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Applying Transtheoratical Model and Stages of Change, Regarding Tobacco Cessation, Among Students, University of Elimam Elmahdi, Sudan 2011-2014

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Abstract

Tobacco is the single greatest preventable cause of death in the world today, killing up to half the people who use it. The TTM has been successfully applied to many health behaviors including tobacco cessation in various settings including universities and schools. The study aim to assess the role of health education regarding tobacco cessation: Applying Transtheoratical Model and Stages of change. The study conducted in Elimam Elmahdi University which located in White Nile State, Sudan. A case control study was conducted. (n=174) students for interventional group and (n=156) for control group. A pre and post tested constructed questionnaires were distributed to respondents, with follow up of 3 years from 2011-2014. Data analyzed with statistical package for social sciences, statistical t test for paired samples was used for the significant. A (P value of 0.05 or less) was considered statistically significant. The transtheoratical model and stages, precontemplation, contemplation, preparation action and maintenance were examined. Significant and different relationships between case and control groups were found (6.3%) of students from intervention group successfully maintained stopped tobacco usage with no change in control group. (3.5%) of targets from intervention group increased in action stage compared with (1.9%) in control group, (23.8%) increased in preparation stage compared with (4.5%)in control group, (27.1%) decreased in contemplation stage in intervention group compared with (3.8%) in control group and decreased of (7.5%) in precont emplation stage in intervention group compared with (2.6%) in control group.

Keywords

Cessation, Change, Model, Nicotine, Prevalence, Stages, Transtheoratical, Tobacco

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1. Introduction and Background

Tobacco is the only legal drug that kills many of its users when used exactly as intended by manufacturers. Tobacco use was defined as self or family reported tobacco smoking, chewing or taking tobacco through the nose. The use of tobacco dates back to at least 5000 years in the Americas, and, by the 1700s, had spread throughout the world [1, 2]. Tobacco products can contain up to 4000 chemicals, 200 of which are deadly and 60 of which can cause cancer. Nicotine is the addictive compound in tobacco; several studies have found that nicotine to be addictive in ways similar to heroin, cocaine, and alcohol [3]. Tobacco is most often smoked, usually in the form of cigarettes, cigars, or in pipes Snuff, Tokomak, water-pipe usually called a hookah, argyle (near-gee-led), or shisha [4]. Researchers suggest that tobacco use is often initiated during adolescence [5]. The world health organization mentioned that in 2015, over 1.1 billion people

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smoked tobacco. Far more males than females smoked tobacco. Although it is declining worldwide and in many countries, the prevalence of tobacco smoking appears to be increasing in the WHO Eastern Mediterranean Region and the African Region [1]. WHO has estimated that tobacco use (smoking and smokeless) is currently responsible for the death of about six million people across the world each year with many of these deaths occurring prematurely? This total includes about 600,000 people are also estimated to die from the effects of second-hand smoke. Although often associated with ill-health, disability and death from no communicable chronic diseases, tobacco smoking is also associated with an increased risk of death from communicable diseases [1]. This is an overview of the Transtheoretical Model of Change, which has been the basis for developing effective interventions to promote health behavior change [7, 11, 12]. The Transtheoretical Model is an integrative model of behavior change [9, 13, 14]. The model describes how people modify a problem behavior or acquire a positive behavior. The central organizing construct of the model is the Stages of change [12]. The model also includes a series of independent variables, the processes of change, and a series of outcome measures, including the decisional balance and the temptation scales [9, 14]. The Processes of change are ten cognitive and behavior activities that facilitate change [7, 8, 10, 13]. The Transtheoretical Model construes change as a process involving progress through a series of five stages. Precontemplation is the stage in which people are not intending to take action in the foreseeable future, usually measured as the next six months. People may be in this stage because they are uninformed or under-informed about the consequences of their behavior. Or they may have tried to change a number of times and become demoralized about their ability to change. Both groups tend to avoid reading, talking or thinking about their high risk behaviors. They are often characterized in other theories as resistant or unmotivated or as not ready for health promotion programs [7, 15]. The fact is traditional health promotion programs are often not designed for such individuals and are not matched to their needs. Contemplation is the stage in which people are intending to change in the next six months. They are more aware of the pros of changing but are also acutely aware of the cons. This balance between the costs and benefits of changing can produce profound ambivalence that can keep people stuck in this stage for long periods of time. We often characterize this phenomenon as chronic contemplation or behavioral procrastination. These people are also not ready for traditional action oriented programs. Preparation is the stage in which people are intending to take action in the immediate future, usually measured as the next month. They have typically taken some significant action in the past year. These individuals have a plan of action, such as joining a health education class, consulting a counselor, talking to their physician, buying a self-help book or relying on a self-change approach. These are the people that should be recruited for action- oriented smoking cessation, weight loss, or exercise programs [8, 11]. Action is the stage in which people have made specific overt modifications in their life-styles within the past six months. Since action is observable, behavior change often has been equated with action. But in the Transtheoretical Model, Action is only one of five stages [9, 14]. The Action stage is also the stage where vigilance against relapse is critical. Maintenance is the stage in which people are working to prevent relapse but they do not apply change processes as frequently as do people in action. They are less tempted to relapse and increasingly more confident that they can continue their change [7, 8].

