, educational status, cultural beliefs, accessibility, and healthcare provider recommendations significantly influence smokers' perceptions and utilization of these therapies [8,9].

Knowledge regarding NRT is a critical determinant of smoking cessation behavior. Smokers who possess accurate information about cessation aids are more likely to consider pharmacological support during quit attempts. Conversely, insufficient awareness may result in reliance on unassisted quitting methods, which are generally associated with lower long-term success rates. Healthcare professionals play a pivotal role in disseminating information regarding NRT; however, studies have suggested that counseling regarding smoking cessation interventions is often inconsistent or inadequate, particularly in low- and middle-income countries [10].

Perception toward NRT represents another important factor influencing treatment uptake. Positive perceptions regarding effectiveness, affordability, safety, and convenience are associated with increased willingness to use NRT during quit attempts. In contrast, negative attitudes, including beliefs that NRT merely substitutes one addiction for another or concerns regarding potential side effects, can discourage utilization. Understanding smokers' perceptions is therefore essential for developing targeted educational interventions and tobacco cessation policies that address misconceptions and improve treatment acceptance [11,12].

Utilization of NRT among smokers is influenced by a complex interaction of knowledge, perception, accessibility, affordability, and healthcare support. Although clinical guidelines consistently recommend NRT as a first-line treatment for tobacco dependence, many smokers either remain unaware of available products or fail to use them appropriately. Assessing patterns of NRT utilization can provide valuable insights into existing gaps in tobacco cessation services and identify opportunities for enhancing treatment delivery and public awareness programs [13,14].

Given the substantial burden of tobacco-related diseases and the demonstrated effectiveness of NRT in facilitating smoking cessation, it is important to evaluate smokers' knowledge, perceptions, and utilization patterns regarding these therapies. Understanding these factors can assist policymakers, healthcare providers, and public health practitioners in designing evidence-based interventions aimed at increasing NRT uptake and improving smoking cessation outcomes. Therefore, studies focusing on the knowledge, perception, and utilization of Nicotine Replacement Therapy among smokers are essential for strengthening tobacco control strategies and reducing the global burden of smoking-related diseases.

Study Aim and Objectives

The present study was conducted to establish the knowledge, perception, and use of Nicotine Replacement Therapy (NRT) among adult smokers in a teaching hospital. To be specific, the study sought to assess the extent of

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knowledge and awareness about NRT among the adult smokers, assess the perception about the effectiveness and safety of NRT among the adult smokers, assess the use of NRT among the adult smokers, and find the predictors of the use of NRT.

Materials and Methods

Study Design and Setting

A cross-sectional observational study was conducted among adult smokers attending the outpatient departments and smoking cessation clinic of Bharath Medical College and Hospital, Chennai, Tamil Nadu, India. The study was carried out over a four-month period from July 2025 to October 2025. The study was designed to assess the knowledge, perception, and utilization of Nicotine Replacement Therapy (NRT) among current smokers seeking healthcare services at the study institution.

Study Population

The study population comprised adult smokers aged 18 years and above who reported current tobacco smoking and consented to participate in the study.

Sample Size Calculation

The sample size for a cross-sectional study can be calculated using the formula:

$$n = Z^2p(1-p) / d^2$$

Where:

- **n** = required sample size
- **Z** = 1.96 for a 95% confidence level
- **p** = anticipated prevalence (0.50)
- **d** = margin of error (0.05)

Substituting the values:

$n = (1.96^2 \times 0.5 \times 0.5) / (0.05^2)$

$n = 384.16$

Thus, the minimum sample size is 384 participants.

Assuming a 10% non-response rate:

Adjusted sample size = 384 / 0.90

Adjusted sample size = 426.7

The final sample size should therefore be 427 smokers.

The sample size was estimated using the single population proportion formula for cross-sectional studies. In the absence of reliable regional estimates regarding knowledge, perception, and utilization of Nicotine Replacement Therapy among smokers, a prevalence of 50% was assumed to obtain the maximum sample size. Considering a 95% confidence level (Z = 1.96) and a precision of 5%, the calculated sample size was 384 participants. After accounting for an anticipated non-response rate of 10%, the final required sample size was 427 participants.

