PREADMISSION INFORMATION - DOES IT HELP CARDIAC SURGERY PATIENTS PREPARE?

by

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DECLARATION

I declare that this thesis has been composed by myself and is a record of work performed by myself. It has not been submitted previously for a higher degree.

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ABSTRACT

This study explored the relationship between the level of knowledge, the self reported anxiety and the modification of coronary heart disease risk factors in the waiting time to coronary artery bypass surgery. It was hypothesised that subjects who received a specific educational booklet when put on the waiting list for surgery would report increased knowledge of the procedure and events surrounding surgery, less preoperative anxiety and more risk factor modification behaviours than those subjects who did not receive the booklet.

The sample consisted of two groups, the test group who received the booklet (n=8) and the control group who did not receive the booklet (n=7). Baseline questioning was carried out 3-29 weeks preoperatively when a knowledge questionnaire, anxiety questionnaire and diet questionnaire were administered. The test group were given the information booklet following this initial interview. The second interview was carried out 2-15 days prior to surgery when all three instruments were administered. The third interview was carried out 7-14 weeks following surgery, when the anxiety and diet questionnaires were administered.

Results of the study showed no statistical difference between groups for state anxiety, although at the second interview test group scores decreased while control group scores increased. Knowledge scores improved for both groups at the second interview with the test group making a significant improvement ($p < 0.01$). There was no difference between the group scores. There was no risk factor modification reported by either group.

Due to the small sample size, the hypothesis was not tested. The sample size was determined by a sudden change in waiting time for surgery from 3 months to 1 year and that patients were not taken consecutively from the waiting list. Further difficulty was encountered when the local health board contracted out coronary artery bypass patients in a waiting list initiative, making these patients ineligible for inclusion in the study.

Replication with a larger study sample is recommended.

DEFINITION OF TERMS

1. For the purpose of this study, I will use Meijler's (1983) definitions of the following:

   Coronary artery disease (CAD) is defined as any demonstrable, functional morphological abnormality of the coronary arterial system.

   Coronary heart disease (CHD) is any clinical sign or symptom, or combination of these, due to myocardial ischaemia and coronary insufficiency caused by CAD. Coronary artery disease can be present without CHD.

   The term CHD will be used in most instances in the following text as the subject group of patients awaiting CABS have already exhibited signs and symptoms of CHD.

2. For reasons of clarity, the nurse is referred to as she and the patient or subject is referred to as he within the following text.

CHAPTER 1: INTRODUCTION

Coronary heart disease (CHD) is a major cause of morbidity and mortality in Westernised society. It has been reported that Scottish men and women have the highest CHD mortality rate (The Scottish Office Home & Health Department 1994). Treatment of CHD consists of medical therapy, percutaneous transluminal coronary angioplasty (PTCA) or coronary artery bypass surgery (CABS). Most patients undergoing elective coronary surgery are those for whom optimal medical management has failed.

There were 2327 coronary bypass operations carried out in four Scottish cardiac surgery centres between April 1994 and March 1995, of which 708 (30%) were performed in the Western Infirmary, Glasgow (Private Comunication GGHB 1995). There was a three month waiting time for CABS at the Western Infirmary in 1989. However, since 1990, the waiting time for surgery has been twelve months.

My interest in patients on the waiting list for surgery began when I was employed as rehabilitation sister in the cardiac surgery unit at the above centre. In my role as rehabilitation sister, I first met the patients on admission for their surgery and my responsibilities lay in preparing the patient and his or her family for discharge and convalescence. A commonly stated complaint from the patients was that they had had no contact with the hospital since their referral clinic appointment. A further problem voiced by many patients was that they would have liked to know more of "what to expect" when they were admitted for their operation.

On reviewing the literature on preoperative information for cardiac surgery patients, I found a number of studies testing the usefulness of preoperative information packages given to patients on admission to hospital, and a dearth of information given to patients on the waiting list.

During the waiting period, patients have a great deal of time to minimise or exaggerate their fears about the impending operation. Some patients seek information from family and friends and/or other patients who have had the operation. Patients would appear to have little access to accurate information about their operation and subsequent hospitalisation.

I contacted twenty cardiac surgery centres around the country and found their practice similar to that of the Western Infirmary - there were commercially prepared booklets on heart disease and its treatment available at the clinics, but no standardised information package for patients on the waiting list for cardiac surgery.

OBJECTIVES OF THIS STUDY

Many previous studies have linked increased knowledge to lower preoperative anxiety levels. Patients with lower anxiety levels have been shown to require less analgesia postoperatively and to have shorter postoperative stays in hospital. From the results of these studies it would appear that informed patients fare better than those less well informed, both preoperatively and postoperatively.

The purpose of this study was to answer the following question:
Does giving patients an information booklet in the waiting time to CABS improve their psychological and physical preparation for surgery?

The question was tested by measuring whether giving patients the information booklet resulted in :

1. increased knowledge about reasons for the operation and events surrounding hospital stay, and
2. reduced preoperative anxiety levels

Also of interest was whether patients given the information booklet were found to:

1. exercise more, i.e. walk regularly
2. eat a healthy diet, and
3. stop smoking if currently a smoker

Three instruments were used to measure these parameters, an anxiety questionnaire, a knowledge questionnaire developed for the study, and a food frequency questionnaire. Each of these instruments is described in detail in Chapter 3.

CHAPTER 2 LITERATURE REVIEW

The following review discusses;

1. Coronary Heart Disease - pathophysiology, risk factors related to CHD development, and treatment of the condition. As will be discussed in the review, there are many factors which are considered risk factors in the development and progression of CHD. Many of these factors are inter-related and for this reason a comprehensive overview is made.
2. Patient Education - the nurse's role in patient education, educating the pre-surgical patient, types of teaching, barriers to teaching and teaching tools.

1. CORONARY HEART DISEASE

PATHOPHYSIOLOGY

Disease of the coronary arteries has become the greatest single threat to life in industrial countries throughout the world (Meltzer & Dunning 1985). As the sole supply to the myocardium, any significant interference with blood flow through these vessels can impair the entire function of the myocardium with dire consequences including sudden death.

The primary disease affecting the coronary arteries is atherosclerosis, which takes years to develop. The process begins at an early age (Coronary Prevention Group 1988), so that by adulthood, there is some evidence of the disease in most people.

Although the intact intima is highly resistant to thrombus formation, when injury occurs, even superficially, a sequence of reactions is initiated:-

1. Platelet aggregation
2. Macrophage accumulation
3. Intimal smooth muscle proliferation

4. Fibrous tissue proliferation
5. Lipid accumulation which results in the development of obstructive atheroma.

Repeated intimal injury and cycling of the process lead to continued progression of the atheroma and coronary artery occlusion (Clark 1992). Unstable angina and acute myocardial infarction appear to result from rupture of an atherosclerotic plaque, haemorrhage into the plaque and luminal thrombosis. The cause of plaque rupture is unknown and may result from normal haemodynamic forces when the fibrous cap of an atheroma has become severely attenuated and fragile.

Sudden cardiac death is frequently an unexpected first clinical manifestation of the disease, while its progression, even in patients who present with angina pectoris or acute myocardial infarction is unpredictable. Coronary arteriography gives insight primarily into anatomy and ventricular function existing at a given moment in time, but which lesions are serious and likely to progress are usually unknown, even to the most experienced angiographer (McIntosh 1989).

The incidence of the occurrence of CHD is dependent on 'disturbances' of human culture, primarily including a variety of risk factors such as:-

1. Cigarette smoking
2. Hypertension
3. High cholesterol diet
4. Personality type
5. Environmental/geographical factors
6. Psychosocial factors. (Sokolow, McIlroy & Cheitlin 1990).

Coronary heart disease (CHD) is a multifactorial disease, but based on the pathogenesis of chronic atherosclerosis, the possibility of arrest and reversal of atherosclerosis in some patients is evident (MAAS Investigators 1994).

However, the principal and continuing therapeutic efforts to reduce the occurrence and control the effects of CHD must be directed toward its prevention.

HEALTH PROMOTION

Health promotion has gained increasing attention over the last decade because of growing knowledge of the relationship of lifestyle to health status, the increasing awareness of the limitations of medicine in preventing disease, and the need to contain health care costs. Brubaker (1983) defined health promotion as "health care directed towards high-level wellness through processes that encourage alteration of personal habits or the environment in which people live." (p2) Pender & Pender (1987) described health promotion as activities directed towards sustaining or increasing the level of well-being, self-actualisation and personal fulfilment of a given individual or group. Pender and Pender proposed that the desire for growth, expression of human potential and quality of life motivate individuals towards health promoting behaviours.

Current health promotion strategies toward CHD risk reduction focus on health maintenance for cardiac disease prevention, delay of onset, and early detection and treatment to slow disease progression (Cunningham, Larosa & Becker 1988). These strategies are based on the assumption that, once informed about their risk and with appropriate education, individuals can be motivated to change their behaviour and lifestyle to decrease CHD risk.

Although knowledge is an important part of health promotion, data indicate that knowledge of risk factors has been insufficient to change unhealthy behaviour (Becker & Levine 1987, Epstein & Pyorala 1987, Cunningham,

LaRosa, Hill & Becker 1988). However, Fleetwood & Packa (1991) found subjects with higher CHD risk knowledge practised more health-promoting behaviours.

Because of the complexity of human behaviour and motivation, it is difficult to explain individuals' acquisition and maintenance of health-promoting behaviours. Some information, however, may work to dissuade or mislead individuals from performing risk reducing behaviours. Persons wishing to change their lifestyles may feel obliged to seek outside treatment from an 'expert' because their poor health practices are relegated to the status of disease. When this happens, Strecher, De Vellis, Becher & Rosenstock (1970) state that the responsibility for effective treatment shifts from the client to the therapist.

BEHAVIOURAL CHANGE

Risk factor modification for many people requires a degree of behaviour change and compliance with health promotion advice.

A commonly accepted principle of behavioural counselling is that the patient must be an active participant in any therapeutic process that emphasises self-directed lifestyle modification, beginning with the identification and selection of the target problem (Sirles & Selleck 1989). If agreement on the target problem is not reached, the process of change is frequently undermined at the outset. The interest and willingness of patients to pursue risk factor

modification, especially for risk factor prevention, may rest on a set of questions that has little to do with what may be the 'most significant' risk factor: patients are more likely to ask themselves "what can I succeed in changing? or "what is the least painful (but meaningful) change in lifestyle I can make?". Levencron & Greenland (1988) studied a group of 241 patients presenting at the Strong Heart Program, a CAD risk-factor intervention clinic which assesses and advises both self-referred and physician-referred patients. Typically, the patients did not have any active or acute symptoms for which medical treatment was sought. Risk assessment was based on the American Heart Association RISKO scale (AHA 1981), a validated health risk appraisal instrument, to stratify risk factors and to identify the single risk factor that contributed most to each patient's overall risk of CAD. (The RISKO score is used on adults without known heart disease, and is based on four modifiable CAD risk factors: weight, blood pressure, blood cholesterol level, and use of tobacco). Presumably modification of the greatest single risk factor would lead to the most significant risk reduction. This logical choice may be used to advise patients to undertake lifestyle modification. Patients, having been shown the result of their assessment, were asked to choose their personal priority for risk factor modification. The overall rate of agreement (the degree to which patients' priorities corresponded with RISKO targets) was 63%. This result is striking considering the highly motivated nature of this special patient population - the majority were self-referred patients who actively sought risk factor treatment because of concern about their long-term risks for CAD. Given this population, one might expect a very high rate of agreement for the primary target of change.

Retchin, Wells, Valleron & Albrecht (1992) surveyed more than six thousand persons aged sixteen to fifty years in the United States (US), France and United Kingdom (UK), to determine changes in health attitudes and behaviours over the previous two years. The US sample (n=1940) reported higher red meat and egg intake, but a lower alcohol intake than both the French sample (n=2294) and the UK sample (n=1833). Americans were also significantly more likely to report attitudes accepting personal responsibility for their health and much more likely to endorse the role of health behaviours for decreasing the risk of cardiovascular disease.

Changes in health behaviours over two years were consistently more likely in the US for weight loss, reduced alcohol consumption, decreased red meat and egg consumption and increased exercise. Americans were also more likely to have changed at least three health behaviours in the previous two years ($p<0.002$).

The continuing changes in health behaviours in the US as compared to only modest changes in the UK and France appear to reflect differential declines in mortality rates in CHD.

Risk factors for CAD are additive and interactive (Grundy, Greenland & Herd 1987). The patient who has multiple risk factors may benefit nearly as much from reducing any one of them even when another seems to be more pressing or portent. Thus, as Grundy et al (1987) suggest, the healthcare worker need not necessarily urge the patient to agree with a preselected target for risk factor reduction, provided that the patient expresses willingness to change something.

COMPLIANCE

Much has been written about patients' compliance with or lack of compliance with medical treatment (Dracup & Meleis 1982, Sacket and Snow 1979). Do more informed and educated patients have greater levels of compliance with treatment? Roter (1977) found more information led to increased dissatisfaction with doctor/patient interaction.

Conrad (1985) draws attention to the fact that patients may have their own very good and rational reasons for not obeying doctor's orders. Lately, more attention is being paid to the aspect of negotiation in medical consultations. Compliance, which has been under siege from advocates of patient autonomy no longer applies, being replaced by adherence to a mutually agreed-upon course (Rankin and Duffy 1983).

In this view, both parties have their own ideas about the best course of treatment and it is not taken for granted that information will lead the patient to 'comply' with the medical regime. Redman & Thomas (1985) stress the importance of setting goals and developing the teaching process in cooperation with the patient. The call for patient education comes from two directions: a patient centred one where autonomy is the key word, and a medically centred one where compliance still reigns. Although these two arguments need not be in conflict, they generally are.

One goal of health professionals is to assist individuals and families in achieving physical, mental, social and spiritual wellbeing and quality of life without disease or infirmity (Shortridge & Lee 1980, Walker, Volkan, Sechrist

Pender 1988). Understanding factors that influence individuals' health behaviours is an important part of health promotion. The ultimate goal of health promotion is supporting positive health behaviours as an integral part of one's lifestyle (Pender & Pender 1987, Walker et al 1988). Through the use of existing knowledge concerning determinants of health promoting behaviours, health care providers can implement effective health promotion programmes.

Preventative campaigns generally focus on heart disease as a male problem, yet CHD is one of the major causes of death in women (Willett, Green & Stampfer 1987). If women are targeted it is often in the context of how to reduce their partner's risk, rather than their own. They are, for example, given advice on changing the family's diet, which suggests that women are responsible for reducing risks in the family lifestyle. Women need to be more aware that they are vulnerable to the same risks as their partner and should, therefore, be taking an active responsibility for their own well-being (Willett et al 1987).

The risks associated with the changing role of women in society (increasing numbers of women in the workforce and those heading households) have given rise to speculation that "competing in a man's world" will result in an increase in environmentally induced CHD (Willett et al 1987).

CHD INCIDENCE

Introduction

Coronary Heart Disease is the leading cause of death in UK and other western countries but is only one tenth as common in Japan and is rare in most third world communities. In Scotland, one in nine women and over one

in five men can expect to die of this disease before they are 75 years old (Scottish Office Home and Health Department [SOHHD] 1994). Its incidence appears to be environmentally determined because immigrant groups soon take on the incidence of their host country (Marmot, Syme & Kato 1975) and there have been large changes over time, in mortality from CHD.

Coronary heart disease was uncommon prior to 1925 then rose steadily, except for a dip in Europe in the second world war. Since its 1962 peak in USA, the incidence of CHD has been declining and this trend is occurring in Australia, UK and Western Europe though less rapidly, while in Eastern Europe the incidence is increasing (Trusswell 1985).

The death rate due to CHD in the USA in the late 1960's was second highest to Finland. By the early 1980's the USA was placed eighth among 27 economically developed countries. Only Australia has approached this rate of decline in mortality. The decline in CHD mortality rates in the UK began later than in the USA and Australia and although the UK rate was initially lower than that of the USA and Australia, they now have considerably lower rates than the UK. However, the rate of decline in the UK is now comparable to that in the USA and Australia (WHO Statistics Annual 1989). The decline in the death rate from CHD is not universal and cannot be considered a contemporary "cohort" effort for the human species.

RISK FACTORS FOR CHD

For the purpose of this review, the definition of risk factors is that of the American Heart Association (AHA 1973) which states that risk factors are "characteristics, symptoms or signs present in a person free of disease that are statistically associated with a greater chance of developing a disease".

Extensive work by Rosenman, Brand, Sholtz & Friedman (1976) and Dawber (1980) has established age, sex, cigarette smoking, diabetes, serum cholesterol, hypertension and left ventricular hypertrophy on electrocardiogram as being the major risks in development of the disease while Shea, Ottman, Gabrieli, Stein & Nichols (1984) adds family history and diet to the list.

Modification of Risk Factors

Coronary Heart Disease is a multifactorial disease with many modifiable risk factors in its development and progression. There is evidence to suggest that modification of risk factors through secondary prevention programmes can achieve important reductions in mortality, morbidity and progression of the disease.

Risk factor modification by large segments of society in the USA over the last 25 years has resulted in a striking decline in both the incidence of CHD and the frequency of premature death due to the disease process. Figures from Vital Statistics of the USA, National Center for Health Statistics (1986), show a 30% reduction in age-adjusted death rates from CHD from 1950-1985.

Goldman & Cook (1984) listed factors contributing to the decline in coronary disease in the years from 1968-1976 as medical intervention accounting for 39.5% and lifestyle changes accounting for 54% (reduction in serum cholesterol = 30% and reduction in cigarette smoking = 24%).

Analysis of the data relating lifestyle changes to the decline in the incidence of morbidity from CHD reveals a socioeconomic connection - the more educated have changed their lifestyle more favourably than have the less educated (Pell & Fayerweather 1985, Stamler 1985). In the UK, Shewry, Smith & Tunstall-Pedoe (1992) reported mortality rates to be higher in social class V (unskilled) than in social class I (professional).

The decline in incidence also appears to be as a result of primary prevention due to the efforts by doctors and health-care workers to educate the public about a heart-healthy lifestyle (McIntosh 1989). McIntosh believes that the patient's commitment to lifestyle modification is best acquired before an invasive or operative procedure is performed. Once a procedure is performed, the patient tends to assume that the process has been arrested, whereas the patient must aggressively work to attain a healthy lifestyle.

Through the Nursing Process, nurses may have an important part to play in assisting the patient to identify and plan achievable goals in risk factor modification.

There is now evidence, from the impressive decline in mortality figures in the USA that preventative efforts towards modifying risks do have an impact.

Kannel (1982) states this is due to reduced smoking behaviour, lower consumption of dietary fats and the recognition and treatment of hypertension.

By contrast, Meijler (1983), concludes that the impact of identified risk factor modification has been trivial in coronary prevention. He states that male sex and heredity cannot be manipulated, lowering hypertension, stopping smoking, treatment of diabetes mellitus and weight reduction are reasonable and appropriate measures in patients with or without coronary heart disease. Meijler (1983) also states that a factor should be called a risk factor only if, on elimination of that factor, the incidence of CHD would decrease.

Crouse (1984) suggests it is likely that there are factors that would identify individuals at risk on the basis of thrombosis, genetics or geography and that 'accepted' risk factors for CAD all together may account for less than half of the total risk.

However, for a critical appraisal of the contribution of risk factors to patient care in CHD, one needs to conform to the broad concept as it is generally used and that is - a relation between certain conditions or circumstances and the incidence of CHD. Smoking, high blood pressure, a high total cholesterol and diet are the principal modifiable risk factors.

PRIMARY AND SECONDARY PREVENTION

Primary prevention is directed at healthy people and aims to prevent ill-health arising. It is not merely to prevent illness, but is also concerned with positively improving the quality of health and thus, quality of life (Ewles & Simnett 1985).

Secondary prevention is directed at preventing ill-health moving to a chronic or irreversible stage and involves changing behaviour and learning about self-care and self- help. Health education of the patient is of great importance if his treatment and therapy are to be effective and his illness is not to recur or progress (Ewles & Simnett 1985).

As this study is concerned with those patients who have already developed CHD, the following review of risk factors is mainly based on studies relating to secondary prevention measures.

SMOKING

Introduction

The association of cigarette smoking and heart disease was first reported by the Mayo Clinic in 1940 (English, Willus & Berkson 1940). Evidence that smoking is related to recurrent fatal and non-fatal events in patients with CHD has been documented by Sparrow, Dawber & Colson (1978) who reported mortality of 18.8% in men who gave up smoking after their first coronary event compared to a mortality of 30% in those men who continued to smoke in a six year follow-up study. Reduction of 50% in morbidity and mortality rates in post-myocardial infarction patients who stop smoking has been shown in studies from the US (Coronary Drug Project [CDP] Research Group 1979) and Sweden (Wilhelmsen, Vedin, Elmfeldt, Tibblin & Wilhelmsen 1975). However, these studies were not controlled and those who gave up smoking may have engaged in other risk-reducing behaviour. Smoking cessation rates in myocardial infarction (MI) sufferers have been reported around 50% by Burt, Thornley, Illingsworth, White, Shaw & Turner

(1974) though more recently Coronary Artery Surgery Study investigators (CASS 1983) reported 75% of smokers with CHD continued to smoke after diagnosis and during treatment.

Cardiac effects of cigarette smoking

Smoking causes an increase in heart rate and arterial blood pressure and has a direct effect on myocardial oxygen consumption and coronary perfusion (Pentecost & Shillingford 1964). Smoking may accentuate the atherosclerotic process by inducing endothelial damage, by direct free radical induced changes in the oxidation of low density lipoproteins, and by the excessive catabolism of vitamin C which is one of the principal protectors against free radical damage to a wide variety of molecules (Bolton-Smith, Woodward & Tunstall-Pedoe 1991). Platelet aggregation and vasoconstriction in the presence of coronary atherosclerosis increases the risk of myocardial infarction (Kannel 1981). Smoking is known to induce profound changes in tissues because of the intense free radical load in smoke with the destruction of vitamin E from smokers lungs (Duthie, Arthur & James 1991). Studies of autopsied subjects showed that the finding of atherosclerosis correlated with the smoking pattern of a lifetime. In those who smoked, the incidence of atherosclerosis was much higher than in those who did not smoke and there was a direct graded relationship to the amount smoked (McIntosh 1978, Kannel 1981). Friedman, Pettiti, Bawol & Siegelaub (1981) calculated the relative risk of dying of CHD among persistent smokers is 2.2 times that among those who have stopped. The data were adjusted for major baseline differences in risk characteristics. Kaul, Dogra, Manchanda, Wasir, Rajani & Bhatia (1986) found smoking to be the most frequent risk factor in his study of

young (< forty years) Indian subjects with coronary atherosclerosis on angiography (76% were smokers as opposed to 35% of non-smokers) in a sample group of North Indians.

Meijler (1983) states that cigarette smoking is a major risk factor for CHD and cessation of smoking reduces the risk for CHD, but this is not the only reason the cardiologist will advise his patients to stop smoking. Meijler states, "Even if cigarette smoking should prove not to promote atherosclerosis, smoking should be discouraged in patients with CHD because of its potential for increasing the oxygen consumption of the myocardium" (p16).

Passive Smoking

Several studies have shown passive smoking to be hazardous to health. The Multiple Risk Factor Intervention Trial (MRFIT 1987) which recruited 360,000 men aged 37 - 57 years from 1974-76, showed that CHD incidence and mortality of non-smoking men with wives who smoked to be almost twice that of non-smoking men with wives who did not smoke.

Public vote in 1984 produced legislation in California, USA, requiring employers to provide a smoke free environment for any employee who requests it. Many other designated non-smoking areas - restaurants, hospitals, public buildings and transport systems such as buses, trains and some airline flights have been well received by the public (Martin and Silverman 1986). In the USA, these extraordinary events have taken place without important adverse incidents because of a national movement towards the view that smoking is unacceptable in some social circles. Similar

restrictions on cigarette smoking in public buildings and transport are now commonplace in the UK, with many workplaces such as the new NHS Trusts designating their hospitals and clinics as no smoking areas.

Smoking Prevalence

Over the last two decades, the percentage of smokers over twenty years of age has steadily declined in both male and female populations in the USA (Hulley 1988). A similar trend is to be found in the UK with 31% of males and 29% of females smoking in 1990 Office of Population Censuses and Surveys [OPCS 1991]. Although the overall percentage of smokers is decreasing, there is a rise in the 20-24 year old males and in the 16-24 year old females.

Modification of Smoking Habit

There are no randomised clinical trials of the effect of stopping smoking on the outcome in patients after MI. Observational studies comparing those patients who stopped smoking with those who did not suggest that continuing to smoke is associated with a relative risk of subsequent death of 1.6 to 1.9 (Sparrow and Dawber 1978, Wilhelmsen 1983). The Pooling Project investigators (1978) who studied 6975 white men aged 40-59 years found that though the relative risk of smoking in survivors of MI is less than the value of smoking as a predictor of a first major cardiac event, the potential for preventing MI and death is greater in patients after MI than before. Moreover, stopping smoking may prevent other outcomes such as angina pectoris, congestive heart failure and intermittent claudication (CDP Research Group 1979, Vlietstra, Kronmal, Oberman, Frye & Killip 1986) as well as emphysema and cancer).

Health benefits from stopping smoking are also likely to extend to family members and others in the environment (Fielding 1985, Svensden, Kuller, Martin & Ockene 1987).

Smoking Cessation Strategies

Siegel, Grady, Browner & Hulley (1988) recommend counselling by a physician as an effective method of encouraging patients to stop smoking. Burt, Thornley, Illingsworth, White, Shaw & Turner (1974) found strong advice ('never to smoke again in any form if you wish to give yourself the best chance') was associated with more than twice the number of patients stopping smoking relative to 'conventional advice'. Long-term effect was not discussed in this study.

Many smokers who develop chronic cardiac and pulmonary disease stop after the disease is diagnosed (Burt et al 1974, Pederson 1981). Smokers who do not stop soon after such diagnoses will probably continue to smoke indefinitely, and experience some difficulty in stopping (Pechacek & Danaher 1979, Daughton, Fix, Kass & Patil 1980). Burns (1969) found that stopping smoking may even be more difficult for cardiac or pulmonary patients if they are female, score high on measures of neuroticism or experience marked abstinence symptoms.

Two methods of stopping smoking, health motivation and aversive smoking have been evaluated in a number of studies. Health motivation involves an educational programme with self-monitoring and management techniques, viewing a film on cessation techniques and group discussion and support. Aversive smoking has been shown to produce high cessation rates (Danaher

1977) and involves subjects smoking three cigarettes in the session, driven by taped clues and video feedback, self monitoring, brief relaxation and assertion training.

Hall, Bachman, Henderson, Barstow & Jones (1983) found in their study of 35 smokers with long-standing cardiovascular or pulmonary disease that the health motivation was favoured though a strong difference between the methods for abstinence rate did not occur. They suggest that the health motivation method was more acceptable and smokers were less likely to drop out of treatment. Negative mood states were related to minimal reduction in smoking. However, their sample was small and did not include a control group and as smoking rates are decreasing due to media and social influence, it would have been useful to know the unaided stopping rate in this population. This study had a high proportion (48%) of single subjects and may have been lacking in support for stopping smoking. Social support has been shown to be an important variable in successful stopping (Tongas, Goodkind & Patterson 1979, Sachs 1981).

Burling, Singleton, Bigelow, Baile & Gottleib (1984) report that smokers can relapse one to two days after the cardiac event and that the likelihood of relapse is inversely proportional to the severity of the disease. This finding suggests that patients' perceptions of the seriousness of their condition affects their motivation. Thus, if patients with severe MI's are more likely to stop smoking, the data on mortality rates among smokers may be even more significant.

As previously stated, smoking is one of the three principal modifiable risk factors in the development of CHD, the second for discussion is hypertension.

HYPERTENSION

Introduction

High blood pressure is the most common disease affecting the heart and blood vessels. Tortora & Anagnostakos (1989) suggests that hypertension afflicts 2 out of 5 adults in the US. It is of considerable concern because of its harmful effect on the heart, brain and kidneys if left uncontrolled.

Cardiac Effects of Hypertension

The heart is most affected by hypertension. When blood pressure is high, the heart uses more energy to pump against the increased vascular resistance. Due to the increased effort, the heart muscle thickens and the heart becomes enlarged. Controlling hypertension diminishes myocardial oxygen consumption and therefore may restore the balance between oxygen demand and oxygen supply of the myocardium. Thus, lowering an elevated blood pressure is important in the care of patients with CHD, independent of its potential role as a risk factor for coronary atherosclerosis (Meltzer 1986).

The MRFIT (1982) reported that above normal levels of blood cholesterol and hypertension are both associated with an increased risk of CHD. Coronary heart disease mortality increases progressively in patients with risk factor levels above the twentieth percentile and for those with levels of either risk factor above the eighty-fifth percentile, the relative risk of CHD mortality is about four times that of men in the bottom quartile.

It is important to realise that cholesterol and blood pressure are not appreciably correlated with each other. Thus, each risk factor identifies a separate, large segment of the population that requires intensive treatment.

Barker, Bull, Osmond & Simmonds (1990) have recently proposed that maternal nutrition may be a key to determining the baby's long-term blood pressure. In a retrospective analysis of blood pressures of middle-aged adults, the authors found a close association between the subject's blood pressure and their birth weight and its relationship to their placental weight. Highest blood pressures occurred in men and women who had been small babies with large placentas. These findings were independent of factors such as body mass and alcohol consumption. These findings could signify a total programming of blood pressure from an early age or a susceptibility to CHD. Recent studies have provided evidence of a relationship between sodium intake and a progressive increase in blood pressure with age (Stamler, Rose & Stamler 1989, Elliot, Forrest, Jackson & Yudkin 1988). Increased body weight is closely related to changes in blood pressure in susceptible individuals (Goldstein 1992).

Hypertension is often undiagnosed. Smith, Lee, Crombie & Tunstall-Pedoe (1990) reported that in the mid 1980's half of Scotland's hypertensive cases remained undetected, half of those detected were untreated, and half of the treated cases have blood pressures recorded at the survey clinics which categorised them as persistently hypertensive. The middle-aged Scot has a blood pressure which ranks as one of the highest in the western world (WHO 1988).

Modification of Hypertension

Weight loss is the most powerful factor identified so far for reducing blood pressure (Goldstein 1992, Wing, Jeffrey & Burton 1992). The effect of sodium reduction in patients with hypertension shows that the greater the fall

in sodium intake, the greater the effect on blood pressure (Law, Frost & Wald 1991). Currently, the median intake of 168 mmol/24 hours is ten times the physiological dietary requirement for sodium (Department of Health 1991). James, Ralph & Sanchez-Castillo (1987) estimate that nearly all the salt eaten in Britain is consumed in purchased processed foods.

Drug therapy for treatment of hypertension is most commonly diuretics, beta blockers and angiotensin-converting enzyme (ACE) inhibitors. Following MI, beta blockers have been shown to decrease the risk for death and recurrent MI even in normotensive patients who survive a MI (Furberg & May 1984). Siegel, Grady, Browner & Hulley (1988) suggest that beta blockers may reduce the risk of CHD recurrence through mechanisms other than lowering the blood pressure, possibly by decreasing myocardial oxygen consumption. ACE inhibitors prevent the conversion of the inactive angiotensin I to the powerful vasoconstrictor, angiotensin II.

The third principal modifiable risk factor for CHD is hyperlipidaemia.

