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Building Tobacco Cessation Capacity in Homeless Shelters: A Pilot Study

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Abstract Tobacco use is common among homeless adults, yet few homeless shelters offer tobacco dependence treatment. Using a pre-intervention and post-intervention study design, we pilot tested the feasibility of a capacity building intervention that consisted of a 3.5-h training for shelter staff to provide cessation counseling. Staff ($n = 12$) and homeless clients ($n = 46$) completed questionnaires at pre-intervention, post-intervention (6 weeks), and at 12-weeks follow-up. Staff completed a questionnaire on tobacco-related knowledge, attitudes toward and practices around treating tobacco dependence, and self-efficacy in providing cessation counseling (score range 1–5). Clients completed a questionnaire on tobacco-related knowledge, attitudes toward tobacco dependence, and receipt of tobacco-related services from the program (score range 1–5). We used repeated measures linear regression analysis to examine change in scores over time. From pre-intervention to post-intervention, staff knowledge (β coefficient 0.4, 95 % CI 0.1–0.8) and efficacy (β coefficient 0.4, 95 % CI 0.2–0.7) in treating tobacco dependence increased. Client receipt of tobacco-related program services increased significantly from post-intervention to follow-up (β coefficient 0.3, 95 % CI 0.1–0.5). A brief capacity

building intervention has the potential to increase tobacco-related interventions among clients in homeless shelters.

Keywords Capacity building · Tobacco dependence · Homeless shelters · Homeless adults

Introduction

Homeless adults have among the highest rates of tobacco use, exceeding that of the general population by fourfold [1]. Homeless adults are interested in quitting smoking and make quit attempts [2], but rates of successful quitting are much lower than the general population [1].

Smoking cessation interventions in the homeless population have focused on individual-level behavior change [3–5]. These interventions have included behavioral counseling and pharmacotherapy, and have demonstrated that homeless adults are engaged in quitting smoking, and achieve short-term abstinence similar to the general population [3–5]. However, no interventions have targeted system-level changes. System-level interventions that target social norms and build cessation capacity within organizations serving homeless adults may promote change in organizational culture around tobacco use [6, 7], and may reduce tobacco use behaviors among homeless adults.

Homeless shelters offer a promising venue to introduce interventions to promote smoking cessation because they serve clientele who have high rates of tobacco use [8, 9], of whom the majority are interested in quitting smoking [8]. Previous research has shown that tobacco dependence treatment is more effective when combined with smoke-free policies [10]. Although homeless shelters offer indoor smoke-free policies [8, 9], few shelters offer other

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resources for tobacco dependence [11, 12]. Despite interest in providing cessation care, limitations on staff time and training, lack of reimbursements, and lack of financial resources are some of the barriers to implementing tobacco control programs in homeless shelters [12, 13]. The misperception that homeless adults are uninterested in quitting smoking and concerns about competing priorities are some of the other barriers to providing cessation care in homeless shelters [11, 12].

These barriers to implementation of tobacco interventions are common to other organizations that serve populations with high rates of tobacco use, such as substance use recovery programs and community-based social services agencies [14–16]. Yet studies have demonstrated the feasibility of implementing tobacco dependence capacity building interventions in these settings [6, 7]. These interventions have included training staff to provide motivational interviewing, training to increase knowledge of existing resources for smoking cessation, provision of nicotine replacement therapy, and performance improvement strategies [6, 7]. These interventions have shown to increase knowledge and willingness among staff to address tobacco use among clients disproportionately affected by tobacco use [6, 7].

In this study, we tested the feasibility and acceptability of a capacity building intervention that consisted of a smoking cessation curriculum for staff in homeless shelters. The curriculum included training on the delivery of cessation counseling, information about local community resources for smoking cessation, and strategies to incorporate smoking cessation counseling into the daily workflow. The capacity building intervention was pilot tested in two transitional homeless shelters in San Diego County. We hypothesized that the training would be associated with improved knowledge, attitudes and practices concerning tobacco among staff, and improved knowledge, attitudes, and receipt of tobacco-related services among clients.

Methods

Study Design

Using a pre-intervention and post-intervention study design, we pilot tested a capacity building intervention to improve homeless shelters' capacity to facilitate smoking cessation among their clients. The intervention was implemented in parallel in two transitional homeless shelters between January 2015 and April 2015. All study procedures were approved by the University of California, San Diego institutional review board. Written informed consent was obtained from all participants.

