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IRB Proposal
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Title: Effectiveness of a Smoking Cessation Program after a Myocardial Infarction

A. Study Purpose and Rationale

Coronary artery disease is a leading cause of mortality in the United States and smoking is the most preventable risk factor in the development of coronary artery disease[1]. Despite this association smoking continues to extremely prevalent amongst the US population. It is estimated that 23% of men and 18 % of women smoke in the US. These rates are higher amongst populations with lower incomes and educational levels. For example amongst patients living below the poverty line the rate of smoking is 29.1%[1].

It is notoriously difficult to get a person to quit smoking, but there are certain times that a person may be more receptive to smoking cessation. One such time is after a patient suffers a myocardial infarction. After being hospitalized for a myocardial infarction the patient may be more motivated to quit smoking than he or she was prior to the myocardial infarction since their illness is clearly linked to tobacco use. In addition their cardiac event brought them into the health care setting where smoking cessation counseling can be provided. The health benefit for improving smoking cessation would be significant because patients that continue to smoke after a myocardial infarction have a 50% higher risk of recurrent events as compared to nonsmokers[2].

In recognition of this "vulnerable" moment for modification of high risk habits the Agency for Healthcare Research and Quality and Centers for Medicare and Medicaid services have put forth measures that should be followed regarding smoking cessation in patients that have suffered a myocardial infarction[3]. There has been good adherence to these guidelines, but still 60-70% of smokers will continue to smoke after suffering a myocardial[4]. There have been numerous studies that have looked into increasing the cessation rate of smoking amongst patients that have had a myocardial infarction. Many of these studies have shown success especially when the smoking cessation program runs for more than 1 month post discharge[5].

One study showed that in patients that received smoking cessation counseling for 6 months post discharge had a 55% abstinent rate vs 34% in the control group[6].There are several problems with this study and several others that were performed. One, the population was mostly white English speakers and the results may not carry over to a minority/low income population such as the one commonly treated at Columbia Presbyterian Medical Center. In addition the control group in most studies may not be adequate. There is a disparity amongst the control and treatment groups in regard to the amount of contact they have after discharge and therefore the gains seen in the treatment arms may be secondary to just increased contact with a health professional after discharge and not to the smoking cessation counseling. Lastly, many studies including the one mentioned above did not use biochemical testing to confirm that the patients were abstinent from smoking. The importance of this last factor is highlighted by the fact that patients with coronary artery disease have been found more likely to lie about their tobacco use. One study reports that 6.5% of patients with recent ischemic events lied about abstaining from smoking[7].

This study will look at the success of a smoking cessation program in patients that have been admitted to Columbia Presbyterian Medical Center (CPMC) with a diagnosis of a myocardial infarction. This study will differ from previous ones in several important ways. Firstly, the population served by CPMC contains many minorities, non-English speakers, and have a lower income on average. It will be useful to see the effectiveness of a smoking cessation program in this population. Also, this study will be unique in that it will have a control group that meets with the same frequency as the smoking cessation

group, but discuss a different topic. This will help assess whether the smoking cessation counseling is useful or if the improvement is related to just an increased contact with a health care provider. Lastly this study will rely on biochemical testing for evaluation of abstinence from smoking as it has been shown that patients may make false statements regarding their smoking habits.

B. Study Design and Statistical Analysis

This will be a prospective, randomized, controlled trial to evaluate the effectiveness of a smoking cessation program in patients with myocardial infarctions. The study will be a single center study at Columbia University Medical Center. Potential subjects will be patients admitted to CUMC with a diagnosis of either a non ST elevation myocardial infarction (NSTEMI) or a ST elevation myocardial infarction (STEMI). Importantly, patients admitted with a myocardial infarction can initially be quite ill and may be in various locations including the CCU. Approaching subjects at this time would likely not be beneficial. In most cases, once a patient is stabilized and nearing discharge they are transferred to the general cardiology floor (5 Garden South or 5 Garden North). The potential participants would be approached on the day prior to their anticipated date of discharge. Information about dates of discharge and smoking status will be obtained from the charge nurse on each unit.