HYPERLIPIDAEMIA

Introduction

Fatty acids, triglycerides and cholesterol are insoluble in water, they are transported to body fluids bound to small lipid-protein complexes called lipoproteins. These lipoproteins vary in their relative fat/protein composition, but they all contain triglycerides, phospholipids and cholesterol in addition to protein. In general, the higher the proportion of protein, the higher its density. On this basis, therefore, there are High Density Lipoproteins (HDL), Low Density Lipoproteins (LDL), and Very Low Density Lipoproteins (VLDL). The liver is the primary source of VLDL which transports

triglycerides synthesised and processed in the liver to adipose tissue. The residue of VLDL is converted to LDL which is cholesterol rich. The role of LDL is to transport cholesterol to the peripheral tissues, making it available to the tissue cells for membrane or hormone synthesis and for storage for later use. The LDL also regulates cholesterol synthesis in the tissue cells. The major function of HDL, which is rich in phospholipids and cholesterol, is to transport cholesterol from the peripheral tissues to the liver where it is broken down and becomes part of bile (Tortora & Anagnostakos 1989). Cholesterol is essential for human life. It is found in cell membranes and is the raw material of vitamin D, steroid hormones and bile salts.

It is not enough to simply measure the total cholesterol level, the form in which it is transported in the blood is of major clinical importance. As a rule, lipid profiles revealing high levels of HDL are considered good because the transported cholesterol is destined for degradation. High LDL levels are considered bad as in this case, potentially lethal cholesterol deposits are laid down in the walls of arteries (Marieb 1989).

One in 500 Scots suffers from familial hypercholesterolaemia but nearly one in three of the total Scottish population develop CHD (Tunstall-Pedoe, Smith & Tavendale 1989). The average LDL level in Scottish men and women is high, 75% of adult Scots have total cholesterol levels above the acceptable range (greater than 5.2 mmol/L) and 36% have high levels (greater than 6.5 mmol/L) (Tunstall-Pedoe et al 1989). The first WHO MONICA report (WHO 1988) revealed Scottish men and women to have the highest risk from

elevated cholesterol levels in the Western world. Epidemiological evidence supports the relationship between serum cholesterol and CHD (Marmot 1979).

Modification of Hyperlipidaemia

Diet alone does not appear to show the dramatic effects on plasma lipid levels that diet and drug treatment can achieve. However, as the increase in dietary fat intake, particularly saturated fats over the last thirty years has parallelled the increase in morbidity and mortality from CHD, it is reasonable to assume that reducing saturated fat intake, particularly in those with established CHD, will reduce the risk of future events. Reduction of dietary fat to 35% of total energy intake including 15% saturated fat was recommended by the Committee on Medical Aspects of Food Policy (COMA 1984) and endorsed by the British Cardiac Society. It is estimated that these dietary changes would result in a reduction in the mean serum cholesterol level in the UK population from 5.7mmol/L to 5.2mmol/L. The WHO report (WHO Expert Committee 1982) and the National Advisory Committee on Nutrition Education (NACNE 1983) recommend a reduction in fat to 30% of total energy intake with 10% saturated fat. It is estimated that if these recommendations were adopted, the mean serum cholesterol level in the UK would fall to 4.9mmol/L. The British Cardiac Society's decision appears to reflect the perceived need for pragmatism and consistency in relation to agricultural and food interests in the UK.

The Scandinavian Simvastatin Survival Study (4S Study 1994) randomised 4444 patients with angina or previous MI and serum cholesterol of 5.5-8.0 mmol/L on a lipid-lowering diet to either the cholesterol lowering drug

simvastatin or placebo groups. Compared to the placebo group, the treatment group showed a reduction in serum cholesterol of 25%, and LDL of 35%, and an increase in HDL of 8%.

The authors reported a 42% reduction in the risk of coronary death in their treatment group, with a relative risk of major coronary event such as non-fatal MI, silent MI or resuscitated cardiac arrest of 0.66 in the intervention group ($p < 0.00001$).

The Multicentre Anti-Atheroma Study (MAAS 1994) randomised 381 patients to diet and either simvastatin or placebo for four years. When compared with placebo group, the treatment group showed reductions in serum cholesterol of 23%, and LDL of 31% with an increase in HDL of 9% over four years. Using quantitative angiography to assess changes in coronary artery lesions, the authors reported the trial to show that progression of the disease on a per-patient basis was slowed in the treatment group. Regression of the disease was more frequent and fewer new lesions were found in the treatment group. Although there was no difference in clinical outcome between the groups, the trial authors suggest that regression of disease and prevention of new lesions may have clinical benefit over a longer term.

The 4S and MAAS studies, though very different in design, sample and outcome measures, have both shown that significant reductions in lipid levels is achievable. This may be particularly important since lesions that rupture and lead to thrombotic occlusion are often lipid-rich (Fuster, Badimon & Badimon 1992).

A number of other factors, though not classed as principal risk factors, contribute to the development of CHD. In the following text, these factors are discussed individually and the links between these factors are explored.

DIABETES MELLITUS

Introduction

Diabetes mellitus is a major precursor of atherosclerosis. Because CHD due to atherosclerosis often occurs in the absence of any carbohydrate metabolism abnormality, the combination of the two diseases does not necessarily reflect a cause and effect relationship and there may be other variables that have not been considered.

Non-insulin-dependent diabetes mellitus (NIDDM) is the most common form of diabetes. The accepted UK figure for prevalence of the disease is 1% of the overall population with a sharply increasing prevalence as age increases. As many as 40% of newly diagnosed cases are asymptomatic and are detected incidentally or by routine screening, the true prevalence may be much higher (SOHHD 1994).

Effects of NIDDM in CHD

The main medical importance in NIDDM is the acceleration of CHD. Wong, Pearson & Murchison (1991) and Duncan, Chalmers, Campbell & Jones (1992) report the marked increase in cardiovascular death rate in patients with NIDDM. Duncan et al (1992) also state that CHD is present in around 30% cases prior to NIDDM being diagnosed.

Epidemiological evidence is consistent with both a high fat Western-type diet and physical inactivity playing important roles in the development of NIDDM (West and Kalbfleisch 1971), while Colditz (1992) emphasises the importance of being overweight in the development of the disease.

Modification of NIDDM

Seventy-five percent of people with NIDDM are overweight (Lean, Powrie, Anderson & Garthwaite 1990) and since overweight is the principal correctable factor causing NIDDM, weight loss should be the first aim of treatment. The importance of physical activity in promoting increased insulin sensitivity has been documented in US programmes for the management of NIDDM National Institutes of Health [NIH] (1987). Helmrich, Leung & Paffenbarger (1991) studied the physical activity patterns of almost 6000 males over a 14 year period. The greater the physical activity, the lower the risk of developing NIDDM. Activity helped to limit weight gain over the study period but exercise still had a protective effect on the development of NIDDM even when weight changes were taken into account.

OBESITY

Introduction

Overweight is now the most widespread nutritional disorder in the developed world and although the prevalence in Scotland is relatively low in the European context, just over half the middle-aged men and 45% of women in Scotland are overweight (SOHHD 1994).

Effects of obesity in CHD

Two features characterise a society where a high proportion of adults become overweight: a diet rich in fat combined with low physical activity.

A report on factors influencing long term prognosis in male patients surviving a first coronary attack by Mulcahy, Hickey, Graham, McKenzie (1975) provides a general review of several authors in the field and concludes that obesity clearly is a risk factor but is considered an unimportant contributor to CHD because there is a very weak association of obesity to heart disease when compared with other risk factors. A British Medical Journal (BMJ) editorial (1977) noted that research had found associations between obesity, raised concentrations of triglycerides, insulin and glucose intolerance and higher blood pressure. Thus, obesity was thought to be a common factor explaining the prevalence of raised lipid concentration among hypertensive patients. The BMJ editors suggest that there is a strong case for a synergistic effect among factors which together increase the risk of CHD. This synergism effect was investigated and supported by Thomas, Mann, Beilin & Ledingham (1977) and The Royal College of Physicians (1976) concluded that while obesity as an independent risk factor may be argued, the combined effect and association of the disease with obesity should support a clinical effort to reduce weight in general as a way to reduce the risk of CHD. Some observational studies have found that obesity is an independent risk factor for CHD (Rabkin Mathewson & Hsu 1977, Hubert, Feinleib, McNamara & Costelli 1983), whereas Keys' (1980) study did not support this.

There have been no clinical trials which have studied weight loss as a method of reducing mortality from CHD. However, studies have shown that weight loss is accompanied by a reduction in cardiovascular risk factors such as hypertension, left ventricular hypertrophy, serum cholesterl and serum glucose (Hubert et al 1983, McMahon, Macdonald & Bernstein 1985).

Whether or not obesity is an independent risk factor, weight reduction is an essential part of medical treatment of patients with CHD as excess weight carried by the body requires physical energy that has to be provided by the myocardium and excess weight contributes to hypertension (Braunwald 1980), and increased serum cholesterol levels (Van Itallie 1985).

Modification of obesity

Overweight is related to energy intake exceeding energy output over a period of time. Therefore, weight loss is achieved by reducing energy intake to below that of energy expenditure.

Current dietary reports recommend reducing total fat, saturated fat and sugar, and increasing complex carbohydrates, fresh fruit and vegetables and dietary fibre (NACNE 1983, COMA 1984).

EXERCISE

Introduction

Hickey, Mulcahy, Burke, Graham & Wilson-Davis (1975) also Shephard (1981) report that regular leisure physical exercise is associated with lower blood pressure, serum cholesterol and smoking levels and with less obesity. Whilst disagreement exists about the direct effect of exercise on the primary and secondary prevention of coronary disease, (Holm, Fink, Christman, Reitz & Ashley 1985). Shephard (1981) favours the advisability of regular exercise and physical fitness programmes.

Effects of exercise in CHD

Secondary prevention studies suggest that after MI, patients might benefit from a rehabilitation programme that includes moderate, graduated aerobic

exercise supervised by trained personnel. The data show a statistically significant reduction in mortality with exercise (Vermeulen, Lie & Durrer 1983, Furberg 1984, Shaw 1981,). These findings are consistent with observational studies suggesting that the risk of a first cardiac event is higher in sedentary persons compared with persons who exercise regularly (Morris, Chave, Adam, Sirey, Epstein & Sheehan 1973, Paffenbarger, Wing & Hyde 1981). Exercise in patients after MI may also improve myocardial function, raise the anginal threshold, improve mood and encourage patients to return to work (Shaw 1981, Stern and Cleary 1981, Rechnitzer 1982).

Scottish Office recommendations (SOHHD 1994) for minimum activity levels are three 20-minute periods of moderate exercise weekly ie. brisk walking, swimming, aerobics or keep-fit.

It must be remembered, however, that imposing rigorous exercise routines on those who are overweight often fail because the energy cost of the exercise is high in the overweight and musculoskeletal injuries are common.

FAMILY HISTORY

Introduction

Clinical observations as well as published studies have long supported the concept of family history of CHD being an important consideration in assessing a patient's risk of developing CAD. Family history independent of other risk factors is difficult to quantify. Rissanen and Nikkila (1977, 1979) and Goldstein, Hazzard, Schrott, Bierman & Motulsky (1973) reported that CHD aggregates in families where other risk factors such as hypertension and hypercholesterolaemia aggregate. Other studies reported a risk attributable to family history that is independent of other risk factors (Snowden,

McNamara, Garrison, Feinleib, Kannel & Epstein 1982, Tenkate, Boman, Daiger & Motulsky 1982). Efforts to clarify the role of family history have been limited by several methodological problems. Nearly all studies have relied on clinical diagnosis of angina and MI and not on angiographic data. The effects of confounding factors such as diabetes, serum cholesterol and hypertension have not always been considered (Rose & Marmot 1964, Nora, Lortscher, Spangler, Nora & Kimberling 1980), although it is known that these factors are unequally distributed in the families of patients with and without CAD (Goldstein, Hazzard, Schrott, Bierman & Motulsky 1973, Rissanen & Nikkila 1977). Even when confounding factors have been considered, the risk associated with family history has been calculated as a whole (Rissanen & Nikkila 1979, Snowden et al 1982, Tenkate et al 1982), ignoring the possibly that family history may be of greater importance in some subsets of patients such as those in whom risk factors are absent or mild.

Shea, Ottman, Gabrieli, Stein & Nichols (1984) did however, use angiographic data to establish the existence of CAD and concluded that family history of CHD was indeed a significant independent risk factor. Their study showed that relatives of patients with significant CAD were three times more likely to suffer angina, MI and cardiac death than those relatives of patients in their control group (these patients had no significant CAD). Another finding was that relatives of patients with significant CAD who are at low risk as assessed by the seven established risk factors (AHA 1973), have a higher incidence and earlier age of onset of CHD than do the relatives of patients with significant CAD who are at higher risk. This suggested to the authors the possibility that susceptibility to CAD aggregates in families in the absence of elevated levels of other coronary risk factors.

PSYCHOLOGICAL FACTORS

Introduction

The "coronary-prone" person, with type A behaviour pattern is said to be aggressive, ambitious, highly competitive, possessed with a great sense of the urgency of time and have a significantly higher cholesterol than the type B behaviour pattern who does not have these characteristics (Benner & Wrubel 1989).

In response to certain challenges or threatening situations, two common responses are associated with type A behaviour - increased sympathetic and parasympathetic activity.

While these effects may be seen in any individual exposed to a situation perceived as stressful, it is the extreme or prolonged manner in which type A individuals respond which results in a higher incidence of coronary atherosclerosis (Glass 1977). Type A individuals do not cope as effectively with such stresses as type B individuals. The stress responses are accompanied by swings of hormones (particularly adrenalin and noradrenaline) into the bloodstream which lead to increased fatty deposits in the arteries and cause platelets to clump together and in turn lead to CAD (Trusswell 1985). It has been suggested that these hormone surges become classically conditioned responses to stress cues such as the sight of a classroom or workplace (Wright 1988). In the 1960s and 1970s a body of evidence supported an independent relationship of the type A behaviour pattern to the increased incidence of clinical CHD (Jenkins 1976). The Framingham group who carried out a prospective study, found a positive association between type A behaviour and CHD among men in white-collar occupations (other than

clerical jobs) and in women working outside the home (Haynes, Feinleib & Kannel 1980). These results led a National Heart, Lung and Blood Institute (NHLBI) Review panel (1981) to conclude that the type A behaviour pattern is associated with an increased risk of clinically apparent CHD in employed middle-aged citizens although the panel stated the need for further studies with a broader population base in terms of race, age, socioeconomic status, culture and sex to allow generalisation of findings concerning type A behaviour to the population.

The Belgian-French Pooling Project (1984) also found the association between type A behaviour and CHD with the relative risk of MI and CHD death of 1.6, the association remaining significant after adjustment for age, blood pressure, cigarette smoking and serum cholesterol concentration. However, in the MRFIT trial, CHD incidence was not related to type A behaviour. Early studies linked type A behaviour and CAD (Rosenman 1976, Williams, Haney & Lee 1980) though several angiographic studies found no relationship between type A behaviour and coronary atherosclerosis (Dimsdale, Hackett & Hutter 1979, Krantz, Schaeffer & Davis 1981, Bass & Wade 1982).

Pickering (1984) suggests that the angiographic studies linking CAD and type A behaviour use a biased subject selection - the link is hardly surprising when people who undergo cardiac catheterisation are more likely to have CAD than not. It has been noted that the negative findings of many of the angiographic studies may be due to the small sample sizes of 150 or fewer. If

the effect of type A and CAD relationship is small, larger sample sizes may be required to detect it. If the small magnitude of effect required for this interpretation of the angiographic studies, it calls into question the practical

and clinical importance of global type A as a risk factor for CAD. Costa, Krantz, Blumenthal, Furberg, Rosenman & Shekelle (1987) suggest there may be limitations to the NHLBI review panel's conclusion.

Relating behavioural factors to non-invasive indices of CAD would provide a study population with a much higher proportion of subjects without CAD than the subjects who are selected for angiography. With a more representative balance between subjects with and without disease, there should be a better chance of identifying correlations between behavioural factors and disease.

Hostility

Certain aspects of anger and hostility may qualify as coronary-prone behaviour. Haynes, Fenleib & Kannel (1980) reported that scales measuring absence of outward anger predicted incidence of CHD in both sexes. Patients judged to hold anger in and be high in hostility had greater levels of CAD than those patients judged to directly express anger outwardly (Dembroski, Macdougall, Wiliams, Haney & Blumenthal 1981). Shekelle, Gale, Osfeld & Paul (1983) found low hostility scores to be associated with a lower 10 year incidence of CHD, lower cardiovascular mortality and lower mortality due to causes other than cardiovascular/renal disorders (eg. malignant neoplasms) during a 20 year follow-up.

Given the conflicting reported results, Costa et al (1987) make the following recommendations:

1. Further study to better understand the mechanisms whereby behavioural factors such as type A, hostility and anger expression may be translated into CHD.
2. Adoption of standard psychometric tests to validate the scoring procedures and scales.
3. The distinction between symptoms of disease eg. angina pectoris, and objective signs should be made when psychological and behavioural predictions are used, since occurrence of the former may be due to factors other than atherosclerotic CAD.

Modification of psychological risk factors

Psychological stress is commonly believed to contribute to the development of CHD and has been implicated in the rehabilitation process of patients with CHD (Taylor & Berra 1993). In a meta-analysis of 18 studies on modification of type A behaviour pattern, Nunes, Frank & Kornfeld (1987) found that psychological intervention reduced the number of coronary deaths and repeat MI by 50% over a three year period.

Many rehabilitation programmes teach relaxation skills, reduce coronary-prone behaviour such as anger and hostility, and teach stress coping skills, however, access to these programmes is not available to all patients. Younger, Marsh & Grap (1995) states that mastery of stress is achieved through developing new capabilities, changing the environment and/or re-establishing meaning and purpose in life so that the difficulties can be overcome. Achievement of these then becomes a personal resource for the individual, leading towards "positive living and upward aspirations". When

mastery is not achieved, a state of stress continues and the individual continues to perceive discrepancy between the demands of the environment and his/her resources to meet the demands.

The primary responsibilities of nursing revolve around the individual's responses to health and illness. Therefore, mastery of the stress response is relevant to nurses who are involved with patients experiencing health-related stress. Nursing interventions aimed at reducing the stress that is related to cardiovascular illness include communication strategies such as giving and clarifying factual information, individual and group support, and role modelling.

Social support

The possibility that social support and reduction in stress levels may be key factors in improving survival after myocardial infarction as suggested by Ruberman, Weinblatt, Goldbert & Chandhary (1984) will require further test with an experimental design. Various groups providing social support for heart disease victims may provide an opportunity to test whether enhanced social support reduces morbidity and mortality after a heart attack.

ENVIRONMENTAL FACTORS

British mortality data analysed by social class have shown a change from a direct to an inverse association of social class with coronary heart disease mortality during the past 20 years (Rose & Marmot 1981, Smith, Kenicer, Tunstall-Pedoe, Clark & Crombie 1990). In a prospective study of civil servants in Whitehall, Marmot (1983) found that the lower the grade of employment, the higher the mean blood pressure and the greater the prevalence of smoking, obesity and low physical activity. Over a 10 year

period, there was a two to threefold gradient in CHD mortality by socioeconomic level which could not be entirely explained by differences in CHD risk factors or by use of medical services. The reasons for these large differences in disease rates by socioeconomic status are not known. Ruberman et al (1984) suggest that education and social support is important. Their study of men who had survived a first MI, found that those with low education tended to be more socially isolated and to have experienced more life stress. These men had mortality rates twice as high as men with more education and social support, even after other important prognostic factors had been taken into account.

A number of studies have supported the hypothesis that lack of control over job factors can contribute to the incidence of CHD (Karasec, Baker, Marxer, Albhom & Theorell 1981, Chesney, Sevelius, Black, Ward, Swan & Roseman 1981).

Chesney et al's study (1981) of white, male, salaried workers at a California aerospace company found that type A behaviour workers who perceived that the work environment encouraged autonomy had lower systolic and diastolic blood pressures than type A's who did not perceive the encouragement of autonomy. Among type B workers these patterns were reversed.

Wolf's study (1966) of Roseto, an exclusively Italian-American community which has existed in Pennsylvania since 1882 found that in the years 1955-1961 the death rate from MI was less than half that of four neighbouring towns though combined medical and psychosocial assessment showed no differences in risk factors for CHD. Wolf found that Roseto villagers under 35 years

maintained close family and community ties and adhered to traditional values and behaviour of Italian villages but expressed aspirations towards a more conventional American way of life. This did in fact happen and by 1975, CHD mortality in Roseto was similar to that of its neighbouring towns. Wolf's study supports the findings of Marmot, Syme & Kato (1975) who suggest that the incidence of CHD is environmentally determined.

COMMUNITY PROGRAMMES

Rapid social change has been shown to affect the incidence of and mortality from CHD. In 1971, North Karelia County had the highest age standardised death rate from coronary disease in the world. A community programme of health promotion and health checks project produced a significantly greater fall than the general decline in coronary deaths in Finland during the same period from 1971-79 (Truswell 1985).

Glasunov, Shamariu, Malaya, Sarkisian, Beiul & Katsenovich (1988) screened over 12000 university and college students in four USSR regions for CHD risk factors (hypertension, smoking, obesity,lack of physical activity) and although their report gives little information on specific interventions, methods and results, they found a reduction in blood pressure, smoking, obesity and an increase in physical activity in their test group, and no change or increase in risk factors in the control group. They attribute the higher efficacy of their preventative measures in one area, Kharkov, to

1. The inclusion of psychiatrists and psychologists in that campaign.
2. Trades Union organisation supplying free meals to students, enabling a balanced diet.
3. More frequent contact with their selected population.

As previously discussed, a number of risk factors for CHD-hypertension, hyperlipidaemia, NIDDM and obesity can be modified by dietary intervention.

DIETARY ADVICE

Throughout the world, as countries become industrialised and affluent, a westernised lifestyle is being adopted. This is being accompanied by a change in diet, including an overconsumption of calories, an increase in dietary fats (particularly saturated fats), cholesterol, sugar and salt. These increases parallelled the increase in morbidity and mortality rate of CHD (Stamler 1973).

Until recently, there was no definitive evidence that reducing cholesterol levels by diet or pharmacological means reduces CHD mortality. However, the 4S Study (1994) reported a 42% reduction in the risk of death from a coronary event in their treatment group.

The best diet for prevention of CHD in young adults is one that lowers plasma LDL but in someone who already has manifest coronary disease and in old people, the best diet is one that makes thrombosis less likely (Trusswell 1985, Shipley, Peacock & Marmot 1991). Patients who are particularly prone to clotting have increased levels of factor VII and fibrinogen in their blood; these were found to be as good a predictor in individuals of CHD as total cholesterol in a high risk UK population (Meade, Mellows & Brozowic 1986). Marine oils are the most potent inhibitors of thrombosis found in ordinary diets. This is supported by evidence of particularly long clotting times in the fish-eating Greenland Eskimos (Kromhout, Brosscheiter & Coulander 1986). Reynaud, Morazain & Godsey (1986) studied two groups of French farmers

and found that the group from the north of France had higher cholesterol levels and a greater propensity to clot than those living in the south of France. By changing the northern farmers diet to that of the southern farmers which was lower in total fat and saturated fat and rich in fruit and vegetables, the authors showed a rapid reduction in the tendency to thrombosis.

Recently Singh, Singh & Rastogi (1993) demonstrated a halving of mortality rates within a year when high risk patients were placed on a low fat diet rich in fruit and vegetables. Fruit and vegetables are rich in the antioxidants beta-carotene and vitamin C. A high level of antioxidants in the diet are believed to reduce the risk of CHD (Bolton-Smith, Woodward & Tunstall-Pedoe 1992). The authors also suggested that the intake of fibre containing foods may be cardio-protective as assessed by electrocardiography in subjects with undiagnosed CHD in the Scottish Heart Health Study (Bolton-Smith, Woodward & Tunstall-Pedoe (1992).

The effect of dietary fibre depends on the type; wheat fibre does not decrease plasma cholesterol, while oat fibre, pectin and guar can produce large reductions. There is some evidence to suggest that changing to a diet with a higher complex-carbohydrate and dietary fibre content tends to lead to weight loss without specific dietary restrictions (Weinsier, Johnston, Doleys & Bacon 1982) but this is not a universal finding.

The NACNE report (1983) proposes the use of the term "healthful diet", and emphasises the need to alter the proportion of foods eaten, while encouraging the introduction of new foods and the consumption of a variety of different foods. The main problems associated with diet in the UK at the time of the

NACNE report was a high fat intake (40% of energy was being derived from fat), resulting in obesity and an increased risk of heart disease (Rowland 1993). Both the NACNE (1983) and COMA (1984) reports agree in principle that perhaps less protein is required in the diet than previously thought, and that the major source of protein should be cereals, grains, potatoes and pulses which contain no saturated fat. Both the reports state that the total consumption of saturated fats in the British diet is too high and recommend a reduction.

The NACNE report (1983) was produced with nutritional guidelines for the health education of the whole population in mind, while the COMA report (1984) was concerned only with cardiovascular and cerebrovascular disease. Both reports recommended cutting fat, salt and sugar consumption, and increasing complex carbohydrate and fibre intake to compensate for the reduction in fat intake (this would be in terms of satiety and increase in the digestive process).

Much literature highlights lifestyle as one of the major causes of heart disease. If diet and heart disease are examined from this perspective, it is easy to assume that it is the fault of the individual if he or she persists in eating a diet high in fats, salt and sugar (Naidoo 1986). However, atheromatous changes may begin to take place in childhood (Shafer, Sawyer & McCluskey 1979). In many instances, children have little or no control over what they eat and their diet depends greatly on parental choice, family income and availability of foodstuffs.

The aim of dietary intervention is to prevent coronary atherosclerosis or slow the progression of the disease. Most authorities agree that preventative measures should be taken throughout adult life. There is still considerable debate as to whether dietary intervention should begin in childhood. Health Visitors, Practice nurses and schools have an important role to play in the education of families of young children and children themselves to promote healthy eating habits.

The change from saturated fat to unsaturated fats has been appreciable as individuals have attempted to change their diet. Dietary changes recommended in the prudent diet will not only lower blood cholesterol levels but beneficially affect other risk factors such as hypertension, overweight, NIDDM, haemostatic factors and antioxidant status.

To achieve continuing public awareness of these recommendations, widespread programmes of public health education are required, a pricing policy where it is not more costly to buy healthier options and a clear labelling of nutritional constituents of foods - particularly processed foods.

Hulley (1988) states that coronary disease mortality has been declining in the US for more than twenty years. This favourable trend is believed to be real, not caused by an artifact in death certification. This may be a reflection of improvement in the treatment of MI. Risk factor reduction can be extremely effective in this secondary prevention setting and may have played a role (Browner & Hulley 1989, Siegel 1988). However, part of this decline is likely to be due to adoption of primary preventative practices by the population - the decline of the smoking habit, improvements in the detection and treatment of hypertension, reductions in blood cholesterol that have resulted

from some changes in the dietary habits of the population and an increased level of physical fitness in the population (National Center for Health Statistics, figures 1950-83). Similar, though smaller trends are seen in many other western countries that have high CHD mortality rates and these too are likely to increase in the next decade (World Health Statistics 1989).

The evidence suggests that risk factor modification does have an impact on mortality. However, intervention on one risk factor might have adverse effects on the level of another, or at least affect the magnitude of the response to intervention on the latter. Therefore, simultaneous intervention is required in order to affect an individual's risk to a significant extent eg. poor responses of plasma cholesterol have been associated with diuretic therapy - thiazide diuretics attenuate the effect of the dietary intervention but without dietary intervention, higher cholesterol levels would have resulted (Watkins 1982). Similarly, stopping cigarette smoking is often accompanied by weight gain because of increased intake of calories, this in turn has adverse effects both on blood pressure and serum cholesterol levels (MRFIT 1985).

Scotland has seen a substantial fall in mortality from CHD in the last ten years which coincides with major efforts to change public perception about the role of diet and the campaigns to reduce smoking by the Scottish Health Education Group, Health Education Authority and the Coronary Prevention Group.

MEDICAL MANAGEMENT OF CHD

Coronary Artery Disease is an umbrella term for various diseases that reduce or halt blood flow in the coronary arteries. Atherosclerosis accounts for more

than 90% of the cause of CAD. Arteriosclerosis, arteritis, coronary artery spasm, embolism, thrombosis and certain infectious diseases account for the remainder. In atherosclerotic CAD, patients do not usually experience angina until the lumen is narrowed by 70-75% (Becker & Levine 1987). Successful medical management of CHD depends on early diagnosis and drug treatment.

Diagnosis

Diagnostic tools include 12 lead electrocardiogram, exercise testing, echocardiography and nuclear medicine scans. Angiography visualises coronary arteries and allows the cardiologist to detect and gauge the extent of CHD and establish left ventricular function.

Once diagnostic tests have established the presence of CHD, treatment may include drugs, percutaneous transluminal coronary angioplasty (PTCA) or coronary artery bypass surgery (CABS).

Mayou (1986) states there is probably little association between cardiological measures of severity, social handicaps and mental state. Some patients with severe angina manage to lead full lives whilst others with mild symptoms are unduly cautious and describe severe handicaps or emotional distress. For an elderly patient with frequent and severe angina, symptomatic relief alone may be the main aim whilst for a younger patient with moderate angina, the indication for surgery rather than medical treatment may be the prospect of return to work, sport and full family life.

Drug Therapy

In stable angina pectoris drug therapy includes nitrates, beta blockers and calcium channel blockers. Nitrates are coronary and peripheral vasodilators

which reduce arterial resistance. They may be given sublingually or chewed for an acute attack or orally or topically for prophylaxis. Beta blockers inhibit the beta receptors of the sympathetic nervous system. They reduce myocardial oxygen demand by reducing heart rate and decreasing cardiac contractility and systolic blood pressure. Calcium channel blockers prevent the influx of calcium ions into arterial smooth muscle and myocardial cells. They dilate the coronary arteries, increase coronary blood flow and encourage collateral circulation.

If drug therapy fails to relieve angina, PTCA may be performed. PTCA dilates the obstructed coronary artery or arteries by inflating a balloon catheter to compress the obstruction against the arterial walls to allow increased blood flow. PTCA has an overall mortality of 1% with 3-6% of patients requiring CABS for acute occlusion of the coronary artery. The restenosis rate following PTCA has largely unchanged over the years and stands between 30-45% within six months (Hirshfeld, Schwartz & Jugo 1991). Re-angioplasty is possible, and with the coronary stent becoming widely available, stenting of the restenotic lesion is a promising technique which appears to provide a more predictable immediate result and potentially a reduced rate of subsequent restenosis for selected types of lesions (Serruys, Strauss & Beatt 1991).

CORONARY ARTERY BYPASS SURGERY

Coronary artery bypass surgery is a commonly undertaken operation to relieve the symptoms of CHD, namely stable angina pectoris. Bypass surgery is currently carried out with a low operative mortality (1-2%) and a low rate of perioperative myocardial infarction (1.2-4.5%) and major post-operative

complications in selected patients with CHD. Symptomatic improvement is due to increased blood supply to the myocardium. With successful revascularisation, the ejection fraction is increased. The relief of angina with improved ventricular function is manifest as improved cardiovascular performance. Improvement in functional status is also evident as fewer hospital readmissions and less medication use than medical management alone (European Coronary Surgery Study Group 1982).

Campeau, Lesperance & Hermann (1979) has reported that one year after myocardial revascularisation, angina is improved in 80% of patients, and at 7 years, 62% of patients remained angina free or improved. Bypass surgery is a palliative, not a curative treatment and long-term results depend on attrition rates of bypass grafts and a progression of disease in the native coronary arteries (Campeau, et al 1979). Grondin, Campeau, Thornton, Engle, Cross & Schreiber (1989) reported that in the early postoperative period, 8-12% of grafts occlude, and in the subsequent months, another 5-8% close. Occlusion rate of the saphenous vein graft is 12-20% during the first year and 2-4% annually for the next 4-5 years. Subsequently, this rate doubles so that at 10 years, approximately 50% of grafts become occluded due to graft atherosclerosis. A similar percentage of patent grafts show atherosclerotic changes at the end of the first decade.

