

Effectiveness of Telephone Quitline's on Smokeless Tobacco Cessation among Residents of a Community in Nigeria

Running Title: Smokeless Tobacco Cessation

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ABSTRACT

Background: Nigeria is grappling with a significant tobacco epidemic, yet no effective strategies have been implemented to encourage the cessation of smokeless tobacco use. The study evaluates the effectiveness of a telephone quitline intervention in promoting smokeless tobacco cessation in Izzi LGA, Ebonyi State, in the South East Zone of Nigeria.

Study design: This research was a quasi-experimental study.

Methods: The study compared the effectiveness of a telephone intervention involving proactive calls to 60 adults and 60 control groups, aiming to reduce tobacco consumption. Data was collected through anonymous questionnaires from the Global Adult Tobacco Survey and cessation rates were assessed six months post-intervention.

Results: The mean age of the participants in the intervention group was 49.05±15.7 years and 49.92±17.2 years in the control group. There was a statistically significant decrease in the proportion of participants who used smokeless tobacco; 59(98.3%) used dry snuff before the intervention and participants who continued post-intervention 9(15.0%) p<0.001. In the control group, there was however no statistically significant difference in the proportion of participants who used smokeless tobacco 56(93.3%) used dry snuff at the beginning of the study while 54 (90.0%) used it at the end of the study p=0.095. The quit rate in the intervention group was 85% and 13.3% in the control group.

Conclusions: The intervention increased the number of participants willing to quit using smokeless tobacco and those who did so at the end.

Keywords: Tobacco, Quitlines, Smokeless. Snuff, Izzi

1. Introduction

One of the major preventable causes of death is tobacco use. It is the leading global cause of preventable death¹. It kills nearly 5 million people and causes hundreds of billions of dollars of economic wastage worldwide each year². Tobacco use is increasing worldwide because of increased consumption in low-income countries and as a result, a disproportionate share of the global tobacco burden falls on developing countries, where 84% of 1.3 billion current smokers reside. Tobacco use kills nearly one-half of all lifetime users³. Tobacco kills over 8 million people every year while second hand smoke causes 1.2 million deaths every year. Unfortunately, about 80% of the world's 1.3 billion tobacco users live in middle and low-income countries⁴.

Telephone-based tobacco cessation services are commonly known as quitlines⁵. Proactive quit lines provide comprehensive services through outbound (“proactive”) calls. The outbound service, which often entails multiple follow-up sessions, is typically scheduled by agreement with the respondent⁶. Quitline’s provide behavioral counseling to tobacco users who want to quit. Cessation specialists schedule follow-up calls after the specialist or tobacco user makes initial contact using a proactive Quitline; reactive quit lines rely solely on tobacco users to make future contact⁷. Some quit lines provide additional interventions such as mailed materials, web-based support, text messaging or tobacco cessation medications⁸. Reactive quit lines, which respond to callers’ immediate requests for assistance but do not provide outbound counselling calls, have not been studied as widely as proactive quit lines and are not usually recommended⁹.

Hence, the aim of this study was therefore to determine the effectiveness of telephone quitlines in promoting quit attempts among smokeless tobacco users in Izzi Local Government Area of Ebonyi State.

2. Methods

2.1. Study Area

The study was conducted in Izzi LGA of Ebonyi State in the Southeastern part of Nigeria. Its Local Government Headquarters is located at Iboko.

2.2. Study participants

The study population were adult males and females 18 years and above who took smokeless tobacco at least once a week.

The inclusion criteria were; an adult who regularly took smokeless tobacco at least once a week, respondents who had access to a mobile phone, those who have lived in the community for at least a year and those who willingly agreed to participate. Those who were pregnant and terminally ill were excluded.

2.3. Study design

This research was a quasi-experimental (interventional) study to evaluate the *effectiveness of telephone quitlines on smokeless tobacco cessation intervention*. Tobacco cessation was tested six months post intervention in the intervention and control groups.