2. Methods

2.1. Study Design

The design was an interventional case control trail study, representative sample of students in Elimam Elmahdi University [16], which located in White Nile State, Sudan [17, 18, 19]. Conducted monthly between October 2011 and September 2014, with a minimum follow up of 12 months. To measure the role of health education regarding tobacco cessation: Applying Transtheoretical Model and Stages of change. The study compared the cessation rate and the progression in cessation stage according to the trastheoratical model stages of change, precontemplation, contemplation, preparation, action and maintenance stages [13, 15] within the case and control groups, The intervention group was subjected to health education activities for one year from November 2011 to December 2013. Health education tools & a method has been bravely applied as follow; individual face to face counselling (5 minutes), brief interventions typically involved an assessment of tobacco use, status, dependence, and motivation to quit; advice on the benefits and methods of quitting; and assistance with quitting, Self-help non interactive approach, mobile call and Mobile short messages (SMS), this approach used to delivers support or counselling by mobile rather than through face-to-face encounters, lectures and seminars methods delivered by trained Islamic studies teachers presenting the rule of Islam towards tobacco used in a brief intervention, a trained health care (nurse) and other trained provider (e.g., teachers, law enforcement official and religious preachers) identified tobacco users and advised them about the consequences of tobacco used and the steps they can take to quit and how to cope with nicotine withdrawal symptoms.

2.2. Study Population

The study covered all students whom registered in Elimam

Elmahdi University during the academic year 2011/2012, the total numbers them were (5656) students [16, 28], the study cover all students who achieved these inclusion criteria's, (male students registered in (first, second & third classes), currently using tobacco or quite for less than six months, voluntary agreed to be part of the study and able to participate in intervention phases, 330 students were achieved the above criteria's of eligibility chosen as a study targets, divided into two groups case (n=174) and control group (n=156) the two groups truckles to assessment of their status of cessation according to the theory phases, (precontemplation, contemplation, preparation, action and maintenance stages) [15], then the case group was subjugated to health education interventions and follow up for 12 months with variety of health education methods (individual face to face counselling (5 minutes), brief interventions typically involved an assessment of tobacco use, status, dependence, and motivation to quit; advice on the benefits and methods of quitting; and assistance with quitting, Self-help non interactive approach, mobile call and Mobile short messages (SMS), this approach used to delivers support or counseling by mobile rather than through face-to-face encounters, lectures and seminars methods delivered by trained Islamic studies teachers presenting the rule of Islam towards tobacco used in a brief intervention, a trained health care (nurse) and other trained provider (e.g., teachers, law enforcement official and religious preachers) identified tobacco users and advised them about the consequences of tobacco used and the steps they can take to quit and how to cope with nicotine withdrawal symptoms).

