CASE STUDY:
Decídetexto Puerto Rico
Smoking Cessation Intervention
via Mobile Phone

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Decídetexto Puerto Rico: **Smoking Cessation Intervention via Mobile Phone**

GOAL/PURPOSE:

Decídetexto Puerto Rico is a pilot study that assessed and studied the feasibility and acceptability of a smoking cessation intervention in Puerto Rico via mobile phone. A lack of inclusion in smoking cessation research of Puerto Ricans who live on the island has resulted in the need for tailored research to understand the unique challenges and disparities among smokers of Puerto Rican origin on the U.S. mainland and of those on the island.

BACKGROUND:

Smoking prevalence varies geographically, with rates between 19-35% for Puerto Ricans who reside in the U.S. mainland, compared to 10–17% for those who live in Puerto Rico.[1] Furthermore, while cigarette use varies significantly by gender among other Hispanic subgroups, cigarette use does not vary by gender among Puerto Ricans. 40% of Puerto Rican men and women between the ages of 30 and 50 years of age are current smokers.[2]

The evidence suggests that a smoking cessation intervention delivered by mobile phone would be effective. Given the development of advanced technology to allow for flexible delivery of text messages, messages may be tailored to each user to address the motivational and behavioral needs of the individual that are required for successful smoking cessation.

19–35%
Puerto Ricans who reside in the U.S. mainland

10–17%
Puerto Ricans who live in Puerto Rico
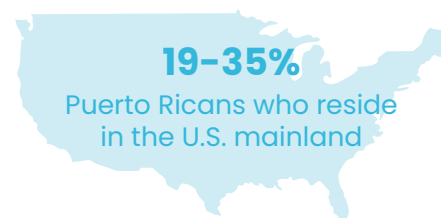
40%
of men and women between the ages of 30 and 50 years of age are current smokers

DESCRIPTION:

Decídetexto is a smoking cessation mobile intervention that encompasses three integrated components:

The first is tablet-based software that collects smoking-related information to support the development of an individualized smoking cessation plan and guides the text messages program. This tool was adapted from two web informed decision-making tools for smoking cessation that were developed for Hispanics in the United States, Mexico, and Brazil. It was

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[1] *Substance Abuse & Mental Health Data Archive. National Survey on Drug Use and Health: 2-Year RDAS (2018 to 2019) online analysis tool [accessed 2022 Mar 1]*

[2] *Kaplan RC, Bangdiwala SI, Barnhart JM, Castañeda SF, Gellman MD, Lee DJ, Pérez-Stable EJ, Talavera GA, Youngblood ME, Giachello AL. Smoking among U.S. Hispanic/Latino adults: the Hispanic community health study/study of Latinos. Am J Prev Med. 2014 May;46(5):496-506. doi: 10.1016/j.amepre.2014.01.014. PMID: 24745640; PMCID: PMC5794209.*

available in English and Spanish and consisted of interactive features that lead smokers through various steps while simultaneously developing a personalized quit plan. The tool included testimony from a former smoker and features short video clips and narrated graphics on the benefits of quitting while also describing how pharmacotherapy (NRT – nicotine replacement therapy) can support abstinence. The tool also collected participant smoking-related information, including number of cigarettes smoked per day, primary reason to quit smoking, top two smoking triggers and one strategy to manage each trigger.

At the end of the 10 to 15 min tablet-based session, participants were prompted to request optional pharmacotherapy (nicotine patches or gum) and to select a quit date within a 30-day timeframe. Upon completion of the tool, participants were provided with a one-page summary print-out of their individualized smoking cessation quit plan (e.g., the selected quit date and pharmacotherapy (NRT with the recommended dose and regimen). Participants then automatically began receiving the text messaging portion of the intervention.

The second component is a 24-week text messaging counseling program, that allows 3 levels of interactivity:

1

Prescheduled standard messages: With a library consisting of **712 messages** covering **10 themes**: education, logistics, intra-treatment social support, coping with triggers, extra treatment social support, stimulus control, vicarious experience, relapse prevention, social norms, and reward. The text messaging system delivered these messages according to an algorithm based on fours sequential phases of the quitting process that support the personalized quit plan: **(1) Pre-quit** (30 days), **(2) Quit-Day**, **(3) Post-quit Intensive** (28 days), and **(4) Post-quit Maintenance** (20 weeks). The library also included a Relapse track (8 days).

