ABSTRACT

Purpose: Compare the relative effectiveness of two smoking interventions by the occupational health nursing practitioner in a South African workplace.

Literature: Sickness model of nursing health promotion efforts, using nurse-dominated information-giving education, produces poor results compared with a Wellness model characterised by an individualised, client-dominated counselling approach.

Methods: A quasi-experimental study was conducted at a chemical manufacturing organisation over eight months. The convenience sample of 33 participants was equally assigned to Group I (control), Group 2 (Sickness model intervention) and Group 3 (Wellness model intervention). Cigarette smoking reduction was measured by self-report and cessation by serum cotinine tests.

Results: There was significant improvement in reduction and limited success regarding cessation in Group 3. Group 2 showed minimal improvement, whilst there was none in the control.

Conclusions: Further research using a Wellness model, with a larger sample size and over a longer period should be conducted, as the approach shows promise.

INTRODUCTION

By 1990, South Africa had a 34% prevalence of smoking and there were 25 000 tobacco-related deaths annually. Smoking results in significant ill-health and death in the long-term, and its adverse effects can be compounded by exposure to a variety of agents in the workplace. Since employees are valuable resources, it follows that employers should assist them to protect their health by addressing smoking behaviour. They also have a legal responsibility to control smoking in the workplace. To this end, occupational health practitioners offer a range of smoking cessation interventions, frequently with a low rate of success. Given the potential for wasted resources, there is a great need to develop effective smoking cessation programmes.

LITERATURE REVIEW

Understanding smoking behaviour

Smoking often starts in the adolescent years as a tool to gain acceptance, and then continues into the adult years because of enjoyment and as a coping tool to deal with stress, anxiety, fear and anger. Consequently, the psychological factors that contribute to an individual’s decision to initiate smoking tend not to be the factors that maintain it.

Nicotine produces euphoric effects in the brain, and induces relaxation, reduction of stress, mood modulation, and higher vigilance. However, when consumption is reduced smokers experience nervousness, restlessness, irritability, anxiety, and difficulty in concentration and cognition, as a result of its addictive effects. So, although nicotine can assist with stress relief its absence can cause significant stress.

Smoking cessation programmes

Clearly, smoking is a three-sided problem that includes psychosocial factors (especially stress), learned behavior (habit) and addiction to nicotine. Therefore, effective smoking cessation programmes should address these aspects through the incorporation of stress management skills and problem-solving techniques to cope with the psychological stressors, the recognition and management of habits associated with tobacco use and the techniques to deal with the addictive component. These programmes are essentially health promotion programmes, and should be founded upon the principles of health promotion. McDonald recommends empowering smokers with the tools of knowledge and information to the point of realisation that smoking cessation is more gainful than continuance. Specific techniques, methods and resources follow.

Practical counselling

Cognitive behaviour techniques and social skills training are essential. They should target the factors that maintain the smoking, as identified by the smoker, especially problem-solving and stress management issues. They should also enable individuals to identify cues for smoking and develop methods and alternate skills to break their link with smoking. The counsellor should enhance self-efficacy by providing information and assisting them to develop an individualised plan for dealing with the effects of stopping which concern them. Repeated encouragement is essential, and Fiore et al. state that “there is a strong dose-response relationship between the intensity of tobacco dependence counseling and its effectiveness. Treatments involving
person-to-person contact (by individual, group, or proactive telephone counselling) are consistently effective, and their effectiveness increases with treatment intensity (ie, minutes of contact)" (Guideline No. 6)

While it is essential that health practitioners, including doctors and nurses, are properly trained in counselling skills and behaviour change theories

Social support
The provision of social support to address the addictive aspect of smoking enhances the success. Peer and family influence and positive reward are important in sustaining efforts. Support can comprise self-help groups, telephone help-lines and a buddy system.

Self-help materials
These include written leaflets and manuals, audiotapes, videotapes, websites and interactive computer programmes. Used in conjunction with other interventions, they enhance motivation and skills.

Nicotine replacement therapy
This has variable success, appearing to work best when combined with intensive individual therapy and is most needed by strongly addicted individuals.

Smoking policies
Restrictive smoking policies in the workplace seem to reduce smoking rather than stop it.

