



IMPACT OF PHARMACIST DELIVERED SMART PHONE BASED SMOKING CESSATION PROGRAMMES IN PATIENTS UNDERGOING PHARMACOTHERAPY IN A STOP SMOKING CLINIC OF TERTIARY CARE TEACHING HOSPITAL.

Pulmonary Medicine

Rajeev P Thomas	M Pharm, Associate Professor, Department of Pharmacy Practice, National College of Pharmacy, Kerala University of Health Science, Kozhikode, Kerala, India.
Fathima Mujeeb	Pharm D, Department of Pharmacy Practice, National College of Pharmacy, Kerala University of Health Science, Kozhikode, Kerala, India.
Shifa Thahseen*	Pharm D, Department of Pharmacy Practice, National College of Pharmacy, Kerala University of Health Science, Kozhikode, Kerala, India. *Corresponding Author
Juma Abdulrahiman	Pharm D, Department of Pharmacy Practice, National College of Pharmacy, Kerala University of Health Science, Kozhikode, Kerala, India.
Shahila Sherin	
Panangattuparambil	MBBS, Resident medical officer, Nadakkavil hospital, Malappuram, Kerala, India.
Binuraj C	MBBS, MD, Associate Professor, Department Of Pulmonology, KMCT Medical College, Kerala University of Health Science, Kozhikode, Kerala, India.

ABSTRACT

INTRODUCTION: Tobacco smoking is a dangerous factor for many illnesses such as malignant growth, lung infections, cardiovascular illnesses, etc. making it one of the biggest reason for morbidity and mortality.

OBJECTIVES: To compare and assess the effectiveness of pharmacist initiated smart phone based smoking cessation programs in patients who are under pharmacotherapy.

METHOD: A prospective-interventional study conducted in two groups having 76 participants enrolled in each group. Patients intermittently assessed for a duration of 6 months after randomization. The patients who had easy access to digital media chosen for a mobile-based intervention, whereas the control group for behavioral treatment. NRT treatment were suggested for the patients based on their FTND score. This scoring technique helped assess the nicotine dependency. SPSS 17.0 used to evaluate the data.

RESULTS: Patients have undergone therapy based on their FTND scores. Upon evaluating the effectiveness of smart phone based smoking cessation interventions, it is found that, 46 patients (60.5%) in the intervention group who used the mobile application successfully quit smoking while 30 patients (39.5%) failed to quit smoking. Only 31 patients (40.78%) in the control group successfully stopped smoking while the majority i.e., 45 patients (59.22%) failed in their attempt to stop smoking (P- value ~0.012). The highest success rate obtained when NRT + smart phone application + behavioral interventions were given together.

CONCLUSION: Based on the study results it is concluded that smart phone based behavioral intervention along with nicotine replacement therapy has significant role in smoking cessation.

KEYWORDS

NRT (Nicotine Replacement therapy), FTND, Tobacco smoking, smart phone application intervention, smoking cessation.

INTRODUCTION

Smoking is the world's number one cause of preventable morbidity and mortality. Treatments that include both counselling and pharmacotherapy tend to be the most effective and more aggressive treatments are likely to be more efficient. In the population of those in care or recovery from substance use disorders, smoking is especially prevalent; between 74% and 98% of patients with substance use disorders are also smokers.¹ Several pharmacological treatments are available to help cease smoking. The Food and Drug Administration have approved seven drugs for this reason: five nicotine replacement therapies, bupropion, and varenicline. Additionally, the antihypertensive clonidine and the tricyclic antidepressant nortriptyline sometimes used as second-line smoking cessation agents but their use is not FDA approved for this indication.¹