2.4. Sample size determination and sampling

The minimum sample size required for the prevalence study is given by the formula below

$$n = \frac{Z^2PQ}{D^2}$$

Where p is the prevalence and is 0.047 in a previous study in Ukpo in Anambra State¹⁰.

$$Q=1-p$$

$$Q=0.5$$

Z is 95% confidence level which is 1.96

D is degree of accuracy required which is 5%

$$D=0.05$$

$$n = \frac{1.96^2 \times 0.047 \times 0.953}{0.05 \times 0.05}$$

$$n = \frac{0.1721}{0.0025}$$

$$n = 68.84$$

Adjusting for non-response rate of 20%

$$68.84/0.8$$

N=86 -sample size for the prevalence arm of the study.

A total of 400 participants were studied in both the intervention and control sites for the prevalence arm of the study so as to enable us identify enough users of smokeless tobacco who would be invited to participate in the intervention study.

For the intervention study, the minimum sample size required was given by sample size calculation for two independent proportions

$$n = \frac{[Z\alpha + Z\beta]2x [P1(1 - P1) + P2(1 - P2)]}{[P1 - P2]^2}$$

Where:

P₁= change in the intervention group, i.e. the proportion of respondents that will quit use of smokeless tobacco after intervention; taken as 30.9% at 6 months post intervention.

P₂= control group response, i.e. the proportion of respondents that will quit use of smokeless tobacco after the study taken as 9.8% at 6 months.

Inserting the required information in the formula for the quit rate at 6 months intervention;

P₁= anticipated change in the intervention group, i.e. the proportion of respondents that will quit use of smokeless tobacco after intervention; taken as 30.9%.

P₂= control group response, i.e. the proportion of respondents that will quit use of smokeless tobacco after the study taken as 9.8%.

$$n = \frac{[1.96 + 0.84]^2 \times [0.309 \times (1 - 0.309) + 0.098 \times (1 - 0.098)]}{[0.309 - 0.098]^2}$$

$$n = \frac{7.84 \times [0.309 \times 0.691 + 0.098 \times 0.902]}{[0.211]^2}$$

$$n = \frac{7.84 \times [0.213519 + 0.088396]}{[0.044521]}$$

$$n = \frac{7.84 \times 0.301915}{0.044521}$$

$$n = \frac{2.3670136}{0.044521}$$

n=53.165

n=54

However, to allow for non-response rate of 10%, the sample size was increased to 60 in each group.

2.5. Data collection methods

A total of 60 tobacco users participated in the intervention site while a total of 60 participants were selected at the control site using simple random sampling by balloting.

Actual data collection was done pre and post intervention. Before data collection at each stage, consent was sought individually; the questionnaire was then administered to the participants when they were comfortably seated. When there were doubts, the other close members of the household who were present were interviewed to ascertain the authenticity of the information from the participant.

2.6. Data analysis

Data were entered and analyzed using IBM Statistical product for service solution (SPSS) version 23. The independent variables included: socio-demographic characteristics of the respondents (age, sex, marital status, level of education, occupation, religion, etc). These variables were measured using the structured questionnaire. The dependent variables were tobacco cessation rates. Univariate analysis involved frequencies and proportions and means and standard deviation for quantitative variables.

Data was obtained by administering the questionnaires before intervention. At the end of 6months, the same questionnaire was re-administered. Tobacco cessation rates were computed by the difference in frequency of tobacco consumption pre and post intervention.

2.7. Ethical approval

Approval to conduct the study was obtained from the ethical review board of Alex Ekwueme Federal Teaching Hospital Abakaliki. and Ebonyi state ministry of Health. Permission was also obtained from the traditional leaders of the communities.

3. Results

The results of this study are tabulated below. (Table 1)

Table 1 shows the socio-demographic characteristics of the participants. The mean age of the participants in the intervention group was 49.0515± while the mean age of the participants in the control group was 49.92±172. Also, in the intervention group 47(78.3%) were males, 13(21.7%) were females, 6(10.0%) were single, 50(83.3%) were married, 2(3.3%) divorced while 2(3.3%) were widowed. Also, 14(58.3%) were self-employed, 8(33.3%) were government employed, 2(8.3%) were privately employed, 17(70.8% earn less than #20,000, 5(20.8%) earn #20,000-50,000, 2(8.3%) earn #51,000-100,000. In the control group, 45(75.0%) were males, 15(25%) were females 5(8.3%) were single, 50(83.3%) were married, 1(1.7%) was divorced while 4(6.7%) were widowed. Considering employment status, 23(38.3%) were employed; 15(65.2%) were self-employed, 7(30.4%) government employed and 1(4.3%) employed in a private company. Of the people employed, 18(78.3%) earned less than #20,000, 4(12.4%) earn 21-50,000 while 1(4.3%) earned #51-100,000. There was no statistically significant difference in socio-demographic distribution between intervention and control groups. (Table 2)

Table 1: Socio demographic characteristics of the participants.