2.3. Measurement of Effect (Cessation Stages)

A pre questionnaire modified from Global Health Professions Student Survey [20, 21] (GHPSS) (WHO, 2012) and American Academy of Pediatrics (AAP) [22], distributed to respondents to collect primary data about, tobacco users knowledge and attitudes and believes about tobacco different aspects and questions assessing the amount of tobacco used, how long students had been used for, where most of their tobacco was used, tobacco quit attempts, methods used to quit, and information on any tobacco restrictions in their households. Tobacco user's behavior algorithm; Which contained questions to classify tobacco users according to Prochaska & Di Clemente's [23] stages of change model, asking whether participants were seriously considering quitting within the next 6 months, and whether they had quit for at least 24 h within the past year. If they answered yes to planning to quit, they were further questioned as to whether they planned to quit within the next 3–6 months, 1–3 months, or within the next 30 days. Precontemplators were those who answered no to quitting within the next 6 months; contemplators were those planning to quit within the next 1–6 months, or planning to quit within the next 30 days without a recent quit attempt; and those in the preparation stage endorsed plans to quit within the next 30 days and had a recent quit attempt lasting over 24 h [8, 15, 16, 17]. After 12 months of intervention follow up for case group, then the case and control group undergoes for assessment to measuring the progress of cessation rates and to pursuing the transformation of each group through the theory sages of change, to determine the efficacy of health education regarding tobacco cessation.

2.4. Analysis

Data obtained from case and control groups both in pre and post intervention phase were analyzed with statistical package for social sciences version 20, bivariate associations between the use of different cessation stages, and potentially confounding socio-demographic and smoking history variables were assessed with $\chi 2$ tests and one-way analyses of variance (ANOVA)s for categorical and continuous variables, respectively the significant between variables in each groups and between groups were compared by statistical t test for paired samples. (P value of 0.05 or less) was considered statistically significant, levels of significance are denoted as ($P < 0.05$) for multiple comparisons.

3. Result

The respondent students from the case group (n=174) and control group (n=156) the study found that with regard to demographic variables quarter of tobacco usages from intervention and control group their age less than 19 years table 1, the study indicated most of families (78.2%) in intervention group have low family income less than 1000 SDG /Month compared with (59.6%) in control group (Table 2). With regards to kinds of tobacco targets usages the study revealed the majority of students usage cigarette, water pipe and fewer of them used snuff (Figure 1). The study found that health education increased targets knowledge about tobacco different aspects which appear very clearly on intervention group rather than control group (P Value 0.000), which fulfilled the hypotheses that health education increased targets awareness and knowledge regard tobacco, (60.3%) in intervention group pre intervention were knew the health effects of tobacco usage increased to (100%) in intervention group after follow up and intervention compared with (48.7%) in control group pre intervention to (62.8%) (Table 4). The study found that the over half of targets in intervention group pre intervention knew that tobacco increased morbidity and mortality and all of them knew that tobacco increased mortality and morbidity after health education compared with minimum change in control group

(Table 3, 4). The study found that (15.5%) of targets in intervention group pre intervention were in precontemplation stage, (49.5%) in contemplation stage, (22.4%) in preparation stage, (1.7%) in action stage and (10.9%) in maintenance stage, versus (10.9%) precontemplation stage, (45.5%) in contemplation stage, (26.9%) in preparation stage, (1.9%) in action stage and (16.7%) in maintenance stage in control group. After completion of the intervention at one year 12 months of follow up with designed health education program, the study found that there were statistically significant changes in tobacco usage overall between the groups, defined by initial tobacco usage status (95% confidence intervals, P value 0.000) (Figure 2), (6.3%) of successfully interviewed users had maintained stopped tobacco usage (from 10.9% to 17.2%), with no change in control group, (3.5%) increased in action stage compared with (1.9%) in control group (from (1.7%) pre intervention to (5.2%) post intervention in intervention group, (23.8%) increased in preparation stage compared with (4.5%) in control group, (27.1%) decreased in contemplation stage in intervention group compared with (3.8%) in control group and decreased of (7.5%) in precontemplation stage in intervention stage compared with (2.6%) in control group (Figure 2).