Tobacco use is one of the primary danger factors for some, constant sicknesses including malignant growth, lung infections, and cardiovascular illnesses, making it one of the biggest preventable reasons for sudden death and illness over the world. The harmfulness of tobacco smoke is because of the inward breath of around 4000 synthetic compounds including 50-60 carcinogens.² Nicotine is a ganglionic cholinergic-receptor agonist that works on receptors in the brain and other organs; GH, prolactin, vasopressin, adrenocorticotrophic hormone and cortisol are all activated by nicotine, and also presynaptic ally improves neurotransmitter releases. Nicotine addiction caused by smoking cigarettes or using other tobacco products. Most smokers are dependent on nicotine, and the degree of dependency is a predictor of the effects of withdrawal and the severity of treatment required.³

Pharmacotherapy is suitable in patients who find themselves

dependent on nicotine. Nicotine replacement therapy, varenicline, and bupropion are the most commonly available pharmacotherapy choices. Pharmacotherapy aims at reducing the intensity of withdrawal phenomena, and is likely to work by reducing the frequency and/or intensity of smoking urges.⁴

Nicotine Replacement Therapy (NRT) is a smoking cessation aid used to mitigate symptoms of nicotine withdrawal by providing nicotine with a nontobacco, controlled release amount. This is intended to reduce smoking motivation and the symptoms of physiological and psychological withdrawal often experienced during a quit attempt.⁵ Combination nicotine replacement therapy should be recommended for smokers who are unable to quit or who suffer from immunotherapy cravings or withdrawal symptoms.⁶

Bupropion is an antidepressant that has each noradrenergic and dopaminergic activity; It is a susceptible blocker of the neuronal uptake of serotonin and norepinephrine and also inhibits the neuronal reuptake of dopamine to a few extent.⁷

Impact of Smartphone Applications in Smoking Cessation represents one in every of the most effective buys to curb the worldwide public health threat of the tobacco epidemic. Mobile phone applications have delivered health promotion interventions and services successfully like regulation of physical activity, psychological state monitoring, nutrition and diet improvement.⁸ Since SMS interventions were first tested, phone technology has progressed to the purpose where the bulk of smokers possess smartphones, which might be interacted with during a kind of ways not available with traditional mobile phones. Smartphone applications ('apps') are downloadable standalone software programs that do not require clinician input and are

fundamentally different to SMS interventions. Apps are widely used across many spheres, including health education⁹. Apps may be customized to the individual, as an example by adding age, weight and a variety of private preferences to help with goal setting and motivation. Smoking cessation apps (SCAs) offer the promise of improving smoking cessation success by increasing user knowledge, motivation and engagement with existing smoking cessation programs. One smartphone app for smoking cessation helped 30% of its users abstain from smoking for 8 weeks. Because of the high prevalence of smartphone usage, delivering health promotion interventions using smartphone apps could be a promising approach, especially thanks to the proximity to users, cost effectiveness, location independence, possibility of tailoring and providing instant interactive support.¹⁰

One among the key recommendation of the clinical practice guideline Treating Tobacco Use and Dependence is to deliver social support in individual, group or telephone counseling settings. External resources like social support seem promising in helping smokers to quit and might buffer the daily stress smokers experience while quitting. Transportable technology has enormous potential for behavior change. The study aimed to assess the impact of pharmacist delivered smart phone based smoking cessation programs in patients undergoing pharmacotherapy.

METHODOLOGY

This Prospective interventional study conducted in a tertiary care teaching hospital for a period of six months. 152 patients who visited the Stop smoking clinic driven by the Pulmonology Department with an intention to quit the habit of smoking were selected. The technique used to enroll the two patient population here is simple randomization. Patients randomized into two groups based on their ability to deal with smart phones; an intervention group and a control group. 76 patients selected in each group where patients in intervention group assigned for mobile-based intervention involving installation of smoking cessation app. Along with that, telephonic follow-up, quit based SMS services, motivational messages and videos for smoking cessation were sent. The clinical pharmacist managed to provide Behavioral therapy for the control group. A combination with pharmacotherapy given depending on the FTND score of patients. Baseline FTND (Fagerstrom Test for Nicotine Dependence) score of the patients were assessed to determine nicotine dependence. Patients will be re-assessed for FTND (Fagerstrom Test for Nicotine Dependence) score to find their nicotine dependence in every two weeks up to 3 months. Data evaluated using SPSS version 17.0

