Nicotine Gum: Does Providing It Free in a Smoking Cessation Program Alter Success Rates?

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Successful strategies to enhance smoking cessation are important in family medicine. Many facets of smoking-cessation programs have been evaluated to determine their effectiveness in contributing to success. One factor that has not been investigated is the effect of cost to the smoker of nicotine gum. A retrospective analysis of the 1-year sustained (lapse-free abstinence) success rates of 375 participants in a smoking-cessation program, led by family physicians, revealed that participants who were provided nicotine gum by their employer had a significantly higher 1-year success rate (38% vs 27%) than those who purchased the gum individually.
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The 1987 Surgeon General's report on the health consequences of smoking identifies nicotine as the drug in tobacco that causes addiction.[1] Addictions are increasingly being treated with pharmacologic agents that block or relieve craving. Meta-analysis of numerous studies has demonstrated that nicotine gum is effective in helping smokers participating in group type smoking-cessation programs quit smoking and influences long-term success.[2] In addition to nicotine gum, several factors that contribute to the success of each program have been analyzed by Kottke et al[3] in a meta-analysis of 39 controlled smoking-cessation trials. Those factors shown to increase success at 12 months included the number of intervention modalities, the number of reinforcing sessions, and the type of intervention session (group and individual sessions together better than either alone).

One factor that has not been studied is the effect of cost of the nicotine gum to the individual. Paying is often seen as a commitment to the therapeutic process. As such, purchasing nicotine gum could be interpreted as an extension of the commitment that smokers make when they join a smoking-cessation program. Theoretically, the additional commitment of paying for nicotine gum should enhance success of an individual in a smoking-cessation program. Providing nicotine gum at no cost to the participant, however, may facilitate its use in that there would be a savings from not having to buy cigarettes or medication.

To determine the effect of cost of nicotine gum on program outcome, the success of two sets of smokers participating in a smoking-cessation program was compared. One group of smokers were provided the gum at no cost, and the second group had to purchase the gum at retail prices.

METHODS

This study is a retrospective analysis comparing the effect of providing nicotine gum (nicotine polacrilex) to smokers in a smoking-cessation program at no cost with that of requiring smokers to purchase the gum. The Travis Smoking Cessation Program is a structured eight-session group program that uses behavioral modification and 2-mg nicotine gum to help participants quit smoking. Descriptions of the program and its success rate have been published elsewhere.[4,5] Success, defined in this study, is lapse-free continuous abstinence from smoking for 1 year from the date of the last (eighth) session. This definition follows the guidelines of the National Heart, Lung, and Blood Institute.[6] Smoking cessation rates and nicotine gum use were compared using chi-square analysis.

The study population consisted of 454 smokers who participated in any one of 25 smoking-cessation groups at Travis Air Force Base, California, from November 6, 1984, to January 7, 1986. The individual group size ranged

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TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS IN THE SMOKING-CESSATION PROGRAMS

Characteristics	Free-Gum Group (n=137)	Buy-Gum Group (n=207)
Male	95	82
Female	42	125
Age range (years)	16–77	16–77
Mean age (years)	34.4	47.7
Amount smoked (packs per day)	1.2	1.2

TABLE 2. SUCCESS RATES OF PARTICIPANTS IN A SMOKING-CESSATION PROGRAM COMPARING FREE-GUM WITH BUY-GUM GROUPS

Group	Number	12-Month Success No. (%)
Did not use gum	31	7 (23)
Free gum	137	52 (38)*
Buy gum	207	56 (27)
Total	375	115 (31)

*P = .033 for free vs buy gum.

from 11 to 28 participants (average, 18). The age range of the smokers was 16 to 77 years (median, 42 years). Smoking cessation classes were offered at no cost to participants.

Because of the transient nature of military base populations, 79 (17%) participants were unable to be recalled for follow-up or chemical validation and were excluded from the study. Their demographic characteristics were no different from those of the included participants.[5]

Of the remaining 375 participants, 137 obtained nicotine chewing gum provided by their employer (the Air Force) and 207 purchased gum from local pharmacies (price range $18 to $25 per box of 96 pieces). Thirty-one individuals did not use the gum to assist their effort to quit smoking. Free nicotine gum was provided to all participants in class numbers 1 and 2. In class numbers 3 through 23, only active-duty military personnel were provided free gum, and no participants in class numbers 24 and 25 received free gum. The policy regarding who was eligible for free gum was dictated by local military hospital budget considerations. Participants who were eligible for free gum were able to receive it at no cost for up to 1 year from completion of their individual programs. The length of time nicotine gum was used was determined through patient questioning and confirmed through Air Force pharmacy records for those receiving free gum.

The demographics of the study groups are outlined in Table 1. In the free-gum group, there were 95 men and 42 women with a mean age of 34.4 years who smoked an average of 1.2 packs per day. The buy-gum group contained 82 men and 125 women with a mean age of 47.7 years who smoked an average of 1.2 packs per day.