Re-operation rates have been reported as 13.4% in an 11.5 year follow-up of 446 patients (VanBrussel, Plokker & van den Bergh 1992), 9% in a 10 year follow-up of 500 patients (Lawrie, Morris & Calnoon 1982) and 3.6% in an eight year follow-up of 1363 patients (Dougenis, Naik & Brown 1992). Re-operative risk is at least double that of the first operation and symptomatic relief appears to be of shorter duration. Preservation of medial and

endothelial function and inhibition of platelet function may lead to longer duration of the venous graft (Grondin, et al 1989). Clinical trials of drugs that inhibit platelet function, namely aspirin and dipyridamole showed increased patency of vein grafts by as much as 14% in the first year (Fuster & Cheseboro 1982). More recent reports no longer support dipyridamole as an antiplatelet drug following CABS (Pedersen & Fitzgerald 1985, Fitzgerald 1987).

RANDOMISED TRIALS OF MEDICINE V SURGERY

Three major prospective, multicentre, randomised trials were conducted in the 1970's. The trials are not easy to interpret and although there are some similarities, there are also major differences between inclusion and exclusion criteria. The Veterans Administration Cooperative Randomised Study [Veteran's Study (1972-74)] randomised 686 men to surgical and medical groups. Surgical results showed high operative mortality (5.6%) and low graft patency (71%). Overall survival for medically treated patients was 83% and 86% for surgically treated patients. Only left main coronary disease showed significant benefit from surgery - survival was 93% at 4 years whereas with medical treatment, survival was 67%.

The European Coronary Surgery Study Group [European Study 1973-76] randomised 768 men under 65 years, with mild to moderate chronic stable angina and 50% or more stenosis of at least two major vessels to medical or surgical treatment. There was a large crossover of medically assigned patients to surgical treatment (27%). The study showed overall survival in the surgery group to be 92.4% at five years compared with 83.6% survival in the medical group. Patients with left main, three and two vessel disease fared better with

surgery than those patients treated medically and had significantly more relief from angina. The five year risk of non-fatal myocardial infarction (MI) was not significant between the groups though the authors could not differentiate between perioperative and later MI in the surgical group. The authors assumed that most MI's were perioperative as figures after two years showed the difference to remain constant (medically assigned MI rate was 11-14%, surgically assigned MI rate was 14-15%).

The Coronary Artery Surgery Study [CASS (1974-79)] which was the most recent, largest, influential and lengthy trial, in many respects resembles the European trial. Seven hundred and eighty patients were selected from a registry of 24,959 patients and randomised to medical and surgical treatment. Surgery was performed in 26% of the medical group, casting serious doubt, even among the authors, on the validity of the study to test the true contrast in outcome between medical and surgical treatment. Surgery failed to show benefit in terms of survival, except for a subgroup of patients with left ventricular ejection fractions of less than 36%.

Summary

All three studies reported a significant reduction in the requirement for anti-anginal drugs in the surgical group when compared with the medical group. Exercise tolerance was notably improved in the surgical patients up to four years postoperatively then tended to decline progressively during long term follow-up. The Veterans study showed exercise tolerance in surgical patients was no longer superior to medically assigned patients ten years after bypass.

Quality of life, defined as relief or improvement of angina, increased exercise tolerance and decreased need for anti-anginal medication is significantly improved in the majority of patients for 5-7 years after CABS. Relief of angina that the patient cannot tolerate because of lifestyle, personality, inconvenience and adverse effects from medication remains a major indication for the intervention.

Improvement in angina and in exercise tolerance tend to decrease significantly between 7-10 years after bypass surgery. At 10-12 years, these functional benefits are no longer evident after CABS when compared with long-term medical therapy. An important difference between the three studies relates to changes in surgical technique and experience. Between enrolments from 1972-1979, there was rapid progress in surgical technique and experience which may explain differences in operative mortality - VA study was 5.6%, European study was 3.6% and CASS was 1.4%. The large randomised trials comparing bypass surgery and medical treatment were carried out before the introduction of antiplatelet agents to reduce early vein graft occlusion and before the expanded use of internal mammary artery grafting. The trials were associated with relatively high rates of perioperative MI and operative mortality.

It is quite possible that better long term results will be achieved following CABS as it is currently practised.

INFORMED CONSENT

The concept of informed consent is disclosure of relevant information and should include patient's diagnosis, the nature, benefits and risks of proposed treatment, alternatives to treatment and prognosis if treatment is withheld (Cushing 1991).

Other than in an emergency, the patient requires time to assimilate this information and have time to ask questions before agreeing to treatment.

Studies have shown that information given in a brief and direct manner leads to greater understanding (Epstein & Lasagna 1969, Cassileth, Zupkis, Sutton-Smith & March 1980), though in contrast, Faden, Becker, Lewis, Freeman & Faden (1981) found that in their study of outpatients and parents of paediatric patients, both patients and parents preferred more detailed disclosures. The authors studied what patients want to know as contrasted with what physicians report actually disclosing, in a population of physicians who treat seizures and patients or parents of patients who have this disorder. Ninety percent of 53 patients and 107 parents completed the questionnaire. A 50% sample (n. 108) was drawn from the 1977 Child Neurology Society of which 54% returned the questionnaire and a 30% sample (n. 279) from the American Academy of Neurology, 1977, of which 32% returned the completed questionnaire. Despite socioeconomic differences and differences in their roles in the medical setting, there was substantial agreement among both patients and parents about the information they wished to receive. When asked why they wanted detailed disclosures, they indicated two main reasons in order to know about the consequences that could be expected from taking the drug and in order to decide whether to take the drug. There was also substantial agreement among physicians about the kinds of information

they routinely disclose. In general, patients and parents preferred detailed and extensive disclosures particularly regarding risks and alternative therapy. By contrast, physicians were likely to disclose risks with a relatively high probability of occurrence, and they provided little information about alternative therapies. Twenty percent of adult neurologists favoured withholding anxiety-provoking information from the patient and his family while no patients favoured this approach. Although the response rate for the physician samples appears to fall within the normal range for mail questionnaires, the authors acknowledge there was likely to be some response bias in that those physicians who took time to respond were those already interested in the issue of informed consent. Because of this interest, the data may overestimate the extent of disclosure among neurologists. The question of the validity of self-reported behaviour should also be raised where disclosures by physicians generally receive social approval, these physicians may report disclosing more information than they actually do provide in practice. Although the findings of this study may not be generalised to the CABS population, Faden et al's (1981) does reveal discrepancies in the information that patients and carers received and Cushing's (1991) definition of informed consent. Faden et al's study (1981) did not address comprehension so it is unknown how detailed disclosures would have affected subjects' comprehension of information for informed consent.

Korsch and Negrete (1972) suggest that limited disclosures and one-sided exchanges between physicians are correlated with non-compliance and poorer medical outcomes.

Morrow, Gootnick & Schmale (1978) showed a significant increase in comprehension of information for informed consent when their cancer patients were given informed consent statements home to read or discuss with others.

Nurse's role in informed consent

Although consent for surgical treatment is obtained by medical staff, the nurse's role as the patient's advocate means that nurses have a duty to ensure that consent for any treatment is truly informed (Zylinski 1993). Cushing (1991) suggests the best way for nurses and other providers to avoid problems in the realm of informed consent is to treat disclosure not as a bureaucratic formality but as an opportuntity to inform and communicate with the patient. This may be achieved by way of a teaching programme or package, tailored to the needs of the patient.

PREPARING FOR ELECTIVE SURGERY

Introduction

Admission to hospital makes many people feel anxious. Existing research has identified sources of anxiety which include the strange environment, the unknown faces and the uncertainty of not knowing what to expect. Patients admitted for surgery must also face the direct threat of an operation and anaesthetic, which may arouse fears of pain and discomfort (Mishel 1984). It appears minor operations are as likely as major surgery to provoke anxiety in the patient. Information, explanation and forewarning of what to expect may enable people to prepare themselves both physically and psychologically, which may in turn facilitate relief of anxiety (Janis 1958).

Many studies concerned with information giving in hospital have focused on surgical patients. Research shows that surgical patients who are given emotional support and information, usually after admission to hospital, have a smoother operative course and recovery, and are more cooperative with treatments (Mathews & Ridgeway 1981).

PREADMISSION INFORMATION

Relatively few studies have concentrated specifically on pre-admission preparation for hospitalisation, although this period is often one of elevated anticipatory anxiety (Wallace 1985). Much of the work that has been done in this area has concentrated on the preparation of children. In an early study involving adult subjects, the hypothesis that explanation about hospital routine, facilities and procedures and information about forthcoming treatments would reduce feelings of anxiety, was tested and upheld (Elms & Leonard 1966). This relates to the idea that anxiety, if perceived as 'fear of the unknown', may be reduced when more information is given to the patient.

Coping

Lazarus (1984) defines coping as a process that requires constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are perceived as taxing or exceeding the resources of the person.

Miller and Mangan (1983) suggest that patients scheduled for invasive medical procedures will experience less anxiety if the amount of preparatory information they receive is consistent with their coping style. Therefore, patients who have an information-seeking style will fare better with a high

level of information, whereas those patients who have an information-avoiding style will fare better with less information. Watkins, Weaver & Odegaard (1986) found that prior to cardiac catheterisation, information-seeking patients had lower levels of anxiety when given procedural and sensory information. Information-avoiding patients fared better with procedural information alone.

PREOPERATIVE PREPARATION

Following admission to hospital, the patient becomes the centre of many activities such as history taking by doctors and nurses, physical examination, blood-testing, skin preparation and other procedures performed before surgery. The elevated anxiety associated with this period is likely to interfere with the individual's ability to recall much of what he or she is told.

Planned pre-operative preparation before elective surgery lowers the risks of post-operative infection, improves success rate and reduces length of stay in hospital (Healy 1968, Lindeman & Van Aernam 1971). Predisposing factors to post-operative morbidity include age (impaired immunological response in patients over 60), obesity (increase in post-operative infection, increased incidence of post-operative respiratory failure), underlying disease such as diabetes, renal failure, pulmonary disease and cigarette smoking.

As previously discussed, cigarette smoking and obesity are also risk factors for CHD. Where CABS is being planned, it would appear advisable for the healthcare professional to introduce a further reason for modifying these factors - to reduce the risk of surgery.

In a more recent study, it was shown that patients welcome preparation prior to hospitalisation (Wallace 1985). It was suggested that pre-admission preparation may have the benefit of facilitating emotional adjustment over a longer period, and may also stimulate the patient to see more information and support, which may lead to reduced anticipatory anxiety.

Summary

All patients require routine information before surgery. Mayou & Bryant (1987) argue that more could be done both to counter unrealistic expectations and to provide extra individual help for those 'at risk' of psychosocial difficulties after surgery (pessimistic, anxious and depressed, cautious, smokers, less involved in leisure). Tailoring the type and amount of information to the individual's need requires an assessment of the patient's coping style, but appears to be a realistic means of ensuring that the patient is as well prepared for the surgery as he or she wishes to be.

ANXIETY THEORY

The definitions of anxiety - both theoretical and operational, are many. Freud (1936) saw anxiety as a signal indicating that the individual was in the presence of a dangerous situation. He differentiated between objective anxiety and neurotic anxiety on the basis of the source of the danger; that is, whether or not it originated in the external world or in internal impulses.

Existential theory views anxiety as an apprehension, initiated by a threat to a value that is held essential to the individual's existence (May 1950). Interpersonal theory characterises anxiety as tension that arises from experiencing disapproval in interpersonal relations (Sullivan 1953). Anxiety was described by Francis & Mungas (1968) as an unobservable energy, its

presence being inferred through the effect it has on attention, behaviour, learning and perception. More recently, anxiety has been divided into two aspects. Spielberger, Forsuch & Lushene (1970) define two types of anxiety: state anxiety and trait anxiety. State anxiety is a transitory emotional state that is characterised by consciously perceived feelings of tension and apprehension, and is accompanied by heightened autonomic nervous system activity. It may vary in intensity and fluctuate over time. In contrast, trait anxiety refers to differences in the tendency to respond to threatening situations. It represents a proneness to elevations in state anxiety intensity.

Speilberger (1972) predicts that transitory or state anxiety levels would be higher in circumstances that are perceived as threatening, and lower in situations in which there is little or no perceived danger.

PREOPERATIVE ANXIETY

For many patients, the threat of surgery has been shown to cause uncertainty and anxiety (Wilson-Barnett 1979, Johnston 1980). Interventions to reduce preoperative anxiety involve informing the patient about procedural details and effects (Hayward 1975) or of actual sensations they are likely to experience (Johnston 1978).

Johnston (1980) undertook a series of studies investigating anxiety over the course of a gynaecological surgical experience. The highest level of anxiety was reported two days before surgery and following admission. There was no significant change from one day preoperatively to day two postoperatively or day four postoperatively. However, respondents experienced significantly lower levels of anxiety on day six postoperatively compared to one day

preoperatively. Warrington and Gottleib (1987) studied a group of 20 women being admitted for abdominal hysterectomy. Measuring state and trait anxiety (STAI Form Y, Spielberger 1983) the authors found a significant decrease in state anxiety between one day preoperatively and three days postoperatively. This was unexpected, based on Johnston's results though may be attributed to the different forms used - Johnston used the anxiety and depression form (Form X, Spielberger 1980) whereas Warrington & Gottleib used the form measuring anxiety only. An alternative possibility may lie in the study population - Warrington & Gottleib studied women having hysterectomy for benign disease - Johnston's respondents may have included patients undergoing surgery for malignant or benign disease. It is conceivable that anxiety levels would be higher in oncology patients and this may account for Johnston's higher anxiety scores.

As levels of anxiety were higher before surgery than afterwards, the reduction of pre-op anxiety may be an important goal for nurses. Intervening to reduce mild anxiety is usually unnecessary. However, moderate anxiety may take on characteristics of severe anxiety and necessitates some form of nursing intervention (Francis & Mungas 1968).

Measurement of Anxiety

Measurement of anxiety can be carried out by objective and subjective means. Objective measurements of anxiety estimate sympathetico-adrenal activity using heart rate and blood pressure (Nisbet & Norris 1963), plasma cortisol (Williams, Jones & Williams 1975), urinary catecholamine excretion (Martinez, Von Euler C, Norlander 1966) and palmar sweat production (Nillson 1977). Subjective measurements include observer ratings (Forrest, Brown & Brown 1977) or self report measures by the patients themselves.

Self-report these measurements may take the form of linear analogue scales (LAS) described by Beechey, Ettringham & Studd (1981), multiple choice assessment scales e.g. hospital anxiety and depression scale (HAD [Zigmond & Snaith 1983]) and multiple affect adjective check list (MAACL [Wassenaar Lancee, Galloon & Gale 1977]), or more complex questionnaires such as STAI (Speilberger, Gorusch & Lushene 1970) which attempt to distinguish immediate 'state' anxiety from underlying 'trait' anxiety.

Hicks and Jenkins (1988) found a high level of correlation between LAS, HAD and MAACL in 100 patients undergoing termination of pregnancy as day cases, and Millar, Jelicic, Bonke & Asbury (1995) found good agreement between LAS, HAD and STAI in 40 patients undergoing breast surgery, provided normative data were taken into account for HAD and STAI scores.

Information and Anxiety

Janis (1958) reported that increased anxiety due to hospital admission could result in anger in some patients, other typical reactions being depression and guilt. Janis found changes in mental functioning, in that the anxious patients had great difficulty in understanding any information given to them. Lazarus (1966) identified hospital admission as a "crisis point" where the patient is faced with a sudden disruption of his normal lifestyle. Lazarus found that patients experienced expectations of pain and discomfort, the threat of death or disability, and the feeling that control had been passed to the hospital staff. These insights may seem obvious today, but before the 1970's it was commonly believed that the less patients knew, the less they would worry. Later researchers suggested that anxiety could cause physiological changes, which could explain the difference in recovery between anxious and non-

anxious patients. Murray (1973) suggested that anticipation, and the resulting anxiety, were the basic ingredients of the pain experience, and when anxiety is reduced, the subjective experience of pain is also minimised. Gentry et al (1973) demonstrated that very anxious patients had increased sodium and potassium retention and produced more corticosteroids and catecholamines. In observational terms, this means that the patient's blood pressure and heart rate will increase and there will be more risk of cardiac dysrhythmias. These factors will increase the surgical risk. The anxious patient will also require higher doses of anaesthetic drugs for induction, which will further increase the chance of post-operative complications. The corticosteroid release can also delay wound healing and increase susceptibility to infection by suppression of the formation of antibodies.

A recent report (Teasdale 1993) suggests that informing the patient and therefore relieving his or her anxiety is an oversimplification. Teasdale argues that the patient's anxiety can be relieved more reliably by communicators selectively presenting what they know in order to induce recipients to infer the intended meanings. Teasdale also argues that health professionals are rarely neutral in the explanations that they offer to patients, they generally have personal views about what is best for individual patients and use information to try to induce patients to respond accordingly. Teasdale suggests that information can be presented in such a way that it induces a patient to be active in controlling events or to be passive in reframing them. In this context, reframing refers to where the health professional tries to induce the patient to view events as less threatening than they originally feared or believed.

Summary

Admission to hospital provokes uncertainty and anxiety in many patients and it is recognised that anxious patients do not concentrate or digest information given as readily as those less anxious patients.

Despite much research stating that information leads to reduced uncertainty and therefore reduced anxiety, there may not be a direct relationship (Teasdale 1993). A number of reports suggest that procedural information and sensory/coping information reduces the patient's anxiety more than procedural information alone (Mathews & Ridgeway 1982, Langer, Janis & Wolfer 1975). However, Miller & Mangan (1983) found that those patients who received sensory and behavioural information in addition to the usual procedural details had significantly higher levels of arousal and discomfort than those patients who received procedural details alone.

There is a great deal of research on preoperative education and information-giving. This usually involves the patient after admission to hospital, which is recognised as a time when patients suffer high levels of anxiety.

Information and education in the waiting time to surgery has not received the same attention. This may be due to the fact that the majority of research in this area has been conducted in the US and involves a rather different healthcare system to that of the UK. Giving information to patients on the waiting list for surgery allows the patient to view that information at his or her own speed, allows the family to be involved and gives the patient time to find out any further details if necessary. This may lead to reduced levels of uncertainty and therefore anxiety in the preoperative phase.

Psychological research has shown that anxiety will not only exacerbate pain, but increases the chance of post-operative complications. Reduction in anxiety preoperatively is essential to counteract these problems and aid recovery.

OUTCOMES OF CABS

The literature reveals a number of factors which have been studied to assess the outcome of CABS. These are discussed in the following text.

Life Expectancy

A small subgroup of patients with left main coronary artery disease and some patients with triple vessel disease have been shown to benefit from CABS through increased life expectancy (European Study 1982, CASS 1983, VA Study 1984). Those patients with left ventricular ejection fractions of less than 36% in the CASS (1983) study were found to have improved life expectancy following CABS.

Relief of Symptoms

Coronary artery bypass surgery achieves relief of angina in 80-90% of patients. Unfortunately, due to progression of disease and graft occlusion, angina returns within seven to ten years in one half of those patients (Mayou 1986). Patients with angina and/or restrictions following MI may have unrealistic expectations of CABS as a 'cure' and a chance to return to a 'normal' life.

An individual with no personal experiences of chronic illness is likely to think of CHD from an acute illness perspective. This perspective may be reinforced by undergoing CABS, which alleviates the concrete identity features of the

disease, namely, the symptoms. Cronin (1990) suggests that it is easy to understand why many post-CABS patients mistakenly believe themselves to be 'cured' and why they behave accordingly.

Functional Status

Stanton, Jenkins & Savageau (1984) found marked improvements in usual daily activity which were associated with less exertional angina, reduced fatigue and increased vigour following CABS. There was a reduced need for anti-anginal drugs. Although differences between surgically and medically managed patients decreased with time, differences were still significant at five years (European Study 1982). Problems with delayed healing in leg and chest wounds may restrict activities and cause considerable discomfort (Wilson Barnett 1981, Mayou 1986).

Cerebral Complications

Cardiopulmonary bypass is a brain insult. Despite careful air evacuation of the heart and equipment, gaseous emboli have been shown on Doppler studies to reach the brain, during and after the use of the bubble oxygenator (Parker, Marvasti & Bove 1985).

The incidence of neurophysiological complications following CABS has been reported as being between 1-100%, depending on study design, timing and nature of assessment, and whether the study is retrospective or prospective. Commonly reported complications are poor memory, lack of concentration (Mayou & Bryant 1987), visual field defects (Shaw, Bates & Cartlidge 1985) and postoperative delirium (Kornfeld, Heller, Frank, Wilson & Malm 1982).

Shaw, Bates & Cartlidge (1985) found a 12% incidence of brachial plexus injury associated with nerve compression during either surgery or postoperative care.

Shaw and colleagues (1985) carried out a prospective study of 312 CABS patients and found signs of neuropsychological changes in 60% of the sample and death or severe disability in 1.6%. There was no comparison group in this research and 3 of 15 strokes were known to have developed some time after surgery. Savageau, Stanton, Jenkins & Klein (1982) found that 70% of a sample of 227 CABS patients exhibited some cerebral dysfunction after surgery, though at 3 months, only 5% showed persistent impairment. Again, there was no comparison group in this study.

Smith, Treasure & Newman (1986) compared 55 CABS patients with 20 thoracic and major vascular patients preoperatively, 8 days and 8 weeks post operatively. The authors found persisting neuropsychological changes to be rare though minor abnormalities were significantly more common in CABS patients. These changes persisted in one third of patients at 8 weeks - low perfusion pressure and long bypass time were associated with postoperative deficits. At 8 weeks there was a similar incidence of abnormalities in the comparison group.

Klonoff, Campbell, Kavanagh-Gray, Mizgala & Munro (1989) tested 102 CABS patients at 4 intervals, 2 weeks preoperatively, 3, 12 and 24 hour months postoperatively. Using cognitive, neuropsychiatric and personality assessments, the authors reported that CABS does not result in long-term deleterious or beneficial effects in intellectual or neurophysiological functioning. Responses indicated that overall levels of distress and in

particular, concerns with health, reduce substantially after operation. With the alleviation of symptoms, the patient's quality of life in terms of physical activity and personal satisfaction with life appears to be enhanced.

It is probable that most of the cerebral complications are transient and not of long-term significance but there can be no doubt that a small proportion of patients do suffer disabling impairment. Recognition and acknowledgement that transient cognitive dysfunction frequently follows CABS can provide reassurance to the patient and his family that it is a temporary phenomenon that should resolve in time. Raymond, Conklin & Schaeffer (1984) suggests slow-paced instruction with intentional repetition of information and including the individual most involved in the patient's recovery in all teaching sessions as ways to minimise the effects of these complications.

Quality Of Life

The concept of quality of life (QOL) is multifaceted and complex because different people can be satisfied or dissatisfied by similar objective states.

When considering health-related issues, the physical wellbeing of the individual may be indicative of QOL. In cardiac patients, as in general population studies of QOL, major consideration is given to objective indicators such as return to work or repeat hospitalizations (Barnes, Ray, Oberman & Kouchoukas 1977, CASS 1983, Hamilton, Hammermeister & Deronen 1983).

When objective measures of severity of disease are used such as number of vessels involved, few associations between disease severity and psychosocial adaptation are found. When more subjective indicators are examined, the relationship is much stronger. The presence of physical symptoms such as chest pain, breathlessness and fatigue seem to influence the patient's perception of illness much more directly than do angiographic and surgical reports. Gundle, Reeves, Tate, Raft & McLaurin (1980) and Gutmann, Knapp, Pollock, Schmit, Simon & Walcott (1982) found that perceived health status was significantly correlated with psychosocial adjustment to CABS, independent of objective state of health. Patients who continued to have symptoms and perceived themselves as ill or 'damaged', were less likely to return to work, social activities and sexual relations than were those patients who perceived more positive changes in their health.

Jenkins, Stanton, Savageau, Delinger & Klein (1983) reported satisfactory QOL in 318 cardiac surgery patients who underwent valve replacement or CABS. The investigators indicated that the majority of patients achieved relief of dyspnoea, the ability to engage in usual activities, no long-term alteration in neuropsychological function, no change in social role functioning, stable income satisfactory family life and satisfactory sexual functioning. Anxiety, depression and fatigue were reported to decrease postoperatively whereas the degree of vigour and positive wellbeing increased.

CASS investigators (1983) found patients in the surgically managed group to experience less chest pain, less activity restriction and less drug therapy than the medically managed patients. There were no differences, however, between the groups in work status or types of activities the patients engaged in.

The Veteran's study (1984) had similar findings with one notable exception - at ten years after surgery the QOL for surgically managed patients did not differ from that of the medically managed group. The reported indicators from both the CASS and VA studies were primarily objective and were determined by physicians without QOL data. It is not known whether the patients would have provided subjective details which would similarly deteriorate.

Changes in QOL are less impressive than doctors often expect, but appear to be what patients themselves want. Most find that surgery enables them to lead a fuller, more active and satisfying way of life. In contrast, a minority have an unsatisfactory outcome and their QOL may be even less good than before surgery. Misra, Bain & Mahmood (1982) comment that some of the psychological and social morbidity after surgery is of long-standing and is often unrelated to the cardiac problems of operation.

Return To Work

With 80-90% of patients having an improvement and around 75% of patients experiencing complete relief of angina, it could be argued that many patients should return to a productive livelihood after the operation. Thus, the procedure can be viewed as rehabilitative with its costs weighed against future potential earnings.

Early advocates of CABS claim that the operation not only produces symptomatic relief but increases the patients' ability to return to and maintain employment (Wallwork, Potter & Caves 1978, Westaby, Sapsford & Bentau 1979). Niles, Vandersalam & Cutler (1980) found that 10% of patients

unable to work before CABS were employed after surgery; however, only 50% of the 111 subjects who were followed for a mean of 20 months postoperatively had been working preoperatively. Studies by Barnes, Ray, Oberman & Kouchoukas (1977), Rimm, Barboriak, Anderson & Simon (1976) and Bass (1984) did not support this finding. Differences in results may be explained through demographic differences and socioeconomic status of samples.

Kornfield, et al (1982), studied 100 consecutive CABS patients and concluded at 4.5 year follow-up that the majority of long-term survivors had substantially less angina and greater exercise capacity. Surgery did not increase the number who were employed but led to substantial improvement in quality of life, including general pleasure, reduction of anxiety and depression, and subjective improvement in job and family roles. Sexual adjustment improved the least. Compliance with the medical regime was relatively good for smoking and exercise but not for diet and type A behaviour, suggesting a need for psychological intervention.
Guvendik, Rahan & Yacoub (1982) compared pattern of employment of 96 male CABS patients with employment patterns in the general population of England and Wales. Ninety percent of CABS patients were employed at one year which compares with the general population. There was a slow deterioration in employment to 73.4% at five years. Seventeen patients retired over the 5 year period. There was no correlation between the rate of employment and age, previous MI or number of bypass grafts. At 5 years the difference compared to the general population was nearly 20% where the difference had been 3% at 1 year. Deterioration in employment seemed closely related to symptomatic status.

A number of studies agree on predictors of employment following CABS:- unemployed for longer than 1 year preoperatively (Guvendik, et al 1982, Almeida, et al 1983, Hymowitz, et al 1985, Caine, Harrison, Sharples & Wallwork 1991), age less than 55 years at operation (Niles, Vandersalam & Cutler 1980, Almeida, et al 1983, Hymowitz, et al 1985, Caine, et al 1991) and symptomatic status (Anderson, Barboriak, Hoffman & Mullen 1980, Guvendik, et al 1982, Almeida, et al 1983, Caine, et al 1991).

It is important not to underestimate the impact of economic factors on measures of outcome in patients having CABS. Economic recession has forced many employers to introduce early retirement schemes and to offer staff the opportunity of voluntary redundancy. Patients with chronic angina faced with a bypass operation may be attracted to these offers and may even be encouraged to accept them by their employers. In addition, patients with chronic angina may have lost their jobs as a result of their physical disability and may be receiving invalidity or other welfare payments at the time of operation. These payments, if they resemble the patients' pre-illness income, may act as a disincentive to return to work following operation. It is possible that the issue may be further complicated as persons having a major surgical procedure may enjoy undue attention from friends and family or other rewards from their inactivity. Perhaps such persons have little incentive to resume productive activity. The family and doctor may reinforce such behaviour by adopting an overly protective role for the patient (Frank, Heller & Kornfeld 1972). Short-term results and available data do not demonstrate increased economic productivity after operation for these patients (Mayou 1986).

Mental State

With CABS, it is highly reasonable to suggest that the impending operation is a stressor of significant magnitude that would result in predictable signs of disturbance and distress on objective psychological tests. Accordingly, after a successful surgical outcome, the observed level of distress should be less. Pre-event emotional status might be expected to influence the patient's psychological response. Morton & Tolan (1982) found many of their sample of 1100 patients (at a mean of 3 years after CABS) to have a stronger feeling of vulnerability postoperatively than preoperatively when the actual risk of MI or other catastrophic event was greater. Patients expressed a fear that grafts could be disrupted by exertion or stress - a fear often shared by spouse and other family members. The authors felt that this fear led to a continuing low level of cardiac neurosis in some patients.

Preoperative discussion with the patient and family dealing with concerns and expectations may set the stage for cardiac rehabilitation and improved recovery for the patient.

Satisfaction

Satisfaction with the results of surgery and improved exercise capacity are important subjective indicators to patients. Mayou & Bryant (1987) suggest that simple measures such as return to work and physical activity are unrealistic evidence of quality of life benefits of surgery. Many subjects in their study of 79 male patients aged <65 years referred for CABS described few objective changes but were delighted to be without the worry of angina and the need to pace all physical exertion. These positive feelings of improvement are arguably as important as demonstrable change in the extent of physical activities. Penckofer & Holm (1983) studied two small groups (17

in each) of post CABS males. Both groups were alike in terms of preoperative physical activity, angina level and type of revascularisation. The first group were 3-5 months post-op and the second group were 6-8 months post-op. There were measurable improvements on quality of life early in the recovery period. The first group reported higher levels of life satisfaction and although they did not perceive their past and present quality of life to be significantly different, they did project the future as being significantly better than the past. The second group also reported increased levels of satisfaction, seeing their present and future quality of life as superior to the past. The authors concluded that the difference in life satisfaction ratings between the two groups may have been affected by the limitations imposed by residual incisional pain.

Kornfeld, et al (1982) reported that 62 out of 100 patients found pleasure in life much improved, while 71% of 318 patients gave an unqualified "yes" to Jenkins, et al (1983) when asked "would you undergo surgery again, knowing what you know now?".

Summary

CABS does provide symptomatic relief for patients with limiting angina, not controlled by medications. Symptoms diminish and function improves. The individual price is operative mortality, morbidity associated with surgery and gradual recurrence of symptoms over years. Nonetheless, surgery for the limited and willing patient is a good therapeutic option. At another level, bypass surgery is not as appealing. It does not include the likelihood of return

to employment, non-fatal MI, or increased life expectancy, other than for a small subgroup with left main coronary disease. These factors indicate little, if any, medical care cost-benefit in the procedure.

REHABILITATION

Although this review concentrates on pre- and perioperative information-giving and relief of anxiety, postoperative and discharge information can improve or achieve optimal psychological recovery for patients after cardiac surgery. The continuation of the patient's education after surgery has been shown to promote a faster and more complete recovery in studies by Healy (1968) and Meyer & Latz (1979).

A multidisciplinary approach will involve input from medical and nursing staff, physiotherapy and social work departments. Brown, Glazer & Higgins (1983) suggest family involvement to be of value at this time.
After surgery, CABS patients tend to manifest behavioural changes such as 'personality changes', loss of appetite, emotional lability and sleep disturbances. They express fears of perceived life-style changes in the areas of socialisation, employment, financial status, sexual performance and physical activities (Gundle, et al 1980, Lovvorn 1982).