Variable	Intervention (n=60) Freq. (%)	Control (n=60) Freq. (%)	χ ²	P-value
Age (yrs)				
21-30	12(20.0)	9 (15.0)	1.462	0.917
31-40	10(16.7)	14(23.3)		
41-50	11(18.3)	9 (15.0)		
51-60	9 (15.0)	10(16.7)		
61-70	10(16.7)	11(18.3)		
Above 70	8 (13.3)	7 (11.7)		
Mean ± SD	49.05±15.7	49.92±17.2	t=0.288	0.774
Sex				
Male	47(78.3)	45(75.0)	0.186	0.666
Female	13(21.7)	15(25.0)		
Marital status				
Single	6 (10.0)	5 (8.3)	1.199*	0.885
Married	50(83.3)	50(83.3)		
Divorced	2 (3.3)	1 (1.7)		
Widowed	2 (3.3)	4 (6.7)		
Religion				
Christian	57(95.0)	52(86.7)	2.502	0.114
Others	3 (5.0)	8 (13.3)		
Ethnicity				
Igbo	60(100)	59(98.3)	1.008*	1.000
Yoruba	0 (0.0)	1 (1.7)		
Employment status				
Yes	24(40.0)	23(38.3)	0.035**	0.852
No	36(60.0)	37(61.7)		
Occupation				
Self-employed	14(58.3)	15(65.2)	0.527*	1.000
Govt employed	8 (33.3)	7 (30.4)		
Private employed	2 (8.3)	1 (4.3)		
Average monthly income (₦)				
Less than 20,000	17(70.8)	18(78.3)	0.578*	1.000
20,000-50,000	5 (20.8)	4 (17.4)		
51,000-100,000	2 (8.3)	1 (4.3)		
Level of Education				
No formal education	5 (8.3)	10(16.7)	2.146	0.542
Primary level	25(41.7)	22(36.7)		
Secondary level	20(33.3)	17(28.3)		
Tertiary	10(16.7)	11(18.3)		

*Fishers exact test used

**Statistically significant

The above table shows that the commonest type of smokeless tobacco used by the participants was dry snuff by nose. However, there was no statistically significant difference between the intervention and control groups in the proportion of participants who used dry snuff 59(98.3%) in the intervention group and 56(93.3%) in the control group (p=0.171). On the frequency of use, there was also no statistically significant difference between the intervention and control groups p=0.827 (Table 3).

Table 2: Baseline pattern of use of smokeless tobacco between the intervention and control groups.

	Beginning of the study		χ^2 (P-value)
	Intervention (n=60) Freq. (%)	Control (n=60) Freq. (%)	
Types of smokeless tobacco ever used			
Dry snuff	59(98.3)	56(93.3)	1.878(0.171)*
Chewing Tobacco	1 (1.7)	4 (6.7)	
Frequency of using smokeless tobacco			
Daily	47(78.3)	46(85.7)	0.048(0.827)
Less than daily	13(21.7)	14(23.3)	

* Fisher’s exact test used

Table 3 above shows that in the intervention group, there was a statistically significant difference in the proportion of participants who were willing to quit the use of smokeless tobacco 45(75.0%) pre-intervention versus 53(88.3%) post-intervention p=0.059 and who had ever tried to quit using

Table 3. Comparison of effectiveness of telephone quitlines in promoting quit attempts and willingness to quit use of smokeless tobacco.