Sampling Technique

Participants were recruited using consecutive sampling. Eligible smokers attending the study setting during the study period were approached and invited to participate until the desired sample size was achieved.

Inclusion Criteria

- Former smokers who had quit smoking for more than six months.
- Individuals currently enrolled in structured smoking cessation intervention trials.
- Participants with severe cognitive impairment or psychiatric illness preventing questionnaire completion.

Exclusion Criteria

- Former smokers who had quit smoking for more than six months.
- Individuals currently enrolled in structured smoking cessation intervention trials.
- Participants with severe cognitive impairment or psychiatric illness preventing questionnaire completion.
- Individuals unwilling to provide informed consent.

Study Instrument

Data were collected using a structured, pretested questionnaire developed after an extensive review of the literature. The questionnaire consisted of four sections:

1. **Sociodemographic characteristics:** age, sex, educational status, occupation, income, and marital status.
2. **Smoking-related characteristics:** duration of smoking, daily cigarette consumption, previous quit attempts, and nicotine dependence.
3. **Knowledge regarding NRT:** awareness of NRT products, indications, benefits, safety profile, availability, and effectiveness.
4. **Perception and utilization of NRT:** attitudes toward NRT, perceived barriers, willingness to use NRT, previous use, type of NRT utilized, and satisfaction with treatment.

The questionnaire was reviewed by experts in public health, tobacco cessation, and epidemiology to establish content validity. A pilot study involving 20 participants was

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conducted to assess clarity and feasibility; pilot participants were excluded from the final analysis.

Data Collection Procedure

Eligible participants were identified during outpatient visits. After obtaining written informed consent, participants completed the questionnaire under the supervision of trained investigators. Assistance was provided when necessary without influencing responses. Data were collected anonymously to ensure confidentiality.

Bias Reduction and Quality Control

Steps were taken to remove any source of bias. A standard questionnaire that had already been validated before the survey was used to collect the data. The interviewers were trained in order to reduce bias that is likely to arise from the recruitment of respondents and the administration of questionnaires. A consecutive sampling method was used to reduce bias that would have emerged from selecting the respondents from the eligible smokers to participate in the survey. The respondents were interviewed anonymously in order to prevent social desirability bias.

Outcome Measures

The primary outcomes included:

- Level of knowledge regarding Nicotine Replacement Therapy.
- Perception and attitudes toward NRT.
- Utilization patterns of NRT among smokers.

Knowledge scores were calculated based on correct responses to knowledge-related questions. Participants scoring ≥75% of the maximum attainable score were classified as having adequate knowledge, while those scoring below this threshold were categorized as having inadequate knowledge.

Ethical Considerations

The Institutional Ethics Committee of Bharath Medical College & Hospital, Chennai, Tamil Nadu, India, reviewed and approved this study protocol (IEC Approval Number: BMCH/IEC/2025/067). The research was conducted following the ethical aspects mentioned in the Declaration of Helsinki. Written informed consent was obtained from all participants prior to the experiment. Participation in the research was voluntary, and it was ensured to all participants that they could withdraw from the experiment at any time without any consequences.

Statistical Analysis

Collection of data was done using Microsoft Excel, while analysis of data was done using the help of IBM SPSS Statistics for Windows version 26 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as means ± standard deviations, while categorical variables were presented as frequencies and percentages.

Chi-square test was used for the determination of significant associations between the categorical variables. Fisher's exact test was conducted when the expected frequency was below five. Statistical significance for the relationship between the use of NRT and participant characteristics like adequate knowledge, educational status, previous quit attempts, and smoking history was assessed using the chi-square test. Significant associations were found for adequate knowledge ($p<0.001$), previous quit attempts ($p<0.001$), graduate education ($p<0.001$), and smoking history >10 years ($p=0.006$).

The categorical variables that showed significant association with the use of NRT in bivariate analysis were subjected to multivariable logistic regression to determine the independent predictors of NRT. The adjusted odds ratios (AOR), along with 95% confidence intervals (CI), were calculated.