The prospect of going home is often disturbing and frightening for cardiac surgery patients, regardless of the nature of the postoperative course. Stanton et al (1984) studied a group of 249 CABS patients to assess the perceived adequacy of patient education and fears and adjustments after surgery. The longitudinal study tested patients 6 months postoperatively for fears and adjustments experienced during the postoperative period. The hypothesis tested was that those patients who perceived that, overall, they

were well prepared while in the hospital would report having encountered fewer fears and adjustments during the six months after surgery. There was no significant correlation between patients' perceptions of adequacy of preparation and fears encountered. Patients reported a mean of six different fears and five different adjustments. Both physical and emotional factors were associated with fears and adjustments. Most commonly stated were worries about paying medical expenses, an incomplete recovery, becoming overly dependent or the possibility of having to undergo heart surgery again in the future. In general, patients who were experiencing better physical and emotional health were also experiencing fewer fears and adjustments. This is understandable as these patients have achieved a more complete recovery.

The authors suggest that even those patients who believe they have been well prepared for convalescence do need additional reinforcement and encouragement to assist them in coping with the recovery process.

As this was an American study, worries regarding medical expenses are not applicable to UK patients. However, other worries stated are likely to apply equally to both US and UK patients. While there may be some general area to which hospital-based patient education programmes could devote more attention, such programmes cannot provide a complete solution to the problem.

Involvement Of Patient's Spouse

Scalzi & Dracup (1978) recommend separate counselling for spouses who could logically provide a renewing source of encouragement and assistance. Dracup, Baker & Edlefsen (1984) observed the relationship between support

and compliance and have encouraged nurses and other health professionals to use the patient's natural support system by involving families in teaching programmes.

Group programmes are a means of reaching those patients and families and provide an opportunity to deal with their questions and concerns so that the recovery phase will be maximised.

One potential source of reinforcement and encouragement is the patient's spouse. This need not necessarily be confined to postoperative teaching, perhaps involving families in the preoperative phase would improve the patient's preparation for and adjustment to the impending surgery.

Cardiac rehabilitation programmes and self-help groups offer two additional potential resources for patients after cardiac surgery. During the 1960's, aerobic exercise was the primary focus of cardiac rehabilitation efforts. In the 1970's a multidisciplinary approach was introduced, and a 'team' approach was recognised as most successful. Over the next twenty years, the momentum for rehabilitation gained much needed support as an essential component of comprehensive modern cardiology (Squires, Gall & Miller 1990).

Valle & Lemberg (1991) suggest that rehabilitation should begin on admission to hospital where individual needs can be assessed, and support and encouragement can be provided for the patient and the family.

Risk factor modification has already been discussed in detail. Risk reduction often requires prolonged, sustained education and implementation of these habits over a long period of time (Valle & Lemberg 1991).

Local and national programmes such as Mended Hearts (USA), Zipper Club (UK) and The British Heart Foundation (UK) offer programmes which combine education, practical assistance with adjustments, and family involvement - all of which appear to be valuable in the postoperative recovery period.

Social Support

Social support, particularly the support of family members, is documented in the literature as being beneficial to patients from the initial diagnosis of CHD through surgery and rehabilitation.

Leske (1993) reports that family-member involvement in patient care increases the patient's cooperation, promotes the patient's adjustment to illness, decreases family anxiety, increases family satisfaction with care and fosters a positive attitude towards hospitalisation.

Raleigh, Lepczyk & Rowley (1990) argue that although preoperative instruction is accepted as beneficial for patients, instruction for the families of patients undergoing surgery has been largely ignored. In their study of 72 preoperative cardiac surgery patients and their spouses or significant others, the authors found that although spouses and significant others did not differ from the patients on knowledge testing before and after the information class, they had significantly higher level of anxiety prior to the information class. The anxiety level decreased after the class and became equivalent to that of the patients. There was no significant correlation between the patient's and

spouse's or significant other's scores. The results supported the hypothesis that the spouses and significant others were more anxious than the patients prior to surgery. However, the sample of significant others came from volunteers who attended the preoperative class, so the study was selective in that it included only those who chose to obtain the information by structured means. One might assume that the individuals who voluntarily attend a class are also those who are information seekers.

This study did not consider those individuals who wish to avoid information or those who seek information from other, less structured sources. The authors suggest that a cost effective means of providing information is to send it by mail prior to admission. This would enable the patient and significant others to assimilate the information at their own pace and discuss it together.

During a 13 month follow-up of 85 male CABS patients, Kulik & Mahler (1993) found that those patients who had experienced higher emotional support had less emotional distress, felt they had a better quality of life and complied more with behaviour recommendations (i.e. smoked less, walked more) than those patients who had lower emotional support. Married patients were higher in emotional support than unmarried patients and both groups reported decreased support with time. However, support did not predict cardiac health such as angina episodes and doctor visits for cardiac problems during the follow-up.

IMPACT ON PATIENT'S SPOUSE

As previously stated, the 'CABS patient's' spouse may be an important form of support to the patient. However, the impact of the diagnosis of CHD and the need for cardiac surgery may cause increased levels of anxiety in the spouse.

Goldschmidt, Brooks & Sethia (1984) investigated the impact on the 'CABS patient's' wife. Sixty eight percent of a small sample (n= 19) in a pilot study of wives reported suffering emotional problems postoperatively. Wives completed a number of psychological tests 4 to 20 months after their husband's surgery. Forty two percent were identified as having clinical depression. There were no significant relationships between surgical outcome and affective outcome though 75% of patients were judged by the surgeons to have an excellent outcome. Four of the wives had a preoperative psychiatric history - alcohol abuse, anxiety, reactive depression as a teenager and recurring depression. Eight wives felt problems were definitely associated with adjustment to their husband's surgery, four stated a possible relationship and one stated no relationship to husband's operation. The authors do not state whether the husbands of those wives with problems had the more recent surgery. Husbands were not assessed other than on surgical outcome and the pre- and postoperative relationships between the couples were not investigated.

A more recent study by Langeluddecke, Tennant & Fulcher (1988) assessed 65 spouses of patients having CABS preoperatively and 12 months postoperatively. Eighty five percent of the sample were wives. Depression and anxiety scores were significantly higher when compared to the general population, one third to one half of spouses having clinically significant levels

of anxiety with or without depressive symptoms. Preoperative social impairment was only modest. Anxiety and depressive symptoms were significantly improved at 12 months though one quarter continued to exhibit clinically depressive symptoms.

Findings were similar to Goldschmidt's study in that CHD symptoms, disease severity nor outcome of surgery predicted the spouse's postoperative psychiatric or social adjustment. Preoperative physical and psychological variables in patient or spouse generally failed to predict psychological symptoms or impairment in spouses 12 months after surgery. Trait anxiety was unrelated to postoperative functioning - a finding inconsistent with Goldschmidt's study in which the authors tentatively suggested that neuroticism predicted postoperative psychological state.

Millet, Wikoff, McMahon, Garrett & Ringel (1990) studied a group of 136 patients (and their spouses) who had undergone heart surgery in the year prior to the study. One hundred and twenty-two spouses were female. Using the STAI (Speilberger, et al 1983), the authors found that trait anxiety was related to couple marital functioning and spouse state anxiety was related to spouse marital functioning. In this study, marital functioning relates to spouse coping methods, patient compliance, couple agreement of shared responsibility for patient compliance and spouse anxiety.

Summary

Millet, et al (1990) suggest that inclusion of the spouse in the rehabilitation programme should be planned as early as possible and extended into the convalescent period. Each of these studies suggest that spouses of CABS

patients do have problems adjusting postoperatively. Perhaps more attention to the spouse's preparation in the form of information and advice prior to surgery would minimise the incidence of these problems, particularly where the UK experience is of longer waiting times to surgery which may not be as relevant in the USA healthcare system.

2. PATIENT EDUCATION

Introduction

Patient education has long been an integral part of quality health care, but may still be given low priority in nursing practice. Many nurses state that patient education is or should be a major part of their role. However, most feel that in reality, patient education is not given enough importance, owing to external factors which include lack of staff, lack of time and what is seen as accepted and 'normal' nursing (Pohl 1965, Hockey 1978). Strehlow (1983) states that the health education aspect of general nursing is of vital importance but it is often difficult to put into practice. Nurses have many urgent and active tasks to perform and may prefer to appear to be busy so the important feature of talking with and reassuring patients and relatives is often overlooked, or even regarded with suspicion. Today, neglecting to give (and document) patient teaching can be grounds for a successful law suit against nurses, claiming that practice fell below the reasonable standards of professional care (Smith 1987).

Research by Egbert, Battit, Welch & Bartlett (1964) and Boore (1978) has shown that information given preoperatively reduces the liability of postoperative complications and pain. Hayward (1975) found less analgesia was required as pain thresholds were higher when preoperative information was given. Shorter hospital stay and resumption of normal activities sooner was found by Devine & Cook (1983).

HISTORY OF PATIENT EDUCATION

As early as 1918, concern was shown for the preparation of nurses for their teaching task. "Another limitation of the ordinary training is that it deals only

or mainly with disease, neglecting almost entirely the preventive and educational factors which are such an essential element in the many new branches of public health work, such as school and visiting nursing, infant welfare, industrial welfare, and hospital social service" (National League of Nurse Education, 1918, p6).

By 1950, some of the areas common to all nursing curricula were identified as teaching, contributing subject matter, psychology (especially principles of learning), knowledge of principles of learning and teaching, and teaching skills (National League of Nurse Education, 1950).

The place of teaching in nursing and increasing interest in knowledge of the scientific bases of the teaching-learning process is shown in each of the above statements.

More recently, Project 2000 (UKCC, 1986) proposals reflect the importance of nurses promoting health as well as providing care, and this has been advocated by a number of statutory and professional bodies (WHO 1978, RCN 1989). Indeed, the Royal College of Nursing sees the incorporation of activities related to the promotion of health, prevention of disease and an approach which encourages individuals to take responsibility for their own health as one of the main routes to professional excellence (RCN 1989).

Boylan (1982) states that knowledge of the patient's status, if it belongs to anyone, belongs to him. Health professionals care for, treat and investigate his functioning by his permission, and the knowledge that is gained of him seems to Boylan to belong to the patient. In the United States, the patients' rights movement has made institutions and health care providers sensitive to

consumer concerns in health care (American Hospital Association 1979). No longer can the patient be viewed as a passive recipient of health care. He not only wishes to participate in but also to have some control over his care. Since he may be required to change habits and lifestyles or adapt to new behaviours in achieving an optimum state of health, his cooperation is, in fact, necessary.

HEALTH EDUCATION AND HEALTH PROMOTION

There is still much confusion over the terms 'health education' and 'health promotion', some nursing texts use the terms interchangeably without explaining their meanings and relationship. Macleod-Clark & Latter (1990) suggest that the main difference between 'health promotion' and 'health education' lies not so much with the aims and objectives but the way in which they are achieved. It is obvious that before someone can make an informed decision about adopting a healthy lifestyle, he/she will need the appropriate knowledge. Therefore health education is vital: it enables people to have more control over their own health and the factors that affect it.

Health promotion goes beyond the individual's actions. If social policies affecting health are to be changed, society as a whole needs to be aware of health issues in order to make an impact on those policies through, for example, pressure groups. Many nurses are already actively involved in health education as part of their daily activities, through informing, counselling, advising and helping their clients to learn about their conditions and how to manage them. This often involves not only the client but family and friends as well. It can be done in a number of different ways, including developing support groups in the wards, or informally when providing care at the bedside.

Macleod-Clark & Latter (1990) find "educating" is a preferable term to "teaching" because it suggests a two-way process between the nurse and client. Education is aimed at helping the client to become more aware and at providing the information he needs about his condition and how to manage it. Education may increase awareness and understanding, but it will not necessarily increase compliance.

In general, health education is concerned with a person's learning to live life in the healthiest way possible. Alternative approaches to change in health behaviour, such as legislation and environmental controls, ultimately depend on education for acceptance by people. It is possible to prevent, promote, maintain or modify a number of health related behaviours by means of teaching (Redman 1988).

THE NURSE'S ROLE IN HEALTH EDUCATION

At present, the nurse's role in health education seems to be limited to 'health education activities' - teaching patients and advising on healthy lifestyles (Macleod, Clark & Latter 1990).

The results of early studies have contributed to the recognition of patient teaching as an important nursing activity. Pender (1974) found that 85% of the 162 hospitalised patients she interviewed wished they had received more information about how to care for themselves at home, the effect their illness would have on their daily lives, possible complications and the prevention of future illnesses. Lindeman & Van Aerman (1971) have demonstrated that there are physiological and psychological benefits which patients derive from being taught.

An early study conducted by Linehan (1966) questioned 450 patients during a period of nine months, on what questions they had, whether they asked the questions and whom they had asked. Most commonly, patients wanted to know what was wrong with them, would they get better and when they could resume activities. They wanted to be talked to, told what was happening to them and why, wished more communication between doctors and families, and more explanation of nursing procedures.

Anderson (1973) found that the emotional needs of patients, despite their importance to the patients and nurses, often went unmet. One of the expressed needs of patients was to be given opportunities to ask questions and have procedures explained. Of the 124 patients, 42% felt that nurses did not spend enough time doing this activity. The patients' families expressed similar concerns. Many patients felt that nurses were not able to answer their questions, and that the nurses may even have been told not to answer questions. The survey suggested that along with more general improvements in communication between medical personnel and patients regarding discharge and convalescent instructions, particularly in the surgical area where the questions were more numerous, new methods of teaching patients, pictorially and verbally, through the use of charts, pamphlets, booklets, television and "possibly even the computer" should be investigated.

A recent study by McBride (1994) explored the attitudes, beliefs and health promotion practices of hospital nurses in acute, adult, ward-based care. All qualified nurses in an English teaching hospital were sent a questionnaire. Of the 225 who responded, 94.6% felt that nurses were more appropriate people than doctors to get involved in health promotion, whereas 167 acute care consultants who responded to the same questionnaire, 42.8% agreed with the

statement. It was felt by 84.3% of the nurses that they should be attempting to influence patient's lives through health education activity, though 97.3% of nurses felt that helping people to understand how their body works is an important part of the nurse-patient relationship. Some insight into the failure of nurses to advise on a specific topic was gained when 19.3% of nurses felt unable to advise patients on diet, stating that evidence relating to diet was too uncertain and contradictory, and 24.7% of nurses felt that patients might be annoyed when asked about smoking when smoking was not directly related to the patient's problem. McBride concluded that nurses appear to be aware of the skills of other professions and use them when they feel it is appropriate. Nursing strategies such as lifestyle assessment, health teaching and effective communication can facilitate clients to reach decisions about health practices. Nurses should be alert to lifestyle-induced diseases and risk factors that precede these diseases.

Health care workers have an important role in providing individuals with health information. Nurses can play an integral part in helping the hospitalised patients achieve better health by incorporating health promotion strategies in everyday clinical practice.

Hospitalisation may provide a patient with his or her first encounter with lifestyle assessment and subsequent plans can be made for health education. Health education for patients should be the objective of nursing practice with disease management being only one aspect of the care administered.

Syred (1981) studied the abdication of the role of health education by nurses: many nurses appear to abdicate this role and even basic communication skills appear to be poorly developed. Syred claims that the traditional image of the nurse is one who is too busy and does not have time to talk to patients.

Wilson-Barnett & Osborne (1983) state that nurses have a responsibility to choose the most helpful aspects to teach, to avoid overloading or confusing patients and ensuring that it is seen as important to them.

This statement may sound like a prescriptive approach to patient education, but it could be argued that individualised patient teaching would ensure that patients are involved in choosing information which is important to them. Pohl's survey (1965) of American nurses' views on teaching, found they considered it necessary, and supported the idea that they should teach but admitted that they felt unprepared for this role and very rarely undertook it.

Further work by Hockey (1978) reported a United Kingdom survey in which nurses gave information-giving and preparation for surgery an important place, if they had more time, suggesting that this was not done very much at present. Wilson-Barnett & Osborne (1983), in a review of 29 patient-teaching studies, concluded that whether or not nurses consider teaching important, patients do not generally receive it. The review authors recommend that nurses should include the following in their care:

1. Attempt to provide patients with information related to their particular worries prior to stressful events such as surgery
2. Prepare patients for their life at home during convalescence
3. Help patients to understand their illness and treatment.

Summary

Traditionally, midwives and health visitors have a well defined health education role, especially in the areas of pre and post-natal care and child rearing (Anderson 1979). The hospital nurse has no clearly defined role in health education, although it has long been recognised that all health workers have a role to play in this area, especially those dealing directly with the public.

However, nurses are in a unique position to carry out all levels of health education as they are the most constant point of contact with patients (Smith 1979), and are thereby in a position to initiate and reinforce patient education. The nurse is substantially aided in her task by the fact that she is more likely than other members of the team to develop empathic relationships and is then able to recognise a patient's anxieties and failures in communication. There is a world of difference between a prescriptive approach and that of educating or helping people to make their own decisions about changing their lifestyles or behaviour. Nurses must accept the philosophy that the client should be actively involved. They must also be armed with the appropriate knowledge and skills. Nurses need the skills to act as facilitators, assisting patients to make their own decisions, which requires infinitely more skill than giving prescriptive advice. The profession must ensure that the emphasis is placed on providing resources for pre- and post-registration education and training in communication skills for nurses.

Perhaps the Project 2000 training with its patient education and health promotion components will produce nurses who are proficient health educators and promoters of health.

NURSE FACILITATION

Redman (1988) draws a similarity between teaching and nursing in that each involves a helping relationship that has as its objective the development of independence in the subject.

Jenny (1978) states that the determinants of credibility include expertness, trustworthiness and power or social status. The credibility which the patient accords the nurse will be a product of her professional knowledge, positive self-concept, willingness to embrace the role of teacher/facilitator, her initiative in establishing rapport with the patient and demonstrating her ability to help, her skill in maintaining a supportive nurse-patient relationship and her teaching skills. Jenny (1978) further states that "all of these qualities must be bolstered by an evident commitment to protect and enhance the patient's right to self-care and knowledgeable participation in those decisions affecting his wellbeing" (p.347). In delivering health education where the aim is not merely to inform but to influence people, the credibility of the teacher is important. This has long been recognised in attitude change theory (Festinger 1957) which emphasises the importance of the communicator's personal characteristics in promoting behavioural change. The nurse has the expertise and the image of credibility and trustworthiness with the public, and as such, is well positioned to adopt the teaching role.

Before the nurse can contemplate implementing an effective health education programme with either an individual or group of patients, it is necessary for her to assess and evaluate the patient's situation. The nursing process and written care plans provide a useful framework for this. Woody, Ferguson & Robertson (1984) questioned the validity of the nurse's role as teacher by asking patients pertinent questions after the teaching had taken place. The

study involved 33 trained nurses and 51 patients from medical and surgical wards. Each patient was taught using content categorised in the research instruments. When the nurse felt that the patient had learned the content, she was interviewed by the researcher who documented exactly what the nurse had taught the patient. Immediately thereafter, the researcher asked the patient the verbatim questions related to the content the nurse had said she taught. The authors found no statistical difference between what nurses taught and what patients learned and assumed that patient teaching is a viable nursing role for all types of nurses.

Both the nurse and patient groups knew they were to be questioned immediately following teaching and this may have influenced results. There was no measure of patients' knowledge level prior to teaching nor was there follow-up with regard to whether changes in behaviour that teaching seeks to establish were maintained after patients' discharge from hospital in this study. Redman (1988) has argued that changes in behaviour, the real test of learning, may not occur immediately after teaching. Perhaps a replication of this study including a pre-test knowledge level and follow-up of patients' knowledge and changes in behaviour in the longer term would provide a measure of the value of the nurse's role in patient education.

Tilley, Grigor & Thiessen (1987) measured the perceptions of 38 matched nurse-patient dyads concerning the nurse's role in patient education. The results indicated that incongruencies existed between nurses' and patients' perceptions.

Patients identified a general teaching role for nurses and most frequently preferred to have a physician teach them specific information related to their condition. Nurses most frequently chose a nurse as the current and most desired patient teacher.

Nurses incorrectly assumed that the desires of their patients for patient education were similar to their own. Tilley et al (1987) highlight the importance of clearly defining the nurse's role in patient education and suggests that nurse practitioners and nurse educators should work to define that body of knowledge which is the nurse's unique responsibility to teach patients. Because of the fairly small sample in Tilley et al's study (1987), it may be difficult to generalise on the authors' findings.

Rather than providing medically orientated information, the nurse's role may be to provide assistance to patients with interpreting their illness experience and integrating the implications of that experience into their lifestyle. Benner (1984) describes such activities as the 'teaching-coaching' function of nurses. This function goes beyond that of information-giving or formally planned teaching sessions. Teaching-coaching competencies are embedded in skilled nursing care and include helping patients cope with their illness and mobilising them for recovery.

However, although the nurse is uniquely positioned to carry out health education, it could be argued that she is still poorly equipped for this task and frequently reluctant to carry it out. Syred (1981) found that although degree-course nursing students were more frequently found just talking and listening to patients during quiet times in the ward than traditionally trained students and nurses, they did not consciously undertake the health educator's role.

Financial pressures and the realisation that many diseases and illnesses such as heart and chest diseases are preventable through the adoption of a healthy lifestyle, eg. exercise and diet, is resulting in health professionals turning their attention to prevention. The nurse of the future is likely to emerge with skills as a care specialist/educator, teaching people self-care and how to care for their sick and dependents.

TEACHING AND LEARNING

Patient education has been defined by Bartlett (1985) as a planned learning experience using a combination of methods such as teaching, counselling and behaviour modification techniques that influence patients' knowledge and health behaviour. Redman (1988) suggests it is most useful to health practitioners to view an interaction with patients as contributing to the broad process and objectives of teaching-learning. Each time providers are with patients, they are assessing patient needs, some of which can be met by providing the patient with information, clarifying their thinking, reflecting their feelings or teaching them a skill. Providers also communicate non-verbally and by example about such topics as health and good hygiene practices. The process of teaching-learning often begins when an individual identifies a need for knowing or gaining an ability to do something. At other times, the doctor or other members of the health team recognise that patients need to learn even though the patients are not aware of their own needs.

It is easy to identify the opportunity for teaching when the request is direct. More difficult is inferring the need from observing physical condition and behaviour and anticipating it from the treatment plan. The patient's failure to ask questions should not be construed as understanding. Indeed, it is suggested that caregivers must become proficient at helping patients to identify their needs.

Since learning requires motivation, a realistic goal cannot be set without incorporating the learner's desires. Individuals who are not convinced that they need to learn a particular skill will resist efforts to teach them. Sometimes lack of motivation is the result of difficulty in adapting to an illness, and sometimes it is the result of differences of value systems and concepts of health and illness between the professional health worker and the client. Value systems vary by cultural group and socioeconomic class.

Two of the principles of adult learning suggest that learning is more effective when the content is relevant and the patient participates in determining the sequence and setting of goals. Scalzi & Burke (1982) recommend that to manage the amount of information to be taught, the nurse and patient make a joint decision, setting priorities for content. Lovell (1980) defines learning as a relatively permanent change in our potential for performance as the result of our past interaction with the environment.

Spicer (1982) feels that this definition is incomplete as it does not take into account important changes in such as ageing, illness and disease. Jenny's engagement model (1978) is patient-centred and concentrates on the patient's

perceptions and perspectives. Jenny suggests that a patient accepts or neglects advice depending on his values, beliefs and attitudes and that these determine the extent of his co-operation with the teaching plan.

Teaching consists of assessing what the patient or family needs to learn, planning the lesson, and actually doing the teaching. It also includes ascertaining whether the desired behavioural change has occurred which is accomplished by observation of the behaviour and by oral and written questioning.

The objectives or goals of health teaching are the behaviours desired as a result of the learning process. Determined by the patient and the health team, they are based on the individual's health, social needs, and capacity to learn.

Discrepancy in patient and staff objectives is not uncommon. Dodge's (1972) study of 139 adult patients in a New York hospital found nurses and patients agreeing that patients should be informed about what is wrong with them, how long the illness is likely to last, how they can participate in their own care while in the hospital, and what symptoms to expect. Nurses and patients also disagreed; patients were much more interested in how they would feel than in what would be done to or for them. These findings may be related to patients' desire for prognoses that nurses felt they could not give. Half of the patients were from surgical wards and half were from medical wards, no other diagnostic categories were described in the study.

In particular situations, there will be certain discrepancies in the patients' and staff's ideas of education as well as other goals. They are worth considering since they may adversely affect the teaching relationship. An important

problem is that people often do not maintain initial behaviour changes over a long period of time. The factors that influence the patient to adopt a new behaviour are apparently not the same as those required to maintain it. Short-term training influences are usually no match for the multitude of factors that affect the person's behaviour in months and years to come.

Summary

Patient perception of control, convenience, cost, value of health and understanding of risks are all factors that can modify behaviour (Reichmann 1985). Teaching cannot be effective in the absence of patient motivation because as Fisher (1976) points out, the patient must take the information and use it in order to make himself healthier.

TYPES OF LEARNING

There are two broad categories of learning - behaviouristic and cognitive. Behaviouristic theory sees learning as a conditioning or a reinforcement of behaviours. Motivation for behaviour change comes from the environment, for example, when a person is deprived of something for which there is a need. When the response satisfies the need, the individual is rewarded and the response behaviour is reinforced.

Cognitive theory sees learning as the development of insights or understandings that provide a potential guide for behaviour. Learning may occur with or without a change in behaviour. Motivation becomes associated with goals, expectancies, intentions and purpose. It is more efficient for an individual to learn general information, skills and ways of thinking and apply them to many situations instead of learning specifically for each situation.

Forgetting learned material may be due to disuse of what was learned, interference from other learning, loss during reorganisation of ideas, and motivated forgetting, which may be subconscious (Redman 1988).

Ley (1979) summarised a series of studies on patient memory of clinical advice and found no consistent relationship between age and intelligence and recall. Recall of information was shown to be one third to one half of medical information given to patients. Diagnostic statements were best recalled while instructions and advice were most poorly recalled. Four methods were found to increase recall - the use of shorter words and sentences, explicit categorisation, repetition, and the use of specific rather than general statements. Using these tactics, plus giving instructions and advice and stressing their importance, showed significant differences in amounts recalled by patients.

Robinson & Merav (1976) tested patients four and six months post operatively and found patients could recall fewer than half the items covered as verified against recordings made of the initial postoperative conversation.

Studies of provider-patient relationships have frequently raised questions about quality of interactions. In one such study, physicians were found to spend little time informing their patients, to overestimate the time they did spend, and to underestimate patients' desire for information (Waitzkin 1985).

METHODS OF TEACHING

Preoperative teaching classes and one-to-one instruction are ideal methods of patient teaching (Meeker 1989). However, because of busy schedules and staffing limitations, nurses find less quality time to provide teaching solely through these methods.

Several studies have shown that supplementing routine patient instruction with videotapes and closed-circuit television systems has reduced patients' anxiety and post-operative analgesia requirements (Weis, Sriwatanakul, Weintraub & Lasagna 1983). Gaskey (1987) investigated the impact of supplementing the routine preoperative anaesthesia visit with an educational videotape presentation on anaesthesia procedures. Results showed that patients who viewed the videotape found it to be very thorough in explaining operating room and anaesthesia procedures. Gagliano (1988) reviewed the efficacy of videotapes in patient education and concluded that they are practical, establish consistency of information presented and appear to reach a larger audience than other teaching methods.

Parrinello (1984) studied the effectiveness of a preoperative teaching booklet on 28 arterial bypass patients. Eighty-five percent found the booklet to be helpful to them during surgery preparation. Meeker (1989) found that providing a short video with an accompanying information booklet containing descriptions of procedures pre- and postoperatively, and showing the layout of various pertinent areas in the hospital such as the x-ray department and anaesthetic room, was advantageous to the patient and to the nursing staff. The patient could read the booklet or view the videotape at his own pace and still have the opportunity to ask related questions.

Nursing staff could then reinforce the information given in the booklet and videotape without neglecting other patients. This study also found the booklets printed in the medical centre's own printing department to cost half as much as commercially prepared booklets and concluded that this was an economical means of patient education. A similar programme studied by Stanfield (1987) where the video was shown prior to surgery but the booklet was administered at the physicians office when the surgery was at the planning stage, showed patient compliance with dietary restrictions and surgery preparation to be 99% effective.

It could be argued that this finding is the result of the patient being able to read at his own pace and/or involving the family in this aspect of preparation for surgery. Further study could confirm this as being a simple and cost-effective means of having the patient comply with medical recommendations.

Summary

It is clear that more creativity and flexibility are needed to meet patient education requirements of today. Studies identify and support the use of videotapes, closed-circuit television, audiovisual presentations and written instruction materials as effective alternative methods of preoperative teaching.

COMPLIANCE

While studies have shown an increase in knowledge with the use of structured teaching, this change in knowledge is not consistently associated with compliance with health-promoting behaviours (Marshall, Penckofer & Llewellyn 1986).

Sivarajan, Newton, Almes, Kempf, Mansfield & Bruce (1983) conducted a follow-up study of patients with MI and reported changes in compliance behaviours in patients who attended group teaching/counselling sessions for six months after discharge. The sample was divided into control, exercise and teaching/counselling groups. No significant differences between groups were noted for cigarette smoking, weight loss or dietary intake. However, more patients in the teaching/counselling group reduced their sodium and caffeine intake than in each of the other groups.

Becker & Maiman (1980) believe many interventions are necessary to influence compliance. These include raising information and skill levels, altering characteristics of the regime, assisting to modify health related attitudes, improving various aspects of the relationship between the provider and the patient, enlisting social supports such as the family, and utilising all members of the health-care team.

STRUCTURED AND UNSTRUCTURED TEACHING

Marshall et al (1986) studied a convenience sample of two comparable groups of 32 patients who had CABS. The study was designed to assess the effectiveness of a structured teaching guide for use by the nurses to educate the patient and family about normal post-operative recovery. Patients were assessed preoperatively and risk factors for heart disease identified for each. One group was taught by an unstructured method, the other group received structured teaching. All patients were assessed on discharge and again six weeks later, for postoperative health and compliance with their health risk factors identified earlier. Analysis revealed that both groups had increased total knowledge scores after surgery. Most post-operative health indicators (angina, smoking, hypertension and diet) were comparable between groups.

However, those patients who had structured post-op teaching walked further after surgery and had higher total compliance scores (diet, medication, smoking and activity) than those who had unstructured teaching. The authors conclude that although structured teaching may not have initially affected patients' knowledge, it may have had an impact on their compliance with postoperative health behaviours. Reduction of post-operative respiratory and circulatory problems through deep breathing, coughing and leg exercises was discussed as early as 1941 by Dripps and Waters.

Healy (1968) conducted a comparative study with 321 patients admitted electively for surgery. Patients admitted on busy evenings were allocated to the control group and those patients admitted on less busy evenings to the experimental group. The experimental group received instruction from the admitting nurse on deep breathing, coughing, turning and an explanation of the specific procedures expected with the particular operation. A specific care plan was devised for each patient - deep breathing was taught by demonstration and practiced under supervision. The patients in the control group received the same information but with fewer details. They had no specific instructions or supervised practice in deep breathing, coughing or bed exercises. Data showed 75% (135/181) of the experimental group went home three to four days sooner than the expected day of discharge. Two percent (3/140) of the control group went home prior to the expected discharge date. In the experimental group 88% began oral narcotics on their fourth post-operative day and were off all medication by the sixth post-operative day. Oral narcotics were not begun until the sixth or seventh day for 91% of the control group patients and ten percent of these patients were still on narcotics on the day of discharge. There were three complications in the experimental

group and sixteen in the control group. Healy argued that the research supported the value of having a definite time set aside for preoperative instruction of patients and their families about what they would encounter following surgery. However, this study did not include random assignment of subjects to the two groups or any assurance that the groups were comparable preoperatively. There was no measure of postoperative ventilatory function, making it impossible to know if this or some other factor contributed to the experimental group being discharged sooner and requiring less narcotics. The data were not tested for significance.