Willingness to Quit Use of Smokeless Tobacco	Intervention			Control		
	Pre (n=60) Freq. (%)	Post (n=60) Freq. (%)	χ^2 (P-value)	Pre (n=60) Freq. (%)	Post (n=60) Freq. (%)	χ^2 (P-value)
Willing to quit smokeless tobacco						
Yes	45(75.0)	53(88.3)	3.562	39(65.0)	42(70.0)	0.342
No	15(25.0)	7 (11.7)	(0.059)	21(35.0)	18(30.0)	(0.559)
Willing to quit smoked tobacco						
Yes	2(100)	3(100)	Na	2(66.7)	1(100)	0.680*
No	0 (0.0)	0 (0.0)		1(33.3)	0 (0.0)	(1.000)
Total	2(100)	3(100)		3(100)	1(100)	
Have ever tried to quit using smokeless tobacco						
Yes	33(73.3)	49(92.5)	6.512	20(51.3)	23(54.8)	0.098
No	12(26.7)	4 (7.5)	(0.011)**	19(48.7)	19(45.2)	(0.754)
Total	45(100)	53(100)		39(100)	42(100)	

* Fisher’s exact test used na – not applicable

**Statistically significant

Table 4. Comparison of effectiveness of telephone quitlines in promoting quit attempt between intervention and control groups.

Number of Quit Attempts	Pre Intervention n=33	Post Intervention n=49	χ^2 (P-value)	Beginning of the study n=20	End of the study n=23	χ^2 (P-value)
0-5	25(75.8)	40(81.6%)	0.414	15(75.0)	17(73.9)	0.007
6-10	8 (24.2)	9 (18.4%)	(0.520)	5 (25.0)	6 (26.1)	(0.935)

Table 5. Comparison effectiveness of telephone quitlines in promoting quitting of smokeless tobacco use.

Practices of Smokeless Tobacco	Intervention			Control		
	Pre (n=60) Freq. (%)	Post (n=60) Freq. (%)	χ^2 (P-value)	Beginning of the study (n=60) Freq. (%)	End of the study (n=60) Freq. (%)	χ^2 (P-value)
Types of smokeless tobacco ever used						
Dry snuff	59(98.3)	9(15.0)	43.125*	56(93.3)	54 (90.0)	4.703
Chewing tobacco	1 (1.7)	0 (0.0)	(<0.001)**	4 (6.7)	2 (3.3)	(0.095)
None	0 (0.0)	51(85.0)		0 (0.0)	4 (6.7)	
Frequency of using smokeless tobacco						
Daily	47(78.3)	3 (5.0)	53.838*	46(76.7)	44(73.3)	3.081
Less than daily	13(21.7)	6(10.0)	(<0.001)**	14(23.3)	13(21.7)	(0.214)
Not currently	0 (0.0)	51(85.5)		0 (0.0)	3 (5.0)	

* Fisher’s exact test used

**Statistically significant

smokeless tobacco 33(73.3%) pre intervention versus 49(92.5%) post intervention p=0.011 (**Table 4**).

The table shows that in the intervention group, there was an increase in the number of quit attempts following quitline intervention 25(75.8%) versus 40(81.6%).

The table above shows the practice of smokeless tobacco. In the intervention group, there was a statistically significant difference in the proportion of participants who used smokeless tobacco; 59(98.3%) used dry snuff before the intervention while 9(15.0%) used it post-intervention p<0.001. On the frequency of use, statistically less number of participants used it; daily 47(78.3%) pre-intervention versus 3 (5.0%) post-intervention p<0.001. In the control group, there was no statistically significant difference in the proportion of participants who used smokeless tobacco 56(93.3) used dry snuff at the beginning of the study while 54 (90.0) used it at the end of the study p=0.095. On the frequency of use, there was also no statistically significant difference in the number of participants who used it; daily 46(76.7) at the beginning of the study versus 44(73.3) p= (0.214).

4. Discussion

Quitline's have emerged as an integral component in tobacco control efforts. Lichtenstein et al noted that they can deliver individualized, clinically rich sessions with a live counselor¹¹. In this study, the mean age of the participants in the intervention group, 49.0515.7± and 49.9217.2± in the control group was similar to that reported in a study in northern Nigeria where the mean age of the participants was 40.4 ± 11.3 years¹².

The difference in the mean age of participants in this study and 37.9 years in one study in the US may be because the study in the US was conducted among the younger age group. Similar findings to socio-demographic characteristics in this study were reported by Desalu et al in northern Nigeria where Ninety-seven (72.9%) of the users were males while 36(27.1%) were females, with a male-to-female ratio of 3:1 but was in contrast to the findings from the study in the US where 97.5% participants (n = 1,641) were males¹³.