In order to be included in the study the patients must have been active smokers prior to admission and have a desire to quit smoking after discharge. To assess for active smoking prior to admission the patients will be asked about the quantity and duration of their smoking as well as given the Fagerstrom test for nicotine dependence[8]. Only patients with a score of greater than 4, an indication of nicotine dependence, can be included in the study.

The details of the study will be explained to the patient and if they choose to enroll they will be randomized to either a treatment arm or to the control arm. Randomization will be generated by the Department of Medical Statistics with a blocked method. Participants in the treatment group will receive smoking cessation counseling both prior to discharge as well as multiple follow up sessions after discharge. Participants in the control arm will receive the same smoking cessation counseling prior to discharge and will have follow up sessions after discharge but these follow up sessions will focus on dietary modifications in place of smoking cessation counseling.

Once enrolled baseline information about each participant will be collected. This will include demographic variables, income levels, previous attempts at smoking cessation, smoking history. Information regarding the type of myocardial infarction, the need for CCU level care, and length of total hospital stay will be collected to assess the level of illness in each arm of the study.

The primary outcome of this study will be continuous abstinence from smoking once the patient states that they have quit smoking at 3, 6, 9 and 12 months after discharge. To be classified as continuously abstinent the smokers would have to confirm they are not smoking with either a salivary cotinine (a nicotine metabolite) test or expired carbon monoxide. Salivary cotinine would be the preferred method but could only be used in participants that are not using any nicotine replacement therapy. This is because salivary cotinine can verify smoking in the past 7 days and carbon monoxide verifies for one day. A cotinine concentration of >15ng/ml and an expired air carbon monoxide level of 8-10ppm would indicate tobacco use[9].

In past studies the number of patients that were abstinent from smoking at 1 year after discharge after experiencing a myocardial infarction was 40%[10].In order to reach 80% power with a type I error rate of 0.05 this study will need a sample size of 407 subjects in each arm as calculated using the Chi-squared test. This calculation was done assuming a quit rate of 40% in the control arm and an effect size of 10%. The quite rate of 40% in the control arm is based on a study that revealed that approximately 40% of patients had quit smoking at 1 year after experiencing a myocardial infarction. The effect size of 10% is reasonable because smoking is prevalent in the population and an effect size of

just 10% would mean a significant proportion of patients are at much lower risk of having further cardiac events as well as a multitude of other negative effects smoking has on the body.

Statistical analysis of results of the study will consist of χ^2 analysis for dichotomous baseline variables, and continuous variables will be analyzed with t-tests. Absolute smoking cessation rates will be compared using χ^2 analysis.

C. Study Procedure

Upon enrollment into the study the participants will be randomized to either the control arm or the treatment arm prior to hospital discharge. Prior to discharge both groups would receive counseling for 30 minutes from a designated smoking cessation counselor and receive a copy of "Quit Smoking for Good" which is a brochure from the American heart Association[11].

Once discharged from the hospital the patients in the intervention group will meet with a tobacco cessation counselor for 45 minutes every week for the first month, then every 2 weeks for the following two months, and then monthly till 6 months post discharge. The counseling sessions will have several participants at each meeting. The meetings will focus on behavioral modification training, social support, stimulus control, providing information about pharmacotherapy and nicotine replacement. Both pharmacotherapy and nicotine replacement will be given to participants at no cost. The number of people utilizing pharmacotherapy and nicotine replacement therapy would be recorded.

The control arm would receive the same smoking cessation intervention as the treatment group prior to discharge as mentioned above, but would not receive any additional smoking cessation counseling after discharge. The patients in the control arm would have follow ups of the same duration and at the same frequency as the treatment group. However, these sessions would focus on proper diet and exercise.

The counseling will run only for the first 6 months after discharge from the hospital. The following 6 months will have no counseling sessions. All participants will be assessed for smoking cessation at 3,6, 9 and 12 months post discharge. Any participant reporting that he or she stopped smoking would have a salivary cotinine level assessed or an expired carbon monoxide level checked if they report using nicotine replacement therapy.