2

Keyword-triggered standard messages: These were sent automatically to participants who text one of the following keywords: **(1) Stress, (2) Crave, (3) Family, (4) Patch** and **(5) Gum**. In addition, throughout the 24-week program, participants received **11 response-triggered (YES or NO) messages** to assess their smoking status (e.g., Have you smoked a cigarette (even a puff) in the last 7 days? Text YES or NO). If participants indicated that they were smoking, these automated messages encouraged them to select a new quit date. Participants could withdraw from the text message program at any moment by texting the keyword "Stop" (e.g., "If you would ever like to stop receiving these messages, you can text STOP. However, we would prefer that you stay with us!").

3 **Counselor-personalized responses:** *Decídetexto* encouraged participants to text any concerns and/or questions to the program. A trained tobacco treatment specialist answered these messages following standard protocols (e.g., answering questions on pharmacotherapy (NRT) delivery, use, adherence, and side effects). The tobacco treatment specialist monitored and triaged queries daily, responding within one business day of receipt of text messages.

The last component was the pharmacotherapy support, which used NRT (nicotine patches and gum) following the Clinical Practice Guidelines for Treatment of Tobacco Use. This was offered to participants at no cost. Fruit chill, cinnamon, and mint flavored gum were also available. NRT was provided in two phases. At the end of the baseline assessment, participants who were interested in using NRT received a 4-week supply via postal mail for their NRT of preference. Two weeks after baseline, participants received text message prompts to request an NRT refill to continue treatment. If participants responded to the text prompts indicating interest in NRT, a 4- or 6-week supply was shipped to their home, at no cost.
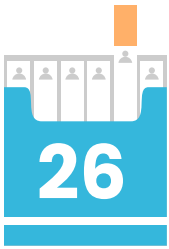
26
smokers in Puerto Rico who were enrolled in mobile smoking cessation intervention and nicotine replacement therapy

11 months
the duration of the pilot (from September 2019 to August 2020)

Ponce Health Sciences University (PHSU), Puerto Rico

$20/$30/$50
gift cards as a compensation

IMPLEMENTATION:

Decídetexto was implemented as a single-arm pilot study, with 26 smokers in Puerto Rico who were enrolled in a culturally and linguistically proficient mobile smoking cessation intervention paired with nicotine replacement therapy (e.g., nicotine patches and gum).

This pilot was conducted over 11 months; from September 2019 to August 2020, at the Ponce Health Sciences University (PHSU), Puerto Rico. Participants were compensated with a $30 gift card for completing the baseline assessment, a $20 gift card for completing the Month 3 assessment, and a $50 gift card for completing the Month 6 assessment.

The participants were recruited through clinic- and community-based efforts, including flyers, in-clinic recruitment, and word-of-mouth referrals from study participants. Then, the research staff assessed each participants' eligibility and those who were eligible were scheduled for an in-person appointment.

Eligibility for the study was based on if the person;

1. self-identified as Hispanic or Latino,

2. knew how to read and speak English and/or Spanish,

3. were ≥21 years of age,

4. had smoked cigarettes for at least six months,

5. smoked cigarettes three or more days within a typical week,

6. reported interest in quitting smoking in the next 30 days,

7. had a cellphone with unlimited text messaging capability,

8. had a cellphone with a U.S. carrier (e.g., Verizon Wireless, AT&T, T-Mobile, Sprint, etc.),

9. knew how to send and read text messages, and

10. were willing to complete two follow-up assessments (at Months 3 and 6).

Exclusion criteria included:

1. use of other tobacco products more than one day within a typical week,

2. current participation in any other smoking cessation program or use of any type of medication to quit smoking,

3. having a household member currently enrolled in the study,

4. being pregnant, breastfeeding, or planning to become pregnant in the next year, and

5. planning to move out of their current residential address in the next six months.

This in-person consultation, which served as a baseline assessment, was followed by two telephone follow-up assessments at Months 3 and 6 (November 2019 and February 2020, respectively).

The baseline survey collected sociodemographic variables such as age, gender, language of preference, education level, and annual income. In the case of more specific, smoking-related variables, the data collected included number of cigarettes per day, age when participants started smoking, use of menthol cigarettes, most used cigarette brand, use of other tobacco products in the past 30 days, number of quit attempts in past year, use of pharmacotherapy and/or e-cigarettes for cessation in the past.