The socio-demographic characteristics of respondents in this study were similar to findings in northern Nigeria which showed that one hundred and twenty (90.2%) of the users belonged to lower socioeconomic status while 13(9.8%) were in higher socioeconomic status¹⁴.

Concerning the effectiveness of telephone quitlines in promoting quit attempts among smokeless tobacco users, there was a statistically significant difference in the proportion of participants in the intervention group who were willing to quit using smokeless tobacco and who had ever tried to quit using smokeless tobacco. This finding is higher than in Northern Nigeria where of the 18% of smokeless tobacco users who were advised to quit the use of smokeless tobacco only 7.5% tried quitting¹⁵.

The proportion of participants who quit using smokeless tobacco significantly increased with the increase in the proportion of participants who were willing to quit p<0.001. Findings from this study were also higher than the results of the study in Pakistan where the Intention to quit was found to be proportionately higher (33%) in the intervention group as compared to the control group. It was also higher than the results from the Indian study which showed that 56% were in the pre-contemplation stage (who are not planning to quit within the next 6 months) and 31% were in the contemplation stage (who are planning to quit within the next 6 months)¹⁶.

Therefore, quit lines have the potential to increase smokeless tobacco users' desire to quit and quit attempts. Quitting the use of tobacco products is a difficult process and available evidence suggests that two methods that enable a person to quit tobacco, include pharmacotherapy and counseling or advice¹⁷. Quit attempts can affect quit success. In this study, there was an increase in the number of quit attempts following Quitline intervention 25(75.8%) versus 40(81.6%) for 0-5 quit attempts. This was in agreement with results from one UK retrospective review of client records and one Indian interventional cohort study that the number of previous quit attempts can affect quit success¹⁸. Among BSTP clients in the UK who had ever attempted to quit tobacco in the past, 60.9% had successfully quit tobacco by the end of the four-week intervention and 39.1% were not successful¹⁹. In India, 9% of attempts to quit are from counseling or advice²⁰. Similarly, countries such as Nigeria, the Philippines, Panama and Brazil have a higher percentage of

attempts to quit the usage of tobacco products with the help of counseling or advice²¹.

In this study, there was a statistically significant decrease in the proportion of participants who used smokeless tobacco; 59(98.3%) used dry snuff before the intervention and participants who continued post-intervention 9(15.0%) p<0.001. On the frequency of use, statistically, a smaller number of participants used it; daily 47(78.3%) pre-intervention versus 3(5.0%) post-intervention while less than daily 13(21.7%) pre-intervention versus 6(10.0%) post-intervention p<0.001. In the control group, there was however no statistically significant difference in the proportion of participants who used smokeless tobacco 56(93.3%) used dry snuff at the beginning of the study while 54 (90.0%) used it at the end of the study p=0.095.

The quit rate in the intervention group was 85% and 13.3% in the control group. In this study, the quit rate in the intervention group was higher than values obtained in the US where researchers reported that abstinence from all tobacco was 6.8% and 30.9% at 3 months and 9.8% and 30.9% at 6 months and at 7-month follow-up, 162 (43%) reported 30-day abstinence (22) while in another study in the US significant 6-month tobacco abstinence was reported by 48% p=0.05. The reason for this disparity may be because the study in the US also included smoked tobacco users in the study. However, abstinence of the control group from this study was lower than values obtained in another study in the US where abstinence from those not receiving calls was 37% p=0.05(11). In this study, the proportion of participants who quit the use of smokeless tobacco significantly increased with the proportion of participants who were willing to quit p<0.001

5. Conclusion

There was a statistically significant increase in the proportion of participants who were willing to quit using smokeless tobacco and who tried to quit using smokeless tobacco. This shows that the use of quitline will be a successful veritable tool in tobacco cessation.

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7. Authors' Contribution

Conceptualization: Ofonakara U

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8. Competing interests

The authors declare that they do not have any conflicts of interest.

9. Ethics approval and consent to participate

Ethical clearance for this study was obtained from the Research and Ethics Committee of ^{Alex} Ekwueme Federal University Teaching Hospital Abakaliki Ebonyi State, Nigeria. Written informed consent was obtained and confidentiality ensured (AE-FETHA/REC/2022/055)

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