D. Study Drugs

- Varenicline (Chantix)
  - It is a partial nicotine agonist approved by the FDA to aid smoking cessation.
  - Standard dosing for adults is 0.5mg once a day for days 1-3, 0.5mg twice a day for days 4-7, and 1mg twice a daily on day 8 and beyond. This medication should be started 1 week before the target quit date.
  - Side effects include: insomnia, headache, abnormal dreams, malaise, sleep disorders, somnolence, nightmares, lethargy, rash, flatulence constipation, abnormal taste, abdominal pain, xerostomia, dyspepsia, vomiting, appetite increased, anorexia, GERD, upper respiratory tract disorder, dyspnea, and rhinorrhea.

- Buproprion (Zyban)
  - It is a dopamine reuptake inhibitor approved by the FDA to aid smoking cessation.
  - Initial dosing is 150mg daily for 3 days, increased to 150mg twice a daily, treatment should continue for 7-12 weeks. Therapy should begin at least 1 week before target quit date.
  - Side effects include: tachycardia, headache, insomnia, dizziness, xerostomia, weight loss, nausea, pharyngitis, palpitations, arrhythmias, chest pain, hypertension, flushing, hypotension, agitation, confusion, anxiety, hostility, nervousness, rash, pruritis, abdominal

pain, diarrhea, flatulence, anorexia, appetite increase, vomiting, constipation, polyuria, urinary urgency, Tremor, myalgia, arthralgia, arthritis, blurred vision, tinnitus, auditory disturbance, URI, and cough.

E. Medical Device.

- Not Applicable

F. Study Questionnaires

- The Fagerstrom test for nicotine dependence

G. Study Subjects

- Inclusion Criteria
  - Patient admitted with NSTEMI or STEMI
  - Current smoker
  - Fagerstrom score >4 (indicates nicotine dependence)
- Exclusion Criteria
  - Cognitive disorders MMSE <24
  - Concurrent illicit substance abuse or alcohol abuse
  - No desire to quit smoking

H. Recruitment of Subjects

- All participants will be recruited from Columbia Presbyterian Medical Center. The potential participant's charts will be reviewed by researcher and if they meet criteria will ask the charge nurse to notify the researcher on the day prior to the anticipated day of discharge. Potential participants will be approached by researcher for consent to participate in the study.
- The patient's primary care physician will be notified of his/her patient's willingness to participate in the study. In order to participate in the study the participant's primary care physician must agree they are suitable for the study.

I. Confidentiality of Study Data

- All of the materials for the study will be stored in a secure manner accessible only to the investigators. A unique code number will be given to each participant when they enroll in the study. The limitations of confidentiality will be in the group sessions conducted by a smoking cessation counselor in the intervention arm or a dietitian in the control arm. The participants will be instructed that they do not have to provide information to other participants unless they desire to do so. In addition the smoking cessation counselors and the diet and exercise counselors will not know the details of the medical histories of the participants.

J. Potential Conflict of Interest

- None

K. Location of the Study

- The study will be performed in both inpatient cardiac units as well as meeting rooms on the CUMC campus for follow-up smoking cessation meetings.

L. Potential Risks

- The only risks would be the side effects associated with the smoking pharmacotherapy mentioned above.

M. Potential Benefits

- There may or may not be improvement in the participants health at the end of the study. If the patients in either arm abstain from smoking they will be greatly improve their overall health and decrease their risks of all tobacco related illnesses. In addition the participants in the control arm may benefit from both the single smoking cessation session they receive in the hospital prior to discharge and from their dietary counseling during follow up sessions.

N. Alternative Therapies

- The participants in the treatment arm will have access to all of the available smoking cessation tools and will have counseling specifically geared towards proper use of these tools. The participants in the control arm will be allowed to use any smoking cessation tools they choose but will not receive counseling on these topics beyond for the pre discharge counseling.

0. Compensation to Subjects

- Subjects will be compensated for travel expenses for travel to and from follow up meetings in the form of a check.

P. Costs to Subjects

- There will be no cost to the study subjects in this study. Participants in the treatment arm will receive nicotine replacement therapy and/or pharmacotherapy to assist smoking cessation for free if they choose to utilize these options to assist in smoking cessation.

Q. Minors as Research Subjects

- Not applicable

R. Radiation or Radioactive Substances

- Not Applicable

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