The Capacity Building Intervention

The Social Ecological Model provided a theoretical framework for the capacity building intervention [17]. In this intervention, we focused on improving the organizational culture around tobacco use, expecting that this would lead to both change in social norms around smoking in shelters and smoking behaviors among homeless adults.

Based on our formative work [12], our curriculum focused on providing shelter staff the tools to provide brief cessation counseling during routine encounters with clients. The intervention consisted of 1.5-h training for staff on the following topics: tobacco use in the homeless population, nicotine addiction, health effects of tobacco use, strategies to implement/enforce smoke-free policies, brief smoking cessation counseling (2As and R) and more intensive counseling (5As), knowledge on tobacco cessation medications, and strategies to incorporate counseling into the daily workflow. We developed the curriculum adapting materials from Rx for Change [18], Behavioral Health and Wellness Program [19], and the Centers for Disease Control and Prevention Tips for Former Smokers Campaign [20]. Following the 1.5-h training, we asked staff to attend 1-h meetings at 6 weeks post-intervention and at 12 weeks follow-up to address problems and reinforce information discussed in the original training (total time commitment 3.5 h). The study provided \$300 to each facility to support staff during their training (i.e. staff were provided lunch) and to boost existing resources for smoking cessation (e.g. purchase of posters, flyers and other promotional cessation materials).

Study Sites

We focused on transitional shelters because they offered long-term shelter and supportive services for homeless individuals and families for up to 2 years. The two participating transitional shelters provided transitional housing services and supportive services to homeless adults and families for at least 4 months and up to 2 years. A notice about the study was sent to the Regional Continuum of Care Council, the largest network of homeless service providers in San Diego County. Of the 61 eligible transitional shelters in San Diego County, three volunteered to participate in the pilot study. We selected two based on the availability of pilot funds for this study. The participating transitional shelters were medium-sized (capacity between 66 and 150 beds) single adult and family transitional homeless shelters. Site 1 was a family transitional homeless shelter that provided individual apartments and supportive services to homeless families for a minimum of 4 months and up to a year (average length of stay 1.5 months). Site 2 was a single adult women's transitional shelter that

provided communal shelter and supportive services to single homeless women for up to 2 years (average length of stay 6 months). Both shelters had indoor no-smoking policies with an outdoor designated smoking area.

Study Participants

All paid staff were invited to participate. Staff who participated were case managers, counselors, program directors, or administrators. Clients were eligible to participate in the study if they were current or former smokers, staying in the intervention facilities, ≥ 18 years and able to provide informed consent.

Procedures

We conducted one training session for staff from both facilities. During this meeting, staff provided written informed consent, completed a brief, self-administered pre-intervention questionnaire, and participated in the training. We followed staff longitudinally at 6 and 12 weeks. All 12 participating staff completed written informed consent prior to the onset of the study.

Three weeks prior to the staff assessments, we made announcements at client group meetings to recruit clients to participate in the study. Trained study staff met with eligible clients to obtain informed consent and to complete a pre-intervention questionnaire. Clients were encouraged to return for follow-up assessments at 6 and 12 weeks. While we intended to follow clients longitudinally, we recognized that attrition rates could be high particularly among clients in Site 1 who had shorter lengths of stay than those in Site 2. Therefore, we also enrolled new participants into the study at each follow-up time point. We obtained written informed consent from all 46 unique homeless clients in this study. Participants who were present at pre-intervention and returned for follow-up assessments at 6 and 12 weeks were asked to provide written informed consent at each follow-up visit. We reimbursed staff and clients with a \$5.00 gift card to the neighborhood grocery store for completing pre-intervention, post-intervention and the follow-up questionnaires.

Measures

We used the Staff Smoking-Knowledge, Attitudes, and Practices survey [21] and the Client Smoking-Knowledge, Attitudes, and Services survey to examine attitudes, tobacco use, and demographic characteristics among participants. [22] These instruments were developed to assess willingness to treat tobacco dependence among staff and clients of substance use recovery programs [21, 22].

Because of the high rates of substance use in the homeless population, we expected that the instruments would be suitable for staff and clients of homeless shelters.

Staff Smoking-Knowledge, Attitudes, and Practices (S-KAP) Survey

The five S-KAP scales (score range 1–5) measured knowledge around tobacco use (alpha coefficient 0.8), attitudes related to treating tobacco dependence (alpha coefficient 0.8), barriers to treating tobacco dependence (alpha coefficient 0.9), counselor self-efficacy in providing tobacco-related services (alpha coefficient 0.7), and practices related to treating tobacco dependence (alpha coefficient 0.9) [21]. We assessed these domains among all staff who had any direct contact with clients weekly (range 3–40 h, median 20 h, interquartile range 20). Staff also reported their awareness of community-based resources for smoking cessation.

Client Smoking-Knowledge, Attitudes, and Services (S-KAS) Survey

The four S-KAS scales (score range 1–5) measured knowledge around tobacco use (alpha coefficient 0.4), attitudes related to treating tobacco dependence (alpha coefficient 0.7), receipt of tobacco-related program services (alpha coefficient 0.8), and receipt of clinician-related services (alpha coefficient 0.9) [22]. We assessed knowledge and attitudes among all clients, and receipt of program and clinician services among smokers [22]. The survey asked all participants whether staff had asked them about their tobacco use upon entry into the facility. Smokers were also asked whether they had the required skills to quit smoking at the time of each survey (Strongly disagree, Disagree, Unsure, Agree, and Strongly Agree).

Statistical Analysis

We reported sample characteristics for staff and clients. We examined un-adjusted differences in the S-KAP and S-KAS scales for staff and clients between pre-intervention and post-intervention, and post-intervention and 12 weeks follow-up, and pre-intervention and 12 weeks follow-up using t-tests. Using linear regression, accounting for repeated measurements and clustering by participant, we examined change in S-KAP and S-KAS scales between pre- and post-intervention, post-intervention and follow-up, and pre-intervention and follow-up. We clustered by participants to account for correlation in responses among the same staff and client participants over time. We adjusted for client and

staff socio-demographic variables (age, sex, race/ethnicity, and education), smoking status (all staff models, and client models on attitudes and beliefs), and cigarette consumption (client models on program and clinician services), and housing program. For each model, we examined interactions between housing program and follow-up time. All analyses were done using Stata, version 9.

Results

Sample Characteristics

Site 1 had 15 regular staff and site 2 had 14 regular staff, of whom 6 participated in the training from each site (41 % response rate). Of the 12 staff who completed the 1.5 h training, all were present at the post-intervention interview, and 11 were present for the follow-up interview (one participant had left the program for another job) (Table 1). For all staff combined, the mean age was 38.4 (SD 12.3) (Table 2). Almost all staff were women, and the majority were college educated. Three staff reported smoking cigarettes at pre-intervention.

The number of clients surveyed at pre-intervention, post-intervention and follow-up were 25, 21 and 17, respectively (Table 1). However, there were 46 unique client participants, and some were surveyed at multiple time points. Of the 25 clients who completed the pre-intervention assessment, 11 (44 %) also completed the 6-weeks post-intervention assessment, and 5 completed all three assessments (20 %). Participants who had two or more assessments were more likely to be older ($p < 0.02$) than those who had only one assessment. Participants who had two or more assessments also showed a trend toward residing in site 2 where length of stay was longer than that in site 1 ($p = 0.08$). There were no differences in follow-up rates by other demographic and tobacco use characteristics.

For all clients combined, the mean age was 41.7 years (SD 12.3) (Table 2). The majority of client participants were women (82.6 %). The majority of the participants were smokers (80.4 %), and about a third of the smokers also reported using other forms of tobacco. Participants in site 1 were more likely to be younger, belong to racial/ethnic minorities, and use cigars compared to those in site 2 (Table 2).

Change in S-KAP Scores Among Staff Over Time

In unadjusted analysis, staff efficacy ($p < 0.007$) and practices ($p < 0.03$) toward treating tobacco dependence increased from pre- to post-intervention, and staff knowledge increased from pre-intervention to follow-up ($p < 0.003$) (Fig. 1). In adjusted analyses, average score in the knowledge scale increased by 0.4 points between pre-intervention and post-intervention (β coefficient 0.4, 95 % CI 0.1–0.8), 0.4 points between post-intervention and follow-up (β coefficient 0.4, 95 % CI 0.1–0.7), and 0.8 points between pre-intervention and follow-up (β coefficient 0.8, 95 % CI 0.5–1.1) (Table 3). The average score in the efficacy scale increased significantly between pre-intervention and post-intervention (β coefficient 0.4, 95 % CI 0.2–0.7), and pre-intervention and follow-up (β coefficient 0.5, 95 % CI 0.02–0.9). There were no significant changes in the beliefs, barriers, and practices scales over time. There was no significant site by time interactions for any scale. Staff reported increased awareness of community resources for smoking cessation between pre-intervention (58.3 %) and post-intervention (91.7 %). Of the three staff who were smokers at pre-intervention, two reported quitting cigarette smoking at post-intervention and maintaining self-reported abstinence at follow-up.

Change in S-KAS Scores Among Clients Over Time

Receipt of program services increased among clients from pre-intervention to post-intervention ($p < 0.04$) and pre-intervention to follow-up ($p < 0.01$) (Fig. 2). In adjusted analysis, average score for receipt of program services increased by 0.3 points between post-intervention and follow-up (β coefficient 0.3, 95 % CI 0.1–0.5) and pre-intervention and follow-up (β coefficient 0.3, 95 % CI 0.1–0.6) (Table 3). There were no significant changes in knowledge, attitudes, and receipt of clinician services scales over the study time period. There was no significant site by time interactions for any scale. There was a non-significant increase in the proportion of clients being asked about tobacco use during the study: 21.4 % at pre-intervention, 33.3 % at post-intervention, and 64.7 % at follow-up ($p = 0.08$). The proportion of participants reporting that they had the required skills to quit smoking did not change over the study time period. The prevalence of cigarette

Table 1 Sample size for the study

	Pre-intervention		6-weeks post-intervention		12-weeks post-intervention	
	Client, no.	Staff, no.	Client, no.	Staff, no.	Client, no.	Staff, no.
Site 1	14	6	9	6	7	6
Site 2	11	6	12	6	10	5
Total	25	12	21	12	17	11

Table 2 Sample characteristics of clients and staff

	Staff			Clients		
	Site 1 N = 6	Site 2 N = 6	<i>p</i> value	Site 1 N = 25	Site 2 N = 21	<i>p</i> value
Age, mean (SD)	40.8 (7.5)	36 (16.2)	0.5	38.4 (11.7)	45.8 (11.9)	<0.03
Female, no. (%)	5 (83.3)	6 (100.0)	0.3	17 (68.0)	21 (100.0)	<0.004
Education, no (%)			0.4			0.5
Less than high school	0 (0.0)	0 (0.0)		4 (16.0)	3 (14.3)	
High school or GED	1 (16.7)	0 (0.0)		12 (48.0)	6 (28.6)	
Some college	2 (33.3)	1 (16.7)		8 (32.0)	11 (52.4)	
College or vocational training	3 (50.0)	5 (83.3)		1 (4.0)	1 (4.8)	
Race/ethnicity, no (%)			0.7			<0.04
White	2 (33.3)	2 (33.3)		5 (20.0)	12 (57.1)	
African American	2 (33.3)	1 (16.7)		7 (28.0)	5 (23.8)	
Hispanic/Latino	2 (33.3)	2 (33.3)		10 (40.0)	2 (9.5)	
Native Hawaiian/Pacific Islander/other	0 (0.0)	1 (16.7)		3 (12.0)	2 (9.5)	
Primary job for staff, no (%)						
Case manager	3 (50.0)	3 (50.0)	–	–	–	–
Program director	1 (16.7)	1 (16.7)	–	–	–	–
Counselor	0 (0.0)	1 (16.7)	–	–	–	–
Administrator	1 (16.7)	0 (0.0)	–	–	–	–
Other	1 (16.7)	1 (16.7)	–	–	–	–
Current smoker, no (%)	1 (16.7)	2 (33.3)	0.5	20 (80.0)	17 (80.9)	0.9
Cigarettes per day, mean (SD)	0 (0.0)	4 (5.7)		8.9 (6.4)	9.4 (6.8)	0.8
Other tobacco use, no (%)						
Electronic cigarettes	0 (0.0)	2 (33.3)	–	9 (36.0)	7 (33.3)	0.9
Cigars	0 (0.0)	0 (0.0)	–	10 (40.0)	1 (4.8)	<0.005
Smokeless tobacco	0 (0.0)	1 (16.7)	–	1 (4.0)	3 (14.3)	0.2

Fig. 1 Unadjusted pre-intervention, post-intervention, and follow-up SKAP scores for staff. *p* value for change in knowledge from pre-intervention to follow-up <0.003; *p* value for change in efficacy from pre-intervention to post-intervention <0.007, from follow-up to pre-intervention <0.006; *p* value for change in practices from pre-intervention to post-intervention <0.03

smoking was 80.0 % pre-intervention, 80.9 % post-intervention, and 70.5 % at follow-up ($p = 0.3$). Average daily cigarette consumption was 10.9 (SD 8.1) at pre-intervention, 9.7 (SD 4.6) at post-intervention, and 6.8 at follow-up (SD 6.6) ($p = 0.3$).

Discussion

This pilot study explored the feasibility of implementing a brief capacity building intervention to improve homeless shelters' capacity to facilitate smoking cessation among homeless clients. The intervention improved tobacco-related knowledge and efficacy in providing cessation counseling among staff, and improved receipt of tobacco-related program services among clients. Our findings suggest that a brief intervention has the potential to increase the provision of tobacco dependence services in homeless shelters.

Table 3 Repeated measures linear regression models examining the main effect of time on SKAP and SKAS scales

	Time (pre-intervention vs. post-intervention) β coefficient (95 % CI) ^a	Time (post-intervention vs. follow-up) β coefficient (95 % CI) ^a	Time (pre-intervention vs. follow-up) β coefficient (95 % CI) ^a
<i>Staff^b</i>			
Knowledge	0.4 (0.1 to 0.8)*	0.4 (0.1 to 0.7)*	0.8 (0.5 to 1.1)***
Beliefs	0.4 (−0.1 to 0.9)	−0.3 (−0.8 to 0.2)	0.1 (−0.4 to 0.7)
Barriers	0.3 (−0.2 to 0.8)	−0.2 (−1.0 to 0.5)	0.1 (−0.6 to 0.8)
Efficacy	0.4 (0.2 to 0.7)**	−0.08 (−0.5 to 0.4)	0.5 (0.02 to 0.9)*
Practices	0.8 (−0.03 to 1.6)	−0.2 (−1.1 to 0.6)	0.5 (−0.2 to 1.3)
<i>Client^c</i>			
Knowledge	0.1 (−0.3 to 0.5)	0.1 (−0.4 to 0.5)	0.2 (−0.3 to 0.7)
Attitudes	0.1 (−0.3 to 0.6)	−0.2 (−0.6 to 0.3)	−0.1 (−0.6 to 0.5)
Program services	−0.03 (−0.2 to 0.1)	0.3 (0.1 to 0.5)***	0.3 (0.1 to 0.6)**
Clinician services	−0.8 (−2.0 to 0.4)	−0.1 (−0.7 to 0.6)	−0.9 (−1.2 to 0.2)

* $p < 0.05$; ** $p < 0.005$; *** $p < 0.001$

^a β Coefficients represent the mean difference in score for each scale between pre-intervention to post-intervention, post-intervention and follow-up, and pre-intervention and follow-up

^b Staff models were adjusted for age, sex, race/ethnicity, education, smoking status, program, time, time and program interaction

^c All client models were adjusted for age, sex, race/ethnicity, education, program, time, program and time interaction; Smoking status was adjusted for in models on knowledge and attitudes; Cigarette consumption in models on program and clinician services among smokers

Fig. 2 Unadjusted pre-intervention, post-intervention, and follow-up SKAS scores for clients. p value for change in receipt of program service scale from pre-intervention to post-intervention <0.04 , pre-intervention to follow-up <0.01

Staff knowledge around tobacco dependence increased significantly between pre- and post-intervention, and these changes were present at follow-up. These results are in contrast to a previous study that did not find improvements in the S-KAP knowledge scale among staff in substance use recovery programs who had participated in more intensive cessation training than ours [6]. Unlike staff in recovery programs who may have a high baseline knowledge on addiction, staff in homeless shelters may benefit from brief interventions to increase knowledge around tobacco use and addiction among homeless clients. An improvement in knowledge was accompanied by increased efficacy in providing cessation counseling from pre- to

post-intervention, but not in tobacco-related practices. Although we observed an increase in the practice scale from pre- to post-intervention, these results did not attain statistical significance suggesting that we may have been underpowered to detect a difference. Knowledge alone may also have been inadequate to trigger change in tobacco-related practices among staff in homeless shelters.

We observed change in only one of the client measures toward the end of the study. Clients' self-reported receipt of program services increased between post-intervention and follow-up and pre-intervention and follow-up. We may not have observed a difference in the program services scale at the earlier time point because clients may not have had adequate exposure to the intervention, and the timing of the follow-up assessment after the intervention may have been too soon to observe a difference.

Although a higher proportion of clients reported being asked about tobacco use at follow-up, this was not accompanied by increased knowledge about the hazards of smoking, more favorable attitudes toward quitting smoking, or more skills in quitting smoking. Many factors may influence change in smoking behaviors after being screened for tobacco use, including the number of discussions around smoking [23], presence of smoking-related comorbidities and psychological distress [24], and one's own self-efficacy in quitting smoking [25]. Self-reported receipt of clinician services trended downward during the study, suggesting that although clients may have received general information on tobacco use and cessation from

their programs, they may not have received tobacco cessation counseling tailored to their needs. Previous studies have demonstrated that the prevalence of the 5As for smoking cessation in clinical practice is much lower for assist and arrange than for ask, advise, and assess [26, 27]. The findings in our study reflect the nature of the intervention, which was intended to provide staff with training for brief cessation counseling than more intensive counseling, highlighting opportunities for improving the training in cessation counseling for shelter staff.

We garnered several lessons during the implementation of the pilot intervention. Previous studies have highlighted that constraints on staff time pose barriers to implementing tobacco control interventions in settings that serve populations with high rates of smoking [12, 13]. We tried to address these barriers by supporting staff to attend the training and by boosting resources for smoking cessation on-site (e.g. flyers, posters, and other promotional materials around cessation). While our intervention focused specifically on staff, we recognized that interventions that targeted clients simultaneously may be more effective in changing organizational culture around tobacco use and promoting change in smoking behaviors among homeless clients. Our intervention was feasible, in part, because it took place in homeless shelters that had a smoke-free policy that was strongly enforced. Homeless shelters that have a commitment to smoke-free grounds may be more likely to implement organizational level tobacco dependence interventions.

Our study had several limitations. The pilot study was conducted in two transitional shelters in San Diego County, limiting generalizability to other shelters. Sample size for staff and clients were small, potentially leading to an increase in type I error. Although the direction of change suggested that the intervention had favorable effects in improving tobacco-related program services in the two facilities, these results need to be corroborated in a larger study. The majority of the staff and client participants were single women and women with children, limiting generalizability to homeless men. Tobacco use was self-reported, potentially leading to recall bias. Responses from participating staff may not be representative of other staff in the participating facilities or other facilities.

This is the first study, to our knowledge, to describe results of an intervention to increase tobacco cessation capacity in transitional homeless shelters. Our findings provide suggestive evidence that capacity building interventions could lead to increased provision of brief tobacco interventions among sheltered homeless adults. The high burden of tobacco use among populations experiencing homelessness underscores an urgent need for interventions that increase access to cessation services and smoke-free policies for these populations.

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Compliance with Ethical Standards

Preliminary results from this research was presented at the University of California, San Diego, Institute for Public Health, Public Health Research Day on April 9, 2015 and at the Tobacco Related Disease Research Conference on October 27, 2015. This article is not published elsewhere. This manuscript is not under consideration with any other journals, and will not be submitted to any other journals while under your review. The authors are responsible for the reported research. We have participated in the concept and design, analysis and interpretation of data, and drafting and revising of the manuscript. Each of the authors has approved the final manuscript.

Conflict of interest Authors have no financial conflicts of interest related to the work described in this manuscript.

Research Involving Human Participants This study was approved by the University of California, San Diego Institutional Review Board.

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