Article

The efficacy of cognitive behavioral therapy for smoking cessation among Egyptian male students in Alexandria university: a randomized clinical study

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Abstract. *Background*: cigarettes smoking among university students remain the most alarming issue worldwide, but research on whether efficacious interventions can be generalized to this population is limited. The main objective of this study was to examine the efficacy of cognitive behavior therapy for smoking cessation among male students at Alexandria University in Egypt. *Methods*: 146 male students giving the history of ten or more cigarette smoked per day for at least 1 year were randomized into two groups: cognitive behavioral therapy (CBT; n=69) (study group) and minimal intervention in form of basic general health education (MI; n=77) (control group). A baseline assessment (of demographic parameters and tobacco smoking behavior) was performed, and the Fagerstrom Test for Nicotine Dependence was used to assess the level of nicotine addiction in the subjects. The primary outcome variable was 7-day point-prevalence abstinence (ppa), which was assessed at the end of the intervention as well as at 3-month and 6-month follow-ups. The secondary outcome variable was the therapy retention rate. *Results*: The 7-day ppa was significantly higher in CBT than in minimal intervention at the end of therapy (72.5% vs 50%), at 3 months (49% vs 26.3%), and at 6 months (37.7% vs 15. 8%): the retention rate in the treatment was significantly higher among CBT vs minimal intervention (73.9% vs 49. 2%).

Conclusion: CBT is significantly more effective than a minimal intervention for smoking cessation among university students.

Keywords: smoking cessation, CBT, abstinence, Egypt

Introduction

Cigarette smoking remains one of the most common causes of preventable disease and premature death worldwide.[1]. Tobacco smoking kills 6 million people every year, with the number expected to rise to 8 million by 2030.[2]

Tobacco usage, as well as tobacco-related morbidity and mortality, continue to rise in developing countries in the Eastern Mediterranean region.[3] Addiction is defined by the World Health Organization (WHO) as "a behavioral pattern in which the use of a psychoactive drug is given a dramatically higher priority over other actions that previously had a much higher value."[4].

Smoking starts early in life lengthens the time spent smoking throughout one's life and raises the burden of smoking-related diseases. Because of the increased availability of cigarettes and their close relationship with smoking peers, university students are at a higher risk of smoking. At the same time, when they start university, they will experience additional social, emotional, and academic challenges.[5,6]

Cognitive Behavioral therapy is currently the most broadly applied behavioral intervention (CBT). CBT focuses on teaching strategies for dealing with both internal (e.g., cravings) and external (e.g., social pressures) cues to smoke (e.g., seeing other smokers).[7]

Group therapy is a popular method of providing smoking cessation interventions. The goals of group programs have been summarized as follows: to analyze the motivations for group members' behavior; to provide an opportunity for social learning; to generate emotional experiences, and to impart information and teach new skills.[8,9] The purpose of this paper is to evaluate the efficacy of cognitive behavioral therapy for smoking cessation among Alexandria university male students in Egypt.

Materials and methods

Participant and procedures

(450) students were recruited from the outpatient clinics of the therapeutic units of Alexandria University in the period from March 2020 to March 2021. A sample size of 225 students was selected by the quasi-random sampling method. students were interviewed to assess eligibility and enhance motivation for smoking cessation.

To be eligible subjects must have reported to the recruiter that they had been Smoking ≥10 cigarettes per day for at least 1 year, Fewer than 3 months of abstinence in the past year.in addition, subjects needed to be able to attend the sessions. They were excluded if they were enrolled in another smoking cessation program or were diagnosed with Serious or unstable

medical conditions in the past 6 months, other substance dependence according to DSM-IV TR criteria in the past year, and serious mental health problems.

(50) students were ineligible; (175) students met the inclusion criteria and were invited to orientation. Of these, (146) attended the orientation session, provided written informed consent to participate, and were randomly assigned to one of the two therapeutic groups: one group composed of (69) students were assigned to cognitive behavioral therapy (CBT) for smoking cessation and another group: composed of (77) students were assigned to a minimal intervention involving basic health education information about smoking cessation. Randomization was performed using a simple randomization method through randomization tables, randomization and allocation concealment were done by an investigator who had no clinical involvement in the trial.