Inclusion and exclusion criteria predefined based, on which the study population where chosen. Smokers irrespective of the gender above 18 years of age willing to sign the consent selected. Smokers who belong to special population, Psychiatric patients, Smokers under alcohol de-addiction therapy excluded. Samples in the intervention group received instructions through a smoking cessation app along with the pharmacotherapy and behavioral therapy whereas the patients in control group received pharmacotherapy and behavioral therapy. After case identification and verification, demographic data and medical details recorded in the Data Entry Form. (Fig no.1)

RESULT

The purpose of this prospective interventional trial among smokers was to see how effective pharmacist-delivered smart phone-based smoking cessation programs are in patients on medication. The FTND scale used to determine the patient's nicotine addiction. They treated differently depending on their score. During each follow-up, the score evaluated. Out of the 152 patients, 76 are in the intervention group, receiving medication together with counseling and digital assistance, while the remaining 76 are in the control group, receiving only pharmacotherapy. The average age of the subjects in the application group is 28.79, while the control group's average age is 48.68.

The intervention group consisted of young people who had access to digital assistance.

In the total study population of 152 patients, a higher percentage of patients aged 20-29 years (63.2 percent) chosen to use the app, followed by patients aged 30-39 years (27.6%). Only 7.9% of all patients in the 40-49 age group and 1.3 percent of the 50-59 age group have not used the application. Majority in these respective groups belonged to the group, which did not use mobile application. In the population who did not use app, a higher percentage comes under the range >60 years (25.3%).

The educational status of the participants plays a significant influence in the research. 96.1% of the intervention group are literate and has at least a bachelor's degree or diploma; therefore, they selected to use digital aids. The control group has a literacy rate of 60%, whereas the illiteracy rate is 40%.

53.9% of individuals who used the app are employed, whereas 48.68% of those who did not use the app are employed. The importance of employment status is clearly recognized by looking into the unemployed population, with 46.05% of those who did not use the app being elderly, retired from work, and more likely to smoke.

COPD was the most commonly diagnosed condition in the research group, accounting for 13.3% of all cases. COPD followed by coronary artery disease (CAD), which accounted for 7.9% of cases. LRTI is another common problem (4.6%), followed by ACS-NSTEMI (4%).

Only 77.63% (59) of the population in the intervention group used cigarettes, whereas 100% of the population in the control group did. Beedi used by 22.36% (17) of the control group, and no educated younger people picked the more harmful beedi.

23.7% of the participants in the research who used the app smoked for habitual reasons. They could not stop themselves from smoking. This is followed by 22.4% who used it for enjoyment and 22.4% who used it for stress alleviation. Smoking used by 2% of the general population to help them focus on their tasks, whereas 7.9% of the intervention group and 9.3% of the control group smoked to combat loneliness.

Among those who did not utilize the app, 28% smoked on a regular basis, followed by 20% who smoked for stress relief. Tobacco used by 18.7% of the population as a coping mechanism for loneliness.

Headaches were reported by 24.5% of the population as a withdrawal symptom, followed by fatigue by 23.2% and impaired concentration by 15.9 percent. Constipation identified as a withdrawal indication by 13% of the overall population. (see fig. 2)

Not everyone given NRT; some were given behavioral treatment, while others were told to strictly adhere to the cessation app's instructions. Nicotex chewing gum used by 46.1% of the intervention group, while 82.9% of the control group chewed it. Lozenges used by just 15.78% of the intervention group.

In the overall study population, 82.4% (61) of patients in the control group used bupropion to treat withdrawal symptoms, but only 53.9% (41) of patients in the intervention group did.

In the control group, every single patient received counseling by the clinical pharmacist, which was effective. Only those in the intervention group who had a high FTND score got counselling.

In the study, 37 patients (48.7%) loaded the app alone, while 39 patients (51.3%) used other mobile interventions such as calls or SMS in addition to the app.