Lindeman & van Aerman (1971) examined the effect of structured versus unstructured preoperative teaching on postoperative ventilatory function, length of hospitalisation and postoperative analgesic use with a convenience sample of 261 patients. Structured preoperative teaching using a 'sound on slide' programme was more effective than unstructured teaching in increasing postoperative ventilatory function and decreasing length of hospital stay.

However, patients in the structured teaching group were admitted the week before Thanksgiving which may have contributed to decreased hospital stay. Differences in postoperative analgesia requirements between the groups were not found though this may have been due to drugs being prescribed on a regular basis by some surgeons and on request by other surgeons.

When Tarsitano & King (1982) replicated this study, length of hospital stay was not significantly reduced.

Summary

Although Healy's early study (1968) supported structured teaching as being more successful than unstructured teaching in terms of patient recovery from surgery, more recent studies have not shown the same effect. However, one clear advantage to a structured approach to teaching is that the information given is standardised and all the necessary topics are covered.

TIMING OF INFORMATION

Carnevali (1971) suggested that the preoperative period is normally a stressful, anxiety-ridden time in a patient's life when the activities of the nurse may be particularly important in providing support and comfort as well as the routine physical ministrations required. Powers & Storlie (1969) state that the aim of preoperative teaching is to get the patient into the best possible condition for surgery. Zander (1978) has specified four aims of preoperative teaching - to allay fear, to gain cooperation, to prevent emotional trauma and to help the patient understand his disease and treatment. Achieving these aims results in physical and psychological wellbeing preoperatively. Postoperatively, the overall aim is to promote rehabilitation.

Preadmission clinics and testing is currently used in many institutions. Preadmission teaching has been limited mainly to clinic settings (Williams 1986). Knowles (1970) stressed the importance of establishing a climate conducive to learning, arguing that readiness to learn is promoted by a non-threatening environment. Knowles also suggests that the best learning takes place when learning is immediately useful.

Williams (1986) studied a sample of orthopaedic (hip replacement) patients to assess whether preoperative teaching in the home setting was better than teaching on admission for surgery. The author found no difference in the amount of analgesia required, systolic blood pressure, or length of stay postoperatively but did find a significantly higher level of preoperative anxiety in the hospital-taught group. However she was unable to conclude that this was linked to home teaching as this could be due to the hospital setting causing more anxiety or the hospital taught patients being assessed at a time much closer to the actual time of surgery than the teaching and anxiety measurement done in the home. The small sample of 30 patients led the researcher to recommend replication using a larger sample size.

Christopherson and Pfeiffer (1980) suggest that a sizable number of patients might not read written information sent to their homes. They sent an information booklet to patients scheduled for open heart surgery approximately two weeks prior to date of admission to hospital. Of the 41 patients who received the booklet, 12 (29%) chose not to read the material. The booklet explained the surgical process but did not include instructions in activities patients would be expected to perform. Patients may be more motivated to learn exercises if they understand that the exercises will help them to recover.

Patient literacy was not measured in the latter study although all participants completed questionnaires. Although readability of the booklet was not measured, the authors comment that the text may have been both too

detailed for some patients and not detailed enough for others. It must also be acknowledged that some patients who do not wish detailed information will choose not to read booklets related to their forthcoming hospitalisation and surgery.

Rice & Johnson (1984) carried out a study using preadmission self-instruction booklets on hernia repair and cholecystectomy patients in a general hospital serving a middle-class community. One hundred and thirty of the 135 subjects contacted completed the project. They were randomly assigned to one of three levels of preadmission instruction - specific exercise instruction, non-specific exercise instruction and no exercise instruction for coughing, deep breathing, ambulatory activity and leg movements. The booklets were sent to the patients two weeks prior to admission. The authors found that during hospitalisation, patients in the specific exercise group performed significantly more of the exercises common to both books than did the non-specific instruction group. Required post-admission teaching time did not differ between the specific exercise and the non-specific exercise group but both groups required significantly less teaching time than the no preadmission instruction group. No differences in results were found between instructions and the type of surgery. Rice & Johnson (1984) conclude that elective pre-surgical patients will learn instructions about exercise behaviours, while Christopherson & Pfeiffer's (1980) study showed that patients might not read information about the surgical process. It is not known whether the authors of these studies took into account what the patients wanted to know when deciding on the content of their booklets.

Steele & Ruzicki (1987) suggest that inpatient teaching programmes can be effective for short-term outcomes, such as information that prepares the patient to deal with postoperative experiences ie. ambulation, exercise, resumption of sexual activity. Limited knowledge gain was found in areas which required long-term behaviour change, such as stress modification and dietary changes. The research findings were based on an evaluation of a six year-old cardiac teaching programme which was predominantly CABS instruction and where the authors investigated knowledge acquisition of in-patients and patients' confidence level with required behaviours after discharge. It was found that as length of stay decreases and acuity levels increase for hospitalised patients, inpatient teaching must be limited to what is possible and reasonable, that is, what is possible for the staff to teach during the short length of stay and what is reasonable for patients to learn, given their acuity.

Why the patients in the latter study learned the exercise behaviours at home needs to be studied. Providing instructions for self care at home may allow the patients to use that information to increase their sense of control over some aspects of the impending experience. Anxiety and distractions in the environment are present following admission to hospital and can interfere with learning and feelings of control.

Rice & Johnson's (1984) study demonstrated that most patients can learn exercise behaviours prior to hospital admission. In addition, more complete learning of the material occurred when the instructions were specific. As patients are now hospitalised for shorter periods of time, nurses must find ways to convey health information and/or instructions that compensate for the reduced amount of time that the patient is available to the nurse for teaching.

Sending the information to the patient's home and then reviewing it on admission is one approach to solving this problem. It allows reinforcement of what the client already knows and additional time to give support or information based on an assessment of individualised needs.

TEACHING TOOLS

A number of teaching tools are available: printed materials in books and pamphlets, programmed instruction, pictures and other visual aids (slides, video), individuals or groups. In using written materials as teaching tools, one must consider more than vocabulary and sentence length.

Other factors affect readability - format, illustrations, type size - but are not incorporated into readability formulae. Printed teaching material provides limited feedback but is constantly available. Print partially relaxes time requirements and is more efficient than oral language (except for the illiterate) because readers can control the speed at which they read and comprehend.

Audiovisual aids represent additional ways to communicate. As with printed material, they must be correct and complete. The primary disadvantage of transient presentations is that the learner must store information because it is not available in the environment for a long period of time.

Pamphlets can support patient instruction by serving a number of functions:

1. They provide a focus for discussion between the nurse and patient about health related issues and they may serve as encouragement for patients to ask questions about their concerns.

2. They provide the nurse with a reminder of all the points that need to be reviewed.
3. They are take-home reference material for patients.
4. Their use ensures that all patients on the unit receive standard, approved information.

Often there is no one best medium or media mix for a given objective; one chooses an alternative based on cost, availability and user preference (Tosti & Ball 1969).

Readability

There are a number of readability formulae available to calculate the reading-grade difficulty of the printed material. Spadero, Robinson & Smith (1980) found a high level of correlation among the scores from the various tests. Readability formulae are not hard and fast indicators of understandability. This is why experts suggest that all printed materials be pretested on the target audience (Miller 1985).

Bartlett (1984) estimates that the median literacy level in the US is tenth-grade and that 20% of the population reads at fifth grade level. Redman (1988) suggests that as a rule of thumb, education materials should be written at eighth-grade level or lower. Eighth grade corresponds to secondary two in the UK.

Content Of Education Materials

Content of patient education material must address the following - is it accurate, is there enough information, is it consistent with hospital policies, are there vital omissions, irrelevant facts or just too much information? Boyd

(1987) suggests content should be organised so as to inform the patients adequately but not overload them with "nice to know" details (as opposed to "need to know").

Format Of Education Materials

Written patient education materials must also be in a readable format. One method is to divide the material into sub-headings, another is using a question and answer method where the patients can easily sift through questions to find the topic of their interest. The use of technical jargon should be avoided where possible, sentence length kept to a minimum and the most important points should be covered first. Characteristics of the target group should be taken into account when considering type size and layout of educational materials, e.g. larger type for older or visually impaired patients.

Summary

The large body of evidence suggests that a variety of patient education materials are useful in giving information and instruction to the pre-operative patient. In reviewing the current literature, pamphlets and booklets appear to be the most cost-effective and easily administered way of providing that information. Whether booklets have a part to play in changing patients' behaviours in the long-term is an area for further research.

With forced shorter hospital stays, increasing demands on available time, and the need to give acutely ill patients highly technical information as quickly as possible, health professionals must strive to make patient education as productive as it can be (Miller 1985). In today's climate of "faster" health-care, the nurse must try to teach in less time than ever before and still be

effective. Miller (1985) suggests the nurse must use every patient encounter as an opportunity to teach or perform one aspect of the teaching process such as assessing readiness or reinforcing teaching that has already taken place.

Miller states that when viewed in this way, teaching is not a separate intervention, it is an integral and deliberate part of almost every nursing activity.

Bartlett (1984) defines patient education as a process of informing patients and their families about the illness, treatment and other health related matters, including how to adhere to the regime, and helping them change their behaviour. Bartlett's three-step approach includes:-

1. establishing rapport and reducing anxiety and fear;
2. teaching the patient about his illness, treatment plan and other health matters; and
3. overcoming obstacles to behaviour change

Boyd (1987) suggests that an accurate and readable piece of patient education material reinforces verbal instruction and can serve as a resource at home. Many patients are already motivated to carry out prescribed regimes and have the social systems to support them. The patients who are not motivated present the greatest challenge.

The importance of patient education in the recovery of CABS patients has been generally accepted. In total programme numbers in the US in 1984, cardiac education in hospitals ranked second only to diabetes education (Giloth 1984). Previous research focused on various aspects of teaching CABS patients, including determining learning needs, teaching strategies, assessing readiness to learn and evaluating whether teaching affects patient

behaviour. Some studies have looked at long term effects of teaching programmes on patient outcomes and compliance. Little attention has been paid to information-giving in the waiting period prior to surgery. In the UK, the current situation around the country shows a waiting time of 6-24 months for coronary artery surgery for stable angina pectoris.

Brambilla (1968), in her investigation of patients' questions, found that patients requested information about the surgical experience and about the activities following discharge. Her conclusion was that "a teaching plan should include not only the material that nurses think the patients should know, but also considers what the patients say they want to know".

SUMMARY OF LITERATURE REVIEW

This literature review has discussed the development and effects of CHD, which leads to CABS for many patients. It considers the effect of anxiety on the patient in the preoperative period and its effects on peri- and postoperative recovery. Patient education has been examined, taking account of theoretical background and teaching methods, paying particular attention to the education of the pre-surgical patient.

Much of the existing research has been carried out in the post-admission, preoperative period. Many CABS patients face an extensive waiting time from referral to surgery, therefore it would seem appropriate to use this waiting time to help prepare these patients for surgery. Information-giving is known to be effective in reducing anxiety in other situations, and as CABS patients suffer preoperative anxiety, it would be worthwhile to investigate whether information-giving in the form of a booklet would be effective in

reducing that anxiety in this group of patients. The information booklet should also serve educational function with regard to modifying risk factors for surgery and progression of CHD, perhaps evoking a positive change in behaviour. The review has taken a comprehensive overview of risk factors associated with the development and progression of CHD, however, the scope of the study limits the number of risk factors which may be addressed. Of the modifiable risk factors reviewed, diet, overweight and cigarette smoking were chosen as changes in these factors were believed to be easily measured by the researcher. In addition, exercise level was included to assess whether patients maintained or improved their exercise level while waiting for surgery. Improving on the above factors may also be seen as sensible preparation for anaesthesia and major surgery.

This study proposed to test the following hypothesis:

Patients who receive information and advice while on the waiting list for CABS will;

1. have increased knowledge and decreased anxiety prior to admission for surgery, and
2. improve their exercise level, adopt healthy eating practices and stop smoking, if currently a smoker.

In view of the limitations of the researcher's time and experience, the information package used in this study consisted of an information and advice booklet, written for patients being admitted to the study centre.

CHAPTER 3: METHODS

INFORMATION BOOKLET

An information booklet (Appendix VIII) was compiled by the researcher to be given to patients when they were put on the waiting list for surgery. The information and advice contained in the booklet was based on the comments of patients discharged from the cardiac unit. The comments had been obtained by the researcher while conducting a survey of postoperative information for cardiac surgery patients. The last question in the survey was " what information would you like to have had prior to admission for surgery?". The responses formed the starting point for compiling the information and advice booklet.

The content of the booklet fell into three sections. The first section contained information in text and diagrammatic form, about the structure and function of the heart, the development of coronary artery disease and a brief description of the coronary bypass grafting procedure.

The second section was concerned with events surrounding admission for surgery and the postoperative stay in hospital. This included a measure of the patient's capabilities prior to discharge with regard to degree of independence and mobility.

The third section contained advice to help the patient prepare for surgery while on the waiting list. This consisted of advice on and rationale for increasing exercise level, stopping smoking, losing weight, cutting down on fats in diet - particularly saturated fats, and reducing stress. It was felt that the patient could decide whether any or all of these measures were appropriate in helping him prepare for surgery.

Two of the available readability measurement formulae, SMOG (McLaughlin 1969) and FRY (Fry 1968) were used to assess readability of the advice and information booklet and the results were SMOG - grade 10, FRY - grade 7. These are United States' reading grades which are comparable to Secondary 3 and 1 in the United Kingdom. Formulae authors state that readability is calculated to within two US reading grades. This suggests that although results differed slightly, there is agreement between the formulae. Redman (1985) recommends that patient education materials should be written at around grade 8 reading level.

As readability formulae are not always reliable indicators of understandability, the booklet was pretested on a group of ward nurses and doctors and the target population of patients awaiting cardiac surgery.

The researcher planned to give the information and advice booklet to patients at the clinic visit when they were put on the waiting list for surgery. The average waiting time for surgery at the study centre was 3 months. It was felt that 3 months would be a reasonable time prior to surgery for the patient to be given information and advice and for him or her to act on that advice. Giving the booklet at this time to back-up the surgeon's advice was thought to give a standardised approach. It was also hoped that the booklet would appear more official if given out at this time rather than being sent unsolicited, through the post.

Ley (1973) and Ley, Bradshaw & Eaves (1979) reported from their studies of doctor-patient communication that although patients forget within five minutes one half of what they have been told, they recall more of the information presented to them if they are given written instruction to which

they could refer repeatedly. More recently, Ley (1982) concluded that patients remain dissatisfied with communication and often do not understand much of what they have been told. Patients often forget what they have been told and written information for patients is produced in a language too difficult for its intended audience to understand.

An added advantage of patient education materials to be taken home is that if the patient finds them difficult to read or understand, family members may be able to read and pass on the information. Family members have also been seen to benefit from preoperative information in studies by Raleigh et al (1990) and Leske (1993).

PILOT STUDY

A pilot study is described by Fox (1982) as a miniature of some part of the actual study in which the intended instrument is administered to subjects drawn from the same population as will be used in the research, or a similar population . Treece & Treece (1986) suggest that a pilot study should only differ from the main study in terms of numbers of subjects, and that a complete mini-study will identify weaknesses in the design.

Limitations of time in the present study made it necessary to follow Fox's definition and restrict piloting to certain parts of the study, namely the information booklet and the knowledge questionnaire. Piloting of the entire study may have identified weaknesses in the design, however, at the time of piloting, the waiting list was 3 months long and the problems which resulted from the extended waiting time would not have been evident.

The pilot study was carried out to assess the readability and content of the advice and information booklet and the applicability of the knowledge questionnaire (Appendix V). This was performed by asking nursing and medical staff on the cardiac surgery ward for feedback and comments on the content of the booklet, and pretesting the booklet and knowledge questionnaire on a group of fifteen patients on the waiting list for cardiac surgery.

Fourteen patients (nine men and five women) waiting for coronary bypass surgery agreed to read the booklet and answer the researcher's questions - namely, the knowledge questionnaire. These patients were due to have their surgery within the next three months, and were believed to fulfil the criteria set down for the proposed study population.

A telephone call of introduction and to obtain verbal permission to take part in the piloting of the booklet was made to each patient by the researcher and was followed by the advice and information booklet and covering letter (Appendix I) being sent to them. The interview was carried out by the researcher in the patient's home where the knowledge questionnaire was administered. All patients and staff questioned thought the booklet to be useful information for cardiac patients. All patients felt it was easy to read and understand and contained enough general information, although two patients suggested that the stress section and the diet hints could be expanded. One patient suggested clearer diagrams, particularly of the heart valves. Following these comments, a diet fact-sheet was added to the text and the valve diagram was re-drawn. The stress section was expanded to include hints on how to deal with some potentially stressful situations.

Two amendments were made to the knowledge questionnaire following the pilot testing. Question 3a asked "what causes this (chest) pain?" The investigator's intention was to find out what the patient knew about the physiology surrounding the development of atheroma in the coronary arteries. Of the nine patients who responded to this question, the initial response of four was to name a task or activity which caused chest pain. For that reason, a prompt of "what is happening to the heart" was used in the study.

Questions 12-15 related to healthy eating guidelines. The term "substances" did not appear to be clear to many patients, therefore, "types of food" was substituted for the study. Both of the above were seen as minor changes and the questionnaire was not re-piloted.

The other two instruments to be used in the research were not piloted. The State Trait Anxiety Inventory had been extensively used in patient and non-patient groups, and had established reliability and validity (Speilberger et al, 1983). The food frequency form (Holt 1978) had been successfully administered to a similar group of patients and was to be used in this study to establish a baseline measurement of dietary intake and indicate a trend over the longitudinal study.

SAMPLE AND SETTING

The study was carried out by the researcher. Ethical Committee approval was given and all four Cardiac Surgeons gave permission to approach patients on their waiting lists. A letter was sent to the patient's general practitioner introducing the researcher and the study (Appendix III).

Subjects were recruited from the cardiac surgery waiting list of the Western Infirmary, Glasgow. Coronary artery bypass patients were chosen as they represent the large majority of patients admitted to the unit and these patients tend to follow a similar pre- and postoperative course. A convenience sample of patients judged to be three months from surgery was contacted by the researcher. A convenience rather than a consecutive sample of patients was used due to the vagaries of the cardiac surgery waiting list.

Patients are not admitted in the order that they are put on the list, rather, they are admitted according to the degree of urgency for surgery, the surgeon's choice and availability of blood groups from the Transfusion Service.

Criteria and rationale for inclusion in the study were:

1. No previous CABS - previous CABS would alter the patient's preoperative knowledge level of the reasons for and the events surrounding the operation and stay in hospital.
2. No other major disability - one of the measurements used in the research was the distance the patient could or did walk.
3. Patients consented to be interviewed in their own homes - it was hoped that the patients would feel more relaxed and comfortable in their familiar surroundings and as the researcher was carrying out all the data collection, it simplified organising interviews with patients. In a longitudinal study, advantages of home visits for the subject include being interviewed in a natural and comfortable setting, being spared the inconvenience of trips to the research site. Advantages for the researcher include an improved response rate and an opportunity to develop a relationship with the subject (McCausland & Burgess 1989).

4. Patients lived within the Glasgow area - this was to minimise the researcher's time travelling to and from interviews. The researcher acknowledges that this criterion may limit the degree to which the findings can be generalised to the CABS population as a whole, but as the majority of patients on the waiting list lived in the Glasgow area, excluding those from other health boards was not felt to make the sample unrepresentative.

A fifth criterion was introduced early in the data collection - that the patient should have a telephone at home. As previously stated, the researcher was carrying out all the data collection and where there was no telephone contact, a great deal of time was spent travelling to and from the patient's home to arrange a suitable time for each interview and then returning to carry out the interview. Again, it must be acknowledged that this may limit the representativeness of the study sample to the CABS population.

The majority of patients on the waiting list met the inclusion criteria and it was felt that this group would provide a representative sample of waiting list patients for the purpose of the study. Statistical advice was taken and it was decided to recruit a sample of 120 patients, giving two groups of 60 subjects. This sample size would achieve a 90% chance of detecting a real difference between the groups at $p < 0.05$.

Once the initial interview was arranged, the patient was randomly assigned to the control or the experimental group by means of a coin flip.

INSTRUMENTS

Three instruments were used:

1. STAI Form-Y

The State-trait Anxiety Inventory (STAI) was originally published in 1970 as Form-X, and was revised in 1980 as Form-Y (Appendix IV). The state-trait anxiety theory states that stressful stimuli evoke differential levels of state anxiety in persons who differ in levels of trait anxiety (Spielberger et al, 1983).

Trait Anxiety

The trait anxiety scale measures the relatively stable personality traits and differences that are expressed in particular dispositions to react or behave in a specified manner over time. The qualities evaluated in the scale are the specifiable tendencies to perceive the world in a certain way. The trait anxiety scores have a predictable stability over time as a stable indication of anxiety proneness among people. Trait anxiety scores tend to be positively correlated with state anxiety scores.

State Anxiety

The state anxiety scale measures the transitory emotional state which results from an emotional reaction to a given stimulus. The qualities evaluated in the scale are current feelings of apprehension, tension, nervousness and worry. The tendency for state anxiety scores to increase when conditions are perceived as threatening or dangerous is predictable. Persons with high state anxiety scores tended to perceive the same condition as more threatening than persons with low state anxiety scores. Thus, state anxiety is a reactive process of varying intensity taking place at a particular moment.

Each self-report scale consists of 20 statements to which subjects respond by selecting one of four options which are assigned values of 1,2,3 or 4 according to the intensity of emotion perceived for each statement. The range of possible scores for each scale is therefore 20-80.

The questionnaire was used in this research because it was easy to understand and administer, taking only a few minutes to complete. The STAI Form Y has been used in a number of nursing research studies and with various patient groups. Christopherson & Pfeiffer (1980) and Anderson (1987) used STAI Form Y to assess pre- and postoperative CABS patients. Speilberger, Gorusch & Lushene (1983) established construct validity and test-retest reliability for this inventory using graduate students, military personnel and medical, surgical, dental and psychiatric patients. Extensive reliability and validity data and correlations with other anxiety measures have been documented in the STAI Manual (Spielberger et al, 1983).

2. A knowledge questionnaire (Appendix V) was developed by the investigator from the content of the information and advice booklet. As previously stated, the content of the booklet was based on the responses of previous CABS patients when they were asked what information they wished they had had prior to the surgery. The questionnaire contained 20 questions, 19 of which were used to compile a knowledge score. Question 7 was asked of the test group at the second interview to ascertain whether they had read and remembered how long they were likely to be in the intensive care unit after their operation. The investigator and colleagues felt this piece of information was unlikely to be discussed in general information booklets or in conversation and was only mentioned when the patient was admitted for surgery. The remaining 18 questions were scored from one to 9: 1 being the

correct response and 9 being "don't know". Partially correct answers were scored as 2 and incorrect answers were scored as 3 for questions 1-10. Questions 11-14 related to healthy eating and were scored from 1-4 with 9 being "don't know". Questions 15-17 related to exercise level and were scored from 1-6. Questions 18 and 19 were concerned with smoking habit and were scored 1-4. The possible scoring range was 19 to 114. It was decided to score the knowledge level in keeping with the scoring of the other instruments, therefore, a lower knowledge score corresponded to a higher knowledge level.

3. A food frequency form (Appendix VI) used by Holt (1978) in her study of the nurse practitioner role in coronary rehabilitation was adapted to assess general eating patterns. It consisted of questions on fat, sugar and fibre intake and whether the patient had been given dietary advice and, if so, from which source. There were ten questions related to fat intake, nine questions were each scored from 0 to 4, and one question was scored from 0 to 3, giving a range of 0-39. There were ten questions related to sugar intake were similarly scored giving a range of 1-39. A lower score for both these variables corresponded to a lower dietary intake. There were five questions relating to fibre intake with one question scored from 0 to 3, three questions scored from 0 to 4 and one question scored from 0 to 5, giving a range of 0-20. In this instance, a lower score corresponded to a higher fibre intake. This questionnaire was chosen as it asked the questions relevant to the purpose of this study. It was easy to administer, again taking only a few minutes to complete.

Weight

Patient weight was measured to assess whether changes in eating and/or exercise patterns resulted in weight changes. Weight was recorded on the researcher's own Salter scale on each occasion. This was a self-calibrating digital scale used exclusively for the study. Most subjects were weighed in indoor clothing without footwear. If the subject was weighed wearing slippers, shoes or jacket, it was noted so that subsequent weighing would take the clothing into account. Weight was recorded in pounds (lbs) as subjects were more familiar with this value than kilograms. This enabled feedback to subjects on any changes in weight.

The concept of validity used in this study is concerned with the extent to which the instruments used will, in fact, measure that intended. With that in mind, all three questionnaires appeared to fulfil the study criteria.

PROCEDURE

Patients fulfilling study criteria were sent a letter of introduction by the researcher of introduction, with a brief description of the reasons for, and the design of the study (Appendix II). The letter stated that the researcher would contact them within the next week. Verbal consent was given over the telephone and an initial interview arranged. For those patients without a telephone, the researcher travelled to the patient's home to arrange a date and time for each interview. All interviews were carried out by the researcher in the patient's own home. At all interviews, the questionnaires were administered in the same order. The STAI was completed first. The diet questionnaire was administered prior to the knowledge questionnaire as it was felt that some of the questions on healthy eating in the second might influence some of the responses to the diet questionnaire.

At the initial interview all three questionnaires were administered. The patients who were assigned to the experimental group were then given the information booklet. They were asked to read the booklet and show it to their families if they felt it appropriate. (The researcher did not encourage questions from the patient or spouse but did answer questions asked - at the end of the interview.)

The initial interview was to be carried out three months prior to surgery. The actual timing of this interview was 3 - 29 weeks (median 11). At the time of arranging the interview, the researcher believed the patient to be three months from surgery. The patient was not made aware of the likely date for surgery and knew only the vague time scale of operation discussed by the surgeon at the referral clinic. Reasons for the variation in timing are described in detail in Chapter 5.

The second interview was to be conducted between the patient receiving a date for admission for surgery and actual admission. At this time all three questionnaires were administered.

The third interview was to be carried out two to three months after surgery and at that time the STAI and the diet questionnaire were administered. Objective comments from patients were noted at this time.

After 27 months of data collection, only 15 completed data sets were obtained. Reasons for the small sample size were a sudden change in waiting-time for CABS from 3 months to 1 year, and a subsequent waiting list

initiative by the local health board. This led to 100 patients fulfilling the study criteria having surgery at another centre and making them ineligible for inclusion.

DATA ANALYSIS

Data analysis was carried out using Microsoft Minitab version 8 for the Personal Computer. One-way analysis of variance was used to establish whether differences existed between the means of the initial values of three groups - the study sample made up of test and control subjects, and the group of subjects who completed the initial interview but were then lost to follow-up. Data within the test and control groups were found to be not normally distributed. Therefore, initial values were analysed using the non-parametric Kruskal-Wallis test. The Mann Whitney U and Mood Median tests were used for all further analysis as both these tests are useful in analysis of small sample sizes.

Significance was set at $p < 0.01$ to correct for multiple testing.

CHAPTER 4: RESULTS

Between September 1990 and July 1992, 78 subjects fulfilling study criteria were sent a letter of introduction and explanation of the study by the researcher which led to 48 initial interviews. Subjects were randomly assigned to test or control groups when the initial interview was arranged.

Thirty subjects did not participate in the study for the reasons stated in Table 4.1. Thirty-three of the 48 subjects interviewed were lost to follow up for reasons stated in Table 4.2. Fifteen of the 48 subjects initially interviewed completed the study.

The sample of subjects who completed the study consisted of thirteen males (86%) and two females (13%) with a median age of 65.5 years in the test group (range 46-72) and 63 years in the control group (range 53-69). There were 8 test subjects and 7 control subjects with 1 female in each group.

The initial interviews were carried out 3 - 29 weeks prior to surgery. There was no difference in interview timing between the groups, test group 6 - 29 weeks (median 11), control group 3 - 26 weeks (median 11).

The second (pre-operative) interviews were carried out 2 -15 days before surgery. There was no difference in interview timing between the groups, test group 3 - 9 days (median 5), control group 2 - 15 days (median 3).

TABLE 4.1: SUBJECTS LOST TO INTERVIEW

Reason Not Interviewed	Number of Patients
Unable to contact	8
Refused	3
Taken off waiting list	2
Died on waiting list	2
Admitted to local hospital	1
Operation in other hospital	7
Operation brought forward	4
Incomplete questionnaire	3
TOTAL	30

TABLE 4.2: SUBJECTS LOST TO FOLLOW UP

Reason Not Interviewed	Number of Patients
Unable to contact	2
Refused	2
Admitted to local hospital	1
Operation elsewhere	13
Operation brought forward	15
TOTAL	33

The third (post-operative) interviews were carried out at 7 - 14 weeks after surgery. There was no difference in interview timing between the groups, test group 8 - 14 weeks (median 9.5), control group 7 - 13 weeks (median 12).

One-way analysis of variance was carried out to assess whether the subgroup of 15 subjects who completed the study was similar to the group of 33 subjects who completed the initial interview but were lost to follow up. Most of the data were found to be not normally distributed, therefore, analysis was repeated using the non-parametric Kruskal-Wallis test. There were no differences in initial values for those who completed the study and those who were lost to follow up (see Table 4.3). Mean values obtained from one-way analysis of variance are reported in Appendix VII.

The Mann-Whitney U and Mood Median tests were used for the subsequent analysis of the subgroup of fifteen individuals, eight test subjects and seven control subjects who completed the study.

ANXIETY

Anxiety level was assessed using the Speilberger State-Trait Anxiety Inventory (STAI) form Y.

Trait anxiety

Trait anxiety scores measure the relatively permanent personality traits and differences. The scores have a predictable stability over time. The possible score range is 20-80, the higher the score, the greater is the level of anxiety. Analysis showed no difference between the test and control groups despite a greater variation within the control group scores (see Table 4.3).

TABLE 4.3: MEDIAN VALUES AT INITIAL INTERVIEW

Initial Values	Test Group	Control Group	Group Not Followed
n	8	7	33
Sex M:F	7:1	6:1	24:9
Age (range)	65.5 (46-72)	58.0 (53-69)	62.0 (42-70)
Trait Anxiety (range)	35.5 (27-42)	39.0 (20-54)	37.0 (22-67)
State Anxiety (range)	32.5 (25-37)	34.0 (20-72)	36.0 (20-62)
Knowledge Score (range)	40.0 (29-42)	39.0 (33-48)	37.0 (24-53)
Fat score (range)	21.0 (14-26)	21.0 (18-26)	20.0 (9-21)
Sugar score (range)	18.0 (11-27)	16.0 (5-29)	17.0 (7-29)
Fibre score (range)	9.0 (6-13)	9.0 (8-13)	10.0 (6-13)
Weight - lbs (range)	174.5 (136-189)	172.0 (150-185)	169.0 (88-257)

Possible score ranges:

Trait Anxiety	20-80
State Anxiety	20-80
Knowledge	19-114
Fat	0-39
Sugar	1-39
Fibre	0-20

The test group score ranged from 27-42 (median 35.50). The control group score ranged from 20-54 (median 39.00).

State Anxiety

State Anxiety scores indicate how the person feels now and often reflects situational factors that may influence anxiety levels. The possible score range is 20-80, the higher the score, the higher is the level of anxiety.

Analysis was carried out using the Mann-Whitney U test.

Initial state anxiety scores did not differ between groups although the control group median was very slightly higher. Test group scores ranged from 25-37, (median 32.50) and control group scores ranged from 20-72, (median 34.00).