RESULTS AND OUTCOMES:

The average age of the participants was 46.8 years. More than half (53.8%) were female, and 30.7% had a college degree. Almost all participants (96.2%) selected Spanish as their language of preference. Most participants (92.3%) smoked daily, 34.6% smoked their first cigarette within five minutes of waking up, and more than half (53.8%) used menthol cigarettes.

Approximately half of the participants tried to quit smoking the previous year, and use of pharmacotherapy and electronic cigarettes for smoking cessation in the past was 34.6% and 30.8%, respectively.

At month 3 (November 2019), 10 participants (38.4%) self-reported to not have used cigarettes or other forms of tobacco in the previous 7 days. The follow-up rate, which measures the percentage of the initial number of smokers that participated in this self report, was 88.5%, or a total of 23 participants. All participants requested nicotine patches at baseline.

At month 6 (February 2020), 16 participants (61.5%) self-reported to not have used cigarettes or other forms of tobacco in the previous 7 days. The follow-up rate was 76.9% or 20 participants. Most participants (90% of the sample) reported being satisfied or extremely satisfied with the intervention.

46.8
the average age of the participants
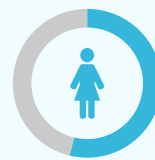
53.8%
female

30.7%
had a college degree

96.2%
speak Spanish
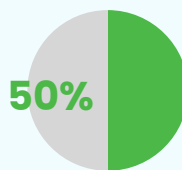
92.3% smoked daily

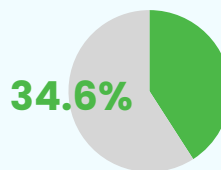**34.6%** smoked their first cigarette within five minutes of waking up
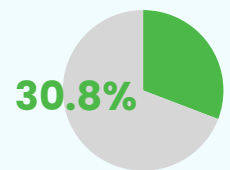
53.8% used menthol cigarettes

50%
tried to quit smoking the previous year

34.6%
use of pharmaco-therapy

30.8%
use of electronic cigarettes

MONTH 3
88.5%

MONTH 6
76.9%

not have used cigarettes or other forms of tobacco in the previous 7 days

All participants (100%) interacted at least once with the program and sent an average of 42.9 text messages. Of the 1116 text messages sent by participants, only 380 (3.4%) included the keywords stress, crave, family, patch and gum.

When analyzing the text messages sent by participants, it was noted that some participants responded to pre-scheduled standard messages as if they were interacting with a live person and not with an automatic text messaging software.

| **100%**	**42.9**	**1116**	**3.4%**
participants interacted at least once with the program	average number of messages sent	total number of messages sent	included the keywords stress, crave, family, patch and gum

RESEARCH OUTCOMES:

This pilot study demonstrated the feasibility of recruiting and enrolling Puerto Rican smokers into a smoking cessation study.

Decídetexto was well received by participants, most of whom engaged in high levels of text messaging interactivity and reported high levels of satisfaction. Moreover, Decídetexto significantly increased self-efficacy, produced medium therapeutic alliance, in what can be described as a successful interaction and relationship between the health care professionals conducting the study and the participants. This was measured using the Working Alliance Inventory—Short Version (WAI-S). The WAI-S is a questionnaire measuring three key aspects of the therapeutic alliance: (1) agreement on the goals of therapy, (2) agreement on the tasks of therapy, and (3) development of an affective bond. It also resulted in noteworthy cessation rates at Month 3 and 6 (38.4% and 61.5%, respectively).

Three key aspects of the therapeutic alliance

1. agreement on the goals of therapy
2. agreement on the tasks of therapy
3. development of an affective bond
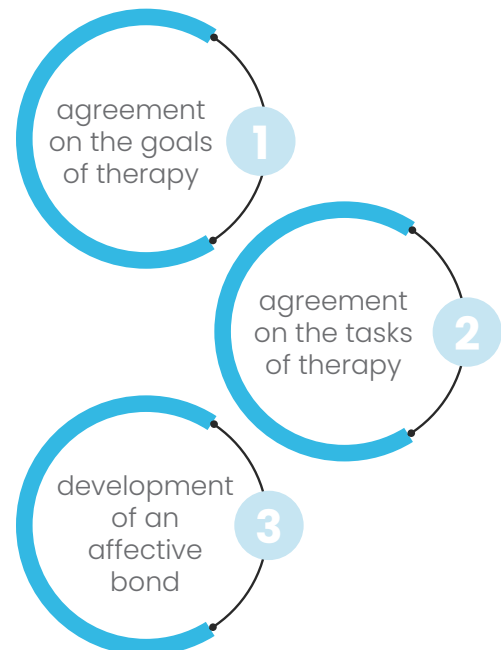
38.4%
noteworthy cessation rates at Month 3