Determinants of success
Programmes should include multiple methods, techniques and resources, as success rates appear to increase with such comprehensive worksite approaches. There is no doubt that cessation success is greater amongst people who desire to stop. However, knowledge of the long-term health effects alone is usually insufficient to motivate people to stop the behaviour. Health information on its own is ineffective. Unfortunately, increased severity of nicotine dependence is associated with lower abstinence rates. Most smokers experience failed attempts at quitting, which can demoralise them. The recognition that smoking is a chronic, long-term health problem and a review of the reasons for failure of previous attempts in order to learn from them, can counteract such feelings.

Use of models in programmes
It is important to use a theory or model as a framework to plan the health information, skills training and activities to be incorporated in the health promotion programmes. Macleod Clark maintains that the model of nursing upon which health promotion programmes are founded can determine their success. Traditionally, nursing practice has been largely determined by the 'sick nursing' model. Such nursing is...
characterised by client passivity and dependency, health professional ownership of expertise and decision-making and focuses on care and cure. The communication tends to involve mainly closed questions, dominance of nurse-talk over client-talk, and a lack of listening re-inforcement and involvement of the client. The interactions are nurse dominating, a generalised approach rather than one that is specific to the situation or needs of the client, prescriptive and directive with didactic health information, reassurance or advice-giving.

Recognising that this is ineffective, a 'health nursing' or wellness model is advocated, which is based on the principles of health promotion. It acknowledges that each individual's need for care is different and whenever possible, clients should be involved in decision-making and participate in their own care. It focuses on maximising their potential for health and independence, and builds on their existing knowledge and experience helping them to become more autonomous and empowering them to take responsibility for their own health. In short, it is a counselling approach as opposed to standardised information and advice giving.

Rowe and Macleod Clark\textsuperscript{15} conducted a successful individualised smoking cessation programme with patients in a coronary care unit, using a framework that incorporated the Wellness nursing model\textsuperscript{15}, and included a number of the methods and techniques mentioned above that were consistent with the framework and model.

**PURPOSE**

In view of Macleod Clark’s\textsuperscript{14} assertion that success is related to the type of model, it was decided to carry out a study in a South African workplace that would investigate the accuracy of this statement. Therefore, the purpose was to compare the relative effectiveness of a smoking intervention based on either a Sickness or Wellness nursing model, implemented by an occupational health nursing practitioner (OHNP) in a South African workplace, in terms of:

1. reduction in cigarette smoking; and
2. smoking cessation.

The study was also used as a vehicle to teach B.Tech.: Occupational Health Nursing degree students how to conduct research.

**METHODOLOGY**

A quasi-experimental design was used for the nine-month study, which was conducted in a chemical manufacturing organisation in Durban. It had 440 employees, consisting of 390 males and 50 females (office workers). Most had less than 12 years of formal education but all were literate. There was a work-site occupational health service provided by one of the students. A smoking policy existed.

**Population**

As most employees were male, females were excluded from the study to have a relatively homogenous group. Smokers were operationally defined as people who smoked at least 5 cigarettes a day. Using these criteria, 156 full-time adult male employees were identified as the population of interest.

**Sampling strategy**

Employees meeting the above inclusion criteria were asked to volunteer for the study. Since the control group would not receive an intervention, it was unethical to allocate participants who wished to quit smoking to this group. Eleven indicated no desire to stop and these formed the control group. A further 22, who wished to quit were identified and randomly assigned to the two intervention groups, so that there were eleven in each group. This resulted in a convenience sample of 33 people.

**Ethical considerations**

Management and unions gave permission for the study and employees participated in the study, having given an informed consent. There was no coercion. Potential risks of harm were prevented by following safety guidelines for taking blood specimens and ensuring confidentiality.

**Interventions**

The interventions were implemented over eight months. Students assisted with these, having first received training in counselling.

**Control – Group 1**

This group did not receive an intervention. At the first contact, they completed a smoking cessation questionnaire and underwent a health assessment. It was ascertained that they had no desire to cease smoking.

**Sickness model of nursing intervention – Group 2**

At the first contact, this group completed the smoking cessation questionnaire, underwent a health assessment and their motivation to stop smoking was determined. They then received an intervention based on the Sickness model of nursing, in the form of a health information-giving session on the harmful effects of smoking and how to quit. They were provided with written materials containing quitting tips, strategies for coping with withdrawal symptoms, methods of obtaining support from other people, smoking avoidance activities, snack calorie chart and how to deal with relapses\textsuperscript{16,17}.