Table 1. Distribution of study targets according to their age.

Age groups	Intervention group		Control group		Total	
	count	%	count	%	Count	%
≥19years	64	36.8	55	35.3	119	36.1
≥20-21years	76	43.7	67	42.9	143	43.3
≥22years	34	19.5	34	21.8	68	20.6

With regard to demographic variables the study found that quarter of tobacco usages from intervention and control group their age less than 19 years this confirm with [6, 24] who stated that the average age of beginning smoking is 14.5 years and [25] who mentioned that approximately 90% of smokers begin smoking before the age of 21 years by the age of 11 years one third of children, and by the 16th year, two-thirds of children have experimented with smoking sadly, most of these young people will go on become regular daily smokers by age 18year.

Table 2. Distribution of study targets according to their family's monthly income.

Family monthly income	intervention		Control		Total	
	Count	%	Count	%	Count	%
Less than 500SDG	67	38.5	38	24.4	105	31.8
500>1000SDG	69	39.7	55	35.3	124	37.6
1000≤1500SDG & over	38	21.8	63	40.4	101	30.6
Total	174	100	156	100	330	100

With regard to family monthly incomes most of families (78.2%) in intervention group have low family income less than 1000 SDG /Month compared with (59.6%) in control group, and the majority of targets (89.2%) has low monthly fund less than 200 SDG

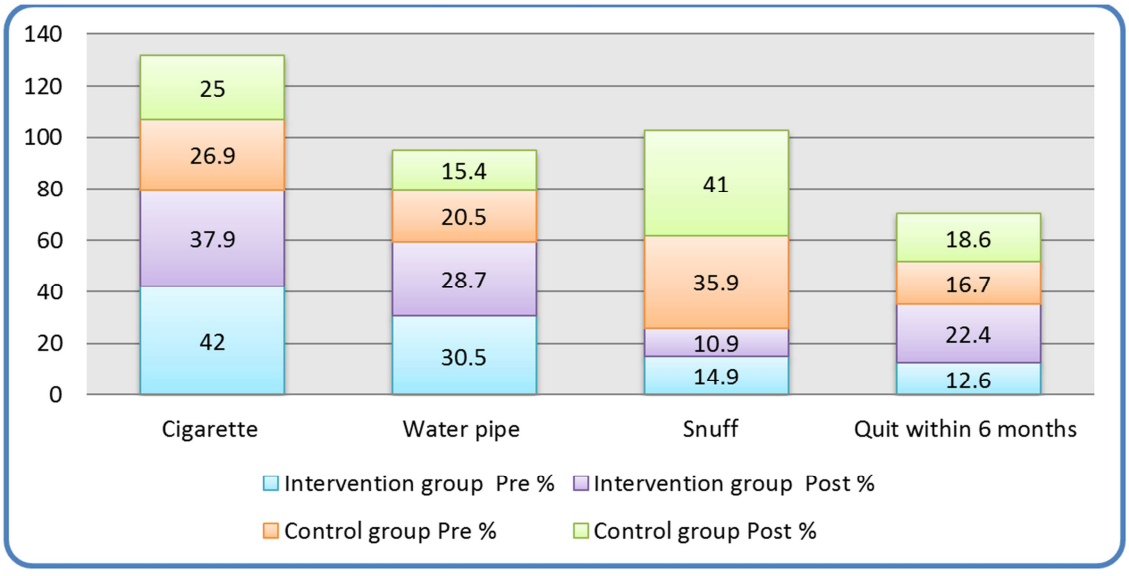

Figure 1. Distribution of study targets according to their types of tobacco usage.