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RESULTS

Figure 1: Participants Flow Diagram

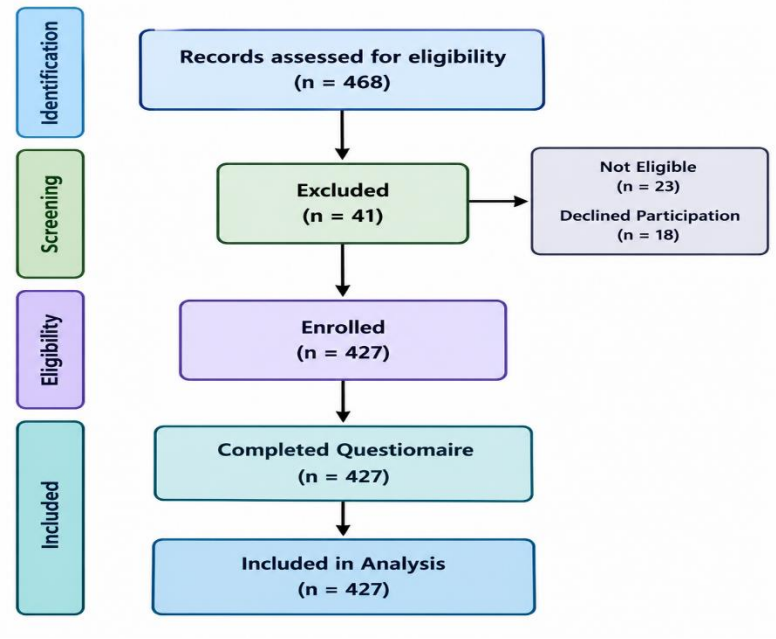


Table 1: Study Overview

Study Stage	Number of Participants
Assessed for Eligibility	468
Excluded	41
Not Meeting Inclusion Criteria	23
Declined Participation	18
Included in Study	427
Completed Questionnaire	427
Included in Final Analysis	427

Overall, the number of those who participated in the screening process was 468. From that number, there were 23 participants who were found ineligible for participation in the survey. At the same time, there were 18 participants who refused to participate in the study. Therefore, the number of those who took part in the survey was 427.

A total of 427 smokers participated in the study. The mean age of the participants was 38.6 ± 11.2 years. The majority were male (84.5%), married (62.8%), and had completed secondary education or above (68.4%).

Table 2. Sociodemographic Characteristics of Study Participants (N = 427)

Variable	Frequency (n)	Percentage (%)
Age 18–30 years	126	29.5
Age 31–45 years	182	42.6

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Age >45 years	119	27.9
Male	361	84.5
Female	66	15.5
Married	268	62.8
Unmarried	159	37.2
Primary education or below	135	31.6
Secondary education	194	45.4
Graduate and above	98	23.0
Employed	302	70.7
Unemployed	125	29.3

Table 2 Most participants belonged to the 31–45-year age group. Male smokers constituted the majority of the study population. Nearly two-thirds were married and had attained at least secondary-level education.

Table 3. Occupational and Income Characteristics

Variable	Frequency	Percentage (%)
Employed	302	70.7
Unemployed	125	29.3
Monthly Income < ₹15,000	121	28.3
Monthly Income ₹15,000–30,000	185	43.3
Monthly Income > ₹30,000	121	28.3

The occupational status and income level of the respondents clearly show that the vast majority of the smokers among the study participants were working people (70.7%), which means that smoking is quite common among economically active people. The income level of the respondents was mainly in the middle-income level (43.3%), and lower and higher income level respondents were equally represented.

Table 4. Nicotine Dependence Characteristics

Variable	Frequency	Percentage (%)
Mild Dependence	108	25.3
Moderate Dependence	196	45.9
Severe Dependence	123	28.8

Nicotine dependence levels are as follows: the most predominant nicotine dependence level among the study participants was moderate (45.9%), followed by severe dependence level (28.8%) and mild dependence level (25.3%). The findings clearly show that a substantial number of the smokers had nicotine dependence; hence, it would be difficult for them to stop smoking.