**Wellness model of nursing intervention – Group 3**

At the first contact, the smoking cessation questionnaire and health assessment were completed. They then received an intervention based on the Wellness model of
nursing. This consisted of a face-to-face counselling session using an interview question guide (adapted from the AHCPR17 questions) to promote participatory nurse-client communication. It involved an individualised assessment of the motivation to stop smoking and the exploration of smoking health beliefs to encourage internalised acceptance of the relationship between smoking and ill-health; the identification of coping strategies for stopping and dealing with withdrawal effects, lessons to be learned from previous quitting attempts to ensure client ownership; and the establishment of a social support system with family, peers and the OHNP researchers. The specific communication skills involved open questions, active listening reinforcement, picking up cues to reinforce client involvement and dominance of client-talk over nurse-talk. The interactions between the nurse and client were collaborative, individualised, negotiated, supportive, and facilitative and involved skills development. The client needed to be active, independent, and take responsibility for own health and decision-making. They were also given the same set of written materials as Group 2.

Further nurse support was provided by face-to-face counselling sessions on at least a monthly basis. The purpose of these encounters was to motivate the client, assess progress, facilitate client-owned solutions and to provide skills training for coping with stress, problem-solving and withdrawal effects. Telephonic or e-mail contact took place at least once between the face-to-face sessions, in order to maintain support. The client was also able to contact the researchers more frequently if so desired. In effect, this provided a help-line.

Data collection
A baseline smoking cessation questionnaire provided information on smoking habits and triggers that maintained smoking. It was developed from a literature review, and was pre-tested and piloted. In addition, a health assessment determined the presence of health problems that indicated the need for quitting.

At monthly unscheduled contacts, participants were questioned on their smoking status.

Smoking cessation: If smoking cessation was indicated, serum for a cotinine test was obtained to validate the self-report. This was to prevent them from abstaining for a short period before the test and thereafter resuming smoking, thus leading to an erroneous recording of smoking cessation. The test measures metabolites of nicotine, and has a sensitivity 94% and specificity of 96.1%. Passive smoking does not give a positive result. A result of less than 50 µg/ml indicates smoking abstinence18. Control was maintained by the adherence to required procedures for the collection, storage and delivery of blood samples, and the use of an accredited laboratory for analysis.

Smoking reduction: The daily cigarette consumption was
recorded to identify a change in smoking behaviour.

Control of intervention

Interviews were tape recorded, and student’s documented reports of client interviews. These were checked by the principal researcher to ensure that the interaction style was appropriate to the intervention.

RESULTS AND DISCUSSION

The data was analysed using descriptive and inferential statistics, with the significance level for the latter being \( p < 0.05 \). Results for the whole sample and the groups are reported. The age and number of years of education of the participants is shown in Table 1. There was no significant difference between groups. The number of years that they had smoked and the age at which they had started was similar.

The outcomes of interest were a reduction in the daily number of cigarettes smoked and smoking cessation. The results, eight months after the inception of the study, are shown in Table 2 and Figure 1. Three had ceased, one from Group 2 and two from Group 3. One from Group 2 and nine from Group 3 had reduced their usual daily consumption. There was no change in smoking amongst the members of the control group. When the groups were compared using the Kruskall-Wallis test, there was a significant difference in their smoking behaviour (\( p = 0.00 \)). The difference in behaviour was greatest in Group 3. There was also a significant relationship between the intervention and the degree of smoking behaviour change (Spearman’s \( p = 0.00 \)).

The daily consumption of cigarettes at the start of the study and eight months later is shown in Table 3. There was no significant difference between the groups.

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<th>Table 3. Daily number of cigarettes smoked at the start of the study and after eight months.</th>
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at the start of the study (Kruskall-Wallis test, p = 0.944). However, the groups differed significantly at the end of the study (Kruskall-Wallis, p = 0.011). Notably, there was a reduction in the mean daily consumption from 13.55 to 5.18 in Group 3. When the participants within the groups were compared, a significant difference in consumption was only found amongst Group 3 (Wilcoxon Signed Rank, p = 0.00).

Despite these encouraging findings, the accuracy of self-reported reduction could be questionable and participants may have increased cigarette consumption after the study. Furthermore, the people in the control group were less likely to cease than those in the intervention groups as they had no desire to do so.

CONCLUSION AND RECOMMENDATIONS

The Sickness model intervention had very limited success, whereas the Wellness model intervention was effective in reducing smoking and was reasonably effective in terms of smoking cessation. There is sufficient evidence to warrant further research on Wellness model interventions in the occupational setting, using larger samples and with follow-up conducted over a longer period to check for sustained abstinence.

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REFERENCES