Throughout the study period, the overall FTND score of the study population showed a significant reduction. A modest rise in the control group when compared to the patients who utilized the mobile app is significant (fig no. 3)

The trial was completed successfully by 46 patients (60.5%) in the intervention group who utilized the smartphone application, while 30 patients (39.5%) in the control group failed to quit smoking.

(See Table 2) Only 31 patients in the control group (40.78%) stopped the habit of smoking successfully, whereas the majority i.e., 45 patients (59.22%) failed to quit smoking. (Figure 4) The study's P-value is 0.012.

DISCUSSION

In spite the fact that smoking has a significant role in causing preventable illness and death among the world's population, quitting this habit can greatly improve life expectancy, lower death rates, and lessen the economic burden imposed by smoking-related health problems. As smoking is the main risk factor of COPD and other diseases, such as cardiovascular disease and cancer, it is important to carry out a study on effective cessation programs.

A study conducted in 152 patients and the criteria for inclusion and exclusion in the protocol used to support their selection. Patients then grouped in two with 76 in each group, of which a group asked to install a smoking cessation application on the mobile phone and initiate a proper smoking cessation following structured recommendations.

Upon categorizing the population based on age, majority of the subjects grouped to use the mobile application belonged to the age of 20 to 39 followed by 30 to 39. Most of the subjects who do not use the application belonged to the age group above 40 years.

Subjects randomized based on their knowledge in technical application. Aged subjects chosen to undergo behavioral therapy and NRT. This is the reason for the increased year of smoking as well as pack year in the without app group.

Subjects belonging to the first group are literate where as the majority in the group using no mobile application are illiterate.

Patient follow-ups conducted six times during the study period and the FTND scores recorded to assess the success rate. A significant decrease in the FTND score observed from the first day of visit and the marked decline of the score in with app group is notable.

Among the tobacco smokers, use of local beedi have significantly decreased and the total population started depending on comparatively less toxic cigarettes.

COPD is the most common diagnosed disease condition observed in the entire study population.

RP Young et al 2009 study stated that COPD was the most prevalent disease among smokers.¹¹

In our study, 13.2% of the total study population were suffering from COPD and the majority of them found to be geriatric patients. In general, these patients have a stronger addiction to nicotine than normal smokers do, which makes it impossible for them to quit. These patients need intensive therapy. COPD patients were found to have higher scores than normal smokers upon review of FTND scores. A combination of nicotine gum and bupropion is required for COPD patients along with some other form of nicotine replacement therapy such as nicotine gum, patch, etc.

The 2017 study by Koel Ghorai et al reported that researchers could capitalize on mobile technology to design successful health applications with the rise in the number of mobile phone users.¹²

Majority among the subjects found smoking as a habit that they cannot get rid of, some used it for entertainment and some as a stress reliever.

The subjects who did not use mobile application used nicotine replacement therapy more than the other group. Elif Yilmazel Ucar et al 2014 research reported that nicotine replacement therapies were more effective at fostering abstinence than other pharmacologic therapies. It is clear from our research that NRT is highly successful in encouraging abstinence.¹³

An overall comparison among the two groups stated that the subjects who used mobile application have the highest success rate of 60.5% followed by the subjects who used other means of cessation program i.e., 40%.

Our research began before COVID19, but the majority of the samples were collected during the pandemic, which necessitated a different approach than routine sample collection.

During the lockdown, most of the subjects were unable to obtain tobacco products, which had an indirect effect on smoking cessation. This might also be viewed as a limitation of our research.

The FTND score of population under intervention group declines to a mean value of 0.64 whereas it only reached to 1.18 in the control group. Both the decline in graph is significant when the percent of decline taken into consideration. The best method for smoking cessation suggested as per the study is a combination of behavioral therapy and app installation along with Nicotine replacement therapy as and when required.

CONCLUSION

The present study conducted to find the impact of pharmacist delivered smart phone based smoking cessation programs in patients undergoing pharmacotherapy in a stop smoking clinic of tertiary care teaching hospital. The study stated that usage of mobile phone application along with nicotine replacement therapy and behavioral therapy is the most effective method in smoking cessation. 46 patients out of the 76 who used the mobile application successfully stopped smoking.