Table 5. Additional Perceptions and Barriers Toward NRT

Variable	Frequency	Percentage (%)
Aware NRT is Available Locally	201	47.1
Willing to Use NRT in Future Quit Attempt	264	61.8
Concerned About Cost	177	41.5
Concerned About Side Effects	136	31.9

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Concerned About Addiction Substitution	176	41.2

It must be said that the willingness to use NRT in future quitting attempts was quite high (61.8%), which means that this serves as evidence of a positive attitude towards cessation aid. At the same time, the level of knowledge concerning the availability of NRTs was relatively high (47.1%) too. The fear of possible side effects, the issue of cost, and the idea that NRT will cause substitution of one addiction by another seemed to be key barriers and, therefore, the reasons for the underutilization of NRT among smokers.

Table 6. Satisfaction Among Previous NRT Users (n=147)

Variable	Frequency	Percentage (%)
Satisfied	87	59.2
Neutral	31	21.1
Dissatisfied	29	19.7

When speaking of those smokers who previously used NRT, most of them had positive experiences (59.2%), while only a small number of them were not satisfied with the therapy (19.7%). This means that smokers who use NRT have a positive and acceptable attitude towards it. A positive satisfaction level will ensure further implementation of NRT usage.

Table 7. Smoking Characteristics of Participants

Variable	Frequency (n)	Percentage (%)
Smoking duration <5 years	91	21.3
Smoking duration 5–10 years	138	32.3
Smoking duration >10 years	198	46.4
≤10 cigarettes/day	165	38.6
11–20 cigarettes/day	182	42.6
>20 cigarettes/day	80	18.8
Previous quit attempt	286	67.0
No previous quit attempt	141	33.0

Table 7. Nearly half of the participants had been smoking for more than ten years. Two-thirds had previously attempted smoking cessation.

Table 8. Knowledge Regarding Nicotine Replacement Therapy

Knowledge Variable	Yes n (%)	No n (%)
Aware of NRT products	318 (74.5)	109 (25.5)
Know NRT helps smoking cessation	296 (69.3)	131 (30.7)
Aware of nicotine patches	281 (65.8)	146 (34.2)
Aware of nicotine gum	245 (57.4)	182 (42.6)
Know NRT is safer than smoking	229 (53.6)	198 (46.4)
Aware of the correct duration of NRT use	154 (36.1)	273 (63.9)
Knowledge Level	**Frequency**	**Percentage (%)**
Adequate	245	57.4
Inadequate	182	42.6

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Although awareness of NRT products and their role in smoking cessation was relatively high, detailed knowledge regarding correct usage duration remained limited. Table 8 Although awareness regarding NRT was relatively high, detailed knowledge regarding appropriate duration and usage remained inadequate among a substantial proportion of participants.

Table 9. Perception Toward Nicotine Replacement Therapy

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
NRT is effective in quitting smoking	241 (56.4)	94 (22.0)	92 (21.6)
NRT is safe to use	215 (50.4)	118 (27.6)	94 (22.0)
NRT should be recommended by doctors	302 (70.7)	71 (16.6)	54 (12.7)
NRT is affordable	164 (38.4)	119 (27.9)	144 (33.7)
NRT substitutes one addiction for another	176 (41.2)	87 (20.4)	164 (38.4)

Table 9. Participants generally exhibited positive attitudes toward NRT effectiveness and physician recommendation; however, concerns regarding affordability and addiction substitution persisted.

Table 10. Utilization Pattern of Nicotine Replacement Therapy

Variable	Frequency (n)	Percentage (%)
Ever used NRT	147	34.4
Never used NRT	280	65.6
Nicotine gum	73	49.7
Nicotine patch	51	34.7
Lozenges	23	15.6
Successful quit attempt among NRT users	81	55.1
Unsuccessful quit attempt among NRT users	66	44.9

Table 10. Only one-third of smokers had utilized NRT despite moderate awareness levels. Nicotine gum was the most commonly used form.