Significant relation found towards types of tobacco usage (P value 0.000), great percentage of targets (42.2%) in intervention group pre intervention usage cigarettes decreased to (37.9%) post intervention, compare with (29.6%) in control decreased to (25%) post intervention, the study revealed the majority of students usage cigarette, water pipe and fewer of them used snuff and quarter of targets (31.6%) were used tobacco for less than six months in intervention group compared with (28.2%) in control group figure P value 0.000.

Table 3. Distribution of study targets according to their knowledge about tobacco harms between intervention& control groups pre and post interventions.

Tobacco harm	intervention				Control			
	Pre		Post		Pre		Post	
	count	%	count	%	count	%	count	%
Yes	105	60.3	174	100	76	48.7	98	62.8
No	47	27.0	0	0	43	27.6	31	19.9
Don't know	22	12.6	0	0	37	23.7	27	27.3
Total	174	100%	174	100%	156	100%	156	100%

P Value 0.000

The study found that health education increased targets knowledge about tobacco different aspects which appear very clearly on intervention group rather than control group (P Value 0.000), which fulfilled the hypotheses that health education increased targets awareness and knowledge regard tobacco, (60.3%) in intervention group pre intervention were knew the health effects of tobacco usage increased to (100%) in intervention group post.

Table 4. Distribution of study targets according to their reasons for usage tobacco, between intervention& control groups pre and post interventions.

Reasons	intervention				Control			
	Pre		Post		Pre		Post	
	count	%	count	%	count	%	count	%
Don't know	25	14.4	25	14.4	26	16.7	23	14.7
Resolve problems	41	23.6	41	23.6	31	19.9	39	25.0
Enjoyment	35	20.1	35	20.1	29	18.6	32	20.5
Modeling	22	12.6	22	12.6	30	19.6	24	15.4
To avoid feeling down	26	14.9	26	14.9	40	25.6	38	24.4
sense of strong	25	14.4	25	14.4	0	0.0	0	0.0
Total	174	100%	174	100%	156	100%	156	100

P Value 0.000

Most of students had stable reasons in intervention group pre and post intervention with small variation in control group pre & post intervention. According to addiction blog there were ten reasons for young people to use tobacco which consist, family attitudes that condone smoking, peer pressure, copycatting what is cool in popular culture socio demographic factors, personality traits, making up for poor social or personal skills, smoking for weight., availability, already using other drugs and stress relief.