Initial state and trait anxiety scores were positively correlated. Spearman's rho correlation was 0.742, $t = 3.988$ which was significant at the $p<0.005$ level.

At the second (preoperative) interview, the groups showed differences in anxiety consistent with the hypothesis. The test group state anxiety decreased relative to the initial value, while that of the control group increased very markedly. The test group scores ranged from 20-42 (median 28.50), the control group scores ranged from 20-58 (median 43.00). Thus, although there was an apparent difference between the groups in anxiety at this time, the very great variation in anxiety scores meant that the difference was not significant.

At the third (postoperative) interview, anxiety scores between groups were similar with the control group making the larger decrease from the second interview score. The test group anxiety scores ranged from 20-39 (median 26.00), the control group anxiety scores ranged from 20-36 (median 24.00). State Anxiety scores are presented in Table 4.4. Anxiety scores over time (interviews one to three) did not differ between groups or within groups.

Anxiety scores between second and third interview showed a substantial difference between the groups, test group median -3, control group median -15 (see Fig 1).

KNOWLEDGE

Knowledge scores were obtained from all subjects at initial interview and second (preoperative) interview. The possible score range is 19 - 114. Reduction in score corresponds to an increase in knowledge.

The difference between first and second interview scores (2-1) showed an improvement in both test and control group knowledge, but only in the case of the test group was the difference significant ($p < 0.01$). Group scores decreased over time (see Table 4.5) but no statistical differences between the groups were found.

Individual knowledge scores showed an improvement for thirteen subjects in the sample who reduced their scores by five to fifteen points at second interview. One test subject achieved the same score at second interview (score =31) and one control subject increased his score from 48 to 49.

Knowledge and State Anxiety

Knowledge and state anxiety scores were examined to assess whether there was a correlation between increased knowledge and lower anxiety scores. No significant correlation was found.

TABLE 4.4: MEDIAN STATE ANXIETY SCORES

Group	Initial Value	Interview 2	Interview 3
Test = 8	32.50	28.50	26.00
(range)	(25 - 37)	(20 - 42)	(20 - 39)
Control = 7	34.00	43.00	26.00
(range)	(20 - 72)	(20 - 58)	(20 - 36)

Possible score range 20-80

Figure 1. Median State Anxiety scores over time.

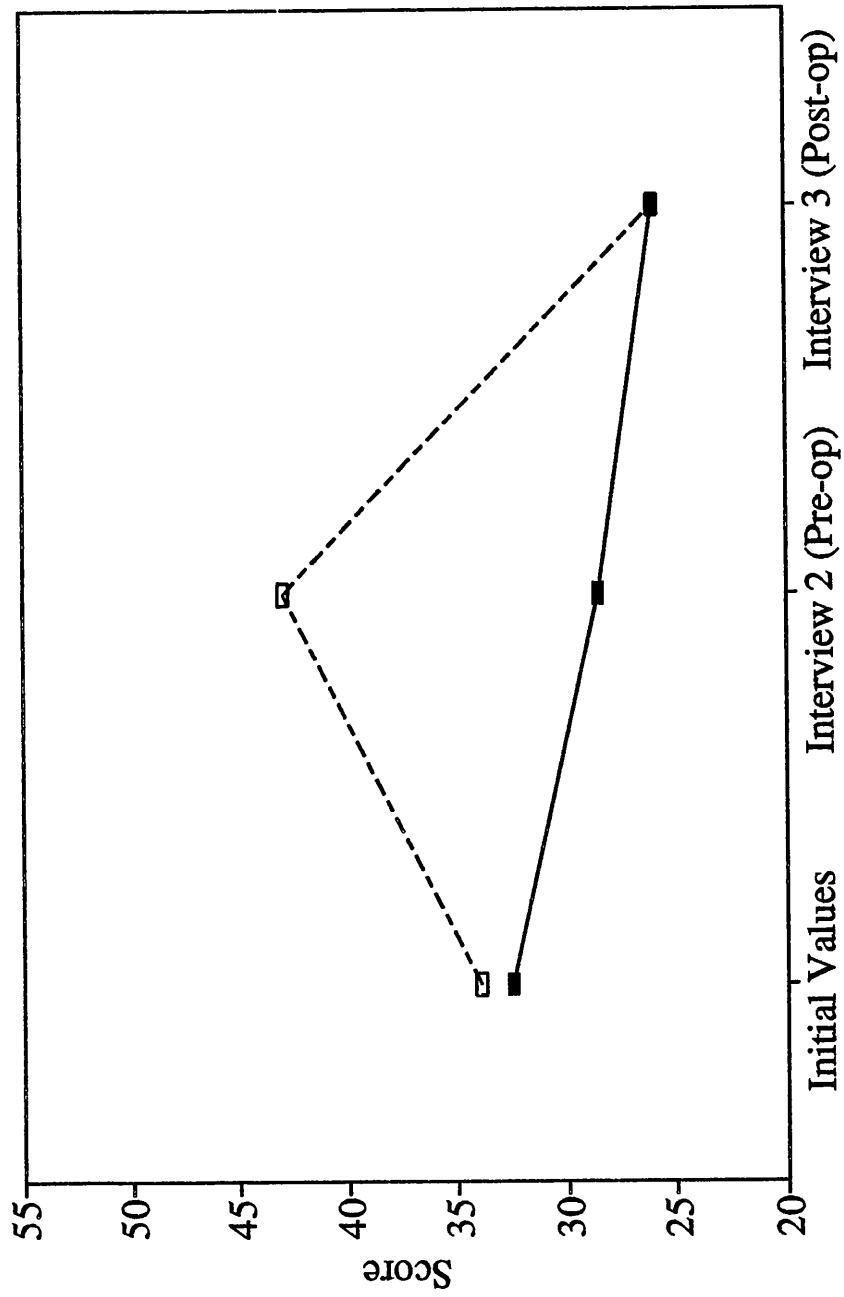

TABLE 4.5: MEDIAN KNOWLEDGE SCORES

Group	Initial Value	Interview 2	Difference 2-1
Test = 8	40.00	27.50	-10.00
(range)	(29 - 42)	(21 - 31)	(-15 - 0)
Control = 7	39.00	30.00	-6.00
(range)	(33 - 48)	(27 - 49)	(-14 - 1)

Possible score range 19 - 114

DIET

The diet questionnaire was administered to all subjects at all three interviews. Fat, sugar and fibre scores were obtained by adding together the individual scores from relevant questions. Total diet score was obtained by adding the fat, sugar and fibre scores.

Fat

The possible range for fat score was 0-39. A lower fat score corresponds to a lower fat intake. The fat score values are presented in Table 4.6.

At the initial interview, the test group fat scores ranged from 14-26 (median 21.00) and control group scores ranged from 18-26 (median 21.00). At the second interview, the test group scores ranged from 10-25 (median 20.00) and control group score ranged from 17-23 (median 21.00). At the third interview, the test group scores ranged from 11-26 (median 17.50) and control group scores ranged from 12-26 (16.00).

Group fat scores were analysed for differences between groups at each interview and group scores over time. There was no difference between groups at each interview or for the test group over time. However, the control group scores differed substantially but not significantly between the first and third interview.

Sugar

The possible range for sugar score was 1-39. A lower sugar score corresponds to a lower sugar intake. Sugar score values are presented in Table 4.7.

TABLE 4.6: MEDIAN FAT SCORES

Group	Initial Value	Interview 2	Interview 3
Test = 8	21.00	20.50	17.50
(range)	(14 - 26)	(10 - 25)	(11 - 26)
Control = 7	21.00	21.00	16.00
(range)	(18 - 26)	(17 - 23)	(12 - 26)

Possible score range 0 - 39

TABLE 4.7: MEDIAN SUGAR SCORES

Group	Initial Value	Interview 2	Interview 3
Test = 8	18.00	20.50	22.00
(range)	(11 - 23)	(15 - 24)	(16 - 25)
Control = 7	16.00	19.00	19.00
(range)	(5 - 29)	(6 - 26)	(10 - 30)

Possible score range 1 - 39

At the first interview, the test group sugar scores ranged from 11-23 (median 18.00) and the control group scores ranged from 5-29 (median 16.00). At the second interview, test group scores ranged from 15-24 (median 20.50) and control group scores ranged from 6-26 (median 19.00). At the third interview, test group scores ranged from 16-25 (median 22.00) and control group scores ranged from 10-30 (median 19.00).

Although both groups increased their sugar scores over time, there were no differences between group scores at each interview or for test and control groups over the three interviews.

Fibre

The possible range for fibre score was 0-20. A lower fibre score corresponded to a higher fibre intake. Fibre score values are presented in Table 4.8.

At the first interview, the test group fibre scores ranged from 6-13 (median 9.00) and the control group scores ranged from 5-13 (median 9.00). At the second interview, the test group scores ranged from 6-15 (median 11.00) and the control group scores ranged from 6-13 (median 9.00). At the third interview, the test group scores ranged from 7-15 (median 9.50) and the control group scores ranged from 7-12 (median 10.00).

There were no differences between group scores at each interview or for test and control groups over the three interviews.

TABLE 4.8: MEDIAN FIBRE SCORES

Group	Initial Value	Interview 2	Interview 3
Test = 8	9.00	11.00	9.50
(range)	(6 - 13)	(6 - 15)	(7 - 15)
Control = 7	9.00	9.00	10.00
(range)	(5 - 13)	(6 - 13)	(7 - 12)

Possible score range 0 - 20

Total diet scores

Although the fat scores differed for the control group between the first and third interviews, there was no difference in the total diet scores over time within or between the groups. Table 4.9 presents the median values at each interview and the differences in scores between interviews.

WEIGHT

All subjects were weighed at each interview on the researcher's digital scale as described in the Methods (Chapter 3). Weight was recorded in pounds (lbs). Median weights are presented in Table 4.10.

Analysis of subjects' weights found no differences between or within the test and control groups at each measurement or over the course of the study.

Changes in individual subject's weight showed 9 of the sample gained 2-19lbs and 6 subjects lost 0-6lbs between first and second measurements. In the test group 5 subjects gained weight, 1 subject's weight was unchanged and 2 subjects lost weight. In the control group 4 subjects gained weight and 3 subjects lost weight.

Between the second and third measurement, 3 subjects (2 test and 1 control) gained 1-9lbs and 12 subjects (6 test and 6 control) lost 1-8lbs. Over the course of the study, 6 subjects (4 test and 2 control) gained 1-18lbs, 1 test subject's weight was unchanged and 8 subjects (3 test and 5 control) lost 3-11lbs.

TABLE 4.9: MEDIAN TOTAL DIET SCORES

Group	Initial Value	Interview 2	Interview 3
Test = 8	51.00	50.00	49.00
(range)	(33 - 58)	(32 - 58)	(41 - 62)
Control = 7	51.00	48.00	48.00
(range)	(35 - 65)	(41 - 62)	(34 - 58)

Possible score range 1-98

TABLE 4.10: MEDIAN WEIGHT (lbs)

Group	Initial Value	Interview 2	Interview 3
Test = 8	174.50	177.00	173.00
(range)	(136 - 189)	(140 - 194)	(140 - 194)
Control = 7	172.00	175.00	174.00
(range)	(150 - 185)	(145 - 188)	(148 - 181)

Two test subjects lost weight at each measurement, 1 test subject gained weight from first to third measurement. All other subjects who lost weight between first and second measurements gained weight between second and third measurements. Those subjects who gained weight between first and second measurements lost weight between second and third measurement. Between the first and third interview, largest weight loss was eleven pounds and largest weight gain was eighteen pounds.

Dietary Advice

Twelve subjects (7 test and 5 control) stated that they had received dietary advice regarding their heart condition. Three subjects denied having received dietary advice. The sources of advice are to be found in Table 4.11, the most frequently reported source was the subject's general practitioner (27%). Eight subjects were advised to cut down on fats, 4 subjects were advised to reduce weight and 2 subjects were advised to increase fibre intake. One subject was advised on "eating for a healthy heart" but did not expand on the meaning behind this comment.

Diet score and source of advice

There was no association between diet score and source of dietary advice.

Diet score and Weight

There was no relationship between dietary advice and weight loss. The three subjects who did not receive advice lost weight over study period.

TABLE 4.11: SOURCE OF DIETARY ADVICE (SAMPLE = 15)

Source	Test (n=8)	Control (n=7)
General Practitioner	3	1
Cardiologist	1	0
Liaison Health Visitor	1	0
Surgeon	0	1
Dietician	0	2
Lipid Clinic	1	0
Leaflets	1	1
No advice	1	2

EXERCISE

Exercise level was estimated by scoring questions 15, 16 and 17 on knowledge questionnaire. Exercise score was measured at initial interview and preoperatively. The possible score range was 3 - 17, 3 being best, indicating the subject was regularly active and taking part in a variety of exercises. A score of 17 corresponded to the subject taking no part in any exercise.

Initial scores ranged from 4-10 (test group 5-10, control group 4-10). At the preoperative interview, 8 scores (5 test, 3 control) were unchanged. Two scores were improved (test subject -1, control subject -4) and 5 scores were worse (2 test subjects +1 and +4, 3 control subjects +1, +3 and +4).

Exercise and Weight

There was no relationship between weight and exercise score over time. Subjects who lost weight between initial and second interviews did not improve their exercise score.

Those subjects who improved their exercise score gained weight over the same period.

SMOKING

There were 2 smokers in the sample, 1 in each of the test and control groups. Both subjects continued to smoke and did not report a decrease in the number of cigarettes smoked per day.

ADVICE AND INFORMATION BOOKLET

All 8 subjects in the test group stated that they read the information and advice booklet prior to surgery. All subjects reported they found the booklet easy to read and understand and stated that it was helpful and informative.

Other comments made were as follows:

1. 'Most of the information was covered by some other booklets.'
2. 'General details okay, explains operation well. Impersonal.'
3. 'Found things happened much as expected.'
4. 'Helpful if no other information.'
5. 'Would like more information on time in hospital and how you feel.'
6. 'Booklet true to events - knew what to expect. Wife was well-versed on events in hospital.'
7. 'Enough information - felt he knew enough.'

Summary of Results

The analysis of results found no differences between the test and control groups for any initial values. Despite apparent trends, there were no significant differences in State Anxiety scores at each interview or over time. State and Trait anxiety scores were positively correlated at the initial interview.

There were no differences between the groups in knowledge scores at each interview or over time although, the test group showed a significant difference in scores from first to second interview.

Fat, sugar, fibre and total diet scores did not differ between the groups, or over time.

There were no differences in weight between the groups or over time. The cigarette smoker in each group continued to smoke.

CHAPTER 5: DISCUSSION

Introduction

When patients were referred for cardiac surgery at the study centre, there was no structured preoperative programme offered. At the surgical clinic visit, the surgeon assessed the patient, and then, with the patient's spouse or partner, would describe the operation. The surgeon advised on risk factor modification, such as taking regular exercise, following a healthy diet and not smoking. The patient would also be given an estimate of the waiting time to surgery.

Many patients travel large distances from regions without a cardiac surgery centre and these patients, along with local patients, would have no further contact with the cardiac surgery department until ten to fourteen days before surgery when they would be sent an admission date for the operation.

During the waiting time, the patient's general practitioner would be his only medical contact.

Sample size

A number of reasons led to the study sample size being substantially less than was planned in the Methods (Chapter 2).

Although patients were not taken consecutively from the list at the time of planning the study, it was felt that with a 3 month waiting list, time to surgery would not be substantially altered for each individual patient. Factors such as degree of priority, availability of blood supplies from the transfusion service and patients being phoned at short notice to replace a cancellation which were not thought to alter the waiting time substantially did, in fact, create

difficulties in the follow-up of the patients already contacted by the researcher or enrolled in the study when the waiting list lengthened.

With the assistance of the waiting list secretary, the researcher estimated which patients on the list were likely to be 3 months from surgery. In reality, the time taken from first interview to surgery varied from 3 to 29 weeks and these were two consecutive patients on one surgeon's list.

Added to this logistical problem, during the data collection the local health board set up a waiting-list initiative to reduce the length of the cardiac surgery waiting time. This involved sending 200 patients from the lists of the two cardiac centres in the city to have their operations in a private hospital in the area. Unfortunately for the researcher, criteria set by the health board for patients to be operated at the private hospital were similar to the study criteria and accounted for 20 patients the researcher had already enrolled becoming unavailable to the study. Seven patients were lost prior to the initial interview, 12 patients following the first interview and one patient, who was admitted to the study centre as planned, had his operation cancelled due to lack of an intensive care bed, and was transferred to and operated on in the private hospital two days later.

Sample

The study was designed to provide a typical sample of patients undergoing CABS in the Western Infirmary, Glasgow.

Initial criteria for inclusion were felt not to make the sample unrepresentative, however, it became clear that the researcher was unable to contact a number of otherwise suitable patients due to their not having a

telephone and not being at home for the arranged interview. It is acknowledged that including only those patients on the waiting list who had a telephone was likely to affect the representativeness of the sample to the CABS population. Patients within the Glasgow area accounted for the majority of patients on the waiting list. Including patients from the Glasgow area only, could also be said to limit the representativeness of the sample but as the researcher was carrying out all interviews, the time scale and the budget available for the study precluded travelling to include patients from the catchment area which consisted of much of the west of Scotland and some of central Scotland and the Western Isles.

Three of the 78 patients initially contacted refused to take part in the study. Reasons given were that they did not want reminding of the details of the operation, or that they did not have time to take part. A further 2 patients declined to take any further part in the study following the first interview. The reason stated by both patients was that they would have much to organise just prior to admission and felt that they could not afford the time to be interviewed again. The study subjects were similar in age to the CABS population in Scotland in 1992 (Common Services Agency [CSA], SMR data,1995). The study sample consisted of 13% females whereas the CABS population in 1992 consisted of 33% (CSA, SMR data,1995).

When compared to the 33 patients who completed the initial interview but were subsequently lost to follow-up the study sample did not differ in any of the initial values.

Instruments

The knowledge questionnaire was developed for and was specific to the study. It is acknowledged that this limits the ability to generalise the findings from the questionnaire.

Despite the STAI being an American questionnaire, it has been widely used in UK studies and appeared to be well understood by the study sample. One subject was unfamiliar with the phrase "I feel inadequate" (Appendix IV, Form Y-2, Statement 35) and asked the researcher for an explanation.

The diet questionnaire was found to be a rather subjective measure of dietary intake, with the subject and his wife discussing and compromising on the response to some questions in a number of interviews. However, as an assessment of a trend towards healthy eating recommendations, the diet questionnaire appeared to achieve its purpose.

Data collection

As previously stated, the researcher carried out all the interviews. All interviews were conducted in the patients' own homes. The main disadvantage of home visits for the researcher in this study was the time associated with travelling to and conducting the interviews.

Subjects were unaware that the researcher worked in the cardiac surgery department. At the initial interview, the researcher did not volunteer any information other than to explain the purpose of the study and the form the interview would take. Any questions asked by the subjects were answered at the end of the interview. It must be acknowledged that this may have led to

knowledge acquisition by the control subjects although it was anticipated that over the waiting time to surgery, both groups of subjects would obtain relevant information from a variety of sources.

Following 27 months of data collecting and achieving only 15 complete data sets, the investigator had no alternative but to discontinue collection due to constraints of time. With only 5 of the 78 subjects contacted declining to take part or continue in the study, the longitudinal design of the study, change in waiting time for surgery and the vagaries of the waiting list management accounts for the high level (81%) of attrition.

Timing of interviews

A number of reasons for the variation in the timing of the initial interview has already been discussed. Given, Kielman, Collins & Given (1990) recommend flexibility in scheduling data collection appointments around the subjects' timetable as a means of retaining subjects over a longitudinal study. Variations in the timing of interviews showed no difference between the groups for each of the three interviews. It could be argued that those subjects close to surgery at the time of the initial interview would be more anxious. No correlation was found between timing of interviews and anxiety scores. At the time of the interview, the subject did not know precisely when the operation would be carried out, and the researcher believed the subject to be three months from surgery.

At the time of the second interview, all subjects had received their letter confirming the date of admission for surgery. Interviews were carried out as close to that admission date as was convenient for the subject. One subject who believed herself to be 5 days from surgery when interviewed, had her

surgery postponed on the evening prior to her initial admission date and her operation was carried out 15 days after the interview. Again, no correlation was found between the timing of the second interview and anxiety scores. The third interview was arranged after the subject had attended the routine postoperative clinic which was usually six weeks after discharge. The interview was carried out at the subject's convenience which accounts for the variation in timing.

RESULTS

Although the 15 subjects who completed the study did not differ from the 33 who completed the first interview but were then lost to follow-up, the sample was still small and generalising any results to the CABS population is not possible. Some trends in scores were noted over the course of the study though no statistical differences were found between the groups for measures of knowledge, anxiety and risk factor modification.

Knowledge

Both groups increased their knowledge scores between the first and second interview, with the test group making a significant improvement compared to the control group. Knowledge gain would suggest a willingness to learn. This may have been due to reading the information and advice booklet but as the control group score also improved, it may have been due to the interview stimulating the patient to gain information from other sources. This may imply that another group with no contact prior to the surgery may provide a 'control'. However, to deliberately shield patients from information would be difficult to control for and may indeed be unethical. Hayward (1975) was unable to distinguish between sources of information when comparing the

effect of different types of information precisely because patients learned from other sources. One possible source in this study may have been the researcher who answered subjects' questions at the end of the first interview. Most subjects asked the researcher if she knew when his or her operation would take place. A small number of subjects asked about timing of mobilisation after surgery.

The greatest improvement in knowledge involved those questions about the timing of mobilisation and discharge after surgery. Most patients improved their scores on questions about reasons for surgery and the least improvement was regarding questions on healthy eating. Having an information booklet to read and perhaps re-read and discuss with the family may have influenced the test group knowledge scores at the second interview.

Anxiety

State-trait anxiety theory (Speilberger, et al 1983) states that higher self-reported trait anxiety is a predictive factor of higher state anxiety. Initial state and trait anxiety scores for both groups were positively correlated.

Two control subjects accounted for the highest and lowest scores at the initial interview. One subject whose state/trait scores were 20/20 viewed his impending surgery as necessary and was willing to allow the experts to guide and make decisions for him. This subject's wife had had cardiac surgery two years previously. The other subject, whose scores were 72/54 was a man with many stresses in his life besides his impending surgery. The subject with the lowest score maintained this score throughout the study. The subject with the highest score at the initial interview also scored highest at the second interview, but then reduced his score at the third interview to second highest.

Speilberger et al (1983), quote normative data for state anxiety medical and surgical patients is stated as 42.68 (SD 13.76). It is not known whether these scores are fully applicable to those patients waiting for surgery but whose operation may not be carried out for some months. At the second interview the test group's scores reduced, while those of the control group increased. As the groups did not differ at the initial interview, this may be due to the influence of significantly increased knowledge levels in the test group, supporting the argument that increased knowledge leads to reduced anxiety. However, with the small sample size, it is not possible to assume this effect, despite the trend of this result being in the appropriate direction. With a larger sample, there might have been a significant effect. It should be noted that when some subjects show very extreme scores, as seen in this study, it creates problems in small samples because the extreme score can completely overwhelm any small effects of treatment in the other subjects in the sample.

No significant correlation was found between knowledge and state anxiety scores. As there were no differences between the groups with regard to knowledge scores and anxiety scores, the findings of this study did not support the hypothesis.

Diet

The dietary questionnaire employed in this study was a very subjective measure of dietary intake so no assumptions can be made with regard to the slight, nonsignificant changes in fat and sugar scores. Weight gains and losses were equivalent between the groups.

One subject gained 18 pounds over the study period. This man had a bowel resection three weeks prior to the initial interview and this weight gain returned him to his 'normal' weight. Body mass index (BMI) was not assessed in this study and would have been a more accurate measure of whether, in fact, subjects were overweight or obese and requiring to lose weight. This is acknowledged to be a limitation of the study.

Interestingly, the main source of dietary advice stated by subjects in the study was their general practitioner. Since the data collection for this study was carried out, practice nurses have been involved in primary health promotion and in secondary prevention clinics and may now be the major source of advice for patients. As dietary habits are the result of years of practice, individual advice on an out-patient basis may be appropriate.

Exercise

Although five test and three control subjects maintained their exercise level, only one subject in each group improved. This finding was not unexpected, as patients with increasing symptoms and/or disability are unlikely to be able to increase their exercise level while waiting for surgery. However, as the benefit of regular exercise such as walking was reinforced in the information booklet, the researcher felt that the inclusion of this outcome would be an indicator of the usefulness of preadmission information. The measure of exercise level used was subjective and treadmill testing would have been a more accurate measure of exercise tolerance as no assessment of severity of CHD was made on entry to the study. Unfortunately, this measurement was beyond the scope of the study.

There were no changes found between the groups with regard to dietary intake, smoking habit and exercise level, therefore, the second hypothesis was not supported.

Information and advice booklet

All test subjects read the booklet, unlike the findings of Christopherson & Pfeiffer (1980) where 12 of their sample of 41 CABS patients did not read their information booklet. This may be the effect of the researcher in this study giving the booklet directly to the patient and stating that the content described the reasons for and events surrounding the surgery. One subject stated the booklet to be impersonal. This is recognised as being a weakness of this form of information. A more individualised approach to preoperative advice and information would be likely to involve a personalised lifestyle assessment for each patient in a clinic set-up and requiring a multidisciplinary input.

One subject wished he had been given information on how he would feel during his stay in hospital. Sensory information was found to be helpful in studies by (Anderson 1987, Miller & Mangan 1983). However, the content of the booklet used in this study was compiled from the comments of previous CABS patients on what they would like to have known prior to the surgery and sensory information was not highlighted by these patients.

CHAPTER 6: CONCLUSIONS

In the past, patients were admitted to hospital a number of days prior to surgery. Patients are now being admitted for surgery either the evening before or the morning of the intended operation. In-patient teaching must therefore be limited to what is possible and reasonable, that is, what is possible for the staff to teach in the available time, and what is reasonable for the patient to learn in that time. Using the waiting time to surgery appears a useful period to allow the patient to learn at his or her own pace.

Given the complexity of the teaching/learning processes, an information and advice booklet may appear an over-simple method of teaching. The booklet used in this study was designed and tested on the basis of it being a time-saving and economical way of giving preoperative CABS patients additional information in the waiting time for surgery. It is also a way of reaching family members with information during the waiting period to surgery. It was not intended to take the place of individualised advice and recommendations from medical staff and for that reason included non-specific advice. The amount of information contained in such a booklet may appear too detailed for some patients and not detailed enough for others. When interviewed about the booklet used in this study, all subjects stated that they had read the booklet, and that it was helpful.

Subjects improved their knowledge of the usual timing of mobilisation after surgery; this may have had a positive effect on the subject's family, as they also knew what the patient would be required to do in the few days after the operation.

This study takes into account recommendations by Christopherson & Pfeiffer (1980) in that subjects were assessed in the waiting period, and again immediately preoperatively. However, the small sample size in this work does not allow comparisons with previous research.

Limitations Of The Study And Their Implications For Further Research

Limitations

There are several limitations to this study which have not been discussed previously.

The inexperience of the researcher may have contributed to methodological problems.

Time constraints and limited resources led to a number of exclusion criteria which may have rendered the final sample unrepresentative of the CABS population being treated at the study centre and elsewhere.

The information and advice booklet was specific to the study centre.

Reliance on self-report measures is a clear limitation of the study. Subjective measures require the patient to be completely honest, both to himself and to the investigator. Patients may be tempted to answer according to how anxious they or the investigator think they ought to be. In instances where the patient is extremely anxious, it may be difficult to admit the fact. Brown (1990) suggests that this may be harder for a male patient than for a female patient where a female investigator is conducting the research.

Postoperative recovery variables were not investigated. As this research was concerned with the waiting time to CABS, measurement of postoperative variables other than anxiety level and dietary intake were believed to be beyond the scope of the study. Demographic data other than those specified as criteria for inclusion in the study were not collected. Therefore, it was possible that the two groups varied in such characteristics as educational level, number of years with CHD and severity of illness.

Improved scores may have been a practice effect as the same questionnaires were administered at each of the two preoperative interviews and the subject may have been cued into learning the necessary information to answer the questions.

Implications For Further Research

A number of factors which were believed to be beyond the scope of the present study may be considered for further research.

The timing of the initial interview and the test subjects receiving the information varied a great deal. Although those subjects who received the booklet a number of months prior to surgery did not differ from those who received the booklet only a few weeks before surgery, a larger sample may indicate an appropriate time to give information to minimise anxiety, increase knowledge and modify risk factors. Assessment of knowledge level should account for educational level, years of CHD, severity of illness and age.

Additional patient teaching contact that may occur in any other setting, such as clinics, should be taken into account to determine if those contacts affect scores.

The food frequency questionnaire used in this study provided a subjective assessment of the subject's diet. A more detailed study of dietary intake may show some changes which were not apparent in this research.

Further research, with a full-time investigator, may improve study attrition. However, the longitudinal design is likely to be affected by the constraints of the current clinical situation.

The number of limitations that occurred and small sample size minimise the conclusions that can be drawn from this research. Replication of this study with a larger sample is recommended. The inclusion of factors such as the value the patient places on his or her health and the patient's coping style may provide insight into the type and form of information that should be provided.

Summary

Research on preparation of patients for surgical procedures has made substantial progress in the last 30 years. During that time, improvements in the care of surgical patients have permitted shorter hospital stays. Despite progress in these areas, health provision in the UK has also undergone major changes and waiting time for elective surgery such as CABS has increased and shows no sign of decreasing. Rehabilitation following MI and CABS deals with the initial care and recovery for these patients. The patient and his family waiting for CABS also require support, advice and information from healthcare providers to enable them to be as well prepared as possible for the impending operation.

APPENDIX (i)
PILOT STUDY - LETTER TO PATIENTS

Dear

Following my recent phone-call, I have enclosed a copy of the new information booklet which you have agreed to read.

I am interested in finding out whether the booklet is easy to understand and also, if it gives information that patients on the waiting list will find helpful.

As I would like to hear your comments and ask you a few questions about the booklet, I will 'phone in a couple of weeks and arrange a convenient time to call and see you.

Thank you for your help.

Yours sincerely

MARY MACKENZIE
Cardiac Rehabilitation Sister

APPENDIX (ii)
LETTER TO PATIENTS

Dear

I am a nurse working in the Nursing Studies Department of Glasgow University. I am carrying out a research project which has two purposes:

Firstly, to find out how patients on the waiting list for bypass surgery feel and secondly, to find out how much information they have about what will happen to them while they are in hospital.

If you agree to be part of the study, it will involve an interview in your home 1-6 months before your operation, when you will be asked about your feelings at that time. The same interview will be carried out around the time of your admission to hospital, and again two months after you go home.

It should be noted that taking part in this study may not be of direct benefit to you, but could help in the development of treatment of future patients. By finding out how a number of patients feel at these times, we will be able to design an information booklet to help patients prepare more fully for their operation.

I will be in touch again within the next few weeks and can then arrange a convenient time to meet with you. If you do not wish to participate in this study, or wish to withdraw at any time, your care will not be affected.

Yours sincerely

MARY MACKENZIE
Cardiac Rehabilitation Sister

APPENDIX (iii)
LETTER TO PATIENT'S GENERAL PRACTITIONER

Department of Nursing Studies
University of Glasgow

Dear Doctor

Your patient, of
has agreed to be interviewed by me as part of a research MSc in the above department.

I intend asking patients about their diet, knowledge of coronary artery disease and their impending surgery, and asking them to complete a self report anxiety inventory. Your patient has agreed to three interviews, each of which will be carried out in the patient's home. The first will be as soon as can be arranged, the second just before admission for surgery and the third will be 2-3 months after surgery.

I will be happy to supply any further information you require.