Table 11. Factors Associated with NRT Utilization

Variable	NRT Users n (%)	Non-users n (%)	p-value
Adequate knowledge	112 (76.2)	133 (47.5)	<0.001
Previous quit attempt	123 (83.7)	163 (58.2)	<0.001
Graduate education	54 (36.7)	44 (15.7)	<0.001
Smoking duration >10 years	82 (55.8)	116 (41.4)	0.006

Table 11. Adequate knowledge regarding NRT, previous quit attempts, higher educational attainment, and longer smoking duration were significantly associated with NRT utilization. Adequate knowledge regarding NRT (χ^2 test, $p<0.001$), previous quit attempts (χ^2 test, $p<0.001$), graduate-level education (χ^2 test, $p<0.001$), and smoking duration greater than 10 years (χ^2 test, $p=0.006$) were significantly associated with NRT utilization. These findings suggest that educational exposure, smoking history, and awareness of cessation therapies play important roles in the adoption of Nicotine Replacement Therapy among smokers.

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Figure 2. Distribution of study participants according to age group.

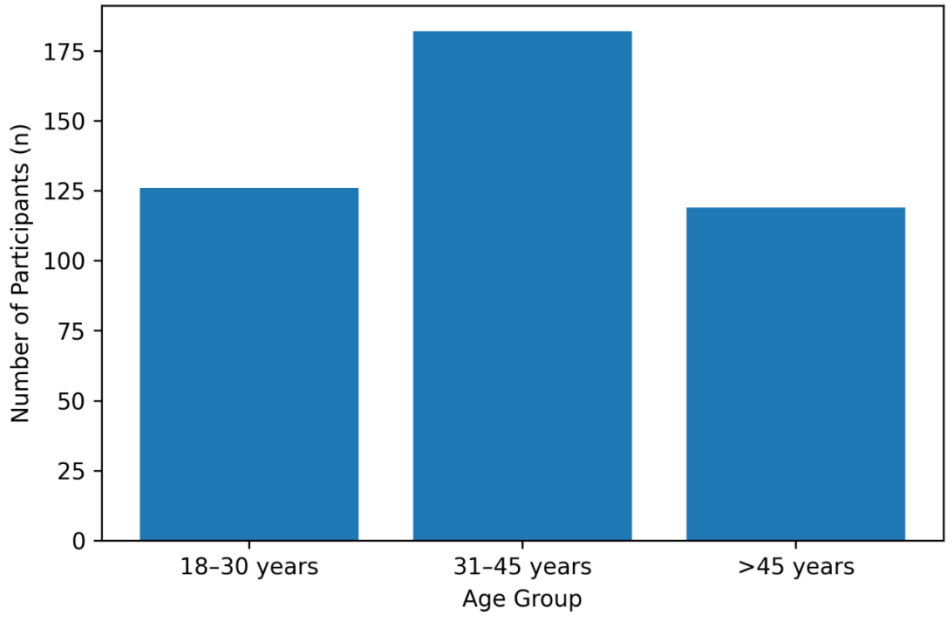


Figure 2 illustrates the age-wise distribution of the 427 study participants included in the study. The majority of participants belonged to the 31–45 years age group, accounting for 182 (42.6%) smokers. Participants aged 18–30 years constituted 126 (29.5%) of the study population, while 119 (27.9%) participants were aged more than 45 years. These findings indicate that smoking was most prevalent among middle-aged adults, who represented nearly half of the study sample. The relatively balanced distribution across age groups allowed for a comprehensive assessment of knowledge, perception, and utilization of Nicotine Replacement Therapy among smokers of different ages.

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Figure 3. Perception of participants regarding effectiveness and safety of Nicotine Replacement Therapy