TABLES AND FIGURES

Fig no.1 Methodology

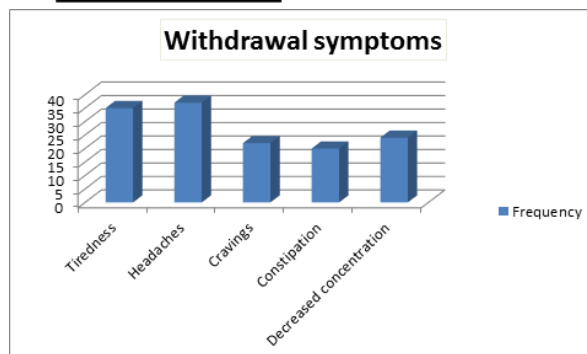
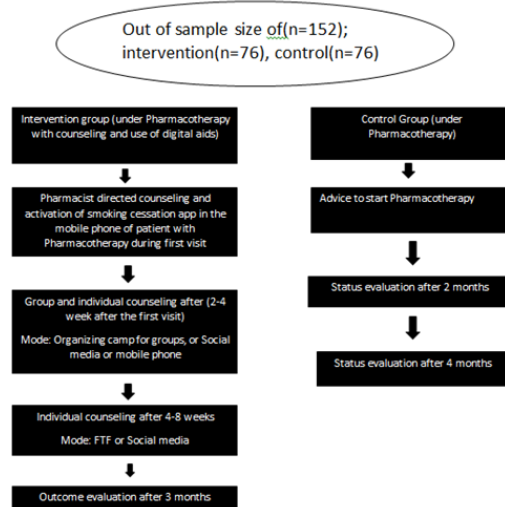


Figure No: 2 Categorization of population based on the withdrawal symptoms

Table No: 1 Categorization of population based on FTND scores

Variables	Mean	
	With app	Without app
FTND1	3.13	6.04
FTND2	2.45	4.61
FTND3	1.68	3.31
FTND4	1.54	2.75
FTND5	0.99	1.53
FTND6	0.64	1.18

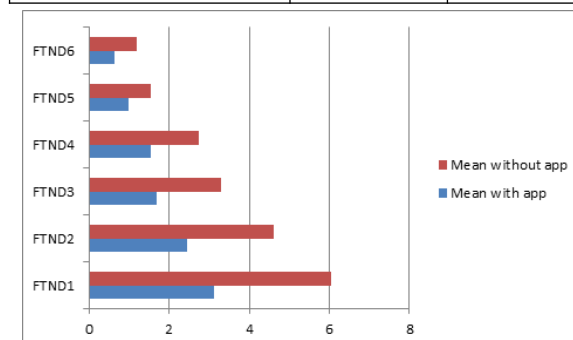
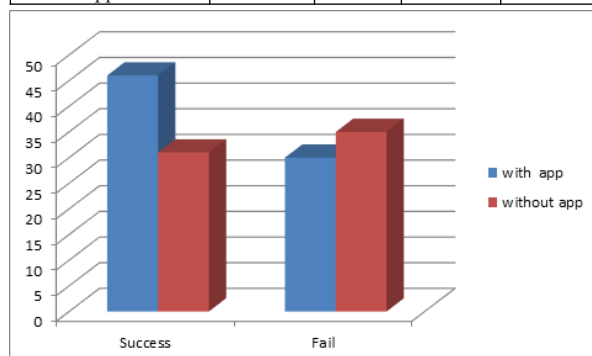


Figure No: 3 Categorization of population based on FTND scores

Table No: 2 Categorization based on effectiveness of the study

Intervention	Success		Fail	
	With app	Without app	With app	Without app
With app	60.50%	46	39.50%	30
Without app	40.78%	31	59.22%	45

**Figure No: 4 Categorization based on effectiveness of the study**

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