Yours sincerely

MARY MACKENZIE
Cardiac Rehabilitation Sister

APPENDIX (iv)

SELF-EVALUATION QUESTIONNAIRE

Developed by Charles D. Spielberger
in collaboration with
R. L. Gorsuch, R. Lushene, P. R. Vagg, and G. A. Jacobs

STAI Form Y-1

Name _____ Date _____ S ____

Age _____ Sex: M ____ F ____ T ____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I feel strained	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel satisfied	①	②	③	④
9. I feel frightened	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel indecisive	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel confused	①	②	③	④
19. I feel steady	①	②	③	④
20. I feel pleasant	①	②	③	④

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SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Name _____ Date _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	①	②	③	④
22. I feel nervous and restless	①	②	③	④
23. I feel satisfied with myself	①	②	③	④
24. I wish I could be as happy as others seem to be	①	②	③	④
25. I feel like a failure	①	②	③	④
26. I feel rested	①	②	③	④
27. I am "calm, cool, and collected"	①	②	③	④
28. I feel that difficulties are piling up so that I cannot overcome them	①	②	③	④
29. I worry too much over something that really doesn't matter	①	②	③	④
30. I am happy	①	②	③	④
31. I have disturbing thoughts	①	②	③	④
32. I lack self-confidence	①	②	③	④
33. I feel secure	①	②	③	④
34. I make decisions easily	①	②	③	④
35. I feel inadequate	①	②	③	④
36. I am content	①	②	③	④
37. Some unimportant thought runs through my mind and bothers me	①	②	③	④
38. I take disappointments so keenly that I can't put them out of my mind	①	②	③	④
39. I am a steady person	①	②	③	④
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	①	②	③	④

APPENDIX (v)

KNOWLEDGE QUESTIONNAIRE

1. WHAT IS THE SURGEON GOING TO DO?
   1 correct
   2 partially correct/vague
   3 wrong
   9 don't know

2. WHAT DO YOU THINK THE CORONARY ARTERIES DO?
   1 correct
   2 partially correct/vague
   3 wrong
   9 don't know

3a. DO YOU EXPERIENCE CHEST PAIN?
   1 yes
   2 no
   3 other symptom

3b. IF YES, WHAT IS THIS PAIN CALLED?
   1 correct
   2 partially correct/vague
   3 wrong
   9 don't know

3c. WHAT CAUSES YOUR PAIN/OTHER SYMPTOM?
   (Prompt - what is happening to the heart to cause the pain?)
   1 correct
   2 partially correct/vague
   3 wrong
   9 don't know

4. IN CABS, A VEIN IS USED. WHERE IS IT USUALLY TAKEN FROM?
   1 correct
   2 partially correct/vague
   3 wrong
   9 don't know

5. DO YOU EXPECT TO HAVE ANY TESTS CARRIED OUT WHEN YOU ARE ADMITTED?
   1 Yes
   2 No
   9 Don't know

5b. IF YES, WHAT TYPE OF TESTS?
   1 5-6 correct
   2 3-4 correct
   3 1-2 correct
   4 wrong

6. DO YOU KNOW HOW LONG THE OPERATION WILL TAKE?
1 correct
2 partially correct/vague
3 wrong
9 don't know

7. HOW LONG DO YOU EXPECT TO BE IN INTENSIVE CARE?
(Test group only, second questionnaire)
1 correct
2 partially correct/vague
3 wrong
9 don't know

8. WHEN WILL YOU BE ABLE TO SIT OUT OF BED?
1 correct
2 partially correct/vague
3 wrong
9 don't know

8b. WHEN WILL YOU BE ABLE TO WALK AROUND THE WARD?
1 correct
2 partially correct/vague
3 wrong
9 don't know

9. HOW MANY DAYS WILL YOU BE IN HOSPITAL AFTER YOUR OPERATION?
1 correct
2 partially correct/vague
3 wrong
9 don't know

10. WHAT TYPE OF EXERCISE WILL YOU BE EXPECTED TO DO AFTER YOUR OPERATION TO REGAIN YOUR STRENGTH?
1 correct
2 partially correct/vague
3 wrong
9 don't know

10b. HOW OFTEN SHOULD YOU DO THIS EXERCISE?
1 correct
2 partially correct/vague
3 wrong
9 don't know

11. WHEN EATING A HEALTHY DIET, WHICH TYPES OF FOOD SHOULD YOU CUT DOWN ON?
1 - 3 or more correct
2 - 2 correct
3 - 1 correct
4 none correct
9 don't know

12. WHY SHOULD YOU CUT DOWN ON THESE FOODS?
1 - 3 correct
2 - 2 correct
3 - 1 correct
4 none correct
9 don't know

13. WHICH TYPES OF FOOD SHOULD BE INCREASED IN A HEALTHY DIET?
1 3 correct
2 2 correct
3 1 correct
4 none correct
9 don't know

14. WHY SHOULD THESE FOODS BE INCREASED?
1 3 or more correct
2 2 correct
3 1 correct
4 none correct
9 don't know

15. WHAT TYPE OF EXERCISE DO YOU TAKE?
1 walking + other/s
2 walking
3 other
4 none

16. HOW FAR CAN YOU WALK?
1 > 1 mile
2 < 1 mile
3 < half mile
4 < quarter mile
5 < 100 yards
6 can't/don't walk

17. HOW OFTEN DO YOU WALK?
1 daily
2 4-6/week
3 2-4/week
4 1-2/week
5 less than once/week

18. DO YOU SMOKE?
1 no
2 yes

19. IF YES, HOW MANY/DAY?
1 < 10
2 10-20
3 > 20
4 no response

APPENDIX (vi)

DIET QUESTIONNAIRE

1. HOW MANY MEALS DO YOU HAVE EACH DAY?
   1 ≤ 1
   2 ≤ 2
   3 ≤ 3
   4 ≤ 4

2. HOW OFTEN DO YOU EAT RED MEAT?
   1 < 1/week
   2 1-3/week
   3 3-5/week
   4 >5/week
   6 not at all

3. HOW OFTEN DO YOU EAT FISH/CHICKEN?
   1 > 5/week
   2 3-5/week
   3 1-3/week
   4 < 1/week
   6 not at all

4. HOW MANY EGGS DO YOU EAT/WEEK?
   1 < 1
   2 1-3
   3 3-5
   4 < 5
   5 none

5. WHICH TYPE OF CHEESE DO YOU EAT?
   1 hard cheeses
   2 soft cheeses
   3 both 1 & 2
   4 low fat cheese
   5 none of the above
   6 none

5b. HOW MUCH CHEESE DO YOU EAT/WEEK?
   1 < 1 oz
   2 1-2 oz
   3 < 4 oz
   4 < 8 oz
   5 > 8 oz
   6 none

6. WHICH TYPE OF SPREAD DO YOU USE?
   1 polyunsaturated, low-fat spread
   2 polyunsaturated spread
   3 low-fat spread
   4 butter or margarine
   6 none

7. HOW MUCH TEA DO YOU DRINK EACH DAY?
1 < 1 cup
2 1-3 cups
3 3-5 cups
4 > 5 cups
6 none

8. HOW MUCH COFFEE DO YOU DRINK EACH DAY?
1 < 1 cup
2 1-3 cups
3 3-5 cups
4 > 5 cups
6 none

9. DO YOU TAKE SUGAR IN TEA/COFFEE?
(main drink if not evenly spread)
1 no
2 sweetener
3 yes

10. HOW MUCH MILK DO YOU TAKE DAILY?
1 < 5oz
2 < 10 oz
3 < 1 pint
4 > 1 pint
6 none

10b. IF YES, WHICH TYPE OF MILK DO YOU TAKE?
1 whole
2 semi-skimmed
3 skimmed
4 other type
5 mixture of types

11. HOW OFTEN DO YOU TAKE FRUIT JUICE/SOFT DRINKS?
1 < 1/week (rarely)
2 1-3/week (occasionally)
3 3-5/week (regularly)
4 >5/week (every day)
6 not at all

11b. IF YES, WHICH TYPES?
1 fruit juice
2 carbonated drinks
3 squash
4 combination of above

11c. ARE THESE?
1 low calorie
2 low calorie and regular
3 regular

12. HOW MANY UNITS OF ALCOHOL DO YOU TAKE/WEEK?
1 < 1 (rarely)
2 1-3
3 3-10
4 10-20
5 > 20
6 none

12b. WHICH TYPE/S DO YOU TAKE?
1 wine
2 beer
3 spirits
4 mixture of above

13. DO YOU EAT FRIED FOOD?
1 yes, rarely
2 yes
3 none at all

14. WHAT TYPE OF FAT IS USED FOR COOKING?
1 polyunsaturated oil
2 vegetable oil
3 cooking fat/lard
6 none

15. HOW MUCH BREAD DO YOU EAT/DAY?
1 < 1 slice
2 1-3 slices
3 3-5 slices
4 > 5 slices
6 none

15b. WHICH TYPE OF BREAD?
1 wholemeal
2 brown
3 mixture of types
4 white

16. DO YOU TAKE A BREAKFAST CEREAL?
1 yes, regularly
2 yes, rarely/occasionally
6 no

16b. IF YES, WHICH TYPE?
1 high fibre
2 regular
3 mixture of types
4 sugar coated

17. HOW OFTEN DO YOU EAT CAKES, PASTRIES, CHOCOLATE BISCUITS?
1 < 1/week
2 1-2 week
3 2-4 week
4 4-7/week
5 >1/day
6 none

18. HOW OFTEN DO YOU EAT FRESH FRUIT?
1 >1/day
2 4-7 /week
3 2-4/week
4 1-2/week
5 <1/week
6 none

19. DO YOU TAKE JAM, MARMALADE, HONEY, ETC?
1 yes, rarely
2 yes
6 no

20. HAVE YOU EVER BEEN GIVEN ADVICE ON YOUR DIET?
1 yes
2 no
9 don't know

21. WHO GAVE YOU THE ADVICE (MAIN SOURCE)?
1 dietician
2 hospital
3 nurse
4 GP
5 other
9 don't know

22. WHAT WAS THE ADVICE?
1 lose weight
2 cut down fats
3 cut down sugars
4 cut down salt
5 increase fibre
6 other
9 don't know

23. HAS YOUR WEIGHT BEEN STEADY?
1 yes
2 recent loss
3 recent gain
9 don't know

24. WHAT IS YOUR WEIGHT? (lbs)

APPENDIX (vii)

MEAN VALUES AT INITIAL INTERVIEW WITH STANDARD DEVIATIONS (SD)

Initial Values	Test Group	Control Group	Group Not Followed
n	8	7	33
Age	61.00	60.43	60.03
SD	(9.80)	(6.32)	(11.59)
Sex M:F	7:1	6:1	24:9
Trait Anxiety	35.38	38.57	38.94
SD	(5.21)	(13.10)	(12.08)
State Anxiety	31.25	37.43	37.00
SD	(3.81)	(17.42)	(12.03)
Knowledge Score	37.13	39.57	38.24
SD	(5.46)	(5.57)	(8.73)
Fat Score	20.25	21.57	19.79
SD	(4.50)	(3.36)	(5.02)
Sugar Score	17.88	18.43	18.06)
SD	(4.89)	(8.18)	(6.67)
Fibre Score	9.13	9.57	9.79
SD	(2.64)	(2.70)	(1.92)
Weight (lbs)	167.13	168.57	171.97
SD	(19.97)	(14.66)	(32.37)

Possible Score range:

Trait Anxiety:	20-80
State Anxiety:	20-80
Knowledge:	19-114
Fat:	0-39
Sugar:	1-39
Fibre:	0-20

REFERENCES

AHA (1981) RISKO:A Heart Hazard Appraisal. Dallas Tx. AHA.

Almedia D, Bradford JM, Wenger NK, King SB, Hurst JW. (1983) Return to Work After Coronary Bypass Surgery. Circulation 68:(Suppl 2):2-205-213.

American Heart Association (1973) Coronary Risk Factors Handbook. Dallas, TX. AHA.

American Hospital Association. Center for Health Promotion (1979) Project Overview of Health Education in Primary Care Facilities. Chicago. Ill. The Association:p1.

Anderson DC. (1979) Health Education in Practice. London, Croon Heim.

Anderson AJ, Barboriak JJ, Hoffman RG, Mullen DC. (1980) Retention or Resumption of Employment After Aortocoronary Bypass Operations. JAMA 243:543-545.

Anderson E. (1973) The Role of the Nurse. Series 2, No.1. London, RCN.

Anderson EA. (1987) Preoperative Preparation for Cardiac Surgery Facilitates Recovery, Reduces Psychological Distress and Reduces the Incidence of Acute Postoperative Hypertension. Journal of Consulting and Clinical Psychology 55:(4):513-520.

Barker DJP, Bull AR, Osmond C, Simmonds SJ. (1990) Fetal and Placental Size and Risk of Hypertension in Adult Life. British Medical Journal 301:259-262.

Barnes G, Ray MJ, Oberman A, Kouchoukas NT. (1977) Changes in Working Status of Patients Following Coronary Bypass Surgery. JAMA 238:1259.

Bartlett EE. (1984) Assessing Benefits of Patient Education Under Prospective Pricing. Birmingham Patient Education Newsletter, University of Alabama. June 1984.

Bass C. (1984) Psychosocial Outcome After Coronary Artery Bypass Graft. British Journal of Psychiatry 145:526-532.

Bass C, Wade C. (1982) Type A Behaviour: Not Specifically Pathogenic. Lancet 2:1147-1149.

Becker DM, Levine DM. (1987) Risk Perception, Knowledge and Lifestyles in Siblings of People with Premature Coronary Disease. American Journal of Preventative Medicine 3:45-50.

Becker MH, Maiman LA. (1980) Strategies for Enhancing Patient Compliance. Journal of Community Health 6:113.

Beechey APG, Eltringham RJ, Studd C. (1981) Temazepam as Premedication in Day Surgery. Anaesthesia 36:10-15.

Belgian-French Pooling Project. (1984) Assessment of Type A Behaviour by the Bortner Scale and Ischaemic Heart Disease. European Heart Journal 5:440.

Benner P, Wrubel J. (1981) The Primacy of Care. London, Addison-Wesley.

Benner P. (1984) From Novice to Expert: Excellence and Power in Clinical Nursing Practice. California, Addison-Wesley.

Bolton-Smith C, Woodward Ml, Tunstall-Pedoe H. (1992) The Scottish Heart Health Study. Dietary Intake by Food Frequency Questionnaire and Odds Ratio for Coronary Heart Disease. II. The Antioxidant Vitamins And Fibre. European Journal of Clinical Nutrition 46:85-93.

Boore JRP. (1978) Prescription for recovery. RCN. London.

Boyd MD. (1987) A Guide to Writing Effective Patient Education Materials. Nursing Management 18:(7):56-57.

Boylan A. (1982) The Nurse and Information Giving. Nursing Times Sept 8: 1523-1524.

Brambilla MA. (1968) An Investigation of Patients' Questions About Heart Surgery: Implications for Nursing. American Nursing Association Clinical Sessions p.217.

Braunwald E. (1980) Heart Disease. WB Saunders, Philadelphia. 1847-8.

British Medical Journal Editorial (1977) How Dangerous is Obesity? British Medical Journal 30 April:115.

Brown DG, Glazer H, Higgins M. (1983) Group Intervention: A Psychosocial and Educational Approach to Open Heart Surgery Patients and their Families. Social Work in Health Care 9:(2):47-59.

Brown SM. (1990) Quantitative Measurement of Anxiety in Patients Undergoing Surgery for Renal Calculus Disease. Journal of Advanced Nursing 15:962-970.

Browner WS, Hulley SB. (1989) Effect of Risk Status on Treatment Criteria. Implications of Hypertension Trials. Hypertension May 13:(5 Pt.2) I:51-56.

Brubaker BH. (1983) Health Promotion: A Linguistic analysis. Advances in Nursing Science. 5:1-14. p 2.

Burling TA, Singleton EG, Bigelow GE, Baile WF, Gottlieb SH. (1984) Smoking Following Myocardial Infarction: A Critical Review of the Literature. Health Psychology 3:83.

Burns BH. (1969) Chronic Chest disease, Personality and Success in Stopping Cigarette Smoking. British Journal of Preventative and Social Medicine 23:23-37.

Burt A, Thornley P, Illingsworth D, White P, Shaw TR, Turner R. (1974) Stopping Smoking After Myocardial Infarction. Lancet 1:304.

Caine N, Harrison SCW, Sharples LD, Wallwork J. (1991) Prospective Study of Quality of Life Before and After Coronary Artery Bypass Grafting. British Medical Journal 302:511-516.

Campeau L, Lesperance J, Hermann J. (1979) Loss of the Improvement of Angina Between 1 and 7 Years After Aortocoronary Bypass surgery, Correlations with Changes in Vein Grafts and in Coronary Arteries. Circulation 60:(Suppl.1):1-5.

Carnevali DL. (1971) Preoperative anxiety. American Journal of Nursing 66:1534.

CASS Principal Investigators and their Associates. (1983) Coronary Artery Surgery Study (CASS): A Randomised Trial of Coronary Artery Bypass Surgery: Quality of Life in Patients Randomly Assigned to treatment Groups. Circulation 68:951-960.

Cassileth BR, Zupkis RV, Sutton-Smith K, March V. (1980) Informed Consent - Why Are Its Goals Imperfectly Realised? New England Journal of Medicine 302: 896-900.

Chesney MA, Sevelius G, Black GW, Ward MM, Swam GE, Rosenman RH. (1981) Work Environment, Type A Behaviour and coronary Heart disease Risk Factors. Journal Occupational Medicine 23:551.

Christopherson B, Pfeiffer C. (1980) Varying the Timing of Information to Alter Preoperative Anxiety and Postoperative Recovery in Cardiac Surgery Patients. Heart Lung 9:(5):854-861.

Clark L. (1992) Atherogenesis and thrombosis. American Journal of Medicine April:131(lipt.2) 1106-1109.

Colditz GA. (1992) Economic cost of obesity. American Journal of Clinical Nutrition 55:503S-507S.

Collaborative Study in Coronary Artery Surgery. (1983) CASS: Principal Investigators and Their Associates - A Randomised Trial of Coronary Artery Bypass surgery. Circulation 68:939.

Committee on Medical Aspects of Food Policy. Diet and Cardiovascular Disease. (1984) London: HMSO.

Common Services Agency (CSA 1995) Cardiac surgery SMR Data. Personal Communication.

Conrad P. (1985) The Meaning of Medications: Another Look at Compliance. Social Science and Medicine 20:(1):29-37.

Coronary Drug Project Research Group. (1979) Cigarette Smoking As a Risk Factor in Men With a Prior History of Myocardial Infarction. Journal Chronic Disease 32:415-425.

Coronary Prevention Group. (1988) Children at Risk: Should Prevention of Coronary Heart Disease Begin in Childhood?

Costa PT, Krantz DS, Blumenthal JA, Furberg CD, Rosenman RH, Shekelle RB. (1987) Psychological Risk Factors in Coronary Artery Disease. Circulation 76:(Suppl.1):July:145-149.

Cronin SN. (1990) Psychosocial Adjustment to Coronary Artery Disease: Current Knowledge and Future Directions. Journal of Cardiovascular Nursing 5:(1):13-24.

Crouse JR. (1984) Progress in Coronary Artery Disease Risk-Factor Research - What Remains to be Done? (Editorial) Clinical Chemistry 30:(7):1125-1127.

Cunningham S, LaRosa JH, Hill MN, Becker DM. (1988) The Epidemiological Basis for Risk Factor Reduction. Cardiovascular Nursing 24:33-35.

Cushing M. (1991) Demystifying Informed Consent. American Journal of Nursing November: 17-19.

Danaher BG. (1977) Rapid Smoking and Self-control in the Modification of Smoking Behaviour. Journal of Consulting and Clinical Psychology 45:1068-1075.

Daughton DM, Fix AJ, Kass J, Patil K. (1980) Smoking Cessation Among Patients with Chronic Obstructive Pulmonary Disease. Addictive Behaviour 5:367-374.

Dawber TRl (1980) The Framingham Study. Cambridge. MA. Harvard Univ. Press.

Dembroski TM, MacDougall JM, Williams RB, Haney TL, Blumenthal JA. (1985) Components of Type A Hostility and Anger in Relationship to Angiographic Findings. Psychosomatic Medicine 47:219.

Department of Health. (1991) Dietary Reference Values for Food Energy and Nutrients for the United Kingdom. Report on Health and Social Subjects, 41. London:HMSO.

Devine EC, Cook TD. (1983) A Meta Analytic Analysis of Psychoeducational Interventions on Length of Post-Hospital Surgical Stay. Nursing Research 32:267-274.

Dimsdale JE, Hackett TP, Hutter AM, et al (1979) Type A Behaviour and angiographic Findings. Journal of Psychosomatic Research 23:273-276.

Dodge JS. (1972) What Patients Should be Told: Patients and Nurses Beliefs. American Journal of Nursing 1852-1854.

Dougenis D, Naik S, Bron AH. (1992) Is Repeated Coronary Surgery for Recurrent Angina Cost Effective? European Heart Journal Jan 13:(1):9-14.

Dracup KA, Meleis AI. (1982) Compliance: An Interactionist Approach. Nursing Research 31:(1):31-36.

Dracup K, Meleis A, Baker K, Edlefsen P. ((1984) Family-Focussed Cardiac Rehabilitation. Nursing Clinics of North America 19:113-125.

Dripps RD, Waters RM. (1941) Nursing Care of surgical Patients: Part 1. The "Stir Up". American Journal of Nursing 41:530-534.

Duncan C, Chalmers J, Campbell IW, Jones IG. (1992) An Audit of Non-Insulin Dependent diabetics Attending a District General Diabetic Clinic: Implications for Shared Care Between Hospital and General Practice. Health Bulletin 50:(4):302-308.

Duthie GG, Arthur JR, James WPT. (1991) Effects of Smoking and Vitamin E on Blood Antioxidant Status. American Journal of Clinical Nutrition. 53:1061S-1063S.

Egbert JA, Battit GE, Welch CE, Bartlett MK. (1964) Reduction of Post-Operative Pain by Encouragement and Instruction of Patients. New England Journal of Medicine 270:825-827.

Elliot P, Forrest RD, Jackson CA, Yudkin JS. (1988) Sodium and Blood Pressure: Positive Associations in a North London Population with Consideration of the Methodological Problems of within-Population Surveys. Journal of Human Hypertension 2:89-95.

Elms R, Leonard R. (1966) Effects of Nursing Approaches During Admission. Nursing Research 15:(1):39-48.

English JP, Willus FA, Berkson J. (1940) Tobacco and Coronary Disease. JAMA 115:1327.

Epstein FH, Pyorala K. (1987) Perspectives for the Primary Prevention of coronary Heart Disease. Cardiology 74:316-331.

Epstein LC, Lasagna L. (1969) Obtaining Informed Consent: Form or Substance. Archives of Internal Medicine 123:682-688.

European Coronary Surgery Study Group. (1982) Long-Term Results of Prospective Randomised Study of Coronary Artery Bypass Surgery in Stable Angina Pectoris. Lancet 2:1173-1180.

Ewles L, Simnett. (1985) Promoting Health. A Practical Guide to Health Education. Chichester. John Wiley & Sons.

Faden RR, Becker C, Lewis C, Freeman J, Faden AI. (1981) Disclosure of Information to Patients in Medical Care. Medical Care 19:(7):718-733.

Festinger L. (1957) A Theory of Cognitive Disonance. Stanford, California. Stanford University Press.

Fielding JE. (1985) Smoking: Health Effects and Control. New England Journal of Medicine 313: 419-498.

Fisher D. (1976) Adult Education Theory Necessary in Health Education Practice. International Journal of Health Education 19:129-135.

Fitzgerald GA. (1987) Dipyridamole. New England Journal of Medicine 316:1247-1257.

Fleetwood J, Packa DF. (1991) Determinants of Health-Promoting Behaviours in Adults. Journal of Cardiovascular Nursing 5:(2):67-79.

Forrest WH Jr, Brown CR, Brown BW. (1977) Subjective Responses to Six Common Preoperative Medications. Anaesthesiology. 47:(3):241-247.

Fox DJ. (1982) Fundamentals of Research in Nursing. Norwalk, Conn. Appleton-Century Crofts.

Francis GM, Mungas B. (1968) Promoting Psychological Comfort. Dubuque IA. Wm C Brown.

Frank KA, Heller SS, Kornfeld DS. (1972) A Survey of Adjustment to Cardiac Surgery. Archives Internal Medicine 130:735.

Freud S. (1936) The Problem of Anxiety. New York, The Psychoanalytic Quarterly Press.

Friedman GD, Petitti DB, Bawol RD, Siegelaub AB., (1981) Mortality in Cigarette Smokers and Quitters. Effect of Baseline differences. New England Journal of Medicine 304:(23):407-410.

Fry E. (1968) A Readability Formula That Saves Time. J Reading 11:513-516, 575-577.

Furberg CD, May GS (1984) Effect of Long-Term Prophylactic Treatment on Survival After Myocardial Infarction. American Journal of Medicine 76:76-83.

Fuster V, Cheseboro JH. (1985) Aortocoronary Artery Vein Graft Disease. Experimental and Clinical Approach for the Understanding of the role of Platelets and Platelet Inhibitors. Circulation 72:(Suppl.V):V65-V70.

Fuster V, Badimon JJ, Badimon L. (1992) Clinical-pathological correlations of coronary disease progression and regression. Circulation 86:(Suppl 2):2-11-2-12.

Gagliano ME. (1988) A Literature Review on the Efficacy of Video in Patient Education. Journal of Medical Education 63:(10):785-791.

Gaskey NJ. (1987) Evaluation of the Effect of a Preoperative Anaesthesia Tape. American Association of Nursing Anaesthetic Journal 55:(4):341-345.

Gentry et al. (1973) Anxiety and Urinary Sodium/Potassium as Stress Indicators on Admission to CCU. Journal of Critical Care 2:875-871.

Giloth B. (1984) Patient Education Update. Promoting Health 5:(4):9.

Given BA, Kielman LJ, Collins C, Given CW. (1990) Strategies to Minimise Attrition in Longitudinal Studies. Nursing Research 39:(3):184-186.

Glass D. (1977) Behavioural Patterns, Stress and Coronary Disease. London, John Wiley.

Glasunov IS, Shamarin VM, Malaya LT, Sarkisian EE, Beiul EA, Katsenovich RAl (1988) Epidemiology and Possibility of Prevention of Ischaemic Heart Disease Risk Factors Among Students in Various USSR Regions. Cor Vasa 30:(4):825-836.

Goldschmidt T, Brooks N, Sethia B. (1984) Coronary Artery Bypass Surgery - Impact Upon a Patient's Wife - A Pilot Study. Thoracic and Cardiovascular Surgeon 32: 337-340.

Goldstein DJ. (1992) Beneficial Health Effects of Modest Weight Loss. International Journal of Obesity 16:397-415.

Goldstein JL, Hazzard WR, Schrott HG, Bierman EL, Motulsky AG. (1973) Hyperlipidaemia in Coronary Heart Disease. 1. Lipid Levels in 500 Survivors of Myocardial Infarction. Journal of Clinical Investigation 52:1533-1543.

Goldstein JL, Hazzard WR, Schrott HG, Bierman EL, Motulsky AG. (1973) Hyperlipidaemia in Coronary Heart Disease. 2. Genetic Analysis of Lipid Levels in 176 Families and Delineation of a New Inherited Disorder. Combined Hyperlipidaemia. Journal of Clinical Investigation 52:1544-1568.

Grondin CM, Campeau L, Thornton JC, Engle JC, Cross FS, Schreiber H. (1989) Coronary Artery Bypass Graft with Saphenous Vein. Circulation. 79:(Suppl.1):1-24:1-29.

Grundy SM, Greenland P, Herd JA. (1987) Cardiovascular Risk Factor Evaluation of Healthy American Adults. Circulation 75:13:40A-62A.

Gundle MJ, Reeves BR, Tate S, Raft D, McLaurin LP. (1980) Psychosocial Outcome After Coronary Artery Surgery. American Journal of Psychiatry 137:(1):591-594.

Gutmann MC, Knapp DN, Pollock ML, Schmit D, Simon K, Walcott G. (1982) Coronary Artery Bypass Patients and Work Status. Circulation 66:(Suppl.3):3-33:3-41.

Guvendik L, Rahan M, Yacoub M., (1982) Symptomatic Status and Pattern of Employment during a Five-Year Period Following Myocardial Revascularisation for Angina. Annals of Thoracic Surgery 34:(4):383-387.

Hall SM, Bachman J, Henderson JB, Barstow R, Jones RTl (1983) Smoking Cessation in Patients with Cardiopulmonary Disease: An Initial Study. Addictive Behaviour 8:(1):33-42.

Hamilton WM, Hammermeister KE, Derouen TA. (1983) Effect of Coronary Artery Bypass Grafting on Subsequent Hospitalisation. American Journal of Cardiology 51:353-360.

Haynes SG, Feinleib M, Kannel WB. (1980) The Relationship of Psychosocial Factors to Coronary Heart Disease inthe Framingham Study: III. Eight Year Incidence of Coronary Heart Disease. American Journal of Epidemiology 111:37.

Hayward J. (1975) Information - A Prescription Against Pain, The Study of Nursing Care Series 2. London, RCN.

Healy KM. (1968) Does Preoperative Instruction Make A Difference? American Journal of Nursing 68:62-67.

Helmrich SP, Ragland DR, Leung RW, Paffenbarger RS. (1991) Physical Activity and Reduced Occurrence on Non-Insuln Dependent diabetes Mellitis. New England Journal of Medicine 325:147-152.

Hickey N, Mulcahy R, Burke GJ, Graham I, Wilson-Davis K. (1975) A Study of Coronary Risk Factors Related to Physical Activity in 15,171 Men. British Medical Journal 2:507-509.

Hicks JA, Jenkins JG. (1988) The Measurement of Preoperative Anxiety. Journal of the Royal Society of Medicine 81:517-519.

Hirshfeld JW, Schwartz JS, Jugo R, et al (1991) Restenosis After Coronary Angioplasty: A Multivariate Statistical Model to Relate Lesion and Procedure Variables to Restenosis. Journal of the American College of Cardiology 18:647-656.

Hockey L. (1978) Women in Nursing: A Descriptive Study. London, Hodder and Stoughton.

Holm K, Fink N, Christman NJ, Reitz N, Ashley W. (1985) The Cardiac Patient and Exercise: A Sociobehavioural Analysis. Heart Lung 14:(6):586-93.

Holt JK. (1978) The role of the Nurse Practitioner in the Rehabilitation of Cardiac Patients. Msc Thesis, University of Glasgow, Scotland.

Hubert HB, Feinleib M, McNamara PM, Castelli WP. (1983) Obesity as an Independent risk Factor for Cardiovascular Disease: A 26 Year Follow-Up of Participants in the Framingham Heart Study. Circulation 67:968-977.

Hulley SB. (1988) Risk Factors for Coronary Heart Disease. Drugs 36:(Suppl.3):1-4.

Hymowitz Z, Freiman I, Borman J, Applebaum A, Gotsman MS. (1985) Work Status Before and After Coronary Artery Bypass Surgery. Public Health 99:367-374.

James WPT, Ralph A, Sanchez-Castillo CP. (1987) The dominance of salt in manufactured foods inthe sodium intake of affluent societies. Lancet 1:426-429.

Janis IL. (1958) Psychological stress. New York, Academic Press.

Jenkins CD. (1976) Recent evidence supporting psychologic and social risk factors for coronary disease. New England Journal of Medicine 294:987.

Jenkins CO, Stanton BA, Savageau JA, Denlinger P, Klein MD. (1983) Coronary artery bypass surgery: physical, psychological, social and economic outcomes six months later. JAMA 250:287.