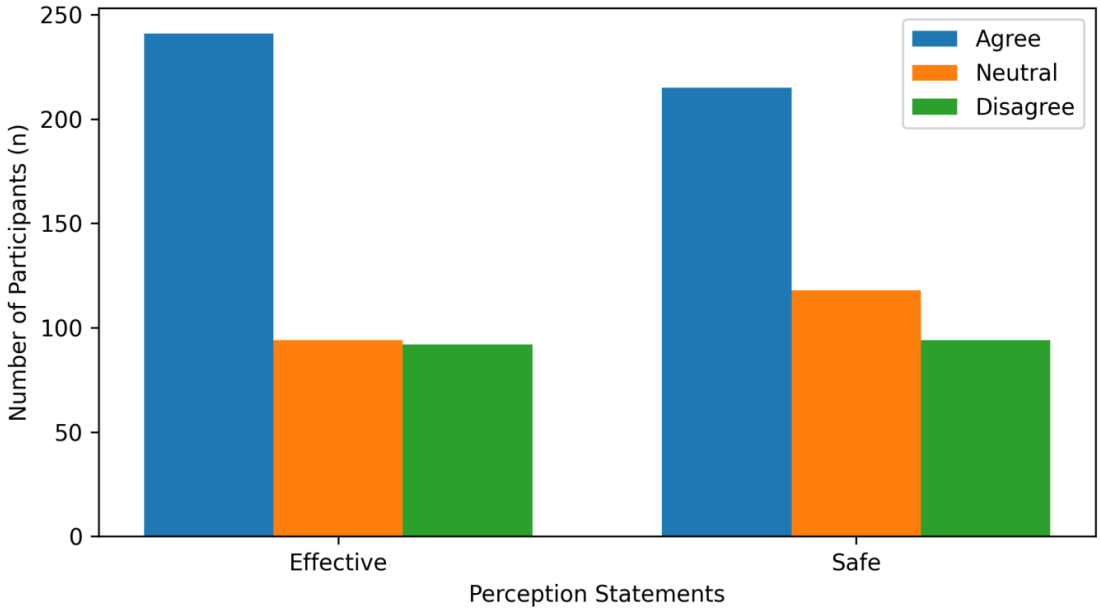


Figure 3 illustrates participants' perceptions regarding the effectiveness and safety of Nicotine Replacement Therapy (NRT). Regarding effectiveness, 241 (56.4%) participants agreed that NRT is effective in helping smokers quit, while 94 (22.0%) were neutral and 92 (21.6%) disagreed. Concerning safety, 215 (50.4%) participants agreed that NRT is safe to use, whereas 118 (27.6%) expressed neutral opinions and 94 (22.0%) disagreed. Overall, the findings indicate a predominantly positive perception of NRT among smokers, although a considerable proportion remained uncertain or skeptical about its effectiveness and safety.

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Figure 4. Association between knowledge level and utilization of Nicotine Replacement Therapy