61.5%
noteworthy cessation rates at Month 6

Furthermore, participants in this pilot study reported a similar cessation rate at Month 3 to smokers enrolled in a comparable mobile smoking cessation intervention in Mexico (40%), and a higher cessation rate compared to Hispanic/Latino smokers in the U.S. mainland (30.0%). A deeper understanding of the differences in smoking cessation among Hispanic smokers living in Puerto Rico and the U.S. mainland is essential to improve our understanding of tobacco-related disparities.

RESEARCH CHALLENGES AND LIMITATIONS:

During the time in which this study was conducted there were two major disruptions. First on January 7th, 2020, a 6.4 earthquake impacted the southern region of Puerto Rico, rendering some areas powerless, and causing structural damages and logistic changes on the recruitment and study sites. The seismic activity lasted all of January 2020. This situation developed into an aid crisis, in which the island lost power for at least a week. The damages that the infrastructure of the island suffered meant that more than half a million of residents were homeless, while a fraction of the island had no access to clean drinking water. Months later, the press reported that thousands of Puerto Rican residents were still on the streets, whether because they had no economical means to repair their homes or because of fear of recurring earthquakes. Then, the COVID-19 pandemic broke out in the U.S., with the first case being reported on January 20th of 2020, and the declaration of a public health emergency on January 31st of the same year.

All this forced changes in protocol and limited researchers' ability to collect biological samples (e.g., saliva and exhaled carbon monoxide) to verify smoking abstinence. Follow-up visits, which were initially planned to be in-person, were conducted over-the-phone. Despite these unexpected events, participants remained highly engaged with the intervention. This suggests that participants relied on the Decídetexto intervention for psychosocial support.

The study had some limitations, including that research only included participants who had a cellphone with a U.S. carrier. Thus, participants with a Claro cell phone, the largest carrier in Puerto Rico, were not able to participate in the study. A second limitation was the small sample size. Third, no comparison group was available, limiting researchers' capacity to assess the efficacy of the intervention. Fourth, the sample was more highly educated than the general population in Puerto Rico.

Future research would determine whether the effectiveness of the intervention is generalizable to those who have less education or have modest incomes. Finally, biomarkers were not used to verify smoking status.

CONCLUSIONS AND LESSONS LEARNED:

In Puerto Rico, the *Decídetexto* mobile smoking cessation intervention generated high satisfaction and frequent interactions, significantly increased self-efficacy, and resulted in noteworthy cessation rates at Month 3 and 6, despite low adherence to NRT. Further studies should examine reasons for low use of NRT among Puerto Rican smokers. Additional research should also examine methods to improve medication adherence, given that greater medication adherence is associated with greater abstinence.

It is noteworthy that the provision of NRT (nicotine replacement therapy) at no cost may have strongly influenced the outcomes of this study. This strategy, when combined with behavioral support, has demonstrated promising results in increasing cessation rates among large populations of smokers. Puerto Rico does have a local smoking cessation quitline, but to the researchers' knowledge the quitline does not provide NRT.

It is also important to highlight that the participants interacted at higher levels and mostly sent their own, self-composed text messages rather than relying on keywords for a program response. This finding reinforces the hypothesis that text messaging interactivity via keywords may not be sufficient for smoking cessation. Future studies should assess the relationship of text messaging interactions and the psychological effects (e.g., intra-treatment social support, therapeutic alliance, and perceived autonomy support).

Similarly, it is important to note the importance of culturally and linguistically adapting smoking cessation interventions. As researchers implemented the study, the team realized the need to adapt the intervention to Puerto Rican smokers, including adapting words used in the text messages that were not popular among Puerto Ricans (e.g., *cigarillo* instead of *cigarro* (cigarettes)).

This study suggests that culturally and linguistically proficient mobile support interventions, such as Decídetexto, combined with other support holds promise for increasing smoking cessation among Puerto Rican smokers who are more likely to be current smokers than Hispanics overall.

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