Jenny J. (1978) A strategy for patient teaching. Journal of Advanced Nursing 3:341-348.

Johnson JE. (1978) Sensory information, instruction in a coping strategy, and recovery from surgery. Research in Nursing & Health 1:4-17.

Johnston M. (1980) Anxiety in surgical patients. Psychological Medicine 10:145-152.

Kannel WB. (1982) Meaning of the downward trend in cardiovascular mortality. JAMA 247:877-881.

Karasek R, Baker D, Marzer F, Ahlbom, Theorell T. (1981) Job decision latitude, job demands and cardiovascular disease: A prospective study of Swedish men. American Journal of Public Health 71:694.

Kaul U, Dogra B, Manchanda SC, Wasir HS, Rajani M, Bhatia ML. (1986) Myocardial infarction in young Indian patients: risk factors and coronary arteriographic profile. American Heart Journal 112:71-75.

Kannel WB. (1981) Prospects for risk factor modification to reduce risk of reinfarction and premature death. Journal of Cardiac Rehabilitation 1:63-70.

Keys A. (1980) Seven countries: a multivariate analysis of death and coronary heart diseases. Cambridge, Harvard University Press.

Klonoff H, Campbell C, Kavanagh-Gray D, Mizgala H, Munro I. (1989) Two year follow up study of coronary bypass surgery. Psychologic status, employment status and quality of life. Journal of Thoracic Cardiovascular Surgery 97:78-85.

Knowles M. (1970) Adult Education. New York, Association Press.

Kornfield DS, Heller SS, Frank KA, Wilson SN, Malm JR. (1982) Psychological and behavioural responses after coronary artery bypass surgery. Circulation 66:(Suppl.3):3-24-3-28.

Korsch BM, Negrete VF. (1972) Doctor patient communication. Scientific American 227:66.

Krantz DS, Schaeffer MA, Davis JE. et al (1981) Extent of coronary atherosclerosis, type A behaviour and cardiovascular response to social interaction. Psychophysiology 18:654-664.

Kromhout D, Bosscheiter EB, Coulander C de L. (1985) The inverse relationship between fish consumption and 20 year mortality from coronary heart disease. New England Journal of Medicine Feb 16:(1):45-63.

Langeluddecke P, Tennant C, Fulcher G. (1989) Coronary artery bypass surgery - impact upon the patient's spouse. Journal of Psychosomatic Research 33G:(2):155-159.

Langer EJ, Janis IL, Wolfer JA. (1975) Reduction of psychological stress in surgical patients. Journal of Experimental Social Psychology 11:155.

Law MR, Frost CD, Wald NJ. (1991) By how much does dietary salt reduction lower bood pressure? 1. Analysis of observational data among populations. British Medical Journal 302:811-814.

Lawrie GM, Morris GC, Calhoon JH. (1982) Clinical results of coronary bypass in 500 patients at least 10 years after operation. Circulation 66:(Suppl.1):1-5.

Lazarus RS. (1966) Psychological stress and the coping process. New York, McGraw-Hill.

Lean MEJ, Powrie JK, Anderson AS, Garthwaite PH. (1990) Obesity, weight loss and prognosis in type 2 diabetes. Diabetic Medicine 7:228-233.

Leske JS. (1993) Anxiety of elective surgical patients' family members. AORN Journal 57: (5):1091-1103.

Levencron JC, Greenland MD. (1988) Patient priorities for behavioural change. Journal of General Internal Medicine 3:224-229.

Ley P. (1979) Memory for medical information. British Journal of Social and Clinical Psychology 18:245-255.

Ley P. (1982) Satisfaction, compliance and communication. British Journal of Clinical Psychology 21:241-254.

Ley P, Bradshaw PW, Eaves D. (1973) A method for increasing patients' recall of information presented by doctors. Psychological Medicine 3:217-20.

Lindeman CA, Van Aernam B. (1971) Nursing intervention with the pre-surgical patient - the effects of structured and unstructured preoperative teaching. Nursing Research 22:(1):4-16.

Linehan DT. (1966) What does the patient want to know? American Journal of Nursing, May:1066-1070.

Lovell RB. (1980) Adult learning. Croon Helm, London.

Lovvorn J. (1982) Coronary artery by-pass surgery - helping patients cope with post-op problems. American Journal of Nursing. July:1073-1075.

MAAS Investigators. (1994) Effects of simvastatin on coronary atheroma: The multicentre - anti-atheroma study (MAAS). Lancet 344:633-638.

Macleod Clark J, Latter S. (1990) Working together. Nursing Times Nov 28:86:(48):28-31.

Marieb E. (1995) Human anatomy and physiology. Redwood City, Ca. Benjamin/Cummings Publishing Co. Inc.

Marmot MG. (1983) Stress, social and cultural variations in heart disease. Journal of Psychosomatic Research 27:377.

Marmot MG. (1979) Epidemiological basis for the prevetion of coronary heart disease. Bulletin of the World Health Organisation 57:331-347.

Marmot M, Syme S, Kato H. (1975) Epidemiological studies of coronary heart disease and stroke in Japanese men living in Japan, Hawaii and California. American Journal of Epidemiology 102:512-525.

Marshall J, Penckofer S, Llewellyn J. (1986) Structured postoperative teaching and knowledge and compliance of patients who had coronary artery bypass surgery. Heart Lung 15:(1):76-82.

Martin MJ, Silverman MF. (1986) The San Francisco Experience with regulation of smoking in the workplace: the first 12 months. American Journal of Public Health. 76:585-586.

Martinez LR, Von Euler C, Norlander OP. (1966) The sedative effect of premedication as measured by catecholamine excretion. British Journal of Anaesthesia 38:780-786.

Matthews A, Ridgeway V. (1981) Personality and surgical recovery: a review. British Journal of Clinical Psychology 20:243-260.

May R. (1950) The meaning of anxiety. New York, Ronald Press.

Mayou R, Bryant B. (1987) Quality of life after coronary artery surgery. Quarterly Journal of Medicine. New Series 62:239:239-248.

Mayou R. (1986) Psychiatric and social consequences of coronary artery surgery. Journal of Psychosomatic Research 30G:(3):255-271.

McBride A. (1994) Health promotion in hospitals: the attitudes, beliefs and practices of hospital nurses. Journal of Advanced Nursing 20:92-100.

McCausland MP, Burgess AW. (1989) The home visit for data collection. Clinical Methods 54-55.

McIntosh HD. (1989) Risk factors for cardiovascular disease and death. Journal of the American College of Cardiology 14:(1):24-30.

McIntosh HD, Stamler J, Jackson D. (1978) Introduction to risk factors in coronary artery disease. Heart Lung. Jan-Feb 7:(1):126-131.

McLaughlin GH. (1977) Smog grading - a new readability formula. Journal of Reading 12:639-646.

McMahon SW, Macdonald GJ, Beraskin L. (1985). Comparison of Weight Reduction with Metoprolol in Treatment of Hypertension in Young Overweight Patients. Lancet 1:1233.

Meade TW, Mellows S, Bronzowic M, et al (1986) Haemostatic function and ischaemic heart disease: principal results of the Northwick Park Heart Study. Lancet ii:533-537.

Meeker BJ. (1989) Preoperative teaching: easing the patient's anxiety. Today's Operating Room Nurse 11:(8):14-18.

Meijler FL. (1983) Contribution of the risk factor concept to patient care in coronary heart disease. Journal of the American College of Cardiology 1:13-19.

Meltzer LE, Dunning AJ. (1985) Intensive coronary care: A manual for nurses. Amsterdam, Charles Press Publishers.

Meyer RM, Latz PA. (1979) What open heart surgery patients want to know. American Journal of Nursing 9:1558.

Millar K, Jelicic M, Bonke B, Asbury AJ. (1995) Assessment of preoperative anxiety: comparison of measures in patients awaiting surgery for breast cancer. British Journal of Anaesthesia 74:180-183.

Miller A. (1985) When is the time ripe for teaching? American Journal of Nursing 85:801-804 July.

Miller P, Wikoff R, McMahon M, Garrett MJ, Ringel K. (1990) Marital functioning after cardiac surgery. Heart Lung 19:(1):55-61.

Miller SM, Mangan CE. (1983) Interacting effects of information and coping style in adapting to gynaecological stress: should the doctor tell all? Journal of Personality and Social Psychology 45:(1):223-236.

Mishel M. (1984) Perceived uncertainty and stress in illness. Research in Nursing and Health 7:(3):163-171.

Misra S, Bain WH, Mahmood Z. (1982) Psychological factors and recovery from cardiac surgery. International Journal of Psychiatry 28:(4):261-266.

Morris JN, Chave SP, Adam C, Sirey C, Epstein L, Sheehan DJ. (1973) Vigorous exercise in leisure-time and the incidence of coronary heart disease. Lancet 1:333-339.

Morrow G, Gootnick J, Schmale A. (1978) A simple technique for increasing cancer patients' knowledge of informed consent to treatment. Cancer 42:793-799.

Morton JR, Tolan KM. (1982) Activity level and employment status after coronary bypass surgery. American Journal of Surgery 143:417-420.

Mulcahy R, Hickey N, Graham I, McKenzie G. (1975). Factors influencing long term prognosis in male patients surviving a first coronary attack. British Heart Journal 37:158-165.

MRFIT Multiple risk factor intervention trial. (1982) Risk factor changes and mortality. JAMA 248:12465-1477.

Murray JB (1973) Psychology of the pain experience. Journal of Psychology 78:193-206.

Naidoo J. (1986) Limits to individualism. In: Rodwell S., Wattis A. (eds). The politics of health education. London: Routledge and Keegan Paul.

National Advisory Committee on Nutrition Education. (1983) A discussion paper on proposals for nutritional guidelines for health education in britain. London: Health Education Council.

National Center for Health Statistics. (1986) Annual summary of births, marriages, divorces and deaths: United States, 1985. Monthly Vital Statistical Report 34:21.

National Institutes of Health. (1987) Consensus development conference on diet and exercise in non-insulin dependent diabetes mellitus. Diabetes Care 10:639-644.

National League of Nursing Education. (1918) A curriculum guide for schools of nursing. New York, The League.

National League of Nursing Education. (1950) Nursing organisation curriculum converence. Glen Gardner, N.J., Libertarian Press.

Niles NW, Vandersalam TJ, Cutler BS. (1980) Return to work after coronary artery bypass operation. Journal of Thoracic Cardiovascular Surgery 79:916-921.

Nilsson GE. (1977) Measurement of water exchange through skin. Medical and Biological Engineering and Computing 15:209-218.

Nisbet HIA, Norris W. (1963) Objective measurement of sedation II: A simple scoring system. British Journal of Anaesthesia 35:618-623.

Nora JJ, Lortscher RH, Spangler RD, Nora AH, Kimberling WJ. (1980) Genetic-epidemiological study of early onset of ischaemic heart disease. Circulation 61:503-508.

Nunes EV, Frank KA, Kornfeld DS. (1987) Psychologic treatment for the type A behaviour pattern and for coronary heart disease: A meta-analysis of the literature. Psychosomatic Medicine 48:159-173.

Office of Population Censuses and Surveys (1991) OPCS monitor, general household survey: cigarette smoking 1972-1990. Government statistical service, 26 November 1991, London: OPCS (Series SS91/3).

Paffenbarger RS Jr, Wing AL, Hyde RT. (1981) Physical activity as an index of heart attack risk in college alumni. American Journal of Epidemiology 108:161-175.

Parker FB Jr, Marvasti MA, Bove EL. (1985) Neurologic complications folowing coronary artery bypass. The role of arteriosclerotic emboli. Thoracic Cardiovascular Surgery 33:(4):207-209.

Parrinello K. (1984) Patients' evaluation of a teaching booklet for arterial bypass surgery. Patient Education and Counselling 5:(4):183-188.

Pechacek TF, Danaher BG. (1979) How and why people quit smoking; a cognitive behavioural analysis. In: P Kendall and S Hollon (Eds) Cognitive-behavioural interventions: theory, research and procedures. New York, Academic Press.

Pederson AK, Fitzgerald GA. (1985) The human pharmacology of platelet inhibition: pharmacokinetics relevant to drug action. Circulation 72: 1164-1176.

Pederson LL. (1981) Compliance with physician advice to quit smoking. A review of the literature (cited in Hall SM et al [1983], smoking cessation in patients with cardiopulmonary disease: an initial study. Addictive Behaviour 8:33-42.

Pell S, Fayerweather WE. (1985) Trends in incidence of myocardial infarction in large employed population. New England Journal of Medicine 312:1005-1011.

Pender N. (1974) Patient identification of health information received during hospitalization. Nursing Research 23:(3):262-267.

Pender NJ, Pender AR. (1987) Health promotion in nursing practice, 2nd ed. East Norwalk, Conn. Appleton & Lange.

Penkofer SH, Holm K. (1984) Early appraisal of coronary revascularisation on quality of life. Nursing Research 33:(2):60-63.

Pentecost B, Shillingford JP. (1964) The acute effects of smoking on myocardial performance in patients with coronary arterial disease. British Heart Journal 26:422-429.

Pickering TG. (1984) Should studies of patients undergoing coronary angiography be used to evaluate the role of behaviouralrisk factors for coronary heart disease? Journal of Behavioural Medicine 8:(3):203-213.

Pohl ML. (1965) Teaching activities of the nurse practitioner. Nursing Research 14:4-11.

Pooling ProJect Research Group. (1978) Relationship of blood pressure, serum cholesterol, smoking habit, relative weight and ECG abnormalities to incidence of major coronary events: A final report of the Pooling Project. Journal of Chronic Disease 31:201-306.

Powers M, Storlie F. (1969) The cardiac surgical patient. London, MacMillan Company.

Rabkin SW, Mathewson FAL, Hsu P-H. (1977) Relationship of body weight to development of ischaemic heart disease in a cohort of young North American men after a 26 year observation period: The Manitoba Study. American Journal of Cardiology 39:452-458.

Raleigh EH, Lepczyk M, Rowley C. (1990) Significant others benefit from preoperative information. Journal of Advanced Nursing 15:941-945.

Rankin SH, Duffy KL. (1983) Patient education: issues, principles and guidelines. London, Lippincott.

Raymond M, Conklin C, Schaeffer J. (1984) Coping with transient intellectual dysfunction after coronary bypass surgery. Heart Lung 13:(5):531-539.

Rechnitzer PA. (1982) Specific benefits of postcoronary exercise programs. Geriatrics. 37:47-51.

Redman B, Thomas S. (1985) Patient teaching in nursing interventions. Philadelphia, WB Saunders. pp 160-172.

Redman BK. (1988) The process of patient education. St Louis, Missouri. CV Mosby Company.

Reichman S. (1985) Patient education models. Bulletin of the New York Academy of Medicine 61:(2):155-159.

Retchin SM, Wells JA, Valleron AJ, Albrecht GL. (1992) Health behaviour changes in the United States, the United Kingdom and France. Journal of General Internal Medicine 7:(6):615-622.

Review panel on coronary-prone behaviour and coronary hearty disease. NHLBI) (1981) A critical review. Circulation 63:1199.

Reynaud S, Morazain R, Godsey F. (1986) Nutrients, platelet functions and composition in nine groups of French and British farmers. Atherosclerosis 60:37-48.

Rice VH, Johnson JE. (1984) Preadmission self-instruction booklets, postadmission exercise performance, and teaching time. Nursing Research 33:(3):147-151.

Rimm AA, Barboriak JJ, Anderson MS, Simon JS. (1976) Changes in occupations after aortocoronary vein bypass operations. JAMA 236:361-364.

Rissanen AM, Nikkila EA. (1977) Coronary artery disease and it's risk factors in families of young men with angina pectoris and in controls. British Heart Journal 39:875-883.

Rissanen AM, Nikkila EA. (1979) Aggregation of coronary risk factors in families of men with fatal and non-fatal coronary heart disease. British Heart Journal 42:373-380.

Robinson G, Merav A. (1976) Informed consent recall by patients tested postoperatively. Annals of Thoracic Surgery 22:209-212.

Rose G, Marmot MG. (1981) Social class and coronary heart disease. British Journal of Preventative and Social Medicine 18:75-80.

Rosenman RH, Brand RJ, Sholtz RI, Friedman M. (1976) Multivariate prediction of coronary heart disease during 8.5 year follow-up in the Western colaborative group study. American Journal of Cardiology 37:903-910.

Roter D. (1977) Patient participation in the patient-provider interaction: The effects of patient question asking on the quality of interaction, satisfaction and compliance. Health Education Monograph 50:1-315.

Rowland T. (1993) Heartfelt Support. Nursing Times Oct 6, 89:(40):30-32.

Royal College of Nursing. (1989) Into the nineties: promoting professional excellence. London, RCN.

Royal College of Physicians of London. (19:76) Prevention of coronary heart disease. Journal of the Royal College of Physicians 10:(3):1-63.

Ruberman W, Weinblatt E, Goldberg JD, Chaudhary B. (1984) Psychosocial influences on mortality after myocardial infarction. New England Journal of Medicine 311:55.

Sackett DL, Snow JC. (1979) The magnitude of compliance and non-compliance. In RB Haynes (ed) Compliance in Health Care, Baltimore. Johns Hopkins University Press pp 11-22.

Savageau JA, Stanton BA, Jenkins CD, Klein MD. (1982) Neuropsychological dysfunction following elective cardiac operation. II a six-month reassessment. Journal of Thoracic Cardiovascular Surgery 84:595-600.

Scandinavian Simvastatin survival study (4S) group. (1994) Randomised trial of cholesterol lowering in 4444 patients with coronary heart disease. Lancet 344:1384-1389.

Scalzi C, Burke L. (1982) Education of the patient and family, In Underhill S, Sivarajian E et al. (eds) Cardiac Nursing, Lippincott, Philadelphia.

Scalzi C, Drakup K. (1978) Sexuality of coronary patients. Heart Lung 7:840.

Scottish Office Home and Health Department. (1994) The Scottish diet, report of a working party of the chief Medical Officer for Scotland, HMSO.

Serruys PW, Strauss BH, Beatt KJ et al. (1991) Angiographic follow up after placement of a self-expanding coronary artery stent. New England Journal of Medicine 324:13-14.

Shafer KN, Sawyer JR, McCluskey AM et al. (1979) Medical and Surgical Nursing, London, Mosby.

Shaw LW. (1981) Effects of a prescribed supervised exercise program on mortality and cardiovascular morbidity in patients after a myocardial infarction. The National Exercise and Heart Disease Project. American Journal of Cardiology 48:39-46.

Shaw PJ, Bates D, Cartlidge NEF. (1985) Early intellectual dysfunction following coronary bypass surgery. British Medical Journal 291:1384-1387.

Shea S, Ottman R, Gabrieli C, Stein Z, Nichols A. (1984) Family history as an independent risk factor for coronary artery disease. Journal of the American College of Cardiology 4:(4):793-801.

Shekelle RB, Gale M, Ostfeld AM, Paul O. (1983) Hostility, risk of coronary heart disease and mortality. Psychomatic Medicine 45:109.

Shephard RJ. (1981) Ischaemic heart disease and exercise. London, Croon Helm.

Shewry MC, Smith WC, Tunstall-Pedoe H. (1992) Variation in coronary risk factors by Social Status: results from the Scottish Heart Health Study. British Journal of General Practice 42:(363):406-410.

Shipley MJ, Peacock SJ, Marmot MG. (1991) Does plasma cholesterol concentration predict mortality from heart disease in elderly people? Eighteen year follow-up in the Whitehall Study. British medical Journal 303:89-91.

Shortridge LM, Lee EJ. (1980) Introduction to nursing practice. New York: McGraw-Hill.

Siegel D, Grady D, Browner WS, Hulley SB. (1988) Risk factor modification after myocardial infarction. Annals of Internal Medicine 109:3:213-8.

Singh RB, Singh NK, Rastogi SS et al. (1993) Effects of diet and lifestyle changes on atherosclerotic risk factors after 24 weeks in the Indian Heart Diet Study. American Journal of Cardiology 71:1283-1288.

Sirles AT, Selleck CS. (1989) Cardiac disease and the family: impact, assessment, and implications. Journal of Cardiovascular Nursing 3:(2):23-32.

Sivarajan ES Newton KM, Almes MJ, Kempf TM, Mansfield LW, Bruce RA. (1983) Limited effects of outpatient teaching and counselling after myocardial infarction: a controlled study. Heart Lung 12:65-73.

Smith CE. (1987) Patient teaching: It's the Law. Nursing: July:67.

Smith JP. (1979) The challenge of health education for nurses in the 1980's. Journal of Advanced Nursing 4:531-543.

Smith PLC, Treasure T, Newman SP et al. (1986) Cerebral consequences of cardiopulmonary bypass. Lancet 12:823-825.

Smith WCS, Kenicer MB, Tunstall-Pedoe H, Clark EC, Crombie IK. (1990) Prevalence of coronary heart disease in Scotland: Scottish Heart Health Study. British Medical Journal 297:329-330.

Smith WCS, Lee AJ, Crombie IK, Tunstall-Pedoe H. (1990) Control of blood pressure in Scotland: The rule of halves. British Medical Journal 300:981-983.

Snowden CB, McNamara PM, Garrison RJ, Feinleib M, Kannel WB, Epstein FH. (1982) Predicting coronary heart disease in siblings - a multivariate assessment. American Journal of Epidemiology 115:217-22.

Sokolor M, McIlroy MB, Cheitlin MD. (1990) Coronary artery disease. In: Clinical Cardiology. Norwalk Ct. Appleton & Lange p.145.

Spadero DC, Robinson LA, Smith LT. (1980) Assessing readability of patient information materials. American Journal of Hospital Pharmacy 37:215-221.

Sparrow D, Dawber TR, Colson T. (1978) The influence of cigarette smoking on prognosis after a first myocardial infarction. Journal of Chronic Disease 31:425-432.

Spicer J. (1982) Teaching the patient. Nursing Mirror Dec 8:51-52.

Spicer J. (1982) Teaching to a plan. Nursing Mirror Dec 15:48-49.

Spielberger CD. (1972) Trends in theory and research on anxiety. In CD Spielberger (Ed), Anxiety: Current Trends in Theory and Research, Vol.1. New York, Academic Pres.

Spielberger CD. (1983) Manual for the STAI II Administration, scoring and norms. Palo Alto, CA. Consulting Psychologists Press.

Spielberger CD, Gorsuch RL, Lushene REl (1970) Manual of the state trait anxiety inventory. Palo Alto, CA. Consulting Psychologists Press.

Spielberger CD, Gorsuch RL, Lushene RE. (1983) Manual for the state trait anxiety inventory. Palo Alto, CA. Consulting Psychologists Press.

Squires RW, Gau GT, Miller TD et al. (1990) Cardiovascular rehabilitation: status 1990. Mayo Clinic Procedures 65:731-755.

Stamler J. (1985) Coronary heart disease: doing the "right things". New England Journal of Medicine 312:1053-1055.

Stamler J, Rose G, Stamler R, et al. (1989) Intersalt: study findings - public health and medical care implications. Hypertension 14:570-577.

Stanfield V. (1987) Perioperative education: changing to meet short-stay needs. Journal of Post Anaesthetic Nursing 2:(2):74-77.

Stanton BA, Jenkins CD, Savageau JA, et al. (1984) Perceived adequacy of patient's education and fears and adjustments after cardiac surgery. Heart Lung 13:525-531.

Steele JM, Ruzicki D. (1987) An evaluation of the effectiveness of cardiac teaching during hospitalization. Heart Lung 16:(3):306-311.

Stern MJ, Cleary P. (1981) National exercise and heart disease project. Psychosocial changes observed during a low-level exercise program. Archives of Internal Medicine 141:1463-1467.

Strecher JM, DeVellis BM, Becher MH, Rosenstock IM. (1970) The role of self-efficacy in achieving health behaviour change. Health Education Quarterly 14:73-92.

Strehlow MS. (1983) Education for Health. Lippincot Nursing Series. London, Harper & Row p.6.

Sullivan HS. (1953) Conceptions of modern psychiatry. New York, WW Norton.

Svendsen KH, Kuller LH, Martin MJ, Ockene JK. (1987) Effects of passive smoking in the MRFIT. American Journal of Epidemiology 126:783-795.

Syred MEJ. (1981) The abdication of the role of health education by hospital nurses. Journal of Advanced Nursing 6:27-33.

Tarsitano B, King I. (1982) The effect of structured and unstructured pre-operative teaching. Nursing Research 31:(6):324-327.

Taylor CB, Berra K. (1993) Psychosocial factors in rehabilitation. Journal of Cardiopulmonary Rehabilitation 13:78-79.

Teasdale K. (1993) Information and anxiety: A critical reappraisal. Journal of Advanced Nursing 18:1125-1132.

Tenkate LP, Boman H, Daiger SP, Motulsky AG. (1982) Familial aggregation of coronary heart disease and its relation to known genetic risk factors. American Journal of Cardiology 50:945-953.

Thomas GW, Mann JI, Beilin LJ,Ledingham JG. (1977) Hypertension and raised serum lipids. British Medical Journal 24 Sept:805-807.

Tilley JD, Gregor FM, Thiessen V. (1987) The nurse's role in patient education: incongruent perceptions among nurses and patients. Journal of Advanced Nursing 12:291-301.

Tongas PN, Goodkind SD, Patterson JL. (1979) Discrimination of longterm successful and unsuccessful quitters. Paper presented at the American Psychological Association Meeting.

Tortora G, Anagnostakos N. (1989) Principles of anatomy and physiology. New York, Harper and Row.

Tosti DT, Ball JR. (1969) A behavioural approach to instructional design and media selection. Audio Visual Communication Review 17:5-25.

Treece EW, Treece JW. (1986) Elements of research in nursing. St Louis, CV Mosby.

Trusswell A. (1985) Reducing the risk of coronary heart disease. British Medical Journal 291:34-37.

Tunstall-Pedoe H, Smith WCS, Tavendale R. (1989) How often that high graphs of serum cholesterol. Fundings from the Scottish Heart Health and Scottish MONICA Studies. Lancet i:540-542.

UKCC (1986) Project 2000: A new preparation for practice, UKCC, London.

Valle BK, Lemberg L. (1991) Cardiovascular rehabilitation update. Heart Lung 20:(3):312-315.

van Brussel BL, Plokker HW, van den Bergh EJ. (1992) Are the longterm results of venous aorto-coronary bypass procedures really so bad? A prospective 13 year long study of 428 patients. NED Tijdschr-Geneeskd 136:(42):2072-2077.

van Itallie TB. (1985) Health implications of overweight and obesity in the United States. Annals of Internal Medicine 103:983-988.

Vermeulen A, Lie KI, Durrer D. (1983) Effects of cardiac rehabilitation after myocardial infarction: changes in coronary risk factors and longterm prognosis. American Heart Journal 105:798-801.

Veterans Administration Coronary Artery Bypass Surgery Cooperative Study Group (1984) Eleven years survival in the veterans as administration randomised trial of coronary bypass surgery for stable angina. New England Journal of Medicine 311:1333-1339.

Vlietstra RE, Kronmal RA, Oberman A, Frye RL, Killip T. (1986) Effect of cigarette smoking on survival of patients with angiographically documented coronary artery disease: a report from the CASS registry. JAMA 255:1023-1027.

Waitzkin H. (1985) Information giving in medical care. Journal of Health and Social Behaviour 26:81-101.

Walker SN, Volkan K, Sechrist S, Pender N. (1988) Health-promoting life styles of older adults: comparisons with young and middle-aged adults, correlates and patterns. Advances in Nursing Science 11:76-90.

Wallace L. (1985) Surgical patients preferences for preoperative information. Patient Education and Counselling 7:(4):377-387.

Wallwork J, Potter B, Caves PK. (1978) Return to work after coronary artery surgery for angina. British Medical Journal 12:1680-1681.

Warrington K, Gottlieb L. (1987) Uncertainty and anxiety of hysterectomy patients during hospitalisation. Nursing Papers 19:(1):59073.

Wassenaar W, Lancee WJ, Galloon S, Gale GD. (1977) The measurement of anxiety in the pre-surgical patient. Brisish Journal of Anaesthesia 49:(6):605-8.

Watkins LO, Weaver L, Odegaard V. (1986) Preparation for cardiac catheterisation: tailoring the content of instruction to coping style. Heart Lung 15:(4):382-389.

Weinsier RL, Johnston MH, Doleys DM, Bacon JA. (1982) Dietary Management of Obesity: evaluation of the time-energy displacement diet in terms of its efficacy and nutritional adequacy for long-term weight control. British Journal of Nutrition 47:367.

Weis OF, Spiwatanakul K, Weintraub M, Lasagna L. (1983) Reduction of anxiety and post-operative analgesic requirements by audiovisual instruction. Lancet 1:(8314-8315):43-44.

West KM, Kalbfleisch JM. (1971) Influence of nutritional factors on prevalence of diabetes. Diabetes 20:99-108.

Westaby S, Sapsford RN, Bentall HH. (1979) Return to work and quality of life after surgery for coronary artery disease. British Medical Journal 2:1028-1031.

WHO. Monica Project (1988) Geographical variation in the major risk factors of coronary heart disease in men and women aged 35-64. World Health Statistics Quarterly. 41:115-140.

Wilhelmsen L. (1983) Cessationof smoking after myocardial infarction: effects on mortality after ten years. British Heart Journal 49:416-422.

Wilhelmsen C, Vein JA, Elmfeldt D, Tibblin G, Wilhelmsen L. (1975) Smoking and myocardial infarction. Lancet 1:415-420.

Willett WC, Green A, Stampfer MJ, et al. (1987) Relative and absolute excess risks of coronary heart disease among women who smoke cigarettes. New England Journal of Medicine 317:(21):1303-1309.

Williams D. (1986) Preoperative Patient Education: In the Home or in the Hospital. Orthpaedic Nursing 5:(1):37-41.

Williams-Barnett J. (1979) Stress in Hospital: Patients' psychological reactions to illness and health care. Edinburgh. Churchill Livingstone.

Williams JGL, Jones JR, Williams B. (1975) The chemical control of preoperative anxiety. Psychophysiology 12:46-49.

Williams RB, Haney TL, Lee KL. (1980) Type A behaviour, hostility and coronary atherosclerosis. Psychosomatic Medicine 42:539-549.

Wilson-Barnett J. (1981) Assessment of recovery: with special reference to a study with postoperative cardiac patients. Journal of Advanced Nursing 6:435-445.

Wing RR, Jeffrey RW, Burton LR. et al (1992) Change in waist-hip ratio with weight loss and its association with change in cardiovascular risk factors. American Journal of Clinical Nutrition 55:1086-1092.

Wong JSJ, Pearson DWM, Murchison LE, et al. (1991) Mortality in diabetes mellitus: experience of a geographically defined population. Diabetic Medicine 8:(2):135-139.

Woody AF, Ferguson S, Robertson HLH, et al. (1984) Do patients learn what nurses say they teach? Nursing Management 15:(12):26-29.

Wolf S. (1966) Mortality from myocardial infarction in Roseto JAMA 11:142.

WHO expert committee. (1982) Prevention of coronary heart disease. WHO Technical Report Series No. 678.

World Health Statistics Annual (1989) Geneva.

World Health Statistics Annual (1987) Geneva.

Wright L. (1988) The Type A behaviour pattern of coronary heart disease. American Psychologist 43:(1):2-14.

Younger J, Marsh KJ, Grap MJ. (1995) The relationship of health locus of control and cardiac rehabilitation to mastery of illness-related stress. Journal of Advanced Nursing 22:294-299.

Zander K. (1978) Practical manual for patient teaching. London, Mosby.

Zigmond AS, Snaith RP. (1983) The hospital anxiety and depression scale. ACTA Psychiatrica Scandinavia 67:361-370.

Zylinski J. (1993) Patient education: postoperative needs. Nursing Standard 8:(6):31-35.