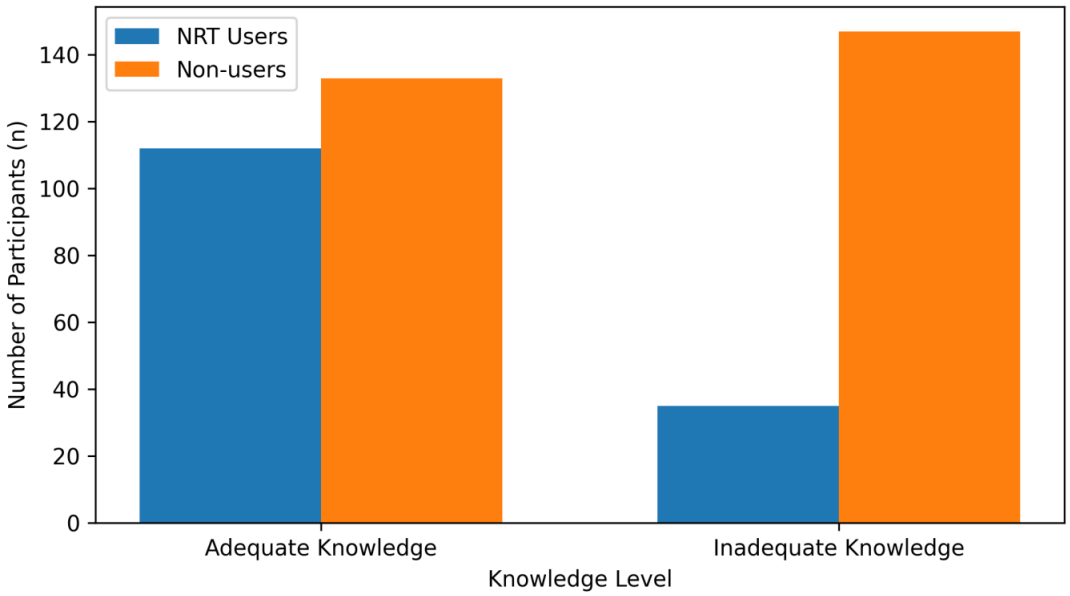


Figure 4 illustrates the relationship between the total level of knowledge on NRT and NRT use. In individuals with sufficient knowledge, 112 (45.7%) had been using NRT, while 133 (54.3%) had not used NRT before. In individuals with insufficient knowledge, 35 (19.2%) had been using NRT, while 147 (80.8%) had not used NRT before. The chi-square test revealed a statistically significant relationship between knowledge of NRT and NRT use ($\chi^2 = 33.84$, $p<0.001$).

Discussion

The present study assessed the knowledge, perception, and utilization of Nicotine Replacement Therapy (NRT) among smokers and demonstrated that although awareness regarding NRT was relatively high, significant gaps remained in detailed knowledge and actual utilization. The findings provide important insights into factors influencing the uptake of evidence-based smoking cessation interventions.

In the present study, the majority of participants were males (84.5%), and the largest proportion belonged to the 31–45-year age group (42.6%). These findings are consistent with global tobacco use patterns, where smoking prevalence is generally higher among adult males and middle-aged populations. The World Health Organization and Global Adult Tobacco Survey have reported similar demographic distributions among smokers, particularly in low- and middle-income countries [15,16]. The predominance of middle-aged smokers may reflect prolonged nicotine dependence and accumulated exposure to tobacco products, emphasizing the need for effective cessation strategies in this population.

Nearly half of the participants had been smoking for more than ten years, and approximately two-thirds had previously attempted smoking cessation. These findings suggest a substantial willingness among smokers to quit tobacco use despite the challenges associated with nicotine dependence. Similar observations have been reported by Hughes et al. and West and Sohal, who demonstrated that multiple quit attempts are common before achieving sustained abstinence [17,18]. Repeated cessation attempts may increase receptiveness toward pharmacological aids such as NRT.

The present study found that 74.5% of participants were aware of NRT products, while 69.3% recognized their role in smoking cessation. However, only 36.1% were aware of the correct duration of NRT use, and overall adequate knowledge was observed in 57.4% of participants. These findings indicate that although awareness exists, comprehensive understanding of NRT remains insufficient. Similar results were reported by Mooney et al., who

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observed substantial gaps in knowledge regarding nicotine and cessation therapies among smokers [19]. Likewise, Zhong et al. reported persistent misconceptions regarding nicotine replacement products among the general population [20]. Limited knowledge regarding dosage, treatment duration, and safety may negatively influence treatment adherence and effectiveness.

Perception toward NRT was generally favorable in the present study. More than half of participants agreed that NRT is effective (56.4%) and safe (50.4%) for smoking cessation, while 70.7% believed that NRT should be recommended by healthcare professionals. These findings are consistent with previous research demonstrating that positive perceptions toward cessation medications are associated with greater treatment acceptance and successful quit attempts [21]. Nevertheless, a substantial proportion of participants remained uncertain regarding the effectiveness and safety of NRT, indicating ongoing informational deficits.

A notable finding was that 41.2% of participants believed that NRT merely substitutes one addiction for another. Such misconceptions have been widely documented and remain an important barrier to NRT utilization. Laidler and Partridge reported that concerns regarding nicotine dependence and perceived safety frequently discourage smokers from initiating NRT despite robust evidence supporting its effectiveness [22]. Addressing these misconceptions through structured educational interventions may improve acceptance and adherence.

Although awareness and perception toward NRT were moderately positive, actual utilization remained limited. Only 34.4% of participants had previously used NRT, whereas nearly two-thirds had never utilized any NRT product. Nicotine gum was the most commonly used modality. Similar underutilization of NRT has been reported internationally despite strong evidence supporting its efficacy. Studies conducted by Shiffman et al. and Hammond et al. demonstrated that utilization rates of cessation therapies remain lower than expected even in settings where NRT is readily available [23,24]. Bondy et al. further reported that barriers such as cost, misconceptions, and inadequate professional guidance contribute substantially to low NRT uptake [25].