Abstinence was determined by telephone contact at 3, 6, and 12 months following the last session. Chemical validation of abstinence was verified using a Vitalograph EC50 carbon monoxide breath analyzer in a random one third of participants at 12 months. An exhaled carbon monoxide reading of less than 10 ppm was interpreted as confirmation of a participant's nonsmoking status.

The deception rate of participants claiming abstinence during telephone contacts, but having a measured carbon monoxide level greater than 10 ppm, was 3%. Success rates reported here have been corrected for this degree of deception.

RESULTS

The success rates at the end of 1 year were as follows: Of those who did not use nicotine gum, 23% (7/31) remained abstinent. Of those who received free gum, 38% (52/137) remained abstinent. Of those who had to buy their nicotine gum, 27% (56/207) were abstinent. The difference in the 1-year success rate between those who received free gum (38%) and those who had to buy the gum was statistically significant ($P = .033$) (Table 2).

Although there was some age discrepancy noted in the two groups, the older smokers tended to have higher success rates than younger smokers (Table 3). On the basis of age one would predict greater success in the buy-gum group, since the average age in this group was higher. Finding a higher success rate in the younger free-gum group suggests a more significant difference between the free-gum vs buy-gum success rates. There was no statistical difference in the 1-year success rates between men (32.9%) and women (27.3%) in the study groups.

If only those 21 classes (ie, class number 3 through 23) that contained participants who received free gum and participants who had to buy gum are analyzed, the difference is even greater. For those who received free gum in those classes, the success rate was 42.6% (40/94), and for those who had to buy the gum, the 1-year success rate was 26.0% (46/177). This difference was highly significant ($P = .005$).

TABLE 3. TWELVE-MONTH SUCCESS RATE, BY AGE

Age	Total	No. (%)
Less than 30 years	90	17 (19)
30 to 49 years	169	54 (32)
50+ years	116	44 (38)

TABLE 4. SUCCESS RATES STRATIFIED BY LENGTH OF TIME GUM USED

Length of Time Gum Used	Gum Cost	12-Month Success Rate	Sample Size (n)	*P* Value*
<1 month	Buy	19.4	36	.325
	Free	7.7	13	
1-3 months	Buy	18.5	65	.060
	Free	34.0	47	
3-6 months	Buy	45.5	44	.936
	Free	46.4	28	
>6 months	Buy	61.9	21	.944
	Free	60.9	23	

*P value is for comparing success rates of free-gum group with those of the buy-gum group in each length-of-use category.
NOTE: Individuals with unknown length of gum use are not included in this table.

Providing the gum at no cost did significantly increase its use: 91% of the participants who received free gum (133/146) used the gum, compared with 84% (192/229) of the participants who had to buy the gum ($P = .044$). There was also a trend for subjects receiving free gum to use the gum longer than those subjects who had to purchase the gum: 88% (98/111) of those in the free-gum group were using the gum at 1 month, compared with 78% (130/166) in the buy-gum group. This difference was statistically significant ($P = .033$).

An additional observation noted was that the proportion of subjects who successfully quit smoking increases with the length of time the gum is used. This finding is independent of whether the gum was individually purchased or provided free (Table 4).

DISCUSSION

Smoking-cessation programs using nicotine gum have been shown to be more successful when an active drug is used rather than a placebo.[2] Lam et al[2] analyzed the pooled data of randomized, controlled trials from nine specialized smoking-cessation clinics and found the combined success rates to be 23% with nicotine gum and 13% with placebo gum. Nicotine gum has, however, not been demonstrated to be clearly beneficial in general medical practices when used in a group of nonselected smokers with a brief intervention.[2,7] Many variables exist in the interactions smokers have with physicians in the medical office that are not present in the interaction in a smoking-cessation program. Two factors that may contribute to this difference are the percentage of patients who use the gum and the duration of time the gum is used.

This study seems to indicate that when nicotine gum is provided at no cost to participants, they are significantly more likely to quit smoking (38%) than when participants are required to purchase their gum (27%). The increased success rate of the free-gum group was dependent on the percentage of smokers using the gum and perhaps on the duration of time the smokers used the gum. Both groups (those buying gum and those given free gum) had similar success rates when the length of time using the gum was constant. Since participants given gum for free more often used the gum and tended to use it for longer periods, providing the gum to all participants at no charge may further maximize the benefit of smoking-cessation clinics.

It is unclear what impact being an active-duty military smoker vs a nonmilitary smoker might have. Although the official pressure on active-duty military personnel to quit smoking did not begin until the issuing of Department of Defense directive 1010.10 in March 1986, there was previously a trend to deglamorize tobacco use prior to that time. Because of the retrospective nature of the study, there are other factors that may have influenced the outcome, such as financial ability to purchase nicotine gum. More studies, especially randomized, prospective studies, are needed to clarify this issue.

The cost to employers of employing smoking personnel has been documented to cost up to an additional $5,620 per smoker per year.[8] Providing smoking-cessation classes and including nicotine gum to employees interested in quitting smoking very quickly becomes cost-effective. The additional expense to the employer of paying for the nicotine gum is more than offset by the increased success rate found when the gum is available at no cost.

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