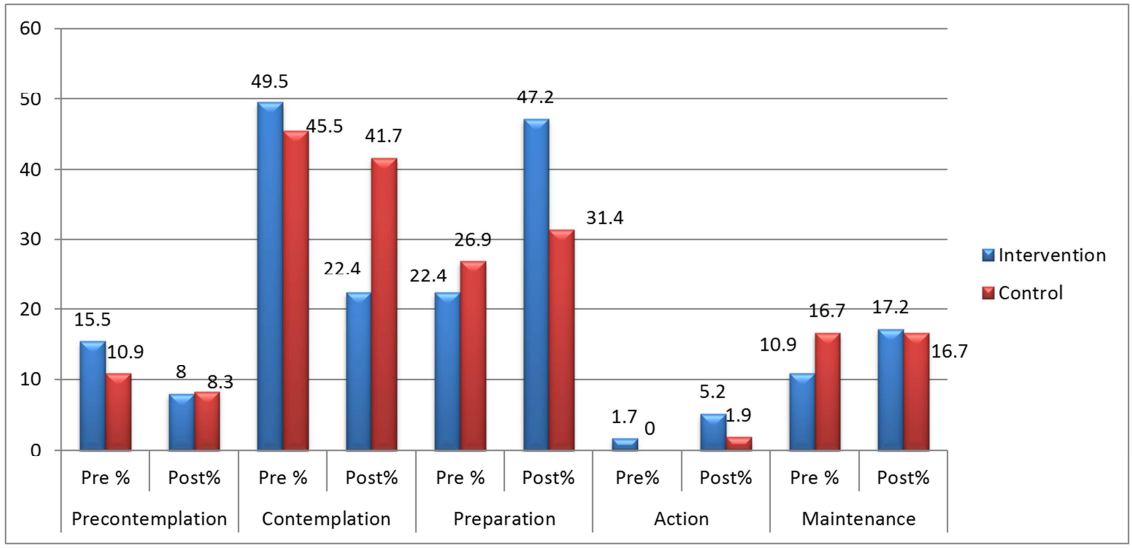

Figure 2. Distribution of study targets according the theories stages, between intervention& control groups pre and post interventions.

There were a significant relation between intervention &control groups pre & post intervention (P value 0.000) that health education increased intention to quit, among the intervention group compared with the control group. The study found that (15.5%) of targets in intervention group pre intervention were in precontemplation stage, (49.5%) in contemplation stage, (22.4%) in preparation stage, (1.7%) in action stage and (10.9%) in maintenance stage, versus (10.9%) precontemplation stage, (45.5%) in contemplation stage, (26.9%) in preparation stage, (1.9%) in action stage and) 16.7%) in maintenance stage in control group. These base data is equivalent to Carlo & et al, 1991 studies who found that (11.3%) of his study targets on the precontemplation stage, (54.2%) on the contemplation stage and (34.5%) on preparation stage, and James & et al, 1993 founding that (12.3%), of respondent on Precontemplation, (57.5%) on the contemplation stage and (30.2%) on Preparation stage and Linda & et al 2003 Found that (26.2%) of targets on the perpetration stage and (65.9%) on contemplation stage. After completion of the intervention at one year 12 months of follow up with designed health education program, the study found that there were statistically significant changes in tobacco usage overall stages between the groups, defined by initial tobacco usage status (95%) confidence intervals, P value 0.000) (figure viii), (6.3%) of successfully interviewed users had maintained stopped tobacco usage (from 10.9% to 17.2%), with no change in control group, (3.5%) increased in action stage compared with (1.9%) in control group (from (1.7%) (pre intervention to 5.2%) post intervention in intervention group, (23.8%) increased in preparation stage compared with (4.5%) in control group, (27.1%) decreased in contemplation stage in intervention group compared with (3.8%) in control group and decreased of (7.5%) in precontemplation stage in intervention stage compared with (2.6%) in control group. These founding similar to the [26, 27] Canga & et al research they found that at the 6-month follow-up, the smoking cessation incidence was (17.0%) in the intervention group compared with (2.3%) in the usual care group, which was (14.7%) difference (95% CI 8.2–21.3%), and similar with Colleen & et al study 2011 who found that, (42.1%) of smokers were in the precontemplation stage and were not intending to quit smoking in the next six months, (40.3%) were in the contemplation stage and were intending to quit in the next six months, and (17.6%) were in the preparation stage and were intending to quit in the next month and had quit for at least 24 hr in the past year. Over the 24 months of the study, (76.3%) of the participants were Stable Smokers, (17%) were Maintainers, and (6.6%) were relapses, according to the above founding the researcher assured that extensive health education program achieve high percentage of quit rate which fulfilled the study hypotheses that there was significant relation between amount of progress students make in their tobacco cessation and the stage they were in at the start of an intervention. Significant relation were found in pros of change (perceived benefits for quit) in pre & post groups (52.9%) to (66.7%) in intervention group compared with (67.9%) to (69.2%) in control group (P value 0.005), (Table 4), it's very clear that increased of targets perceptions of any behavior benefits, and decreased of barriers achieve high rate of any behavior change. There were significant differences between intervention & control group in pre &post intervention toward increased motivation to be tobacco free directly (P value 0.000).

4. Conclusion

This study concluded that significant and different relationships between case and control groups regarding cessation stages reflecting that high cessation rate and the progression towards cessation stage slightly related to health education based program activities.

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