Among NRT users, more than half reported successful quit attempts. This observation supports the established effectiveness of NRT in reducing withdrawal symptoms and increasing smoking cessation rates. Extensive evidence from randomized trials and systematic reviews has confirmed that NRT significantly improves long-term abstinence compared with placebo or unassisted quitting [5,6]. These findings reinforce current recommendations advocating NRT as a first-line pharmacological intervention for tobacco dependence.

A significant association was observed between adequate knowledge and NRT utilization. Smokers with adequate knowledge were considerably more likely to use NRT than those with inadequate knowledge ($p<0.001$). Similar findings have been reported in previous studies demonstrating that awareness and understanding of cessation therapies are important determinants of treatment uptake [19,20]. Improving smokers' knowledge regarding available cessation options may therefore increase adoption of evidence-based interventions.

Higher educational attainment was also significantly associated with NRT utilization. Participants with graduate-level education were more likely to use NRT than less educated individuals. This finding is consistent with studies indicating that educational status positively influences health literacy, healthcare-seeking behavior, and engagement with preventive interventions [26]. Individuals with higher education levels may have better access to health information and greater awareness of the benefits of smoking cessation therapies.

Previous quit attempts emerged as another significant predictor of NRT utilization. Smokers who had attempted cessation previously were more likely to use NRT than those who had never attempted quitting. Similar findings have been reported by Shiffman et al. and Alberg et al., who identified prior cessation efforts as an important determinant of smoking cessation treatment use [27,28]. Motivated smokers may be more willing to adopt pharmacological support during subsequent quit attempts.

The strengths of the present study include its relatively large sample size and comprehensive assessment of knowledge, perception, and utilization of NRT. However, several limitations should be considered. The cross-sectional design limits causal inference, and self-reported responses may be subject to recall and social desirability bias. Furthermore, the single-center nature of the study may restrict generalizability. Despite these limitations, the findings provide valuable evidence regarding existing gaps in awareness and utilization of NRT among smokers.

From a public health perspective, the findings underscore the need for targeted educational programs, healthcare provider counselling, and enhanced accessibility of smoking cessation services. Addressing misconceptions regarding safety and addiction potential may improve NRT uptake and facilitate successful smoking cessation. Strengthening tobacco cessation programs and integrating NRT education

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 3 (2026): September 2026 Issue
https://doi.org/10.51168/y34h3793
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into routine clinical practice may contribute significantly to reducing tobacco-related morbidity and mortality.

Conclusion

The present study demonstrated that although a majority of smokers were aware of Nicotine Replacement Therapy (NRT), substantial gaps remained in detailed knowledge regarding its appropriate use, duration, and benefits. More than half of the participants exhibited adequate knowledge and positive perceptions regarding the effectiveness and safety of NRT. However, actual utilization remained relatively low. Misconceptions regarding addiction potential, concerns about safety, and limited understanding of NRT were identified as important barriers to its adoption.

Limitation

A few limitations can be identified for the current study, which should be considered when interpreting its findings. First of all, the cross-sectional design of the research does not allow evaluating the cause-and-effect relationship between the variables. Secondly, the data were collected via self-administered questionnaires, thus being subject to recall bias and social desirability bias. Thirdly, the study was conducted in one particular teaching tertiary care hospital, thus preventing the researchers from generalizing their findings to other population groups. Finally, the study did not validate usage rates or quit rates clinically.

Recommendation

Based on the findings, there is a need to intensify existing smoking cessation interventions by emphasizing the role of education, which should concentrate on the knowledge concerning the safety, effectiveness, and correct administration of Nicotine Replacement Therapy. It is incumbent upon physicians to give advice to smokers regarding various types of NRT and address myths associated with addiction substitution and side effects. There should be an increase in accessibility and affordability of NRT products through smoking cessation programs, public health programs, and primary health care programs. Further research will have to be done from a multicenter perspective.

Source of funding:

The study has not received any funding.

Conflict of interest:

The authors declare no conflict of interest.

Data availability:

Data are available on Request.

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Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 3 (2026): September 2026 Issue
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Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 3 (2026): September 2026 Issue
https://doi.org/10.51168/y34h3793
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Publisher Details:

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
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WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa