

Research summary

To explore whether “brand switching” to lower-toxicant smokeless tobacco products has benefit in reducing toxin exposure, researchers at the University of Minnesota Transdisciplinary Tobacco Use Research Center conducted a study to assess whether brand switching would reduce biomarkers of smokeless tobacco exposure and levels of nicotine in smokeless tobacco users.

Results and policy implications

Among participants interested in reducing their smokeless tobacco use, brand switching led to a significant reduction in total cotinine and total NNAL. At 12 weeks, the abstinence rate (which was verified through assessment of biochemical markers) was 26% in the *ad libitum* group.

About umntturcresearchbrief

The UMN TTURC Research Brief presents timely information on emerging tobacco research from the University of Minnesota. The aims of UMN TTURC are to examine strategies for reducing tobacco toxin exposure, determine the most effective methods for treating smokers who are unable or unwilling to quit smoking, and outline public policy implications for interventions that reduce exposure to tobacco toxins.

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Brand switching with smokeless tobacco: Does it have benefit?

For tobacco users who are unwilling or unable to quit, reducing exposure to tobacco-related toxicants can be a means to reduce death and disease associated with tobacco use, and it may also be a means of moving toward tobacco abstinence. One method for reducing tobacco toxin exposure has been to switch from a brand with higher toxicant levels to a brand with lower levels. In cigarette smokers, “brand switching” to lower tar yield cigarettes has been met with little success. One reason is because users may compensate for the reduced nicotine levels (which accompanied reduced tar yields) by smoking more of the new brand they were using. (1,2) Previous research has shown that switching to light or ultralight cigarettes leads to compensatory smoking and does not reduce harm. (2,3)

It is unclear whether smokeless tobacco users experience similar effects when they switch to a brand of smokeless tobacco that has lower levels of nicotine and/or tobacco-specific toxicants. To explore this issue further, researchers at the University of Minnesota Transdisciplinary Tobacco Use Research Center conducted a study to assess whether brand switching

would reduce biomarkers of smokeless tobacco exposure and levels of nicotine in smokeless tobacco users.

Methods

Following enrollment and orientation, 66 participants were randomized to either (1) brand switching with “controlled smokeless tobacco topography,” where participants received instructions to maintain baseline levels of number of dips per day and dip duration; (2) brand switching with *ad libitum* use of smokeless tobacco; or (3) a waitlist control group that maintained use of their usual brand of smokeless tobacco. (The control allowed us to assess the stability of our measurements over time.) Those individuals whose usual brand was Copenhagen or Kodiak were asked to switch to Skoal Long Cut Straight or Wintergreen for 4 weeks and Skoal Bandits for the remaining 4 weeks of the study.

Throughout the 8-week intervention period, participants attended weekly clinic visits. When participants expressed an interest in quitting, they received counseling or follow-up calls. Participants who did not want to quit were encouraged to maintain reduction or reduce their

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use of smokeless tobacco even further. A follow-up session took place at 12 weeks after the beginning of the study.

During the study, researchers collected urine samples of the participants twice during baseline and at the end of 4 and 8 weeks to measure for levels of cotinine (a biomarker of nicotine) and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol and its glucuronides (total NNAL). (Total NNAL, a biological marker, indicates the amount of exposure to the known tobacco-specific carcinogen NNK.)

Findings

Researchers observed significant changes in biomarkers for smokeless tobacco exposure during the 8-week intervention period, with no differences observed between controlled topography and *ad libitum* conditions. Among participants interested in reducing their smokeless tobacco use, brand switching led to a significant reduction in total cotinine and total NNAL. Specifically, brand switching reduced total NNAL from a mean of 3.2 to 1.8 pmol/mg creatinine—a reduction of over 50%. There was no significant relationship between amounts of smokeless tobacco use and the total NNAL concentrations, which suggests that the reductions are related to a reduction of NNK in the smokeless tobacco brands.

Significant reductions were also observed for total mean cotinine concentrations. Since researchers noted a significant relationship between amounts of smokeless tobacco use and cotinine concentrations, the reduction in total cotinine may be related to a reduction in amounts of smokeless tobacco used as well as to the switching of brands with lower nicotine levels.

A significant reduction in tobacco use occurred in both in the controlled topography and *ad libitum* groups, as measured by dips per day and tins per week.

At 12 weeks, the abstinent rate (which was verified through assessment of biochemical markers) was 26% in the *ad libitum* group.

Clinical implications

In those interested in reducing their smokeless tobacco use, brand switching can reduce total cotinine and NNAL concentrations. The beneficial effects demonstrated in our study (e.g., abstinence rates, reductions in dips per day and tins per week, and reductions in biomarkers for tobacco toxins) suggest that brand switching may be a viable treatment approach for those not immediately interested in quitting use of smokeless tobacco. Whether a 50% reduction in total NNAL confers reduction in disease risk among switchers is unknown. However, reducing nicotine content of smokeless tobacco may facilitate smokeless tobacco abstinence. Future studies are necessary to further clarify how brand switching regimens can be improved and optimized.

References

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3. Hecht SS, Murphy SE, Carmella SG, Li S, et al. Similar uptake of lung carcinogens by smokers of regular, light, and ultralight cigarettes. *Cancer Epidemiol Biomarkers Prev.* 2005;14:693-8.

For more information, please see Hatsukami DK, Le CT, Shang Y, Joseph AM, Mooney ME, Carmella SG, and Hecht SS. Toxicant exposure in cigarette reducers versus light smokers. Cancer Epidemiol Biomarkers Prev. 2006;15(12):2355-8.