CONSORT flow chart: Randomized Control trial (Figure 1)
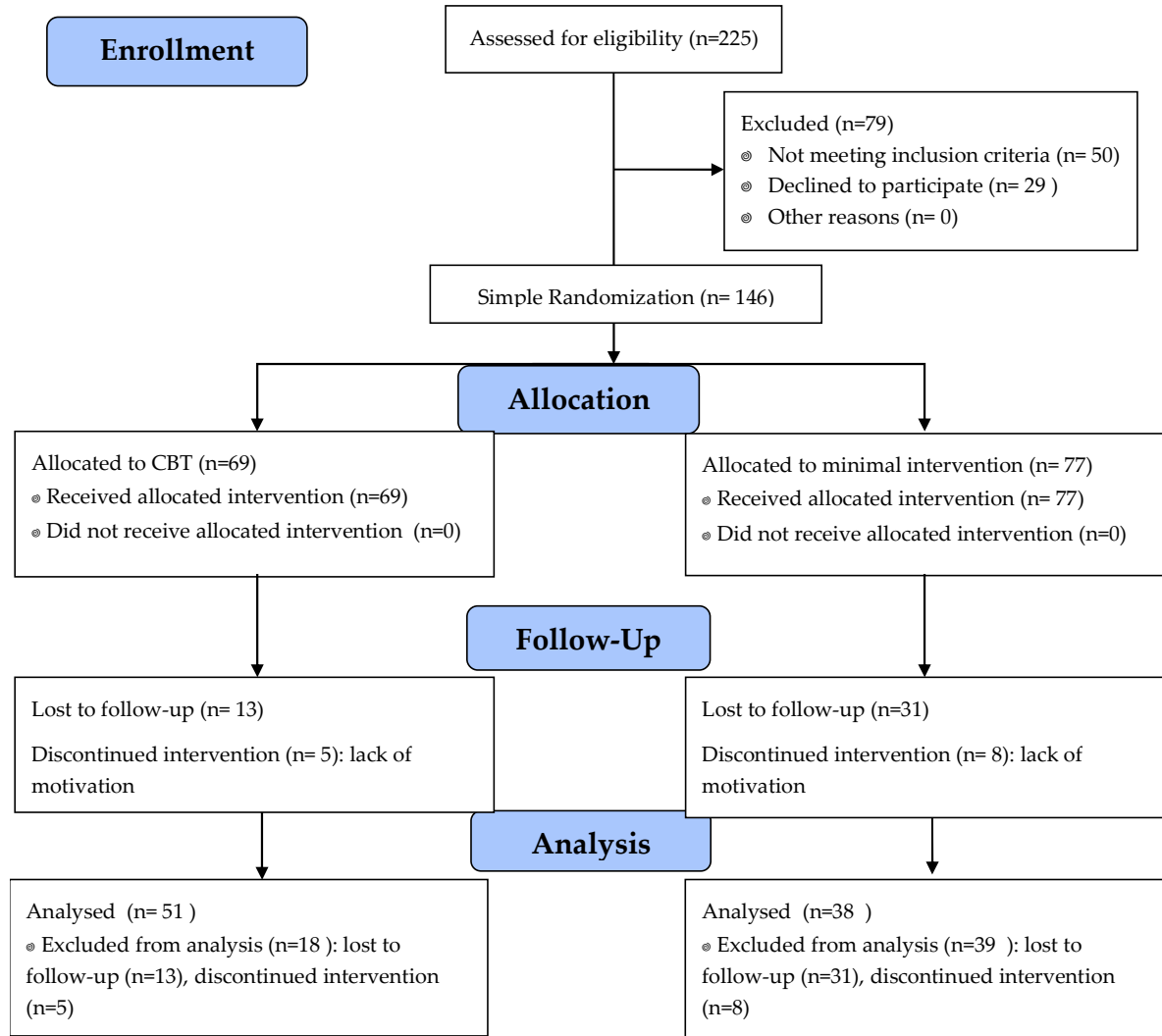
Data Collected and assessment

A pre-designed structured interview questionnaire was used to collect socio-demographic variables such as age, residence, and faculty, also to collect smoking-related information like the number of cigarettes smoked per day and duration of smoking duration, number of quit attempts in the prior year, medical and psychiatric history of all participants. All participants were assessed pre psychotherapy treatment by semi-structured clinical interview for DSM-IV-TR disorders (SCID-I),[10] to diagnose nicotine dependence and, the Arabic version of Fagerstrom Test for Nicotine Dependence (FTND) to assess subjects' nicotine addiction level.[11]. The primary outcome was self-reported 7-day point prevalence abstinence (PPA) at end of the intervention and at 3-month and 6-month follow-ups. The secondary outcome was the retention rate in the therapy.

Interventional methods

The first group was including 69 students subjected to **Cognitive behavioral therapy for smoking cessation** conducted in group sessions (8-10 sessions) one session per week and each session was lasting from 90 minutes. Each group included 10 participants and all groups were managed by the primary therapist and a post-graduate student clinical psychologist as a co-therapist. Students randomized to this group were taught cognitive behavioral cessation and relapse prevention strategies and these included helping smokers understand their reasons for smoking and for quitting, problem-solving and coping skills training, and the provision of social support. Smokers are also taught to avoid situations that make them want to smoke, to try to lessen or control the sensations, thoughts, and emotions that make them want to smoke and to participate in distracting activities if they can't avoid or regulate stimuli. While, the second was including 77 students subjected to Minimal intervention which served as a control arm but it provided basic health education on the harmful effect of tobacco use. Students were advised to think positively, keep themselves busy, remove tobacco products from their surroundings, and exercise. it included one main session and 2 follow-ups sessions (week 2 and week 8).

Sample size

The sample size was calculated with G*Power3 Software.[12] On the basis of an effect size (d) of 0.5, an α-level of 5% ($\alpha = 0.05$), and a power of 80% ($1 - \beta = 0.80$), we calculated a total sample size of 128.Calculating for around 10% drop-out rate, we needed at least a total sample size of 141.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using numbers and percentages. Quantitative data were described using mean, standard deviation. Chi-square test for categorical variables, to compare between different groups. Fisher's Exact or Monte Carlo correction for chi-square when more than 20% of the cells have expected count less than 5. Student t-test for normally distributed quantitative variables, to compare between two studied groups. Mann Whitney test for abnormally distributed quantitative variables, to compare between two studied groups. The significance of the obtained results was judged at the 5% level.

Ethical considerations

Before conducting this research, ethical approval was obtained from the ethical committee (EC) of Alexandria University Faculty of Medicine. This EC has had a federal-wise assurance

(FWA) for more than 20 years now.[13]. It operates according to the International Conference of Harmonization Good Clinical Practice (ICH GCP) and applicable local and institutional regulations and guidelines.[14]

Informed consent

Informed consent was obtained from all patients to use their anonymous data for research purposes.

Results

Participant characteristics and retention rates

Table 1 presents the characteristics of the participants and displays differences at baseline between the CBT and minimal intervention groups. Participants' mean age was 21 years. Participants smoked an average of 20 cigarettes per day for an average of 5 years. Nicotine dependence levels were moderate, as reflected by FNTD scores (M = 5.9). regarding family history of smoking, 69% had at least family member has been smoking and regarding daily contact with smokers, 65% the of participant were in contact with smokers daily which were significantly higher than the minimal intervention group in the CBT group, 51 out of 69 participants completed the sessions while in the Minimal intervention group, only 38 out of 77 participants completed the 3 sessions thus indicate that CBT had significantly higher retention rate in comparison to minimal intervention group.

Table (1): **Demographic and Smoking History of Participants at Baseline and retention rate by Intervention Condition (N = 146)**

	CBT (n = 69)	Minimal Intervention (n = 77)	Test of sig.	p
Age (years)	21.45 ± 1.39	20.88 ± 1.56	t=2.309*	0.022*
Age of onset of smoking	16.55 ± 2.05	16.35 ± 1.92	t=0.525	0.601
Smoking duration	4.91 ± 2.19	4.53 ± 2.38	U=2353	0.230
1 – 3	19 (27.5%)	31 (40.3%)		
4 – 6	35 (50.7%)	29 (37.7%)	χ^2=3.139	0.208
>6	15 (21.7%)	17 (22.1)		
cigarettes smoked per day	20.04 ± 6.28	20.06 ± 6.74	U=2605.5	0.653
≤20	46 (66.7%)	54 (70.1%)	χ^2=0.202	0.653
>20	23 (33.3%)	23 (29.9%)		
Number of previous quit attempt	0.72 ± 0.87	0.86 ± 1.0	U=2487.0	0.472
0	35 (30.7%)	34 (44.2%)		
1 – 2	31 (44.9%)	37 (48.1%)	χ^2=1.084	[MC]p=0.602
3+	3 (4.3%)	6 (7.8%)		
Longer period of abstinence	6.48 ± 8.99	7.43 ± 9.84	U=2513.5	0.553
Family history of smoking	49 (71%)	51 (66.2%)	χ^2=0.385	0.535
Daily contact with smokers	52 (75.4%)	43 (55.8%)	χ^2=6.099*	0.014*
Fagerstrom test for nicotine dependence	6.07 ± 1.15	5.84 ± 1.18	t=1.178	0.241
Retention in the therapy	51 (73.9%)	38 (49.2%)	χ^2=9.225*	0.002*

t: Student t test   , χ^2: Chi square test ,   MC :Monte Carlo test   ,U: Mann Whitney

p: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$

Abstinence rates:7-day point prevalent abstinence (PPA)

Table (2) present 7-day Point-prevalence of abstinence at end of intervention and at 3-month and 6-month follow-ups using completer analysis. Both groups revealed the highest abstinence rates at end of intervention (72.5%vs 50%). Both groups revealed a reduction in abstinence rates with time; at 3 months' follow-up (49%vs 26.3%) and at 6 months' follow-up (37.3%vs 15. 8%).groups comparison showed that 7-day Point-prevalence of abstinence rate among CBT group was significantly higher than minimal intervention group either at end of intervention or follow-ups.

Table (2): Comparison between the two studied groups according to 7-day point-prevalence abstinence

7 day point-prevalence abstinence	CBT (n = 51)	Minimal intervention (n = 38)	χ^2	p
End of therapy				
Relapsed	14 (27.5%)	19 (50%)	4.746[*]	0.029[*]
Abstinent	37 (72.5%)	19 (50%)		
3 months				
Relapsed	26 (51%)	28 (73.7%)	4.704[*]	0.030[*]
Abstinent	25 (49%)	10 (26.3%)		
6 months				
Relapsed	32 (62.7%)	32 (84.2%)	4.967[*]	0.026[*]
Abstinent	19 (37.3%)	6 (15.8%)		

χ^2: **Chi square test**

p: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$

Discussion

CBT is one of the primary evidence-based treatments for tobacco cessation and relapse prevention. Interventions that make use of CBT strategies are among the most effective treatments for smoking cessation; yet, they have not been tested among Egyptian university students by doing well-controlled trials. This study was done to assess and compare the efficacy of cognitive behavioral therapy vs minimal intervention in the form of basic health education as a control group. Both CBT and MI performed well, but when both the groups were compared, the abstinence rate was found to be significantly more in the CBT group than in MI group.

In consistent with our results a study which was conducted in 2010 by Monica S. Webb, Isildinha M. Reis and Michael P. Carey found that 7-day point prevalence abstinence (ppa) was significantly higher in CBT than in general health education at the completion of counseling (51 percent vs. 27 percent) and at 3 months (34% vs. 20%), and at 6 months (31% vs. 14%). Thus, CBT for smoking cessation interventions was found to be one of the effective interventions among African American smokers.[15]

Another study was conducted by Simon J, Carmody T and Hudes E in 2003 revealed that self-reported quit rates were higher in the intensive CBT participants than minimal counseling in hospitalized smokers at 6 months (35%vs 21%) and at 12 months (33% vs 20%).[16]

In line with our finding, Mitali Raja, Sabyasachi Saha and Shafaat Mohd conducted a study in 2014 which showed that reduction in mean Fagerstrom scores was found to be more in the CBT group than in the basic health education group at all-time intervals.[17]

Another study was conducted by Wittchen HU, Hoch E, Klotsche J and Muehlig S in 2011 showed that the abstinence rate of cbt at end of therapy with higher than minimal intervention

(34.8%vs 32.8%). Also, the retention rate for CBT was higher than Minimal intervention (64%%vs 56%).[18]

Though CBT performed better than MI, it was found that any intervention which was given to tobacco users from either CBT or MI groups was helpful to the patients in cigarette smoking cessation.

The main limitations of our research were conducting this study in absence of nicotine replacement therapy that makes comparison with other studies which used nicotine replacement therapy plus CBT challenging. Also, the efficacy of CBT was only assessed over a short duration after psychotherapy intervention (6 months' post therapy) while further follow up assessments must be considered over long durations to can assess its accurate efficacy. However, our results were still significant.

Conclusion

CBT is significantly more effective than minimal intervention in the form of basic health education for smoking cessation among university students and CBT has higher retention rate more than Minimal intervention.

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No finds were received for this project.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgement

None to declare.

Data availability

The data are available upon request

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